

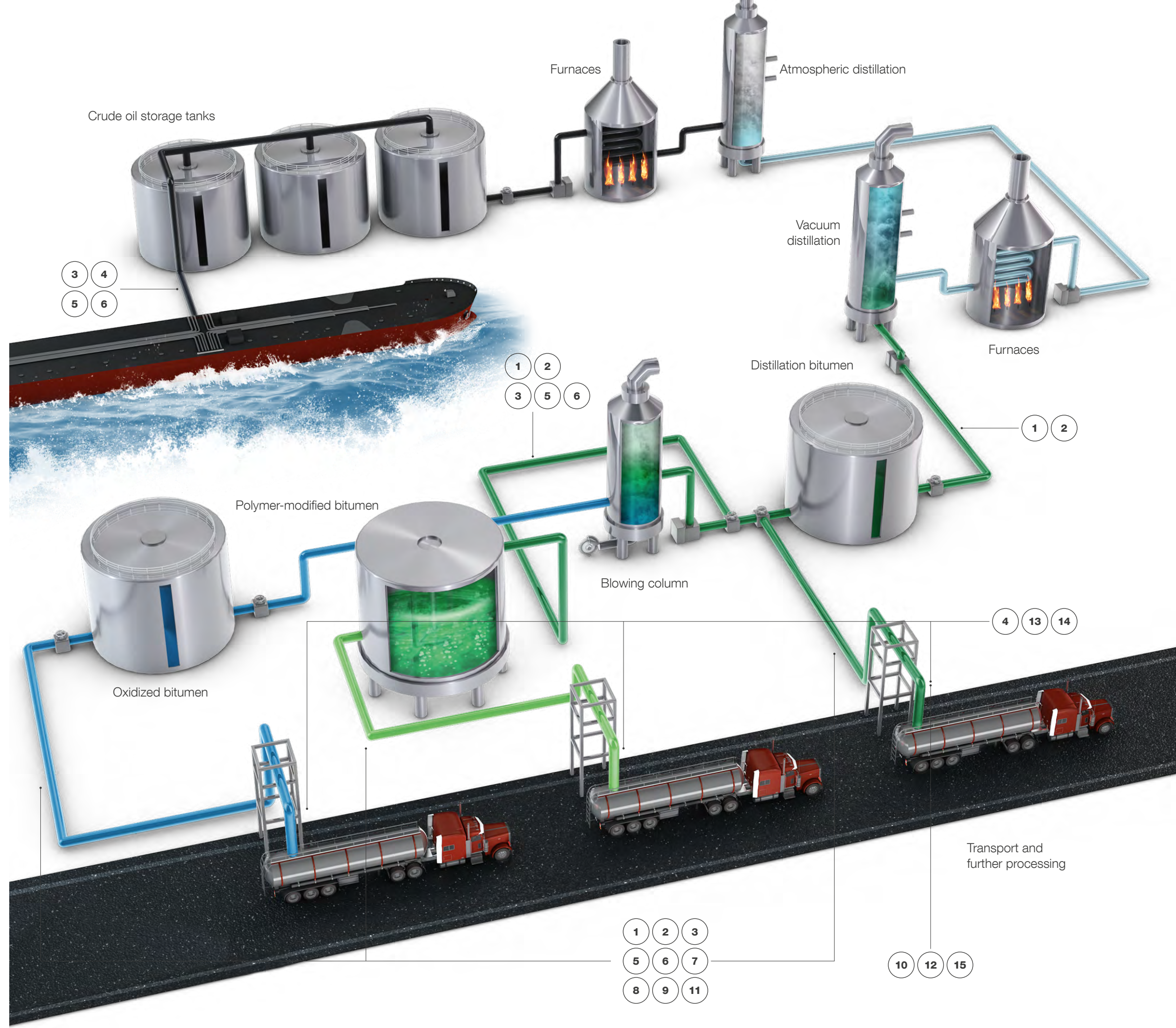
Your Way to  
**Comprehensive  
Asphalt Measurement**

Asphalt and Bitumen Portfolio



# Production of Asphalt and Bitumen

Asphalt and bitumen literally ground our daily lives in the shape of roads, pavements, runways, and more. We offer a variety of solutions for measuring the density and viscosity as well as the deformation and flow behavior of e.g., asphalt components and compositions. Possible areas of application are the digestion of asphalt samples for subsequent trace analysis or the determination of parameters such as the softening point, breaking point, and penetration.



