Ambient Air Monitoring

Only those who understand particles can take the right measures to protect people and the environment.
„Only those who understand particles can take the right measures to protect people and the environment.“
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DURAG GROUP

The DURAG GROUP is a market leader for intelligent solutions in combustion technology, emission and ambient air monitoring, multigas analysis, tunnel sensors as well as environmental and process data management. With around 500 specialists, we offer modern technology, certified instruments, and reliable services for the individual requirements of our customers around the world.

Our services

- We offer a comprehensive product portfolio for industrial combustion and flame control technology, the visualization and online analysis of thermal processes, gas analysis as well as the measurement and analysis of emissions and ambient air monitoring.
- Our products help comply with regulated emission limit values and minimize the environmental impact of industrial processes.

As a family owned company we hold ourselves to the highest standards in the development and manufacturing of our products. Our staff have extremely deep knowledge, and develop our products and solutions with innovative ideas.

Consulting
Expert service
Applications-know-how
Customized solutions

Production
Made in Germany
Products that fit your process

Commissioning
Worldwide commissioning through highly qualified and experienced technicians

Installation
Worldwide installation

Support
Prompt, thorough & competent
24/7 on-call service

Service
Qualified service technicians

Training
Comprehensive training for operators and maintenance staff
History of the DURAG GROUP

1948 – DURAG founded by H. Wilhelm Schaumann. The company name is taken from the duratron, a gamma ray detector.

1960 – Start of development of instruments for process monitoring, electronic counters and controls.

1970 – Start of development of dust measuring devices, monitoring and combustion systems.


1997 – Acquisition of VEREWA Umwelt- und Prozessmesstechnik GmbH. Headquarters moved from Mülheim an der Ruhr to Hamburg.

2006 – Acquisition of Smitsvonk in the Netherlands, a leading supplier of high-energy ignition systems, pilot burners and ignition burners.

2015 – Acquisition of GRIMM, a world market leader in the field of optical measurement of fine particles.

2018 – 70-year anniversary of the DURAG GROUP. Expansion of the product portfolio with multigas analyzers through acquisition of ap2e.
For more than 70 years DURAG GMBH has been an expert provider of combustion and emission monitoring equipment. Since 1948 we have offered modern technology, certified instruments, and reliable services for the individual requirements of our customers around the world. Our own rigorous quality standards in the development and manufacture of our products are our trademark. Our employees have deep knowledge, and continually develop our products and solutions with innovative ideas.

DURAG DATA SYSTEMS has over 40 years of experience in the manufacture of software and hardware for environmental and process data management. Our emissions data evaluation solutions are developed by experience engineers, software developers, and service technicians. We are pioneers in this special area of environmental protection, covering legal limit values, emissions data remote monitoring, and greenhouse gas trading. We advise small and large plant operators, industry-neutral and with long experience and worldwide expertise.

DURAG SIENA is geared to the South American and especially to the Brazilian market. Production, assembly, development and production of products for combustion technology take place with focus on the region. The product portfolio is supplemented by emission monitoring devices, which are supplied according to the requirements of our customers.

ap2e is an innovative company in the gas analysis business for scientific and industrial application such as environment, process optimization and ambient air monitoring. Since 2006, ap2e designs, manufactures and services on-line advanced TDL gas analyser systems, powered by two patented technologies (Extended cavity TDL with Low Pressure Sampling). ap2e multigas analyzers cover a wide & dynamic range, from PPT to %, with unmatched sensitivity, selectivity, stability, fast response time within simple or complex background gas mixtures with no need for sample conditioning/heating.
GRIMM Aerosol Technik Ainring GmbH & Co. KG in Ainring is one of the world leading suppliers of instrumentation in the field of environmental and occupational safety measurements, in service of governmental authorities, research and teaching facilities, safety engineers, or accredited bodies for air quality measurements. For over 30 years, GRIMM has been standing for the optical aerosol measurement „made in Europe“. The measuring range of our systems extends from less than 1 nanometer to 35 micrometers. The measuring instruments are usable stand-alone or integrated in measuring containers. The analysis is made via an intelligent evaluation and control software. Many thousands of systems are in use worldwide, on a daily basis, reliably and with high precision, partly under the most extreme conditions. Our product portfolio for measuring aerosol and particle concentrations, ranges from measuring ultrafine and nano particles to fine dust measurements in indoor and outdoor applications, in the industrial field as well as in basic research.

