

## Thermal Analysis



### Preparation Checklist

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## TMA 4000: Site Readiness Instructions

### Order Overview

Please review this order. Record any discrepancies between the PerkinElmer order and your Purchase Order, along with any agreements or commitments made by your PerkinElmer Sales Representative that are NOT listed on the order. Let your Customer Care Representative know about these discrepancies and/or commitments with your Site Readiness Confirmation.

### Site Requirements

#### Bench Space

Instrument	Dimensions			
	Width	Depth	Height	Weight
TMA 4000	8.75 in/22.25 cm	19 in/48.26	25 in/63.5	45 lbs./20 kg
Computer (approx.)	7 in/17.5 cm	17 in/44.0 cm	15.8 in/40.2 cm	24 lbs./11.0 kg

A bench top having the minimum dimensions above will accommodate a TMA 4000 system with no accessories. The bench must be stable and free of vibrations which will result in increased noise in the TMA curve.

With accessories (Circulating water chiller, Printer, Plotter,) additional bench space will be required.

Note: With all cooling accessories the coolant transfer line attaches to right side of the furnace of the TMA 4000. Consideration must be given for location of the water circulator relative to the TMA 4000. Typically, the TMA is located at the right end of the bench.

## Peripherals and Accessories

Accessories	Dimensions			
	Width	Depth	Height	Weight
Water Circulator	8.25 in/ 21 cm	15.75 in/40 cm	22.5 in/57.1 cm	70 lb./32 kg

## Electrical Requirements

Power Consumption	
TMA 4000	330 Watts Maximum
Computer	Not Available
Circulator	1440 Watts Maximum

Power Specifications	
TMA 4000	120 VAC, 2.8 Amps or 220 VAC, 1.4A
Computer	Not Available
Circulator	120 VAC, 12 Amps or 240 VAC, 7 Amps

This equipment is designed to operate within 10% of the selected line voltage (Except 220 VAC +6%, -10%).

The supply must be smooth, clean and free of transient voltages over 40 volts.

Earth grounding: less than 1 ohm resistance between the grounds of any two components of the system.

Power Outlet Specifications	
TMA 4000	1 standard outlet
Additional Accessories	1 separate outlet each

## Gas Requirements

A purge gas is not a requirement to operate the TMA, however it is recommended. If the instrument is to be purged, all gasses and regulators MUST be supplied by customer and on site before scheduling an installation.

Supplied with the instrument are a 1/8" NPT Swagelok connector (instrument end), Teflon tubing and connectors and restrictors. Gas flow to the instrument is 0-50 cc/min and controlled by the restrictors provided.

If splitting a single gas source is necessary, please contact your local service representative for information on the regulator install kit Part number N519-0462. In the US, please call 1-800-762-4000 - outside the US, visit our website to obtain the address of your nearest PerkinElmer office.

Gas	Pressure	Flow	Purity (Minimum)
Sample Gas: such as argon, nitrogen, air, oxygen	≤ 20 psi (1.38 bar)	0-50 cc/min	99.95
Sample Gas: Helium, exceptionally dry	≤ 20 psi (1.38 bar)	0-50 cc/min	99.95

## Cooling

Required but not included with the analyzer system is a turbulent chamber kit (L8040201). The turbulent chamber attaches at the bottom of the furnace. It has an input and output for cooling liquid. Nominal flow rates of the cooling liquid are between 200-300 ml/min. Control of the flow and temperature are critical for best analytical performance.

### Cooling Accessory requirement specifications

Temperature control: ≤ 0.25 °C

## Environmental Requirements

The TMA is designed to function properly in an environment having the following specifications:

### Laboratory Environment

Full performance: 10 °C to 35 °C ambient

Safe: 5 °C and 45 °C ambient

Storage: -20 °C to 60 °C

Humidity (storage and operational): 20% RH to 80% RH non condensing

Altitude: -400 to 2,000 metres

Clean and dust-free

Indoor use only on level, vibration-free work surface, located away from doorways and other heavy traffic areas.

Circulator requires adequate air flow. A minimum of 6" is required between the unit and the surrounding area.

## Safety Requirements

### Gas Cylinders and Gas Delivery Lines

Lock down straps should be present on all gas cylinders.

### Ventilation

Do not operate the Themomechanical Analyzer in an enclosed environment without adequate ventilation.

## PC Configuration

Due to numerous differences in PC hardware, PerkinElmer cannot guarantee that our software will run on a customer-supplied computer.

