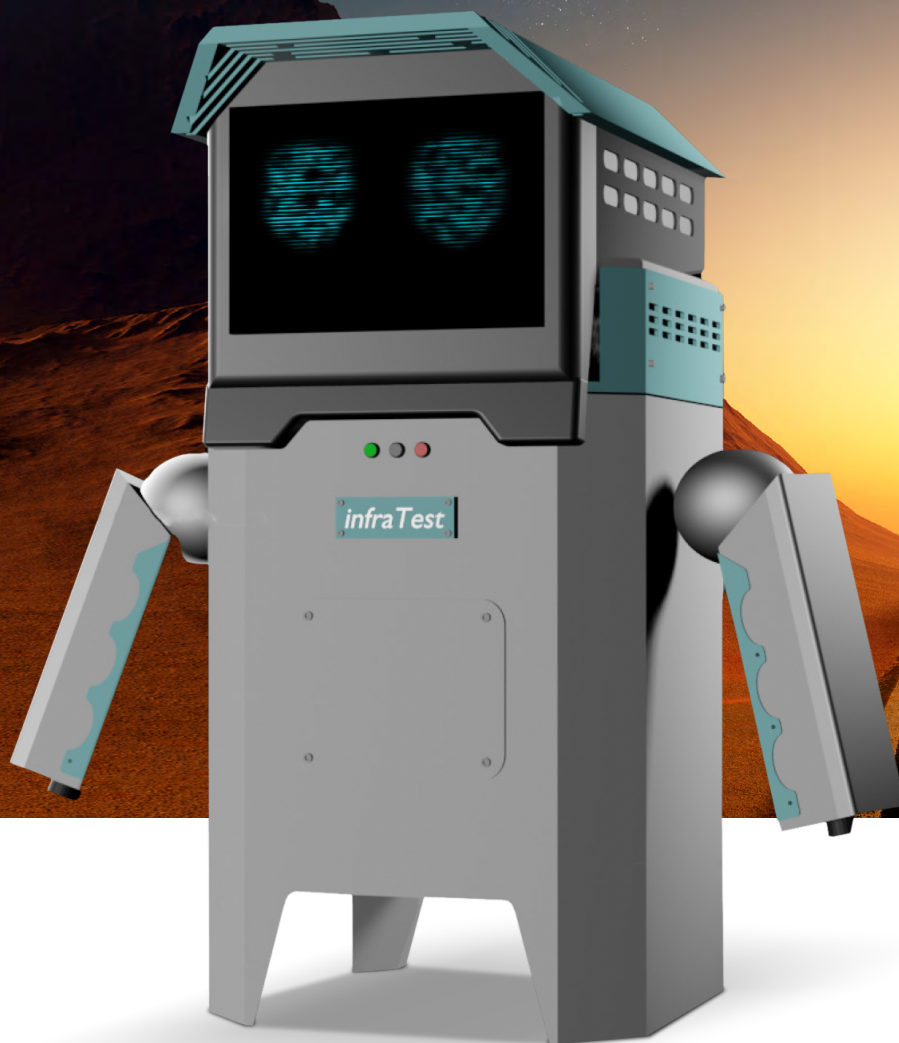


# CATALOG

## ASPHALT & BITUMEN

ALWAYS  
2 STEPS  
AHEAD!









**ALWAYS  
2 STEPS  
AHEAD!**

---

## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### Duriez mold set 80 mm

NF P98-251-4 For static loading of asphalt samples in a testing machine. Equipment set consisting of Duriez form, base plate, pressure stamp, retaining ring and form cylinder.

20-1810

#### Duriez cylinder shape

##### Technical specifications

|            |         | Height mm | Weight |
|------------|---------|-----------|--------|
| 20-1810E10 | 80mm    | 195       | 4.30kg |
| 20-1812E10 | 101.6mm | 190       |        |

#### Stamp with collar

and drainage grooves, usable for top and bottom.

##### Technical specifications

|            |                 | Weight |
|------------|-----------------|--------|
| 20-1810E25 | Ø 79.8 x 65 mm  | 3.10kg |
| 20-1812E25 | Ø 101.4 x 80 mm |        |

#### Stamp with collar

Without drainage grooves, usable for top and bottom.

