Whatever your level of experience, whatever your throughput needs; Markes International provides the best and most reliable test equipment for measuring chemical emissions from products & materials.

Whether you want rapid emissions screening for routine quality control or repeatable, high-performance operation for research and product certification, Markes International provides the robust analytical tools and flexible sampling equipment you need to comply with new regulatory requirements and make the most of new ‘green-chemistry’ business opportunities.
Introduction

New ‘green chemistry’ regulations and increased consumer awareness of product safety issues are driving global demand to test intentional and unintentional release (emission) of chemicals from everyday products. The new EC Construction Product Regulation (CPR), REACH* and new US building codes are key examples of regulatory developments which will increase the need for chemical emissions testing as part of product labelling.

Much of manufacturing industry will be impacted with producers of flooring, furniture, toys, domestic goods, cleaning products, wood-based materials, thermal/sound insulation, coatings, and adhesives/sealants being in the front line, together with all their suppliers.

‘Green’ products – A new business opportunity:

While the new regulations do place an additional burden on industry to monitor the chemicals coming out of products, investing in emission testing also helps manufacturers to take advantage of this new market opportunity by aiding development of low-emission, higher-value product formulations. Markes International is here to help your business to meet the “green chemistry” challenge and make the most of this new market opportunity.

Markes International: Your one-stop shop for chemical emissions testing equipment

Markes offers a comprehensive portfolio of innovative test equipment, sampling accessories and data mining tools to enhance, automate and simplify measurement of chemicals coming out of every day products.

Options include:

- cryogen-free thermal desorption (TD) technology tailored to your needs
- the acclaimed Micro-Chamber/Thermal Extractor™ (μ-CTE™) for fast emissions screening
- the FLEC® cell for field tests of installed products
- sample tubes optimised for the widest possible chemical range
- specialised check standards for auditing system performance.

Expert advice on all aspects of emission testing, can also be provided by Markes’ team of technical specialists.

TD technology for material emissions testing

Featuring simultaneous analysis of volatile and semi-volatile organics plus unmatched compatibility with reactive odorous compounds, Markes TD technology for material emissions testing offers the flexibility and analytical performance you need to meet current and future testing requirements. Cost-effective manual options are based on the single tube thermal desorber UNITY 2, while automated configurations incorporate the robust, 100-tube capacity TD-100™. All systems operate without liquid cryogen for enhanced reliability and offer quantitative sample re-collection for repeat analysis and method/data validation. Automation upgrades are also available for manual systems to allow you to adapt and expand as demand grows.

Key applications include:

- Certification of product emissions using small chambers or emission test cells
- Fast screening of chemical emissions from products and raw materials:
  - Routine quality control of production (e.g. for ‘Attestation of conformity’)
  - Industrial R&D – Aids development of new, low-emission products
- Comparing emissions across a product range
- Checking raw materials
- Addressing customer complaints
- Comparing products against best-in-class competitors

Other related applications such as testing emissions of semi-volatile organic chemicals (SVOCs), detection of trace target compounds in complex data sets, indoor air quality assessment and associated ventilation studies can also be accommodated.

*REACH: Registration, Evaluation, Authorisation and Restriction of Chemical substances- Regulations in Europe and China
Certification of materials and products by accredited labs

Reference methods require chemical emissions from representative samples to be tested under simulated real-world conditions using small chambers or emission test cells. The method is carried out at a prescribed, near-ambient temperature and under a flow of pure, humidified air. Volatile and semi-volatile organic chemicals emitted by the sample pass into the chamber/cell air and are collected at specific times – typically 3, 10 or 28 days - using sorbent tubes. DNPH cartridges with HPLC analysis are also used for formaldehyde tests.

Data is typically reported as area (or mass), specific emission rates (µg/m²) or in terms of vapour concentration in a specified ‘reference (model) room’.

Relevant standards include the ISO/EN 16000 series, CEN TC351 protocols and various ASTM procedures: D6196, D5116, D7143, D7339, etc.

Markes method-compliant TD solutions for material emission testing have been optimised for repeatability and research-grade performance. Technical highlights include:

- **Versatility:** Simultaneous analysis of VOC & SVOC (including phthalates) and compatibility with odorous reactive species
- **Cryogen-free operation:** Minimises downtime and simplifies tests on high-humidity materials such as natural leather
- **Platform neutral:** Add to all major makes of GC & GC/MS
- **Quantitative sample re-collection (SecureTD-Q™)** facilitates automatic validation and repeat analysis
- **100-tube capacity and efficient tube seals** maintain data integrity and allow maximum productivity

Markes material emission testing technology in action for product certification

**Small chambers**

Small chambers, range in size from 20 L to 5 m³ and are typically made from polished stainless steel or glass to minimize background artefacts and sink effects.

Markes material emission testing technology in action for product certification

**Small chambers**

New, very low-emission adhesives (shown above) release less than 500 µg/m³ after 10 days. Vapours collected on Tenax TA tubes.

Reproduced with kind permission from Drs Decio, Dr Cerulli, Dr Leoni and colleagues at MAPEI S.p.A., Milan, Italy.

**The Field and Laboratory Emission Cell: FLEC®**

The FLEC cell provides an easy-to-use device for certification of emissions from the surface of planar materials such as applied paints and coatings, floor coverings, ceiling materials and wall coverings.

- **TD-100 automated thermal desorption system**

- **FLEC-TD-GC/MS analysis of emissions from rubber flooring.**
  Data courtesy of Prof. Dr Peder Wolkoff, DK
Fast screening of chemical emissions from products and raw materials:

Reference methods for product certification are necessarily long – with data required over days or weeks. Manufacturing industry needs rapid and cost-effective complementary tools for routine quality control of chemical release and development of new low-emission products. Markes international provides innovative solutions for every aspect of practical emissions screening for manufacturing industry.

**Sampling**

Markes’ μ-CTE allows bulk or surface emission testing from up to 4 or 6 samples in parallel.

Results obtained using μ-CTE on samples fresh from production are a reliable indicator of longer term product emissions performance.

The flexibility of Markes sorbent tubes and traps allows customers to tailor their analysis for specific applications and materials (See Markes Consumables catalogue for more information).

**Validation**

To ensure the consistent high performance of analytical and sampling equipment Markes is working with standardisation agencies to develop certified reference materials (CRM) and analytical check standards. CRMs will allow validation of the entire emission testing process, including the chamber, whilst check standards can be used at installation and on a routine basis to monitor on-going TD-GC/MS system performance.

Markes TD technology also features:

- Quantitative sample re-collection for repeat analysis and method/data validation
- Electronic tube tagging for enhanced sample traceability and improved quality assurance

**Data analysis**

TargetView is a sophisticated GC/MS data-mining package, offering automatic interpretation of complex material emission profiles. It combines dynamic background subtraction, spectral deconvolution and chemometric analysis to identify trace target compounds in complex GC/MS data sets. It also provides reliable peak abundance information to complement and confirm the quantitative results produced by conventional data handling systems. TargetView offers both 1-click report generation for routine industrial labs and enhanced data analysis for accredited or research labs.

Markers International has been the global leader in sampling and thermal desorption for over 10 years and is renowned for its robust equipment and unrivalled expert support.

If you are in manufacturing industry or third party laboratory analysis, you can be assured that Markes provides the equipment and support you need to meet the challenge of new green chemistry regulations and make the most of associated new business opportunities.