BECAUSE THE FIRST STEP DETERMINES THE LAST

MPS 320™ Microwave Digestion System

A Reference Notebook of Microwave Applications

PerkinElmer®
For the Better

INTRODUCTION

At PerkinElmer, we understand that sample preparation is one of the most critical steps in the analytical process. Often accounting for 60% of your analytical timetable, it has a fundamental impact on laboratory throughput and analytical performance. Any errors within the sample preparation process will undermine the quality of your data at all subsequent stages of your analysis. Great results begin with good preparation, and our MPS 320™ microwave digestion system delivers the clean, clear solutions you need for reliable results.

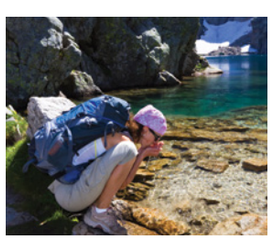
The MPS 320 system is ideal for difficult environmental and common industrial applications while also providing high performance for a wide range of digestion needs.

This document is intended to provide you with the tools you need to quickly and efficiently develop digestion methods for your unique sample preparation needs.

These applications represent starting points for successful digestions and may require modification for your specific samples.

PerkinElmer MPS 320 microwave digestion system.

The Science of Great Preparation.

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DIGESTION OVERVIEW

The process of sample digestion is the chemical reaction of the sample with reagents, typically strong acids, in an effort to digest or break down the sample and leave analyte ions suspended in solution. The sample and reagents are heated in an appropriate container to speed the reaction. In many cases, the energy threshold requirements for reaction cannot be met by the temperatures reached using open-vessel digestion. In addition, open-vessel digestion techniques also may lead to a loss of volatile analytes resulting in poor analyte recoveries. Closed-vessel microwave-assisted digestion creates a pressurized, high-temperature environment by containing the gases produced during sample heating and allowing the sample to reflux. The result is faster, more complete digestion than possible at atmospheric pressure.

During digestion, there is always some vessel-to-vessel temperature variation resulting from microwave field flux variabilities, differing microwave absorption rates among the samples, and chemical reactions during digestion of the sample. The PerkinElmer MPS 320 microwave digestion system, is designed to minimize these effects, and consequently, any remaining variation in vessel temperatures does not compromise the efficacy and repeatability of the sample digestion.

The MPS 320 system accurately measures the temperature of each vessel, ensuring that the temperature of any individual vessel never exceeds the target temperature in the method. This feature allows setting high digestion temperatures while ensuring that the vessel and sample remain under the method limits.

During method development, it is beneficial to design the method so it uses an appropriate mass-to-digestant volume ratio, one that will deliver the detection limits needed during subsequent instrumental analysis. Utilizing the correct mass-to-digestant volume ratio will also increase the lifetime of the vessels and related consumables, prevent uncontrolled reactions and venting of vessels. Samples with high organic carbon should be treated with appropriate caution as they tend to generate higher pressures during digestion.

The process of sample digestion commonly results in the evolution of gas from the sample. Samples with high carbon content and metal oxides will evolve the most gas, and for samples of this type, the sample weights should be kept very small until the performance and parameters of the digestion are well known. In addition, most digestion reactions are exothermic in nature; this “self-heating” can rapidly cause the target temperature to be overrun, resulting in the pressure within the vessel to exceed the desired limit. Once the heating, gas evolution, and reaction profile of the sample have been determined, sample weights can be gradually increased, if needed.

Use of Hydrofluoric Acid (HF)

While the use of HF for sample digestion can be very beneficial, and in some cases is the only effective reagent, using HF requires careful consideration and oversight as there are a number of safety and usability impacts. HF will dissolve glass and quartz causing damage to nebulizers, spray chambers, injectors, or any other wetted items in the instrument sample introduction system. Solutions to this include HF distillation and HF neutralization with a base or use of an HF-resistant sample introduction system which are available for most instruments.

HF is typically used in the digestion of silicates, rare-earth metal alloys, geological samples, and occasionally for ceramics and polymers that will not respond to more typical digestion acids.

The advantage of HF is that it has a vapor pressure similar to water, so does not cause excessive pressure during digestion. HF also does not typically form molecular species that cause interferences during ICP-MS analysis.

However, HF has several disadvantages. HF is very dangerous in contact with skin or when the vapors are inhaled. A complete understanding of HF hazards is required prior to use. When HF is used for digestion, it must be distilled, neutralized or complexed prior to use in any instrument sample introduction system that contains glassware (see "Acid Evaporation" and “Complexation of HF” in the Supplemental section). Additionally, HF will form compounds with Group I and II metals which can precipitate as a fine cloudy haze. These precipitates can be brought back into solution by complexing with boric acid in a secondary digestion.

For digesting samples with HF, the following should be considered:

1. What are the analytes of interest and do they require HF to be freed from their matrix?
2. Is the sample introduction system on the analytical instrument HF compatible?
3. Does the lab have the capacity to perform two digestions for every sample (one for the sample, a second shorter one for complexing the HF)?
4. Is the infrastructure needed for the safe handling and response to an HF exposure present?

DIGESTION OVERVIEW *continued...*

The typical process of using HF for digestion is as follows:

1. There is rarely a need for more than 1 - 2 mL of HF (49%) per sample. The balance of the reagents (around 8 - 10 mL) will commonly be nitric acid, hydrochloric acid (HCl) acid or a blend of the two.
2. HF can be added first or last to the sample in the vessel.
3. The normal procedure to re-dissolve the fluoride salts is to add 1 gram of boric acid for every 1 mL of 49% HF, close the vessel, and heat to 190 °C for 10 minutes.
4. Alternatively, evaporation units could be used to change the matrix by distilling off HF and re-dissolving the residue with HNO_3 and HCl.

Digestion Tips

The following tips are general guidelines and outline considerations and responses to common digestion challenges.

1. When adding the sample, it is important to ensure that it is adequately surrounded by the digestion mixture. In general, there are two steps, the first is to make sure that most of the sample has reached the bottom of the digestion vessel. After the sample is added to the vessel, lightly tap the side and bottom of the vessel to bring the sample down. The second step is to ensure that the sample is fully immersed in the vessel. Gently swirling the vessel will help to incorporate the sample in the vessel.
2. Before the digestion is carried out, a pre-digestion venting step is recommended to be employed. This is critical when adding hydrogen peroxide to the acid mixture. During this step, the vessels should be left uncapped and under a fume hood for 10-15 minutes prior to capping and digesting. This will allow the most violent part of the reaction to be initiated in the fume hood and will reduce the chance of venting during sample digestion.
3. During digestion, pressure is generated as part of the heating and decomposition of the sample. If vessel pressure during digestion is excessive, reduce the sample weight or the temperature of the method.
4. Sample decomposition during digestion can be strongly exothermic and can occur rapidly. If vessel pressure or temperature rises too quickly, reduce the sample weight and increase the ramp time of the step where this occurs. A longer ramp allows the microwave to more easily discern a strong exothermic event from the normal heating ramp and provides additional time for the system to respond to and control the event.
5. Successful digestion of a sample is a combination of chemistry, heating, and time. Raising the temperature of the sample and reagents increases the rate of reaction and therefore shortens the digestion time. High temperatures are also needed to crest the reaction threshold and begin the digestion process, and enough time is needed for the reaction to run to completion. If a sample is not completely digested, the ratio of sample to acid may need to be adjusted and the analyst should be sure that no insoluble precipitates are forming. Raising the temperature or extending the run time may lead to excessive vessel pressures and failure of components.
6. Without the use of HF, samples containing silicon and silicates will typically have this material remaining after digestion. Most geological samples and a number of plant samples contain silicon and silicate material. Most analytes of interest can be successfully extracted without the use of HF, where the remaining silica can be separated through filtration or centrifugation.
7. To dissolve silicon and silicates, HF is included in the acid mixture used for digestion. After the digestion is complete, there may be remaining fluoride compounds that can appear as cloudy white or milky material. A “Complexation of HF” step (located in the Supplemental section) will bring these solids back into solution as well as complex the HF. The last step is to add a base to neutralize the solution so that it can be used with sample introduction systems made of glass.
8. If performing digestion in preparation for arsenic (As) analysis by Hydride-AA or Hydride-ICP-OES, be aware that the use of nitric acid alone may not place the As in an appropriate oxidative state after digestion. If the oxidative state of As is a concern, the use of H_2O_2 should be employed to change the oxidative state of As to As V.
9. The length of the digestion can be critical to its success. Ending a digestion too quickly may result in incomplete digestion. The default limit for digestion time is 75 minutes. This digestion time includes all ramp, hold, and cooling times. If additional time is required, login to the MPS 320 as “admin”, enter “Setup” and increase the maximum digestion time (listed in minutes) to a value slightly larger than is expected to be needed.

