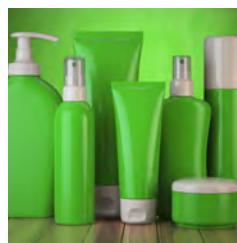


ANALYSIS

FROM R&D TO QA/QC



Comprehensive Polymer Testing Solutions



WELCOME TO THE CIRCULAR ECONOMY

It's a whole different, interdependent world, and polymers are a large and growing part of it. Polymers are in the consumer goods we buy, and in the packaging that protects them. They drive our transportation industries, from automobiles to airplanes to the space shuttle. They're important components of the electronics we depend on. Many of today's construction materials, including paints and resins, are partially or wholly polymer based.

Developing new products with advanced performance features is not enough in the new, waste-averse economy. To stay ahead of the competition, products need to be designed for recycling and/or reuse. Industrial manufacturers are continually challenged to ensure effective quality control and streamline manufacturing processes, all while meeting stringent standards and keeping a watchful eye on costs.

To succeed in the new circular economy, you need a partner who will be there with you.

For 80 years, we've been providing robust, easy-to-use testing solutions to a diverse and ever-changing manufacturing industry. And with the advent of the circular economy, our technologies and expertise are more important than ever. With decades of experience in supporting and servicing global enterprises as well as smaller organizations, helping improve workflows, increase throughput, and add value to your customers, we are ready to help you.

One-Stop Shop, Comprehensive Technology Solutions

INFRARED

THERMAL
ANALYSIS

CHROMATOGRAPHY

INORGANIC
ANALYSIS

NEW AND IMPROVED STARTS HERE

Innovation is the lifeblood of industrial polymer development – the push to improve materials or develop new ones infuses new life into the industry. Advancements in manufacturing processes and root-cause failure analysis are both essential to successful product enhancements. Precise knowledge of material properties and competitive products is crucial to meeting ever-evolving market demand.

R&D labs are looking for analytical capabilities that address a wide variety of sample types and measurement techniques, providing detailed insights and solutions that grow with demand. Our comprehensive polymer product portfolio has the flexibility and performance to support your changing needs – and you can benefit from unique hyphenated solutions that generate multiple results from one run.

R&D Applications

MATERIAL CHARACTERIZATION

Characterizing the structure, properties, and performance of polymers and compounds under process and usage considerations is key to understanding materials properties.

[Click here to see material characterization in action.](#) ►

[See Instrumentation](#) ►



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R&D Applications

FAILURE ANALYSIS/ CONTAMINANTS ANALYSIS

Contamination can cause product failure, undesirable aesthetics, or quality issues. Any of these can cause failures of single items or an entire batch.

[Click here to see failure and contaminants analysis at work.](#) ►

[See Instrumentation](#) ►



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R&D Applications

ADDITIVE ANALYSIS

Substances are added to polymer materials to enhance, change, or protect their properties, and it's critical to characterize all possible additives present in the material. Characterizations include identification of unknown material, quantification of individual additives, and detection of oxidation products.

[Click here to see additive analysis in the real world.](#) ►

[See Instrumentation](#) ►



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R&D Applications

EMISSIONS ANALYSIS

Testing for volatile organic compounds (VOCs) in polymer manufacturing ensures that products comply with international requirements for safeguarding environmental and human health. For example, VDA 278 is a GC/MS thermal desorption method for quantification of VOC emissions from vehicle components.

[Click here to read more about VDA 278 at work.](#) ►

[See Instrumentation](#) ►



TOTAL CONTROL FROM RAW MATERIALS TO FINISHED PRODUCTS

Whether it's an automobile, home appliance, or electronic device, consumers demand high-quality products at reasonable prices. For manufacturers, a critical task is to meet these quality expectations and avoid product recalls. Testing regimens make certain that product characteristics meet customer specifications, and accurate verification of identity and composition of polymers and blends ensure the highest quality and performance of finished goods.

Our comprehensive portfolio of products includes a wide array of analytical solutions designed to simplify and accelerate polymer analysis for increasing productivity. You can confidently and reliably test polymer samples to the purity, composition, and performance standards you depend on.