##### Technical specifications

|            |                 | Weight |
|------------|-----------------|--------|
| 20-1810E30 | Ø 79.8 x 65 mm  | 6.10kg |
| 20-1812E30 | Ø 101.4 x 80 mm |        |

#### Retaining ring

##### Technical specifications

|            |            | Weight |
|------------|------------|--------|
| 20-1810E40 | Ø 80 mm    | 0.50kg |
| 20-1812E40 | Ø 101.6 mm |        |

#### Forming cylinder

##### Technical specifications

|            |                | Weight |
|------------|----------------|--------|
| 20-1810E50 | Ø 85 x 115 mm  | 3.70kg |
| 20-1812E50 | Ø 105 x 125 mm |        |
| 20-1815E50 | Ø 125 x 135 mm |        |

#### Inspection stamp

##### Technical specifications

|            |                   | Weight  |
|------------|-------------------|---------|
| 20-1810E20 | Ø 79.8 x 195 mm   |         |
| 20-1812E20 | Ø 101.4mm x 190mm |         |
| 20-1815E20 | Ø 119.8mm x 275mm | 24.20kg |

#### Steel cylinder shape Ø 101.6 mm

ASTM D 1074-74, height 177.8mm

20-1813E10

#### Special pressure stamp 201.65 mm

20-1813E30

#### Duriez mold set 120 mm

NF P98-251-4 For static loading of asphalt samples in a testing machine. Equipment set consisting of Duriez form, base plate, pressure stamp, retaining ring and form cylinder.

20-1815

#### Duriez cylinder shape Ø 120 mm

##### Technical specifications

|            |         |
|------------|---------|
| Height     | 275mm   |
| Weight     | 8.80 kg |
| 20-1815E10 |         |



### Stamp with collar Ø 119.8 x 95 mm

And drainage grooves, usable for top and bottom.

#### Technical specifications

Weight 6.10 kg

20-1815E25

### Cylindrical shape 150 x 300 mm

M KRC without base plate.

#### Technical specifications

Weight 10.50 kg

20-1817E10

### Stamp with collar Ø 119.8 x 95 mm

Without drainage grooves, can be used above and below.

20-1815E30

### Retaining ring 2-part Ø 120 mm

20-1815E40

### Testing/expulsion frame 100 kN

Suitable for sample cylinder Ø 150 mm, height 300 mm 20-1817E10.. Contains:

- ▶ Four-column frame with head, foot and height-adjustable intermediate plate
- ▶ Replaceable insert plate with a conical attachment to match the headstock
- ▶ Hydraulic cylinder 100 kN, stroke 160 mm
- ▶ Two-stage hydraulic pump with high-pressure hose and precision manometer 0-100 kN/0-509 bar The test cylinders Ø 150 mm 20-1817E10 and pressure and adapter stamps 20-1817E60 and 20-1817E65 are not included in the scope of delivery.

20-1817

### Stamp Ø 149.6 x 30 mm

With drainage grooves, (2 required per cylinder shape).

#### Technical specifications

Weight 2.90 kg

20-1817E60

### Adaptor stamp height 60 mm

For 20-1817E60 (2 required).

#### Technical specifications

Weight 3.60 kg

20-1817E65

### Water collection tray

With support for 20-1817E10.

20-1817E80

## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### Penetration depth tester 1-way

EN 12697-20 To determine the penetration depth and to test the behavior of mastic asphalt, rolled asphalt and similar bituminous masses under static load with a cylindrical stamp. Equipment consisting of stainless steel basin with test frame and lowerable set of weights of 500 N. Incl. interchangeable test stamp 1 and 5 cm<sup>2</sup> as well as precision dial gauge 30 mm, gen. 0.01 mm. Without heater 50-0615.



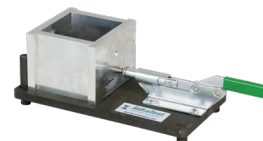
##### Technical specifications

|            |               |
|------------|---------------|
| Dimensions | 420x250x870mm |
| Weight     | 94.00 kg      |

20-1830

#### Cube shape 70.7 mm

With base plate and quick-clamping device for the production of specimens for indentation tests.



##### Technical specifications

|        |         |
|--------|---------|
| Weight | 3.10 kg |
|--------|---------|

20-1850

#### Sample cylinder with aluminum base plate Ø 150 x 25 mm

EN 12697-21 (D)

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.50 kg |
|--------|---------|

20-1852

#### Penetration depth tester 2-way

EN 12697-20 To determine the penetration depth and to test the behavior of mastic asphalt, rolled asphalt and similar bituminous masses under static loading with a cylindrical stamp. Equipment consisting of a stainless steel basin and frame for 2 samples with lowerable sets of weights of 500 N. Incl. interchangeable test stamps 1 and 5 cm<sup>2</sup> as well as two precision dial gauges 30 mm, gen. 0.01 mm. Without heater 50-0615.