DIGESTION OVERVIEW *continued...*

10. Many platinum group metals and metal alloys can be very effectively digested in a solution combining three parts HCl with one part HNO_3 by volume (commonly referred to as aqua regia). Note that the reaction of the solution with metals can be vigorous, and the aqua regia evolves a lot of gas. The vapor pressure and the evolution of gas from aqua regia will raise the digestion pressure significantly. This should be carefully considered when choosing the amount of sample and the target digestion temperature. The use of aqua regia will also increase the amount of NO_x contamination of the vessels which permeate into the walls of the TFM vessels, and as concentration increases, this will lower the melting point of of the TFM significantly if the vessels are not baked on a regular basis. The inverse solution (three parts HNO_3 to one part HCl by volume) is useful for organic samples.
11. To boost the oxidative strength of the digestion, hydrogen peroxide (H_2O_2) can be added to a nitric acid digestion. Doing so will also convert spent oxides of nitrogen back to nitric acid, thereby boosting the total acidity of the reagents during digestion. This is at the expense of increased digestion pressure and the potential to enhance rapid exothermic sample reactions. Excessive vessel pressures can be avoided by adding a pre-digestion venting step as described in tip #2.
12. Nitric acid is the most commonly used digestion reagent. It does not generate interferences or spectral difficulties on most inorganic analytical instruments and is compatible with nearly all sample introduction systems for atomic absorption (AA), inductively coupled plasma optical emission spectroscopy (ICP-OES), and inductively coupled plasma mass spectrometry (ICP-MS) instruments. Nitric acid is readily obtainable in high-purity form, reducing baseline contamination.
13. Hydrochloric acid is a strong alternative to nitric acid and is typically used when digesting metal alloys, oxides, or ceramic samples that do not respond well to nitric acid. Using hydrochloric acid can generate highly corrosive gas that can potentially cause damage to instrumentation, spectral interferences on ICP-OES and polyatomic interferences in ICP-MS analysis. Chloride salts, such as silver chloride, can form during digestion which may affect analyte recovery. The addition of hydrochloric acid is also recommended when mercury is one of the analytes of interest. Adding 1 mL of concentrated hydrochloric acid (35-37%) to the digestion will complex the mercury and prevent it from volatilizing. Like nitric acid, hydrochloric acid is readily available in high-purity form. Please note that the purity of HCl tends to be lower than that of HNO_3 and tends to have much higher concentrations of trace metals.
14. Sulfuric acid, H_2SO_4, is a very powerful reagent that is sometimes used in digesting plastic samples and stubborn organic samples with multiple or cyclic bonds. However, in most cases, the benefits gained using H_2SO_4 in digestion are greatly overshadowed by the analytical challenges that it introduces. Once digested, the sample would need to be diluted significantly since vaporization of the acid is not possible. In addition, the sample introduction of ICP-OES and ICP-MS systems would be severely compromised through factors such as viscosity and memory effects. If H_2SO_4 is used, matrix matching to the sample is absolutely essential.
15. Phosphoric acid is sometimes used in the digestion of many types of geological or ore samples. However, like sulfuric acid, phosphoric acid has many potential interferences and will affect the viscosity of the final sample solution. Phosphoric acid has extended rinse-out times and can form a residue on ICP-OES and ICP-MS torches, injectors, as well as ICP-MS cones. Phosphoric acid is expensive in its purest form.

Vessel Cleaning Between Digestions

If the vessels are not conditioned on a regular basis, the gases will accumulate and reduce the microwave transparency of the vessel itself which will cause the microwave to inaccurately measure the temperature of the sample. In addition, it can also cause the vessel to be directly heated by the microwave energy applied. This can result in uneven heating of samples during digestion and potentially cause damage to the vessel itself.

It is suggested that at the end of each sample run the vessels should be scrubbed with phosphate-free, trace-metal appropriate soap and water using a plastic or plastic-coated brush. Note that the tip of the brush should contain a wool ball or other cushioning to prevent scratches on the TFM vessel or liner. The vessels should never be scraped with a hard tool to remove depositions.

After scrubbing, the vessels should be rinsed 3 to 5 times with deionized water and baked in an oven at 280 °C. The length of baking time depends upon the contamination of the vessel.

During normal operation, all microwave vessels will accumulate nitrogen dioxide (NO_2) gas in the TFM walls. If there is significant yellowing or orange-browning of the vessel walls, it is recommended to condition the vessels overnight. If the vessels have a little yellowing, then the conditioning time can be reduced to 2 to 6 hours. If there is no visible yellowing of the vessel walls, it is recommended to condition for 30 min to 1 hour.

If the contamination cannot be removed through standard cleaning, then it is suggested to follow the "Vessel Cleaning/Conditioning" method located in the Supplemental section of this manual. After the method is applied and the results are satisfactory, scrub and wash the vessels with DI H_2O and condition in an oven as previously described.

DIGESTION OVERVIEW *continued...*

Material Remaining in Vessels

Care must be taken to ensure that no material remains inside the digestion vessels adhering to the walls. This is an especially common issue in samples with high organic carbon (coals, oils, etc). Sample adhering to the walls will cause a variety of problems, including poor analyte recoveries, contamination of the next sample or cause localized heating of the vessels. There are typically two reasons for material to remain after digestion. The first is that the maximum temperature and length of time at the maximum temperature in the method were inadequate to completely digest the sample. If additional time and temperature are unable to digest the sample, then it is likely that the mass-to-digestant ratio needs to be adjusted. Please see the Digestion Tips section for insight on how to attack the residue and enable effective cleaning of the vessel.

Precautions

Microwave ovens are not spark-proof devices. As such, caution must be taken when preparing samples for microwave digestion that are fine powders or that may be prone to spontaneous reaction or ignition. If these samples remain on the sides of the vessel, inside the vessel, or float on top of the reagents as a mass, there is the possibility of direct microwave interaction and generation of a spark. This spark initiates ignition of the remaining sample which can damage the vessel and/or the MPS 320 system itself. While the MPS 320 is designed to capture this energy and reduce danger to personnel and the lab environment, preventing an event of this nature is important.