QA/QC Applications

MATERIALS IDENTIFICATION

There's a growing demand for fast, accurate, easy-to-use qualitative and quantitative polymer analysis, leading to better productivity and faster product release. Whether you're a polymer producer or a buyer of finished products, accurate verification of identity and composition is critical to ensuring quality product releases.

[Click here to learn about the PerkinElmer Polymer ID Analyzer.](#) ►

[See Instrumentation](#) ►



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QA/QC Applications

MATERIALS PERFORMANCE

It's critical to understand the material properties of your products to ensure they're performing as required. Thermal measurements provide valuable information used to select materials for end-use applications, predict product performance, and improve product quality.

[Click here to learn more about characterizing polymers using TGA technologies.](#) ►

[See Instrumentation](#) ►



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QA/QC Applications

RESIDUAL MONOMER CONTENT

Polymer production and quality control require a variety of analytical testing methods. One common test is the analysis of residual monomers in the final polymer material. This analysis is well suited for GC with headspace because it requires no sample preparation.

[Click here to learn more about determination of monomers utilizing headspace technology.](#) ►

[See Instrumentation](#) ►





GREAT PRODUCTS DEPEND ON QUALITY PACKAGING

Good product packaging is cost efficient and environmentally friendly, ensuring product freshness and safety and extending shelf life. Plastic packaging itself can be broadly classified into two kinds: flexible and rigid. Flexible packaging includes lightweight bags or pouches sealed using heat or pressure. Rigid packaging offers better protection, but it's heavier and more expensive than its flexible counterpart.

Quality control of packaging products must be performed to ensure that the correct layers are present, at the right thicknesses and without defects. Researchers also analyse new materials to help develop sustainable packaging.

Researchers benefit from our expert support and analytical testing instrumentation for the development, design, and manufacture of packaging materials. We can provide trusted analytical solutions at every stage and across international standards to ensure compliance with essential regulations.

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MULTILAYER LAMINATES

The Instituto Tecnológico del Plástico (AIMPLAS) is an award-winning technology center with 30 years' experience in plastics research, including the development of packaging materials. Read how the data collected by our Spotlight™ 400 IR Imaging system provides AIMPLAS with valuable information on the composition of complex multilayer laminates.

[Click to read about multilayer laminates using the Spotlight 400 imaging microscope](#) ►

[See Instrumentation](#) ►



PHARMACEUTICAL PACKAGING

Learn how our Spectrum Two™ FT-IR system with the UATR accessory provides fast, robust determination of pharmaceutical packaging. Plus, when used with our Spectrum 10 Enhanced Security software, it can keep you 21 CFR Part 11-compliant per pharma industry regulations.

[Click to read about analysis of pharmaceutical packaging materials – USP 661.1](#) ►

[See Instrumentation](#) ►



RESIDUAL SOLVENTS

It's prohibited for the printed side of flexible packaging materials to make contact with food, because of residual solvents in the ink. Learn how the Clarus® 580 GC and TurboMatrix™ HS systems can easily and accurately quantify residual solvents according to EN13628-2:2004.

[Click to read about determination of residual solvents in flexible packaging according to EN 13628-2:2004](#) ►

[See Instrumentation](#) ►



RECYCLING MAKES THE OLD NEW AGAIN

From the halls of government to college campuses to our individual homes and businesses, recycling is a challenge we're all facing – together. The environmental consequences of solid waste are visible in the ever-increasing levels of global plastics pollution on land and in our oceans. To help meet the challenge, polymer recycling has become a growing industry, and plastics once destined for landfills are now being recycled into new products. But to get better quality of recycled polymers, it's important to presort plastics – so identification leading to proper separation is critical before the recycling process starts.

Our comprehensive portfolio of products includes a wide array of analytical solutions designed to simplify and accelerate analysis of recycled plastics, for increased productivity. You can confidently and reliably test plastic samples to the purity, composition, and performance standards you depend on.