##### Technical specifications

|            |               |
|------------|---------------|
| Dimensions | 660x250x870mm |
| Weight     | 172.00 kg     |

20-1840

#### Retensioning form 69 mm

For testing in the indentation depth tester, the specimen produced with 20-1850 is clamped in this mold.



##### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.20 kg |
|--------|---------|

20-1855

#### Penetration Test Plates

EN 12697-21 Additional equipment for 20-1830 or 20-1840 consisting of: Test stamp 31.7 mm<sup>2</sup> (Ø 6.35 mm) Support weights exchangeable 36 and 115 N Intermediate plate Ø 150 x 50 mm.

##### Technical specifications

|                 |            |
|-----------------|------------|
| Weight          | 18.20 kg   |
| Electrical data | 230V, 50Hz |

20-1875

#### Test stamp 31.7 mm<sup>2</sup>

20-1840E10



## Measurement data acquisition system ETG

For the continuous recording of the deformation during the indentation test with two measuring points (without temperature measurement). Contains: 2 displacement transducers 25 x 0.01 mm Electronics module for connecting the displacement transducers and RS 232 C/V24 interface for PC Set of connection cables Software under Windows with integrated test database for carrying out the penetration test according to EN 12697 with online output of a displacement /time diagram, result output of the increase 30.. 60 or 60..120 min., averaging sample A and B as well as output of an A 4 protocol with diagram and result values. A PC with Windows is required for operation.

### Technical specifications

|                 |            |
|-----------------|------------|
| Weight          | 1.20 kg    |
| Electrical data | 230V, 50Hz |

20-18800

## Measurement data acquisition system ETG +temperature acquisition

For the continuous recording of the deformation during the indentation test with two measuring points and temperature recording. Contains: 2 displacement transducers 25 x 0.01 mm Electronics module for connecting the displacement transducers and the temperature sensor and RS 232 C/V24 interface for PC Set of connection cables Set of temperature sensors Software under Windows with integrated test database for carrying out the penetration test according to EN 12697 -20 with online output of a distance/time diagram, logging of the temperature profile in the water bath, result output of the increase 30.. 60 or 60..120 min., averaging samples A and B and output of an A 4 log with diagram and result values. A PC with Windows is required for operation.

### Technical specifications

|                 |            |
|-----------------|------------|
| Weight          | 1.80 kg    |
| Electrical data | 230V, 50Hz |

20-18850

## Permeability asphalt EN 12697-19

Base frame with worktop and integrated stainless steel basin with 1 1/2" water drain for performing vertical and horizontal permeability tests on asphalt samples. Complete with base plate and drainage holes for permeability cells Ø 100 and 150 mm 20-1955.



### Technical specifications

|            |                |
|------------|----------------|
| Dimensions | 600x740x1050mm |
| Weight     | 45.00 kg       |

20-1950

## Permeability test cell Ø 100 mm vertical

With transparent attachment and overflow for 300 mm water column. Rubber membranes 10-3370 are also required to carry out the experiment.



### Technical specifications

|            |               |
|------------|---------------|
| Dimensions | 160x210x460mm |
| Weight     | 1.40 kg       |

20-1955

## Permeability test cell Ø 150 mm vertical

With transparent attachment and overflow for 300 mm water column. Rubber membranes 10-3375 are also required to carry out the experiment.



### Technical specifications

|            |               |
|------------|---------------|
| Dimensions | 230x240x460mm |
| Weight     | 29.00 kg      |

20-1957

## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### Additional device to 20-1955

For horizontal permeability tests on samples 100 mm. Complete with transparent cap and overflow for 300 mm water column.



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.90 kg |
|--------|---------|

20-1960

#### Additional device to 20-1957

For horizontal permeability tests on samples 150 mm. Complete with transparent cap and overflow for 300 mm water column.



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.30 kg |
|--------|---------|

20-1962

#### Scuba tank

EN 58 - ASTM D 140 - AASHTO T 40 Brass version, capacity 237 ml. Complete with 3 m chain and pull cord to release the locking valve.