When handling fine powder or reactive samples, it is important that the sample be completely rinsed to the bottom of the vessel and either well mixed with the reagents or completely submerged by the reagents. Placing the sample into the vessel first and then using the reagents to wash down the walls of the vessel during addition is a common solution. Other methods include tapping, swirling, or using an anti-static gun. Additionally, PerkinElmer offers PTFE weigh boats that, after weighing the sample, can be placed into the vessel and remain there during digestion.

When heating samples in the microwave, any microwave energy not absorbed by the samples or reagent will either be reflected back to the magnetrons, resulting in less efficient operation, or will be absorbed by a part of the microwave system not intended to be heated. For this reason, each published microwave method indicates that the maximum power of the first step should be reduced when using fewer than the maximum number of vessels.

In order to balance the microwave and achieve even heating of the vessels, the same sample types should be used in all vessels. If the maximum number of vessels are not utilized, the oven should be loaded evenly in groups of four vessels, meaning the minimum number of vessels loaded into the microwave for a run should be four. If more vessels are required, four more should be added so that the load is properly balanced and the microwaves are evenly distributed.

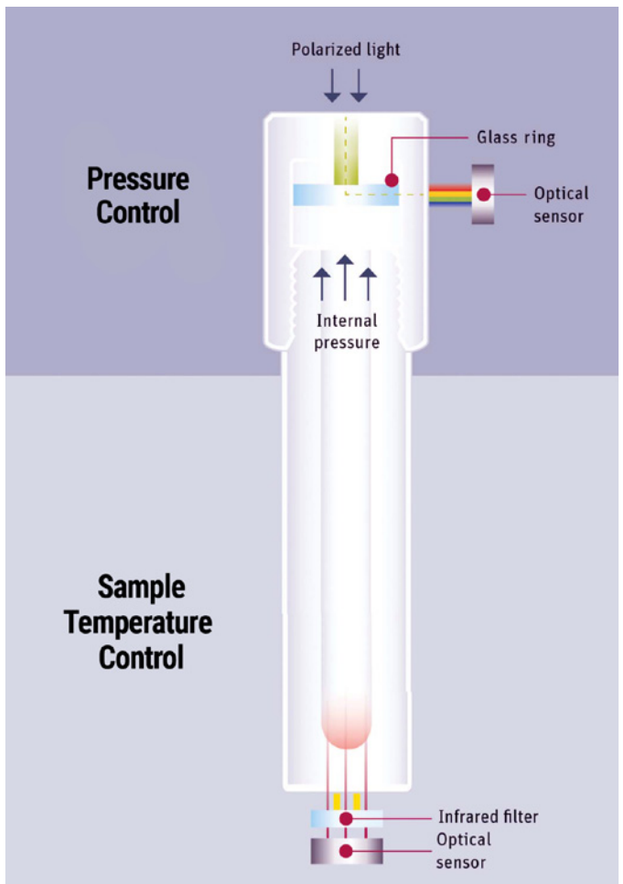
A LOOK INSIDE

Temperature and Pressure Control

To ensure safe, accurate and reproducible digestions, the MPS 320 microwave digestion system employs sophisticated Direct Pressure Control™ (DPC)™ and Direct Temperature Control™ (DTC)™ technologies. With these technologies, the MPS 320 is able to deliver outstanding reaction and digestion control.

DTC eliminates the external temperature interference emitted by the surface of the digestion vessel, allowing the accurate measurement of the internal sample temperature within each digestion vessel. To ensure accurate control on any application, DTC comes standard on all vessel types.

DPC measures sample pressure as a shift in the polarization of a beam of light sent through a prism and glass ring in the vessel cap. This polarization shift is a result of the internal vessel pressure applied directly to the glass ring. DPC and DTC provide sensing with no special assembly required, no fragile or expensive probes to insert, and no physical connections are required.



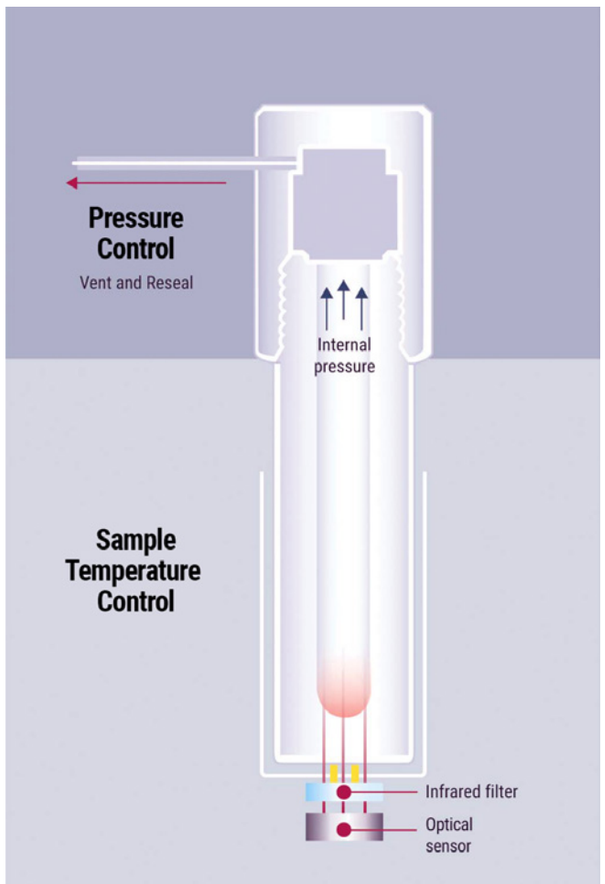
Auto-venting Principle

For optimal control over your digestion, the MR-85 vessels of the MPS 320 system feature auto-venting technology, which provides controlled venting and resealing when pressure exceeds the preset limit. This unique auto-venting design allows digestion to continue when preset pressure is reached by maintaining the pressure needed to reach appropriately high temperatures. These MR-85 vessels allow you to safely digest higher initial sample weights as compared to closed vessels, perfect for organic samples that are digested at up to 210 °C.

Auto-venting technology helps eliminate the risk of over-pressurizing the sample, increasing microwave safety. Plus, the system's unique venting indicator technology alerts you of any venting event, no matter how mild.

The MPS 320 offers two types of venting indicators:

- Through a ready-to-work, calibration-free NO_x sensor that triggers a venting signal when the NO_x exceeds a preset value;
- The unique ability to examine venting tubes on each vessel to determine which vessel vents.



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ENVIRONMENTAL DIGESTION METHODS

Asphaltite

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	2 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	35	5	5	90
2	200	35	3	35	100
3	50	35	1	20	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	3 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	220	80	3	30	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Bark

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	3 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	3	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HCl (35-37%)	3 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	3	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Bauxite

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	5 mL
H_3PO_4 (85%)	3 mL
HF (49%)	2 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	2	90
2	210	30	3	30	100
3	50	30	1	20	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_3PO_4 (85%)	3 mL
HF (49%)	2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	2	80
2	230	60	3	20	100
3	50	60	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Calcites

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	210	35	3	40	100
3	50	35	1	20	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	230	80	5	30	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

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ENVIRONMENTAL DIGESTION METHODS

Cement

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HCl (35-37%)	3 mL
HF (49%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	200	35	3	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	4 mL
HF (49%)	2 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	220	80	5	20	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Coal Fly Ash

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	3 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	200	35	3	25	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	3 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	3	80
2	220	80	3	20	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Dolomites

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
HCl (35-37%)	3 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	200	35	3	40	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	5 mL
HCl (35-37%)	2 mL
HF (49%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	120	60	3	3	90
2	220	80	3	35	100
3	50	80	1	15	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Feldspar

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	8 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	10 mL
HF (49%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Fish Liver