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MATERIALS CLASSIFICATION

Molecular spectroscopy techniques offer easy measurement and identification of plastic types. Our Spectrum Two system with diamond ATR enables you to identify even very heavily carbon-loaded rubber materials in the mid-IR region, plus a range of additive materials based on the infrared spectrum of the crystal residue after measurement of the bulk material.

[Click to read about the advantages of mid-IR spectroscopy for polymer recycling](#) ►

[See Instrumentation](#) ►



AMORPHOUS CONTENT AND CRYSTALLINITY

Crystallinity of semicrystalline polymers is the most important thermodynamic parameter affecting mechanical, chemical, and thermal properties of the final product. Techniques such as infrared spectroscopy, X-ray diffraction, and optical analysis can be used for determining amorphous content or crystallinity.

[Click to read about determination of rigid and mobile amorphous content of semicrystalline polymers using DSC](#) ►

[See Instrumentation](#) ►



IDENTIFICATION AND CHARACTERIZATION

The PerkinElmer Recycling Packages make use of common techniques for material identification and characterization throughout the entire recycling process, allowing for an in-depth understanding of the materials from start to finish. The packages also support the Plastic Identification Codes (PICs), used worldwide for the identification of polymer types.

[Click to read about our polymer recycling package](#) ►

[See Instrumentation](#) ►



MICROPLASTICS

Microplastic pollution and its impacts are growing by the day. So organizations worldwide are working to find solutions to this seemingly intractable problem by characterizing and quantifying microplastics and their origins and analyzing their impact on the environment, the food chain, and human health.

To better identify and quantitate microplastics and organic and bacterial pollutants that attach to them, our complete range of innovative analytical solutions, coupled with deep-seated experience, helps laboratories and field analysts obtaining insights they need. This is enabling scientists to solve biological impacts on the marine and freshwater ecosystem and food chain.

One principal analytical technique for identifying polymers is infrared spectroscopy. We offer a family of advanced infrared instrumentation, from microscopy and imaging to hyphenated solutions, all with ready-made protocols, material libraries, and our unique Spectrum software.

INNOVATION THAT PUSHES YOUR SCIENCE FORWARD

Whether you're working in R&D or QA/QC and need to characterize materials or performing contamination analysis, or simply ensure you're manufacturing the highest quality products possible, our trusted solutions help you achieve accurate results. Because when your lab runs smoothly, you have more time to concentrate on your science.



Polymer Analysis

Accurate verification of identity, quality, and composition of polymers and their blends used in industries such as packaging, construction, and automotive is essential to developing new products and ensuring finished product quality. Our Polymer ID Analyzer is a compact, easy-to-use solution designed to simplify and accelerate your polymer analysis. You can quickly and confidently identify unknown polymer samples, determine composition of blends, and verify quality.



Polymer ID Analyzer

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Microscopy/Imaging and FT-IR Systems

Our comprehensive multirange FT-IR solutions are intuitive to operate, making everything from spectral collection to processing and reporting simple and straightforward. The solutions are highly automated, eliminating time-consuming manual adjustments. The same interferometer platform used in every FT-IR instrument also powers our imaging and microscopy technologies. The microscopy system utilizes a high-performance single-point detector to deliver the best sensitivity. And it's highly automated, eliminating time-consuming manual adjustments to focus, aperture, and region-of-interest location.



Spectrum 3 FT-IR with Spotlight 400 Imaging System

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Differential Scanning Calorimetry (DSC)

Our comprehensive line of high-performance DSC instruments and services – combined with our expertise in materials characterization – helps you push the envelope on your research, offering deeper insights and the best user experience available. DSC applications include the determination of melting point, glass transition, and crystallization. It's also used to differentiate the type of polymer or analyze mixtures. Different cooling devices assure analysis over a wide temperature range, and autosampler options help increase productivity.



DSC 4000

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Thermogravimetric Analysis (TGA)

TGA solutions provide valuable information that can be used to select materials for certain end-use applications, predict product performance, and improve product quality. The technology quantifies the weight change of a sample in dependence of temperature, atmosphere, and time. It's used in laboratories to perform thermal stability testing; to understand the impact of flame retardants, filler, or volatile content; and for product-failure and oxidative-stability analysis. To identify evolved gases, the TGA system can be coupled to an IR or GC-MS instrument.