# Dynamic Shear Rheometer: SmartPave 102e

1

SmartPave 102e is based on the well-established EC motor system from MCR Evolution rheometers, meeting the highest measurement requirements, especially in research and development. It incorporates innovative features like Toolmaster™, a Peltier temperature device for dry sample heating, and step-by-step instructions for measuring procedures that take bitumen and asphalt binder rheology to previously unattained levels of accuracy. With the DSR SmartPave 102e, all rheological asphalt binder specifications according to international standards, such as ASTM, AASHTO, DIN EN, IS, GOST, and SATS, can be measured.

#### Standards:

- AASHTO T315, ASTM D7175 (SHRP test/Superpave PG)
- AASHTO T316, ASTM D4402, DIN EN 13302 & 13702 (Rotational viscosity)
- AASHTO T350, ASTM D7405, DIN EN 16659 (MSCR test)
- AASHTO TP101-UL (LAS test)
- AASHTO TP123 (BYET)
- FGSV AL 720 (BTSV)
- FGSV AL 721 (Constant shear rate)
- FGSV AL 722 (Temperature sweep)
- DIN EN 14770 (Temperature sweep)
- FGSV AL 723 (MSCR test)

#### Parameters:

- Rotational viscosity
- Complex shear modulus
- Phase angle
- Performance grade
- Elastic response
- Temperature
- Non-recoverable creep compliance
- Percentage recovery



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# Dynamic Shear Rheometer: SmartPave 92

2

SmartPave 92, also based on the well-established, highly accurate EC motor system, is the ideal device for daily measuring routines and quality control in test laboratories. The step-by-step software, Toolmaster™, TruRay (integrated light), QuickConnect (fast and easy mounting of the measuring system), and many other features guarantee excellent ease of use and convenient operation for rheological bitumen and asphalt measurements according to international specifications such as ASTM, AASHTO, DIN EN, IS, GOST, and SATS.

#### Standards:

- AASHTO T315, ASTM D7175 (SHRP test/Superpave PG)
- AASHTO T316, ASTM D4402, DIN EN 13302 & 13702 (Rotational viscosity)
- AASHTO T350, ASTM D7405, DIN EN 16659 (MSCR test)
- FGSV AL 720 (BTSV)
- FGSV AL 721 (Constant shear rate)
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- DIN EN 14770 (Temperature sweep)
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#### Parameters:

- Rotational viscosity
- Complex shear modulus
- Phase angle
- Performance grade
- Elastic response
- Temperature
- Non-recoverable creep compliance
- Percentage recovery



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# Rotational Rheometer: **RheolabQC**

3

RheolabQC is a very robust and reliable instrument that measures the rotational viscosity of bitumen and asphalt products at elevated temperatures. The determination of flow curves and the temperature-dependent flow behavior of these materials give you valuable information about their processability. A Peltier temperature device ensures fast and accurate heating up to 180 °C, and disposable cups minimize the cleaning required.

#### Standards:

- In correlation with ASTM D4402, AASHTO T316, and DIN EN 13302 (temperature control up to max. 180 °C)

#### Parameters:

- Rotational viscosity
- Temperature
- Shear rate
- Shear stress



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# Density Meter for Petroleum Products: **DMA 4200 M**

4

DMA 4200 M measures the density and specific gravity of highly viscous samples like bitumen and asphalt. Its U-tube made of Hastelloy C276 is highly resistant and virtually unbreakable. It improves, accelerates, and simplifies density measurement of bitumen and asphalt binders. With DMA 4200 M, tedious, manual, and time-intensive measurements with pycnometers or hydrometers belong to the past.

#### Standards:

- ASTM D8188, in correlation with ASTM D70 and ASTM D3142

#### Parameters:

- Density
- API gravity
- Relative density



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# Rotational Viscometer: **ViscoQC 100**

5

ViscoQC 100, with the electric temperature device ETD 300, is the entry-level setup for viscosity measurements of bitumen and asphalt in quality control. It is the ideal instrumentation for quick single-point tests at temperatures from 25 °C up to 300 °C, complying with international specifications such as ASTM, AASHTO, and DIN EN.

#### Standards:

- ASTM D4402
- AASHTO T316
- DIN EN 13302

#### Parameters:

- Rotational viscosity
- Temperature
- Shear rate
- Shear stress



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# Rotational Viscometer: **ViscoQC 300**

6

ViscoQC 300 improves quality control of bitumen and asphalt with automated measuring methods and unique features such as TruMode™ (optimal speed detection) and Toolmaster™ (automatic spindle recognition). It can be paired either with the ETD 300 temperature device for flow curves of high-temperature measurements or with the PTD 175 Peltier temperature device, for demanding and fast temperature ramping tests.