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	2.5 mL
H_2O_2 (30%)	3.5 mL
DI Water	4 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	35	15	50	90
2	50	35	1	15	0
3	0	0	0	0	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Fluorite

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_3PO_4 (85%)	1 mL
H_3BO_3	500 mg

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	9 mL
H_3PO_4 (85%)	0.5 mL
H_3BO_3	500 mg

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	2	5	80
2	200	60	2	5	100
3	230	60	2	25	100
4	50	60	1	30	0

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Garnet

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	60	3	45	100
3	50	60	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Glass Fiber Filters (Whatman)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HF (49%)	4 mL
-	

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	3	90
2	180	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HF (49%)	3 mL
HCl (35-37%)	1 mL

Sample Weight

0.680 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	40	5	10	60
2	200	40	5	25	60
3	50	40	1	10	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Iron Ores

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

H_2SO_4 (98%)	4 mL
H_3PO_4 (85%)	4 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	3	90
2	220	30	5	35	100
3	50	30	1	20	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

H_2SO_4 (98%)	5 mL
H_3PO_4 (85%)	5 mL
HF (49%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	3	80
2	240	60	5	20	100
3	50	60	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Iron Ores using Aqua Regia

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	6 mL
HNO_3 (70%)	2 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	35	3	35	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL
HF (49%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	80	3	20	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Ironstone

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	8 mL
HNO_3 (70%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	3	90
2	200	35	3	35	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-	
-	

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	10 mL
HNO_3 (70%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	3	80
2	220	80	3	20	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Kaolinite

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

H_2SO_4 (98%)	5 mL
HF (49%)	5 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	3	90
2	220	30	5	35	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

H_2SO_4 (98%)	6 mL
HF (49%)	6 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	3	80
2	240	60	5	20	100
3	50	60	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Leather

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	5 mL
HCl (35-37%)	2 mL
H_2SO_4 (98%)	3 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	15	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	5 mL
HCl (35-37%)	1 mL
H_2SO_4 (98%)	1 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	4	5	90
2	210	60	5	20	100
3	50	60	1	15	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Limestone

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	8 mL
HF (49%)	2 mL
-	

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	35	3	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-	
-	
-	

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	2 mL
HCl (35-37%)	6 mL
HF (49%)	2 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	4	4	80
2	220	80	7	30	100
3	50	80	4	10	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Phosphate Rocks

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	3	90
2	200	30	3	35	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	12 mL
HF (49%)	3 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	3	80
2	220	60	3	20	100
3	50	60	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Platinum Ores

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

H_2SO_4 (98%)	4 mL
H_3PO_4 (85%)	4 mL
HNO_3 (70%)	1 mL
HF (49%)	1 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	3	90
2	210	30	3	45	100
3	50	30	1	20	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-	
-	
-	
-	

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

H_2SO_4 (98%)	4 mL
H_3PO_4 (85%)	4 mL
HNO_3 (70%)	1 mL
HF (49%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	3	80
2	230	60	5	30	100
3	50	60	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Refinery Ash

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	2 mL
HF (49%)	1 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	35	3	35	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-	
-	
-	

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HCl (35-37%)	3 mL
HF (49%)	1 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	80	5	20	100
3	50	80	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Secondary Fuel / Plastic Waste

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

H_2SO_4 (98%)	7 mL
HNO_3 (70%)	5 mL
HF (49%)	1 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	190	80	5	10	100
3	240	80	5	30	100
4	50	80	1	45	0

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Sediment (U.S. EPA 3051)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	3 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	30	1	10	100
2	50	30	1	15	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	3 mL

Sample Weight

0.500 g (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	15	5	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	3 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	60	5	5	100
2	50	60	1	25	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Sewage Sludge (DIN EN 13346)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	180	30	5	25	100
2	50	30	1	15	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g (dry)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	180	25	25	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	180	60	5	25	100
2	50	60	1	25	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Sewage Sludge (U.S. EPA 3051A)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	30	5	5	100
2	50	30	1	15	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	25	10	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	60	5	5	100
2	50	60	1	30	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Shredded Paper

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	3	90
2	180	30	2	5	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	3	80
2	180	60	2	5	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Slag

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	6 mL
HNO_3 (70%)	2 mL
HF (49%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	35	3	40	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL
HF (49%)	1 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	80	5	30	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Soil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	6 mL
HNO_3 (70%)	3 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	35	5	5	80
2	195	35	2	20	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	3 mL
HCl (35-37%)	6 mL

Sample Weight

1.000 g (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	20	5	100
2	195	10	20	100
3	50	0	10	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	80	5	15	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Soil (U.S. EPA 3051A)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL
-

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	30	5	5	100
2	50	30	1	15	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 10 mL or
HNO_3 (70%) 9 mL and HCl (35-37%) 3 mL

Sample Weight

0.500 g (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	15	5	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL
-

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	60	5	5	100
2	50	60	1	15	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Tar

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL
H_2O_2 (30%) 2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	8	10	90
2	200	30	3	30	100
3	50	30	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL
H_2O_2 (30%) 2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	8	10	80
2	220	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

U.S. EPA 3051A

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	100
2	50	30	1	15	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	25	10	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	30	5	5	100
2	50	30	1	30	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS U.S. EPA 3052

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	3 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	180	30	5	10	100
2	50	30	1	15	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	180	25	10	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	180	30	5	10	100
2	50	30	1	30	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Waste Water (U.S. EPA 3015A)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 5 mL
-

Sample Weight

45 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	10	10	100
2	50	30	1	10	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO3 (70%) 5 mL or
HNO_3 (70%) 4 mL and HCl (35-37%) 1 mL

Sample Weight

45 mL (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	175	25	10	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 5 mL
-

Sample Weight

45 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	10	10	100
2	50	60	1	10	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Waste Water and Effluents

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL

Sample Weight

20 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	200	30	3	10	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL

Sample Weight

20 mL (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	20	5	100
2	200	10	10	100
3	50	0	10	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL

Sample Weight

20 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	200	60	3	10	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Waste Water and Effluents using Aqua Regia (DIN EN 15587-1)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	2.5 mL
HCl (35-37%)	7.5 mL

Sample Weight

20 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	145	30	5	5	90
2	180	30	3	10	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	2 mL
HCl (35-37%)	6 mL

Sample Weight

20 mL (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	20	5	100
2	180	10	10	100
3	50	0	10	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	2.5 mL
HCl (35-37%)	7.5 mL

Sample Weight

20 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	145	60	5	5	80
2	180	60	3	10	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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ENVIRONMENTAL DIGESTION METHODS

Wood Chips / Pellets

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	2 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	10	90
2	200	30	5	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	220	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS *continued...*

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FOOD AND BEVERAGE DIGESTION METHODS

Algae (Paste)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	2 mL
HF (49%)	1 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL
HF (49%)	1 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Algae (Powder or Freeze Dried)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	2 mL
HF (49%)	1 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL
HF (49%)	1 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Agar

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Animal Feed

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	2.5 mL
HCl (35-37%)	7.5 mL
HF (49%)	1 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	180	30	10	35	90
2	50	25	1	10	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL
HF (49%)	1 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	220	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Baby Food

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HCl (35-37%)	1 mL
DI Water	3 mL

Sample Weight

0.500 g (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	210	20	20	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Beer

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

2 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

4 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Bran

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	5	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	200	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Bread (Cake, Muffin, Danish, etc.)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	9 mL
H_2O_2 (30%)	1 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	5	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
-	