TGA 8000

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Dynamic Mechanical Analysis (DMA)

The DMA system's innovative design, high functionality, and flexible operation make it ideal for advanced research and routine quality testing in polymers and composites. It measures changes of rheological behavior under dynamic conditions as a function of temperature, time, frequency, stress, and atmosphere, or a combination of these parameters. The DMA uses an ultra-efficient cooling system to cover a wide temperature range. Options include immersion studies or the control of the relative humidity of the sample environment.



DMA 8000

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Gas Chromatography (GC) Systems

Whatever your application, industry requirements, or regulations, we have a breadth of GC solutions designed to solve your separation and detection challenges. The systems are easy to operate, yet deliver the high performance, capacity, and throughput analytical labs demand.

Our end-to-end chromatography solutions include:

- Multiple separation and detection options, including advanced mass spec technology
- Sample-handling technology with headspace, thermal desorption, liquid autosampling, and SPME options
- Consumables accessories, method development support, and services to optimize your lab

A typical application of a GC-HS system is the easy and accurate quantification of residual solvents.



Clarus® 590 with Turbomatix Headspace



Spectrum 3 with Integrated EGA 4000

TG-IR

The combination of a thermogravimetric analyzer with an infrared spectrometer is the most common type of evolved gas analysis in use today. A TG-IR system is ideally suited for applications identifying material evolved on heating, component identification in plastics and rubbers, or the study of combustion products.

TG-IR-GC/MS

This approach is terrific for analysis of a mixture to determine its primary components and to identify additives or contaminants – perfect for evaluating competitor offerings or determining product compliance with regulations.

HOT TOPIC: EGA AND HYPHENATION

Good things happen when great technologies connect. Our hyphenated solutions couple two or more instruments to increase the power of analysis and save time by acquiring more information from a single run. Our TGA and STA systems, coupled with FT-IR, MS, or GC/MS systems, deliver the industry's most complete line of advanced evolved gas analysis (EGA) platforms for materials characterization in polymers, chemicals, and rubber. Its applications include identifying and quantitating components in polymers, determining leachables in packaging, and identifying phthalates in PVC samples.