Smitsvonk specializes in high-energy ignition systems, pilot burners, and ignition burners for use in industrial combustion processes. The company’s electrical and electronic ignition systems have been used around the world for over 70 years, thanks to their high reliability under the most demanding conditions – ignition is not effected by dirt, air humidity, extreme temperatures, or aggressive gases. Smitsvonk is your expert for reliable ignition, and develops solutions tailored to any industrial need. About 75% of its business is within the petrochemical industry, and 10% within the iron and steel industry.

For 70 years, Hegwein has been the specialist in the field of gas and oil ignition burners as well as gas burners for industrial applications. Our experienced experts individually analyze your specific needs and supply pilot burner and gas burner systems that are specially tailored to your process requirements. For this purpose, solutions such as our „ZAVEX“ series are available for use in all explosion-proof zones, as well as pilot burners and burners in a compact design with integrated ignition transformer, flame detector and automatic burner control. We are your reliable partner with our individual and expert advice as well as with our long-lasting products that have already been launched on the market.
3 | Business Units

Emission Monitoring
Our solutions for emission monitoring are also prepared for further deducted emission limit values and stricter safety requirements in the near future.

Combustion Technology
Our products ensure safe ignition and controlled combustion, as well as control and monitoring of various ignition systems.

Gas Analysis
Our analyzers measure 30 different gases (pollutants or toxic or explosive or process) by laser spectroscopy for the safety, process optimization and pollution monitoring required by industries.

Ambient Air Monitoring
Our product portfolio for measuring aerosols and particle concentration ranges from the measurement of ultrafine and nano particles to particulate matter monitoring indoors, in outdoor areas as well as for application in basic research fields.

Data Management
Our new, certified D-EMS 2020 system is the next generation of environmental and process data management. Its modular structure enables individual adaption to any system requirement.
200 years ago the primary sources of fine and ultrafine airborne particles were volcanic eruptions, forest fires, erosion, and dust turbulence. Since the 20th century anthropogenic – human-caused – airborne particles have increasingly dominated. They cause on people affect the environment and atmosphere, and are serious drivers of the climate exchange and emission of greenhouse gases.

The study of these effects and monitoring of compliance with mandated limits requires reliable robust measurement methods and instruments. This is our competence!

**Highlights in Classification + Counting**

- We offer nano devices and spectrometers for measurement of airborne particles in the range of 0.8 nm to 35 μm.
- Our systems have been developed, manufactured and distributed for more than 30 years.

- More than 5,000 of our devices are in use worldwide, in research, air quality measurement and industry.
- Our international network of 69 partners and sales offices grants best service on every continent.
- We deliver quality and engineering „made in Germany“.

**Find out more**
For more details, see www.grimm-aerosol.com.
5 | Applications of Classification + Counting

With different measuring methods we identify size, size distribution and number concentration of particles. Our devices are successfully used in many different applications.

**ENVIRO = Environmental Dust Monitors**
The common component of all environmental dust monitors is the officially approved measuring cell. In the portable devices and compact mobile system solutions, as well as in the stationary 19" monitors, the international recognized measuring algorithm is used to precisely determine the PM values. As the only manufacturer in the world, we offer the customer a compact and weatherproof solution for the continuous measurement of ultrafine particles from 4 nm upwards.

Combined with the EDM 180, the first ever officially approved optical PM monitor, we also offer the customer a unique wide-range system for measuring aerosols from 4 nm to 32 μm.

**IAQ = Indoor Air Quality**
The IAQ line offers the customer full flexibility. The light measuring devices inform the user in research, industry, occupational safety, and authorities, simultaneously about aerosol number and size, dust masses according to the official environmental guidelines and the occupational medically defined mass fractions for the assessment of the health burden. Our precision is based on a full-flow analysis of all existing particles in the range of 250 nm to 32 μm and their division into 31 size classes.

The MiniWRAS (Mini Wide Range Aerosol Spectrometer) is a unique device worldwide. GRIMM perfected the wide-range measurement from 10 nm to 35 μm in a portable device, without the need of radioactive sources or flammable liquids. The enormously extended measuring range provides important information on aerosols that are otherwise invisible to optical particle counters.