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	200	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Bread (Refined White, Wheat, Tortilla, etc.)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	5	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	200	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Bread (Whole Grain, Multi-Grain, Artisan, etc.)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	5	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	200	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Cannabis Tea Leaves

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	1 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	20	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Cheese

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	7 mL
HCl (35-37%)	1 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	210	20	20	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Chicken Liver

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	3	5	80
2	200	35	3	10	90
3	50	30	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

2.000 g (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	5	100
2	200	10	20	100
3	50	0	10	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Citrus

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Cocoa / Cacao

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	30	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	4 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Coconut Oil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	5	90
2	190	30	5	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	5	80
2	210	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Coffee (Bean or Ground)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	5	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	10 mL
-	

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	30	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	4 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Coffee (Beverage)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	5	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	10 mL
-	

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	30	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	4 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Corn Gluten

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	5	90
2	190	35	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 8 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	10	5	100
2	200	15	30	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	5	80
2	210	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Corn Meal

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	30	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Corn Oil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	5	90
2	190	35	5	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	220	60	5	20	100
3	50	60	1	10	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Corn Syrup

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	10	90
2	190	35	5	20	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	10	80
2	200	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Crab Paste

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	10	90
2	190	35	3	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	10	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Ethanol, 0-20% in Water (Wine, Beer, Sake, etc.)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

2 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

4 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS — Ethanol, 21-40% in Water (Scotch, Whiskey, Distilled Beverages, etc.)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

1 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	5	90
2	190	30	5	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

2 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	5	80
2	210	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS — Ethanol, 41-60% in Water (Cask-strength, Specialty Distilled Beverages, etc.)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.500 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	5	90
2	190	30	5	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

1.000 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	5	80
2	210	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Ethanol, > 60% in Water

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.150 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	5	90
2	190	30	5	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.750 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	5	80
2	210	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Fatty Acids for Animal Feed

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	10	90
2	190	35	3	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	10	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Fertilizer

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL
DI Water	5 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	145	35	5	10	80
2	200	35	5	25	90
3	50	35	0	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Fishmeal

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	40	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
-	

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	5	100
2	200	10	10	100
3	50	0	10	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	30	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Flour (Wheat, Rice, Barley, etc.)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
-	

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	190	15	20	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Food Coloring / Food Dyes

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	200	35	5	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Fruit (Dried)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
-	

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	20	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Fruit (Fresh)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.500 g (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	20	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Fruit Juice

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	4 mL
H_2O_2 (30%)	1 mL
-	

Sample Weight

5 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	10	60
2	200	35	5	15	60
3	50	35	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	4 mL
HCl (35-37%)	0.5 mL
DI Water	4 mL

Sample Weight

5 mL (dry organic matter shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	15	5	100
2	210	10	15	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL
-	

Sample Weight

4 mL

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Hemp Protein Powder

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	30	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Herbs

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL
-

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 6 mL
H_2O_2 (30%) 2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	2	15	90
2	190	60	1	10	90
3	210	60	2	15	100
4	50	60	4	10	0

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Instant Soup

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	35	5	5	100
2	200	35	5	20	100
3	50	35	0	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL

Sample Weight

5 mL (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	15	5	100
2	200	10	20	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-	
-	

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Lactose Powder

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	4 mL
HCl (35-37%)	0.5 mL
DI Water	4 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	15	5	100
2	210	10	15	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Lentil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 7 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	35	5	10	80
2	190	35	5	15	90
3	50	35	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Linseed / Flax (Kernel)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	4 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	10	5	90
2	190	30	5	10	100
3	50	30	4	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	15	5	100
2	190	10	10	100
3	50	0	10	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
-	

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Malt and Barley

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Meat

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Milk (Fresh)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	1 mL

Sample Weight

3.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	5	20	100
3	50	30	4	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	4 mL
H_2O_2 (30%)	1 mL

Sample Weight

5 mL (dry content of organics shall not exceed 0.300 g)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	30	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
-	

Sample Weight

5.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Milk (Powder)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	2.5 mL
DI Water	7.5 mL

Sample Weight

0.600 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	140	35	10	2	80
2	195	35	3	20	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	2.5 mL
DI Water	7.5 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	30	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
-	

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Mussel (Freeze Dried)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL
HF (49%)	0.5 mL

Sample Weight

0.240 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	1 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g (dried fish, ERM-BB422)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	5	100
2	200	10	10	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL
HF (49%)	0.5 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Olive Cake

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	1 mL
HF (49%)	2 mL

Sample Weight

0.240 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	200	30	5	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	1 mL
HF (49%)	2 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	220	80	5	25	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Olive Leaves

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Olive Oil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL
DI Water	5 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	15	5	100
2	200	10	15	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Onion

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	35	5	10	60
2	200	35	2	15	60
3	50	35	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Pet Food

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	1 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	10	90
2	200	30	5	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	1 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	220	80	5	15	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Plant Bark or Branch (Woody Material)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	1 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	10	90
2	200	30	5	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	1 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	220	80	5	15	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Plant Leaves (Dried)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.240 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Rice

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL
-

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	180	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 10 mL or
HNO_3 (70%) 8 mL and H_2O_2 (30%) 2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	5	20	100
2	50	0	10	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL
-

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	200	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Soy Lecithin

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	9 mL
H_2O_2 (30%)	1 mL
-	

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-	
-	
-	

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	1 mL
HCl (35-37%)	1 mL

Sample Weight

0.700 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	120	60	3	5	50
2	170	60	10	10	70
3	210	60	3	10	100
4	50	60	1	10	0

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Spice Powder (Paprika, Cumin, Cinnamon, etc.)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	200	30	5	20	100
3	50	30	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	5	100
2	200	10	15	100
3	50	0	10	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
-	

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Sugars (Mono and Disaccharides)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	10 mL
-	

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	3	5	70
2	190	60	2	15	100
3	50	60	1	10	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Sugar Beet

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Sugar Cane

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	10	90
2	200	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	220	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Sunflower Oil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL
DI Water	5 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	15	5	100
2	200	10	15	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Tea Leaves

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Tomato Leaves

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Vegetable Oil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	15	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.700 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Wax (Edible)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.240 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Wheat (Whole Grain)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	180	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

1.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	200	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Whey Powder

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FOOD AND BEVERAGE DIGESTION METHODS

Xanthan Gum

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Animal Fat

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HF (49%)	1 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	2 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	5	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FORENSIC DIGESTION METHODS

Blood

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

2.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	15	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

2.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FORENSIC DIGESTION METHODS

Bone

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL
HCl (35-37%) 2 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL
HCl (35-37%) 2 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FORENSIC DIGESTION METHODS

Hair

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FORENSIC DIGESTION METHODS

Meat or Tissue (Dried)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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FORENSIC DIGESTION METHODS

Meat or Tissue (Fresh)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

1.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Activated Carbon

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2SO_4 (95%)	4 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	20	80
2	220	80	7	40	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Alloy Scrap

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	3 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	10	90
2	200	30	3	50	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	5 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	220	60	3	40	100
3	50	60	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Alloy Scrap (using Aqua-Regia)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	15	90
2	190	35	3	50	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	12 mL
HNO_3 (70%)	4 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	20	80
2	220	80	7	40	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Aluminum

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	35	3	25	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	12 mL
HNO_3 (70%)	4 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	190	60	3	25	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Bakelite

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	15	90
2	190	35	3	20	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	12 mL
HNO_3 (70%)	4 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	15	80
2	190	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Boron Carbide