PerkinElmer installation of a customer-supplied computer is available for an additional fee.

PerkinElmer is not responsible for problems caused by unspecified system components, software, and/or accessories. A maximum of one hour is allowed for installation of a computer and software of a non-PerkinElmer supplied computer. The additional time it takes to verify this type of problem is billable at the current service rate. It is advisable the customer's IT support be available as needed.

**Software** As per requirement.

Note: Computer must be setup with US (English) Code Page.

## Installation Overview

On receipt of the equipment, the customer is to inspect the packaging for physical damage. If damage is present the shipping container should be opened to verify no physical damage to the instrument has occurred and the customer must notify the shipper immediately.

Note: Unpacking will only be performed by approved PerkinElmer personnel and contents inventoried.

### Physical Installation (Instrument Only)

The physical installation will vary based on system configuration.

### Physical Installation (Accessories)

As required.

### Installation Test Standards

If we install your instrument, our Service Engineer will test the instrument in order to insure that its functionality is verified for temperature and height measurements.

Should more testing be required for an optional operation qualification, an IQOQ is available for at an additional charge.

### Customer Orientation

Not specified.

## Miscellaneous

### Cooling System Requirements

In order to get the maximum instrument performance, it is recommended that a cooling system be used for TMA operations.

### For operation at or above ambient temperature

The TMA 4000 can be configured with a water circulator and turbulent chamber.

Using a turbulent chamber the TMA 4000 can be configured with a tap water circulating system or water circulating system (PolyScience Chiller)

With either the tap water configuration (with drain) or a circulating device (chiller), both must be located conveniently near the TMA 4000.

### Sample Preparation

All reference materials required for installation functionality tests are shipped in the instrument start-up kit.

If IQ/OQ validation is required for this instrument, please contact your Customer Care Representative.

Miscellaneous Accessories and Spares	
Part Number	Description
L8040200	TMA Analysis Kit
L8040201	Turbulent Chamber (puck) Kit
L8040202	Advanced Analysis Kit
N519-0376	Flat tip penetration probe
N519-0378	Expansion probe
N519-1549	Deformation tube
02507907	High Temp Tape
N519-0417	Thermocouple
N5191662	Split collar for furnace tube
N5391054	Knurled nut for furnace tube
0990-8400	Non-magnetic tweezers
0319-0033	Indium T-calibration standard
N5340229	Zinc Calibration Material
N5391051	Quartz displacement standard
L9004783	Halocarbon oil 27
L9004784	Funnel for adding oil
L8041600	Aluminum Std Expansion 10mm by 3 mm D
L8041601	Aluminum Std Expansion 5mm by 3 mm D
N5340092	Pyris software CD / dongle
0154-1496	Type A restrictor
0154-1498	Type H restrictor
0990-8134	Thread sealant tape
0250-6483	1/8" OD x 1/16" ID PTFE tubing
0990-3906	1/8" Swageloc fittings (2)
04190367	Recirculating puck
0250-6519	Tygon tubing, 1/2" OD x 3/8" ID
0990-3004	Zinc Calibration Material
N5190377	0.5 mm Round tip Probe
N5190416	Large Round tip Probe
N5190399	Flexure TMA kit

## Miscellaneous Accessories and Spares continued...

Part Number	Description
N5190393	3 point bending Probe
N5391181	Bending anvil
L8041800	Short expansion Probe
N5190619	Extension kit (contains four parts below)
N5190609	Extension probe
N5191700	Extension tube
N5190615	Mounting jig
N5190611	Extension Jaws
02190322	Old style mounting pins
03190461	Quartz Dilatometer (sm) kit
03191705	Dilatometer (sm)
04190197	Alumina Oxide Powder
02191269	Sapphire Disc (thin expansion standard)
L8041802	Fuses 110V AC
L8041803	Fuses 220V AC
L8041804	Fuses 110/220V AC
L8041801	Test and Calibration weights
L8041805	RS232 to USB converter
L8041806	RS232 cable
L8041807	Acquire software CD
L8041808	Ceramic furnace top
L8041809	Sample thermocouple

## Calibration Supplies

Part Number	Description
03190033	Indium T-calibration standard
N5340229	Zinc Calibration Standard
N5391051	Quartz displacement standard
L8041600	Aluminum Std Expansion 10 mm by 3 mm D
L8041601	Aluminum Std Expansion 5 mm by 3 mm D

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