**NANO = Nanoparticle Measurement Systems**
The nanosystems count and classify particles from 0.8 nm up to 1 μm and are available as mobile, stationary and 19" rack devices. Our systems can be found in inhalation, exposure, environmental and climate studies, are used for filter testing and emission measurements, and are standard devices of the basic aerosol research. Our measuring systems are adjustable to the requirements of universities, research institutes, industrial companies, meteorological institutes and authorities.
More information?
The following products are only one reduced selection. Other products, versions and accessories can be found on www.grimm-aerosol.com.
## 6 | Products Classification + Counting

### 11-D Portable Aerosol Spectrometer

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 size channels, equidistant</td>
<td>Aerosol science</td>
</tr>
<tr>
<td>Particle size range 0.25–35 μm</td>
<td>PM monitoring</td>
</tr>
<tr>
<td>TSP, PM₁₀, PM₄, PM₂, PM₁, PMcoarse, inhalable, thoracic, respirable</td>
<td>Indoor air quality (IAQ)</td>
</tr>
<tr>
<td>Counts and Mass</td>
<td>Workplace monitoring</td>
</tr>
<tr>
<td>Built-in filter for gravimetric analysis</td>
<td>Process control in industry</td>
</tr>
<tr>
<td>Real-time and portable</td>
<td></td>
</tr>
<tr>
<td>Advanced software</td>
<td></td>
</tr>
</tbody>
</table>

### Mini-WRAS 1371 Mini Wide Range Aerosol Spectrometer

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>41 size channels, equidistant</td>
<td>Nanoparticle and PM monitoring</td>
</tr>
<tr>
<td>Particle size range 10 nm–35 μm</td>
<td>Indoor air quality (IAQ)</td>
</tr>
<tr>
<td>PM₁₀, PM₄, PM₂, inhalable, thoracic, respirable acc. to EN 481</td>
<td>Cabin air monitoring in vehicles, airplanes, cockpits, busses, trains</td>
</tr>
<tr>
<td>Counts and Mass</td>
<td>Nanoparticle source identification</td>
</tr>
<tr>
<td>Built-in sample air dryer</td>
<td>Workplace monitoring</td>
</tr>
<tr>
<td>Real-time and portable</td>
<td>R&amp;D testing in industry</td>
</tr>
<tr>
<td>Advanced software; wireless Bluetooth operation</td>
<td></td>
</tr>
<tr>
<td>No need for butanol; no radioactive source</td>
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</tbody>
</table>

### SMPS+C Scanning Mobility Particle Sizer with Condensation Particle Counter

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condensation Particle Counter (CPC) and 2 Vienna type Differential Mobility Analyzers (DMAs)</td>
<td>Fundamental aerosol research</td>
</tr>
<tr>
<td>Particle Size range: 5–350 nm (M-DMA) 10–1094 nm (L-DMA)</td>
<td>Environmental and climatic studies</td>
</tr>
<tr>
<td>Stepping mode: 45 up to 255 channels</td>
<td>Inhalation and exposure studies</td>
</tr>
<tr>
<td>Scanning mode: 64 channels per decade, logarithmic spacing</td>
<td>Studies on NP growth, coagulation and transport</td>
</tr>
<tr>
<td>Various accessories to accommodate a variety of experimental needs</td>
<td>Engine exhaust studies</td>
</tr>
<tr>
<td></td>
<td>Mobile aerosol studies</td>
</tr>
<tr>
<td></td>
<td>Workplace monitoring</td>
</tr>
</tbody>
</table>
**SMPS+E**

**Model**

**Benefits**
- Faraday Cup Electrometer, 3 Differential Mobility Analyzers (S, M, L) and DMA controller
- Size range 0.8 nm–1094 nm
- Concentration range 100 to 10⁹ particles/cm³
- Sampling up to 16 Hz
- Advanced software

**Applications**
- Fundamental aerosol research
- Studies on atmospheric nucleation
- Size distributions of airborne ion clusters
- Macromolecule studies
- Nanotechnology process monitoring
- Combustion studies
- Reference for calibration of CPCs

**EDM 465**

**Model**

**Benefits**
- Butanol CPC (n-butanol)
- Particle size range 4 nm–1 μm
- Concentration range: 1–150 000 particles/cm³
- Built-in isothermal sample air dryer
- Data logger with GSM
- Fully automatic 24/7 monitoring system in real-time
- Meteorological sensors, weather housing

**Applications**
- Mobile monitoring of ultrafine particles
- Traffic emission monitoring
- Public site and urban monitoring
- Epidemiological health studies
- Source identification