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	4 mL
H_2SO_4 (95%)	4 mL
HF (49%)	2 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	10	90
2	200	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	5 mL
H_2SO_4 (95%)	5 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	220	60	3	35	100
3	50	60	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Brass

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	35	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	25	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Bronze

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	35	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	25	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Calcined Coke

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

H_2SO_4 (95%)	7 mL
HNO_3 (70%)	3 mL
HCl (35-37%)	1 mL
HF (49%)	1 mL

Sample Weight

0.030 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	10	90
2	200	30	5	50	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

H_2SO_4 (95%)	7 mL
HNO_3 (70%)	3 mL
HCl (35-37%)	1 mL
HF (49%)	1 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	230	80	5	45	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Ceramics / Platinum Catalyst

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	6 mL
HNO_3 (70%)	2 mL
HF (49%)	2 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	10	90
2	190	35	3	60	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL
HF (49%)	2 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	80	5	50	100
3	50	80	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Cigar / Cigarettes

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL
HCl (35-37%) 1 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	35	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL
HCl (35-37%) 1 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	25	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Circuit Board

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	35	5	1	90
2	220	35	5	15	90
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Coal

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL
HF (49%) 2 mL

Sample Weight

0.030 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	200	35	5	45	100
3	50	35	0	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL
HF (49%) 2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	230	80	6	35	100
3	50	80	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

*Please note that if using the 100 mL vessels, the maximum digestion time of the instrument must be extended to allow for this temperature program. Alternatively, the vessels can be cooled outside of the instrument for 45 minutes.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Coal Coated with Iron Oxide

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HCl (35-37%)	3 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Cobalt Tungstate

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	5 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	180	60	5	10	80
2	230	80	5	60	100
3	50	80	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Copper / Copper Wire

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Crude Oil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	10	90
2	190	35	5	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	10	80
2	210	80	5	20	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Diesel

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	15	80
2	200	80	7	15	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Electronic Chips

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
HF (49%)	2 mL
HCl (35-37%)	1 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	35	3	35	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	2 mL
HCl (35-37%)	2 mL

Sample Weight

0.600 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	80	5	25	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Epoxy Resin (ASTM D3171-15)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 30 mL

Sample Weight

0.600 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	80	2	5	90
2	50	80	1	5	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Ethylene Vinyl Acetate (EVA) Foam

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 7 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	35	3	20	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	80	3	15	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Ethylene Vinyl Alcohol (EVOH) Resin

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	180	35	3	15	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	190	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Glass and Quartz

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	4 mL
HF (49%)	4 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	35	10	30	90
2	50	25	1	10	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	8 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Granite Sand

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	1 mL
HCl (35-37%)	5 mL
HBF_4 (50%)	2 mL

Sample Weight

0.040 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	35	5	5	90
2	210	35	5	20	100
3	50	35	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Inks

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	200	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	220	60	3	25	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Indium-Tin Oxides

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	8 mL
HF (49%)	4 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	10	90
2	190	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	10 mL
HF (49%)	5 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Ionomer

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Lanthanum Boride

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	210	30	3	25	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Lead Zirconate Titanate

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	5 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	60	5	45	100
3	50	60	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Low Alloy Steel

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	5 mL
HCl (35-37%)	5 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	80	2	5	60
2	200	80	2	10	60
3	230	80	2	30	60
4	50	40	1	10	10

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Pb

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HBF_4 (50%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	40
2	200	35	2	15	90
3	50	35	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

PbO

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HBF_4 (50%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	40
2	200	35	2	15	90
3	50	35	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS PbO_2

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HBF_4 (50%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	40
2	200	35	2	15	90
3	50	35	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

Precipitate is present when the solution is poured out of the digestion vessel, but it dissolves when dilute to 50 mL with deionized water.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Pb_2O_4

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HBF_4 (50%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	40
2	200	35	2	15	90
3	50	35	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

60/40 Sn/Pb Alloy

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HBF_4 (50%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	40
2	200	35	2	15	90
3	50	35	1	10	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Lithium Titanates

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	4 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	40	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	5 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Magnesium Oxide

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	2 mL
HF (49%)	1 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL
HF (49%)	1 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	30	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Melamine

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

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-
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Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	5 mL
H_3PO_4 (86%)	5 mL
H_2O_2 (30%)	1 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	230	80	5	45	100
3	50	80	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Co-Cr-Mo]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	8 mL
HNO_3 (70%)	2 mL
NH_4F (Crystal)	0.300 g

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	10 mL
HNO_3 (70%)	2 mL
NH_4F (Crystal)	0.500 g

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Co-Cr-W]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	8 mL
HNO_3 (70%)	2 mL
H_2O_2 (30%)	1 mL
NH_4F (Crystal)	0.300 g

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	10 mL
HNO_3 (70%)	2 mL
H_2O_2 (30%)	2 mL
NH_4F (Crystal)	0.500 g

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Fe-Nb]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	3 mL
H_3PO_4 (85%)	3 mL
HNO_3 (70%)	2 mL
HF (49%)	2 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	210	30	3	50	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-	
-	
-	
-	

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	4 mL
H_3PO_4 (85%)	4 mL
HNO_3 (70%)	2 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	60	3	40	100
3	50	60	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Fe-Ni]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	3 mL
H_3PO_4 (85%)	3 mL
HNO_3 (70%)	2 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	210	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

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-	
-	
-	

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	4 mL
H_3PO_4 (85%)	4 mL
HNO_3 (70%)	2 mL
HF (49%)	2 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	60	3	35	100
3	50	60	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Ni-Cr]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL
HF (49%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	50	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

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-
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Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	12 mL
HNO_3 (70%)	4 mL
HF (49%)	1 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	40	100
3	50	60	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Ni-Cr-Mo]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

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Sample Weight

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Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	12 mL
HNO_3 (70%)	4 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Ni-Pd-Cr]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL
NH_4F (Crystal)	0.300 g

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

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-
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Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	12 mL
HNO_3 (70%)	4 mL
NH_4F (Crystal)	0.500 g

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Pt-Ir]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	10 mL
HNO_3 (70%)	1 mL
HBr (48%) or Br_2	1 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	10	10	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

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-
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Sample Weight

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Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	10 mL
HNO_3 (70%)	1 mL
HBr (48%) or Br_2	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	10	10	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Pt-Rh]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	10 mL
HNO_3 (70%)	1 mL
HBr (48%) or Br_2	1 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	10	10	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

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-
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Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	10 mL
HNO_3 (70%)	1 mL
HBr (48%) or Br_2	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	10	10	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Pt-W]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	2 mL
HF (49%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	12 mL
HNO_3 (70%)	3 mL
HF (49%)	1 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Rh-Ir]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	10 mL
H_2SO_4 (95%)	2 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	210	30	3	60	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	10 mL
H_2SO_4 (95%)	2 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	80	3	45	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Metallic Alloys [Ru-Se]

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	2 mL
H_2O_2 (30%)	1 mL
NH_4F (Crystal)	0.300 g

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	12 mL
HNO_3 (70%)	3 mL
H_2O_2 (30%)	1 mL
NH_4F (Crystal)	0.500 g

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	80	3	35	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Molybdenum

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

H_2O_2 (30%)	5 mL
HF (49%)	5 mL
HNO_3 (70%)	3 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

H_2O_2 (30%)	5 mL
HF (49%)	5 mL
HNO_3 (70%)	3 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Molybdenum Oxide

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

1.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	35	10	30	90
2	50	25	1	10	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Natural Rubber (Caoutchouc)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	15	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	15	80
2	210	80	3	35	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Niobium Disulfide