#### Standards:

- ASTM D4402
- AASHTO T316
- DIN EN 13302

#### Parameters:

- Rotational viscosity
- Temperature
- Shear rate
- Shear stress



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# Fraass Breaking Point Tester: **BPA 5**

7

The BPA 5 automatic Fraass breaking point tester determines the brittle behavior of bitumen and asphalt at low temperatures. A thin, flat steel plaque, coated with the sample, is flexed under specified conditions at a descending series of temperatures until a crack occurs.

#### Standards:

- EN 12593
- IP 80
- JIS K 2207

#### Parameters:

- Fraass breaking point



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# Penetrometer: **PNR 12**

8

The modular PNR 12 penetrometer automatically measures a material's resistance against being pierced by a specifically-shaped penetrator such as a needle.

PNR 12 is suitable for consistency determination, and provides the basic value for the product specification of bitumen and asphalt.

#### Standards:

- ASTM D5
- EN 1426
- EN 13179-2
- AASHTO T49
- JIS K 2207
- GOST 33136

#### Parameters:

- Penetration



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# Cleveland Flash and Fire Point Tester: **CLA 5**

9

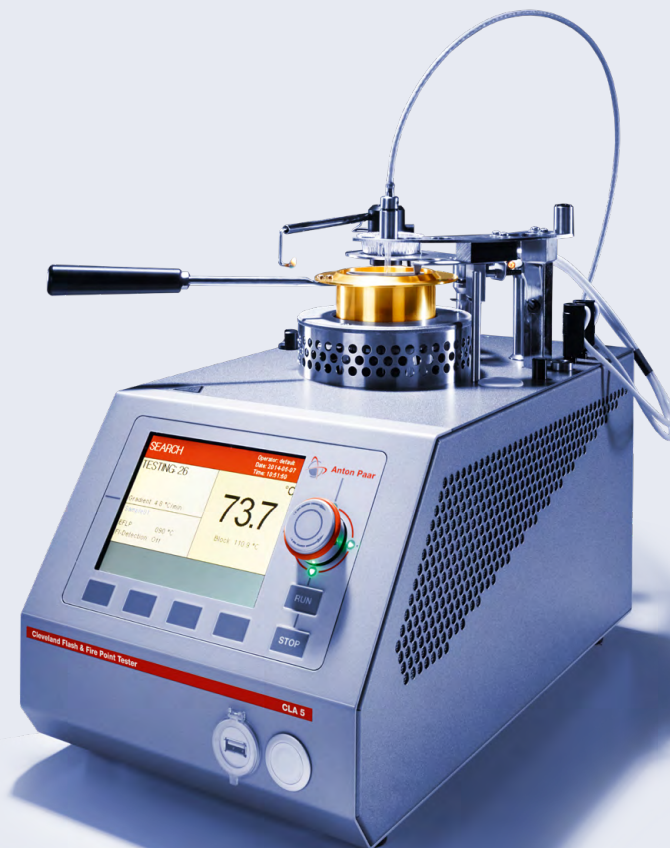
CLA 5 automatic open-cup flash and fire point tester measures the flash point, which indicates the tendency to form a flammable mixture with air, and the fire point, which indicates the tendency for sustained burning in bituminous materials.

#### Standards:

- ASTM D92
- ISO 2592
- JIS K 2265-4
- AASHTO T48
- FTM 791-1103
- IP 36
- GOST 4333

#### Parameters:

- Flash point
- Fire point



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# Pensky-Martens Flash Point Tester: **PMA 500**

10

The Pensky-Martens closed-cup flash point tester PMA 500 reliably measures the flash point of bituminous materials. Its new durable electric igniter, efficient cooling technology, and intuitive design reduce operating costs significantly.