**EDM 665**

**Model**

**Benefits**
- 2 systems (SMPS+C and EDM 180)
- 71 particle size channels
- Particle size range 5 nm–32 μm
- PM₁₀, PM₂.₅, PM₁, inhalable, thoracic, respirable
- Counts and Mass
- Built-in isothermal sample air dryer
- Fully automatic 24/7 monitoring system in real-time
- Meteorological sensors, weather housing

**Applications**
- Atmospheric monitoring of ultrafine particles and dust
- Atmospheric science
- Source identification
- Traffic emission monitoring
### EDM 180

**Environmental Dust Monitor for automated PM measurement**

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Certificates and Approvals: US-EPA, MCERTS, UMEG, CMA</td>
<td>- Automated Measurement System for PM networks</td>
</tr>
<tr>
<td>- 31 particle size channels</td>
<td>- Urban and rural PM monitoring</td>
</tr>
<tr>
<td>- Particle size range 0.25–32 μm</td>
<td>- Environmental and climatic studies</td>
</tr>
<tr>
<td>- PM&lt;sub&gt;10&lt;/sub&gt;, PM&lt;sub&gt;2.5&lt;/sub&gt;, PM&lt;sub&gt;1&lt;/sub&gt;, Total Counts and size distribution</td>
<td>- Epidemiological studies</td>
</tr>
<tr>
<td>- Built-in isothermal sample air dryer</td>
<td>- Monitoring of construction and mining sites</td>
</tr>
<tr>
<td>- Fully automatic 24/7 monitoring system in real-time</td>
<td></td>
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<tr>
<td>- Automatic cleaning of the optical measuring cell</td>
<td></td>
</tr>
<tr>
<td>- No radioactive source</td>
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</tr>
<tr>
<td>- Modular expandability of the measuring modes</td>
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<td>- Very low maintenance and no consumables</td>
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### EDM 164

**Transportable Air Quality Monitoring Station**

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Optical measuring cell and algorithm equivalent to EDM 180</td>
<td>- Mobile and simulataneous monitoring of PM&lt;sub&gt;10&lt;/sub&gt;, PM&lt;sub&gt;2.5&lt;/sub&gt;, PM&lt;sub&gt;1&lt;/sub&gt;</td>
</tr>
<tr>
<td>- 31 particle size channels</td>
<td>- Hot Spot Monitoring</td>
</tr>
<tr>
<td>- Particle size range 0.25–32 μm</td>
<td>- Urban and rural PM monitoring</td>
</tr>
<tr>
<td>- PM&lt;sub&gt;10&lt;/sub&gt;, PM&lt;sub&gt;2.5&lt;/sub&gt;, PM&lt;sub&gt;1&lt;/sub&gt;, Total Counts, and size distribution</td>
<td>- Source identification</td>
</tr>
<tr>
<td>- Fully automatic 24/7 monitoring system in real-time</td>
<td>- Quantification of diffusive emissions according to VDI 4285, part 3</td>
</tr>
<tr>
<td>- Automatic cleaning of the optical measuring cell</td>
<td>- Early warning system for fires</td>
</tr>
<tr>
<td>- Low maintenance and operating costs</td>
<td>- Road side monitoring</td>
</tr>
<tr>
<td>- Meteorological sensors</td>
<td>- Fence line monitoring</td>
</tr>
</tbody>
</table>
### Environmental Dust Monitor for automated PM measurement

<table>
<thead>
<tr>
<th>Model</th>
<th>Benefits</th>
<th>Applications</th>
</tr>
</thead>
</table>
|       | - Continuous monitoring of smallest PM$_{2.5}$ or PM$_{10}$ dust concentrations in ambient air  
- Suitability tested and QAL1 certified for PM$_{2.5}$ and PM$_{10}$: 2008/50/EG, DIN EN 15267  
- Cost savings through low maintenance requirements  
- No cleaning of the measuring cell required  
- Integrated data storage with accessibility of up to 9 months  
- Up to 1.5 years operation without filter change through multiple filter spot usage  
- Enhanced Gesytech protocol allows remote access to measurement data and device control  
- Factory pre-calibrated monitor measures accurately without local calibration  
- Easy integration into existing ambient air quality measuring networks | - Automated, certified monitor for PM networks  
- Extremely robust and reliable 24-h-mean values for fine dust mass concentration monitoring  
- Urban and rural PM monitoring  
- Monitoring of construction and mining sites  
- Fence line monitoring around industrial facilities  
- Applicable even for high dust concentrations |
Contact

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