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	5 mL
HF (49%)	5 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	210	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HF (49%)	6 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Nylon

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2SO_4 (95%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2SO_4 (95%)	3 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Paint (Wet Latex)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.750 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Permanent Magnets

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	2 mL
HCl (35-37%)	8 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	80	3	5	80
2	240	80	2	20	90
3	50	80	1	10	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Petroleum Heavy Oils and Tars

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	200	35	5	50	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	4 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	220	60	5	40	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Petroleum Light Oils

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	35	5	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	4 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	5	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Plastic, Scrap (Discarded Electronics)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2SO_4 (98%)	4 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	35	5	1	90
2	220	35	5	15	90
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Polycarbonate

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Polyester

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	5 mL
H_2SO_4 (95%)	5 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	50	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2SO_4 (95%)	7 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Polyetheretherketone (PEEK)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2SO_4 (95%)	4 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	40	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2SO_4 (95%)	5 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	30	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Polyethylene Terephthalate

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	5 mL
H_2SO_4 (95%)	5 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	50	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2SO_4 (96%)	5 mL

Sample Weight

0.25 g (pellets)

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	5 mL
H_2SO_4 (95%)	3 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	80	3	8	60
2	260	80	3	35	90
3	50	60	1	10	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Polypropylene

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

PVC and PVC Granules

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL
H_2SO_4 (95%)	2 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	15	90
2	200	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	4 mL
H_2SO_4 (95%)	2 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	15	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Refractory Material

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

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-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

H_3PO_4 (85%)	5 mL
H_2SO_4 (95%)	5 mL
HF (49%)	2 mL
HNO_3 (70%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	240	80	5	35	100
3	50	80	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Rhodium

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	8 mL
HNO_3 (70%)	1 mL
HBr (48%)	1 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	15	90
2	190	30	3	50	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	10 mL
HNO_3 (70%)	2 mL
HBr (48%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	15	80
2	210	60	3	40	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Selenium Powder

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	1 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	9 mL
HCl (35-37%)	1 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	25	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Silicon

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	4 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	5 mL

Sample Weight

0.600 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Silicon Aluminum Oxide

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

-
-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

H_3PO_4 (85%)	6 mL
HCl (35-37%)	4 mL
HNO_3 (70%)	2 mL
HF (49%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	10	80
2	240	80	5	35	100
3	50	80	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Silicon Oil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	3 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	200	35	3	25	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	220	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Slag (Furnace)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL
HF (49%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	35	3	45	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	12 mL
HNO_3 (70%)	4 mL
HF (49%)	1 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	80	3	35	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Solder

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	2 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	35	5	5	90
2	210	35	5	15	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
-	

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Sulfur (Elemental)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	30	3	45	100
3	50	30	1	30	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Textiles (Natural Fiber)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	40	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	30	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Tires (Auto)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	2 mL
HBF_4 (50%)	4 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	5	80
2	220	60	6	30	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Titanium Carbide

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	5 mL
H_2SO_4 (95%)	5 mL

Sample Weight

0.050 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	10	90
2	190	35	3	35	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2SO_4 (95%)	6 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	10	80
2	210	80	3	25	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Titanium Diboride

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

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-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HCl (35-37%)	4 mL
HF (49%)	4 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	80	3	40	100
3	50	80	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Titanium Disulfide

Equipment - MR-50 Vessel

This digestion is not recommended for the Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	5 mL
HF (49%)	5 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	80	3	30	100
3	50	80	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Titanium Oxide

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HF (49%)	7 mL
HNO_3 (70%)	3 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	35	3	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HF (49%)	10 mL
HNO_3 (70%)	4 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Tungsten

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	4 mL
HCl (35-37%)	4 mL
HF (49%)	4 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	210	30	3	60	100
3	50	30	1	25	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	5 mL
HCl (35-37%)	5 mL
HF (49%)	5 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	80	3	50	100
3	50	80	1	45	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Tungsten Carbide

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	5 mL
HF (49%)	5 mL
HNO_3 (70%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	35	3	45	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	5 mL
HF (49%)	5 mL
HNO_3 (70%)	1 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	35	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Wire Insulation

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2SO_4 (98%)	4 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	35	5	1	90
2	220	35	5	15	90
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Zeolites

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HCl (35-37%)	6 mL
HNO_3 (70%)	2 mL
HF (49%)	2 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	35	3	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HCl (35-37%)	9 mL
HNO_3 (70%)	3 mL
HF (49%)	2 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	80	3	20	100
3	50	80	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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INDUSTRIAL DIGESTION METHODS

Zinc Oxide

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	1 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	210	30	3	40	100
3	50	30	1	20	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	1 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	230	60	3	30	100
3	50	60	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Body Lotion

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Face Cream

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Lipstick

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	2 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Shampoo

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Soap (Bar, Liquid)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	2 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Sunscreen

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HCl (35-37%)	3 mL
HF (49%)	1 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	35	5	25	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HCl (35-37%)	3 mL
HF (49%)	1 mL

Sample Weight

0.350 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	220	70	5	15	100
3	50	70	1	40	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Talcum Powder

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	3 mL

Sample Weight

0.100 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	200	35	5	35	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	3 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	70	5	25	100
3	50	70	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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Toothpaste

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HF (49%)	2 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HF (49%)	2 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

24-Hour Allergy Nasal Spray

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	2 mL
HCl (35-37%)	0.5 mL
DI Water	7.5 mL

Sample Weight

Up to 1 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	35	5	1	90
2	190	35	5	5	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Aspirin

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HCl (35-37%)	1 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	210	20	20	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Cannabis Oil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL
-	

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	200	30	5	20	100
3	50	30	1	30	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL
DI Water	0.5 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	5	5	90
2	200	5	20	100
3	50	1	30	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Capsule, Hard (Powder or Mini-Pellet Filled)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	2 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	35	3	25	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HCl (35-37%)	3 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	200	60	3	25	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Capsule, Soft or Geltab (Liquid Filled)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	5	90
2	190	35	3	25	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	200	60	3	25	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Cold and Flu Medicine

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HCl (35-37%)	1 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	10	100
2	200	10	15	100
3	50	0	10	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Cough Syrup

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.200 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	30	5	10	90
2	190	35	3	20	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	60	5	10	80
2	200	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Fish Oil

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL
DI Water	5 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	5	100
2	200	10	15	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Ginseng

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	20	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	5 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	200	60	3	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Gummies and Chews

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	140	30	5	3	90
2	190	30	3	15	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.400 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	140	60	5	3	80
2	190	60	3	15	100
3	50	60	1	25	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

If the sample is not totally dissolved when digestion is complete, add 2 mL of HCl (35-37%) to the reagents.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Hemp Face Cream

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 8 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	5	100
2	210	10	30	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Hemp Hand Cream

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 8 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	5	100
2	210	10	30	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Hemp Lip Balm

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%) 8 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	150	15	5	100
2	210	10	20	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Herbal Plants and Extracts

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	7 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.240 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	4 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

If silicate material remains and complete digestion is desired, add 2 mL of HF (49%) to the reagents. When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Homeopathic and Traditional Medicines

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.120 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	35	3	30	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Hydrogenated Vegetable Oils (Ph. Eur 2.4.31)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	5 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.060 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	2	10	100
3	210	30	2	15	100
4	50	30	1	20	0

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	5 mL
H_2O_2 (30%)	3 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	190	60	2	10	100
3	210	60	2	15	100
4	50	60	1	30	0

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Multi-Vitamin and Mineral Tablets

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	2 mL

Sample Weight

0.240 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	45	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HCl (35-37%)	3 mL