TGA 8000-Spectrum3 - Clarus 590 GC/MS



GC Instrument and Laboratory Consumables



Thermal Desorber Tubes



Thermal Analysis Consumables

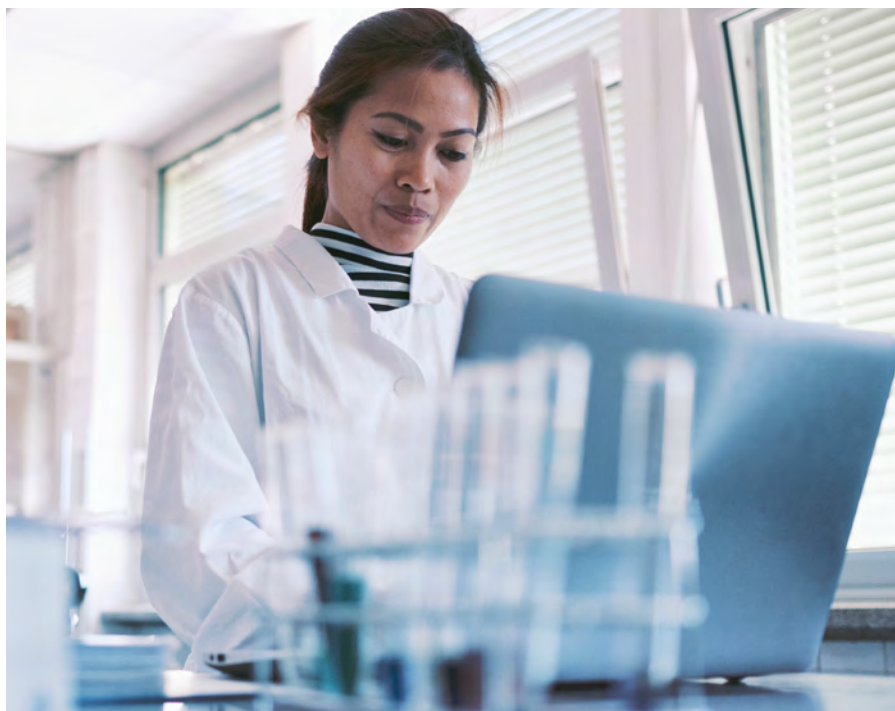
GET THE MOST OUT OF YOUR INSTRUMENTS AND YOUR ANALYSIS

You invest great efforts into your research – and we do the same with our consumables and accessories, tested and validated to fit your analysis needs. That's why we developed a full range of quality consumables designed for best analytical power.

Browse our consumables portfolio for products that offer reliable performance, control of operating costs, and maximized uptime of your instruments. Like our trusted instruments, our consumables offer the best performance over and over.

SMARTER QUESTIONS FASTER ANSWERS

Looking for industry-leading informatics software? We've got that, too: Overcome challenges like volatile pricing, increased environmental regulation, and data complexity. Browse our suite of informatics software and improve collaboration, spark R&D innovation, and deliver predictive analytics in real time.



ChemDraw®

Accelerate the drawing and publishing of chemical and biological compounds.

Signals™ Notebook

A cloud-native electronic lab notebook that captures, reuses, and shares experimental data.

E-Notebook™

Document analyses and leverage the knowledge gained from previous experiments.

Lead Discovery

Discover actionable insights by seamlessly integrating chemical and biological molecules with activity results.

TIBCO Spotfire®

Quickly analyze disparate data from multiple sources and create a complete picture of what's happening in real time.

COMPLETE SERVICES FOR INCREASED PRODUCTIVITY AND EFFICIENCY

Today's lab leaders are facing several challenges, from tighter deadlines to increased budget scrutiny to teams with various degrees of comfort with lab equipment. Time that could be spent getting ahead is utilized on noncore activities.

To help you overcome barriers to success, OneSource® Laboratory Services has built a team of trained scientists and engineers who bring their real-life knowledge to you, helping increase your productivity with recommendations on how to best utilize your assets. With this knowledge, you can get back to your core mission.

Labs of all sizes need to know their equipment will work as expected, every time they turn it on. From contracts and performance maintenance available for our instruments as well as other manufacturers' equipment to full lab asset management delivered globally, we can help you make the most of your important lab assets.

And for labs looking to introduce new equipment and techniques, we offer training at our facilities and at yours.



OneSource Services

- Asset optimization
- Lab environment and instrument monitoring
- Asset location
- Education and training
- Technology and descriptive analysis
- Internet of lab things/lab of the future
- Remote support
- Multivendor services
- Compliance
- Lab support
- IT solutions
- Instrument qualifications

Multivendor Services

With so many different vendors' instruments in your lab, it can be challenging to ensure everything is being maintained properly. Some labs struggle to get the most productivity and efficiency from all their instruments. Others streamline and simplify workflows to maintain regulatory compliance – and reduce the risk of noncompliance. Either way, you're always scrambling to figure out who to call for service as quickly as possible before you lose too much time – and money.

But what if there were a one-stop service contract option for your lab – from a company with decades of deep-seated multivendor experience – that repaired all your instruments, offered state-of-the-art validation and compliance services, and provided reliable preventative maintenance? There is. That's what OneSource Multivendor Service is all about.



Educational Services

Whether you are looking for a basic instrument refresher course, simple troubleshooting techniques, general application support, or method optimization, our field application scientists or service engineers will come directly to your lab.

Through education, you will gain knowledge and insights into the latest techniques, not only increasing your confidence, but also unlocking the full potential of your instrument.



For more information on our polymers solutions, visit www.perkinelmer.com/polymers

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For a complete listing of our global offices, visit www.perkinelmer.com/ContactUs

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