#### Standards:

- ASTM D93
- ISO 2719
- IP 34
- JIS K2265-3

#### Parameters:

- Flash point



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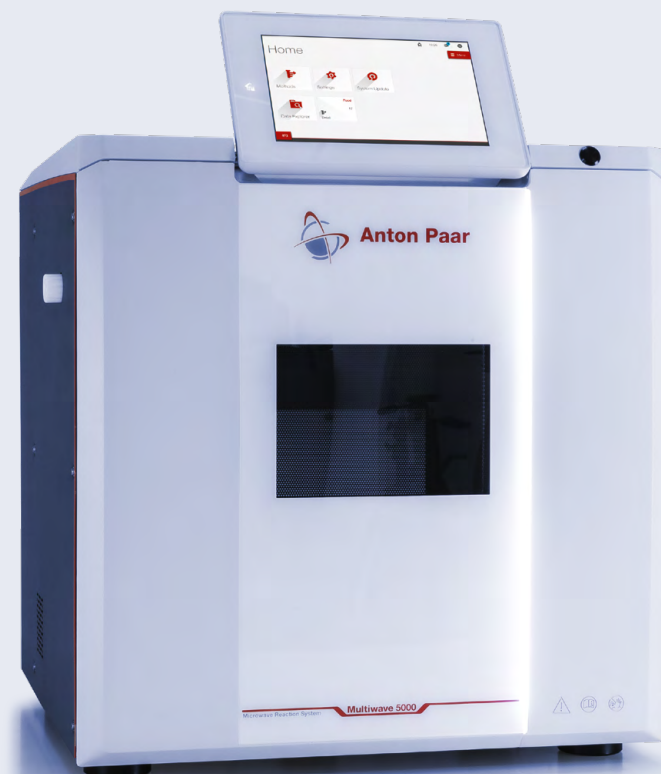
# Microwave-assisted Sample Preparation: **Multiwave 5000**

11

Multiwave 5000 is a modular microwave reaction platform with a broad range of available rotors, vessels, and accessories. Its flexibility with regard to configuration allows not only acid digestion and leaching of bitumen and asphalt samples, but also solvent extraction for the determination of salt content in bitumen samples.

#### Parameters:

→ Sample preparation for elemental analysis



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# Microwave-assisted Acid Digestion: **Multiwave 7101/7301/7501**

12

Multiwave 7101/7301/7501 completely digests your bitumen and asphalt samples for further analysis with ICP technology. When monitoring and analyzing contaminations, good sample preparation is a key factor: Only with the right microwave-assisted sample preparation can a complete and sufficient digestion be guaranteed.

#### Parameters:

→ Sample preparation for elemental analysis



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# Particle Size Analyzer: **PSA 1090 L**

13

PSA measures the size of colloids in bitumen emulsions, enabling the optimization of application-relevant properties. The instrument is controlled by the user-friendly and easy-to-use software Kalliope, and can be operated in the harshest environments due to its robust design. All optical components are mounted on a cast-iron base plate to ensure the system's permanent alignment.

**Standards:**

- ISO 13320
- ISO 9276

**Parameters:**

- Particle size
- Particle size distribution



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# Particle Size Analyzers: **Litesizer DLS 500 and Litesizer DLS 700**

14

Litesizer DLS 500 and Litesizer DLS 700 measure the zeta potential using the patented cmPALS technique to help you understand and modify the coagulation of bitumen particles, yielding insights into long-term stability of asphalt and bitumen emulsions. Absolute zeta potential values higher than  $\pm 30$  mV indicate a stable emulsion.

**Standards:**

- ISO 13099-2

**Parameters:**

- Zeta potential



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# Solid Density Analyzer: **Ultrapyc 5000**

15

The Ultrapyc 5000 gas pycnometer – with disposable metal cups – significantly reduces measurement time when determining bitumen purity and composition in comparison to the manual method according to ASTM D70. The instrument measures the density of bituminous semi-solids, asphalt binders, and mixtures for paving requirements.

#### Standards:

→ ASTM D4892

#### Parameters:

→ Density



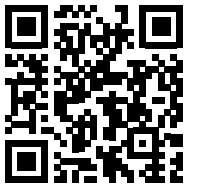
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# Reliable. Compliant. **Qualified.**

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Our well-trained and certified technicians are ready to keep your instrument running smoothly.



#### Maximum uptime

Regardless of how intensively you use your instrument, we help you keep your device in perfect shape and safeguard your investment. For at least 10 years after the discontinuation of a device, we'll provide you with any service and spare part that you might need.



#### Warranty program

We're confident in the high quality of our instruments. That's why we provide a full 3-year warranty. Just make sure to follow the relevant maintenance schedule. You can also extend your instrument's warranty beyond its expiration date.



#### Short response times

We know that sometimes it's urgent. That's why we provide a response to your inquiry within 24 hours. We give you straightforward help from great people, not from bots.



#### A global service network

Our large service network for customers spans 86 locations with more than 600 certified service technicians. Wherever you're located, there's always an Anton Paar service technician nearby.