Sample Weight

0.800 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	30	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Ointments and Creams (Topical)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.150 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	190	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	210	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

If silicate material remains and complete digestion is desired, add 2 mL of HF (49%) to the reagents. When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Pain Killer

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	8 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	5	100
2	210	10	25	100
3	50	0	10	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Raw Materials (Beta Carotene)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HCl (35-37%)	1 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	210	15	15	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS Raw Materials (Glucose, Dextrose, Glyceryl Behenate)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	15	5	100
2	210	10	15	100
3	50	0	15	0
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Raw Materials (Magnesium Stearate)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	5 mL
HCl (35-37%)	1 mL
DI Water	5 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	200	15	20	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Tablets Containing SiO_2 or TiO_2 as Excipients

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	1.5 mL
HCl (35%)	0.5 mL
HF (49%)	0.5 mL
DI Water	7.5 mL

Sample Weight

1 tablet up to 0.4 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	35	5	1	90
2	190	35	5	5	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Tablets and Pills, Hard - Not Containing SiO_2

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	3 mL
HCl (35-37%)	0.5 mL
DI Water	6.5 mL

Sample Weight

Up to 0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	35	5	1	90
2	190	35	5	5	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Tablets and Pills (Hard)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	8 mL
HCl (35-37%)	1 mL
HF (49%)	1 mL

Sample Weight

0.250 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	35	5	5	90
2	190	35	5	20	100
3	50	35	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HCl (35-37%)	3 mL
-	

Sample Weight

0.500 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	5	80
2	200	60	3	25	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

When using HF, if the sample is to be analyzed in an instrument containing glassware, the “Complexation of HF” secondary digestion (located in the Supplemental section) must be performed.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Tablets (Vitamin)

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	6 mL
HCl (35-37%)	1 mL
H_2O_2 (30%)	2 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	210	20	15	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

-
-
-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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PHARMACEUTICAL AND NUTRACEUTICAL DIGESTION METHODS

Wax

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

0.300 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	30	5	5	90
2	200	30	3	30	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Sample Weight

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%) 10 mL

Sample Weight

1.000 g

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	170	60	5	5	80
2	220	60	3	20	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Accurately weigh the sample and transfer into the digestion vessel. Slowly add the reagents to the digestion vessel, rinsing the sample to the bottom of the vessel. Gently swirl the mixture and wait approximately 10 minutes before putting the seal in place and closing the vessel.

To avoid foaming and sample loss when opening the vessels after digestion, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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SUPPLEMENTAL

Acid Evaporation

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel
Evaporation Set (8 evaporation caps, 4-step water-cooled gas washing unit, water jet pump)

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	1	18	80
2	50	30	1	10	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

1. Without transferring the digested sample, close the digestion vessels with the special evaporation caps for your vessel system.
2. Insert the vessels into the rotor and connect with fume collection system inside the microwave digestion.
3. We recommend using microwave evaporation for completely filled rotors. If this is not the case, close unused positions with the blind plugs as described in the operation manual.
4. Remove the exhaust tube from the microwave lid and replace it by using the exhaust hose of the gas scrubber.
5. Prepare 0.5 M NaOH solution for neutralization of acid vapors.
6. Fill halfway the gas scrubber bottles (A), (B) and (C) with marbles, while bottle (D) with NaOH solution (technical grade can be used).
7. Connect the water hoses for cooling water inlet and outlet and fix them with the hose clamps.
8. Attach the immersion tube in the lid of bottle (D) and dip the immersion tube halfway into the liquid.
9. Place the gas scrubber bottles (A) - (D) into the cooling tray. They should be placed in their fixed positions at the cooling tray.
10. Connect the gas scrubber bottles (A) - (D) using the PFA connecting tubes.
11. Connect the water jet pump with the tap water. If available, vacuum pump that has chemical stability membrane can be used instead of water jet pump.
12. Connect the gas scrubber bottle (D) to the hose connection next to the immersion tube.
13. Be sure that all the connections between the four stages of gas scrubber are tight.
14. Connect the connection tube between the gas collection system in the microwave and the gas scrubber.
15. Start the microwave evaporation according to the temperature program. Optimize the time if necessary.
16. After microwave evaporation and the suction of the remaining acids in the PFA tube are completed, close the water jet pump.
17. Temperature program should be set higher than the boiling point of the acid. Hold is the time given for evaporating 8 mL acids. This should be optimized by changing the hold time to evaporate larger volume of acids (e.g. for 10 mL and 15 mL of acid/s, set the hold time to 20 and 25 min, respectively).

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SUPPLEMENTAL

Complexation of HF

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

Saturated Boric Acid — Add 6 mL of saturated boric acid (H_3BO_3) solution for each 1 mL of HF

See recipe for saturated H_3BO_3 in the Recommendations section below

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	190	35	5	10	90
2	50	35	1	15	0
3	-	-	-	-	-
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

-

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

Saturated Boric Acid — Add 6 mL of saturated boric acid (H_3BO_3) solution for each 6 mL of HF

See recipe for saturated H_3BO_3 in the Recommendations section below

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	190	70	5	10	90
2	50	70	1	15	0
3	-	-	-	-	-
4	-	-	-	-	-

Recommendations

Recipe for saturated boric acid: add 5 g of H_3BO_3 to 100 mL of H_20. Heat mixture in a hot water bath until all H_3BO_3 is in solution.

To avoid foaming when opening the vessels after complexation, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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SUPPLEMENTAL

Vessel Cleaning/Conditioning

Equipment - MR-50 Vessel

PerkinElmer MPS 320 System
Permanently Sealed 50 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL (optional)
HCl (37%)	2 mL (optional)

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	30	5	2	90
2	200	30	2	15	100
3	50	30	1	15	0
4	-	-	-	-	-

Equipment - MR-85 Vessel

PerkinElmer MPS 320 System
Auto-venting 85 mL Vessel

Reagents

HNO_3 (70%)	10 mL
HCl (35-37%)	2 mL
-	

Temperature Program

Step	Target Temp [°C]	Ramp Time [min]	Hold Time [min]	Power [%]
1	210	15	25	100
2	50	0	15	0
3	-	-	-	-
4	-	-	-	-

Equipment - MR-100 Vessel

PerkinElmer MPS 320 System
High Pressure 100 mL Vessel

Reagents

HNO_3 (70%)	10 mL
H_2O_2 (30%)	2 mL (optional)
HCl (37%)	2 mL (optional)

Temperature Program

Step	Target Temp [°C]	Pressure Limit [Bar]	Ramp Time [min]	Hold Time [min]	Power [%]
1	160	60	5	2	80
2	210	60	2	15	100
3	50	60	1	30	0
4	-	-	-	-	-

Recommendations

Slowly add the reagents to the digestion vessel.

To avoid foaming when opening the vessels after cleaning, wait until the vessels have cooled enough to be warm to the touch and then vent the residual digestion pressure very slowly.

Always work in a fume hood wearing hand, eye and body protection since a large amount of gas can be produced during the digestion process.

The addition of H_2O_2 will increase the cleaning potential of the solution but can be left out, if desired.

This application is designed for the maximum number of vessels (qty 16 MR-50 vessels, qty 32 MR-85 vessels or qty 8 MR-100 vessels). For MR-50 and MR-100 vessels, decrease the power at the first step by 5% per vessel when using fewer than the maximum number of vessels. For MR-85 vessels, decrease the power from 100% to 70% if half of the positions in the rotor are occupied. Minimum power is 40% regardless of the number of samples digested.

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