#### Technical specifications

|            |               |
|------------|---------------|
| Dimensions | Ø 50 x 250 mm |
| Weight     | 2.00 kg       |

20-2010





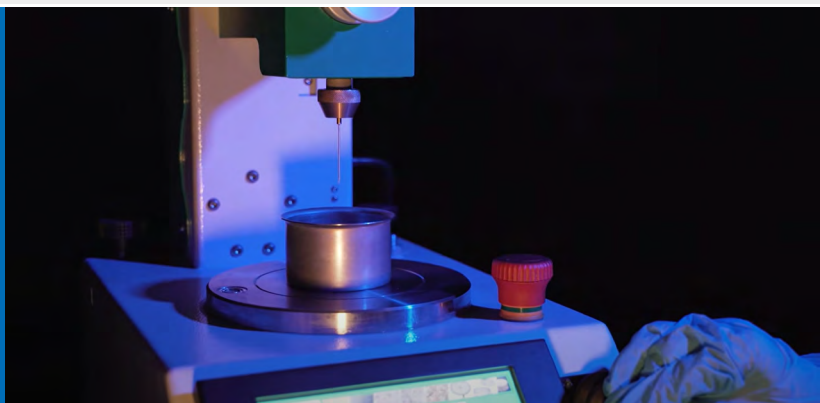


## AREA 20 ASPHALT & BITUMEN

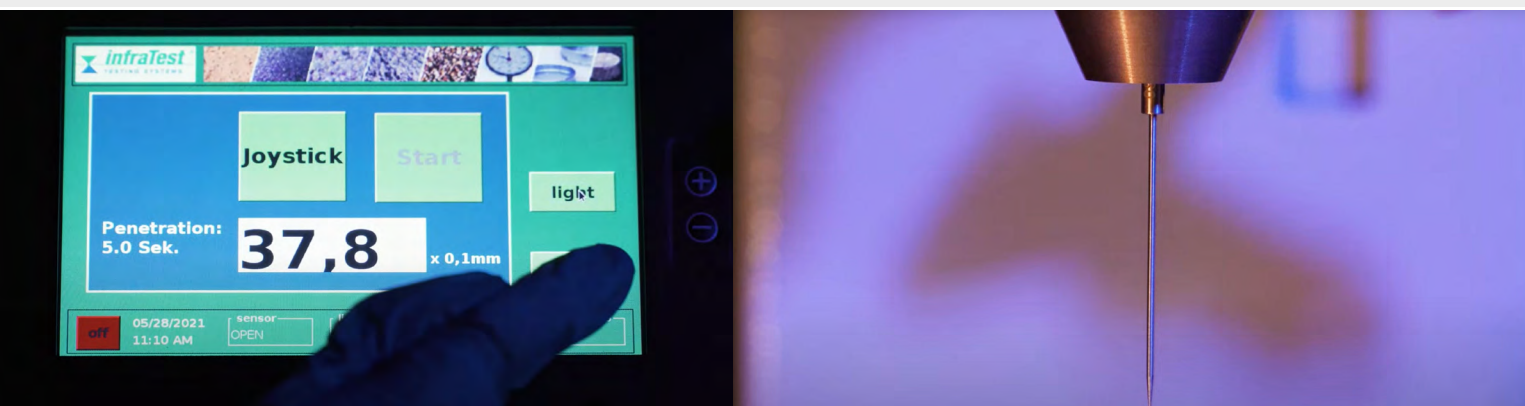
### Bitumen

#### Penetrometer

Device for determining needle penetration.



|                            |                                                                                |                                                                                              |
|----------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Item number                | 20-2050                                                                        | 20-2060                                                                                      |
|                            | Penetrometer                                                                   | Penetrometer with control unit                                                               |
| Norms                      | EN 1426 - ASTM D 5 - AASHTO T 49 - GOST 11501- GOST 33136-2014-78 - NF T66-004 | EN 1426 - ASTM D 5 - AASHTO T 49 - GOST 11501- GOST 33136-2014-78 - NF T 66-004              |
| Weight                     | 13.80kg                                                                        | 16.00kg                                                                                      |
| Electrical data            | 230V, 50/60Hz, 0.1kW                                                           | 230V, 50/60Hz, 0.1kW                                                                         |
| Differences in application | Manual drop bar arrest & time must be stopped itself.                          | Needle manually with crank on surface put on. The timer sets the trigger time automatically. |



20-20665

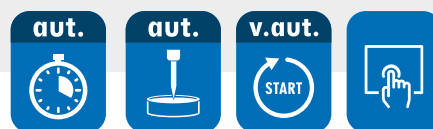
Penetrometer digital

EN 1426 - ASTM D 5 - AASHTO T 49 - GOST 11501-  
GOST 33136-2014-78 - NF T 66-004

24.00kg

100/240V, 50/60Hz

Needle is raised using the joystick  
move the surface.



20-20670

Penetrometer fully automatic

EN 1426 - ASTM D 5 - AASHTO T 49 - GOST  
11501- GOST 33136-2014-78 - NF T 66-004

26.00kg

100/240V, 50/60Hz, 0.6kW

Fully automatic surface recognition and  
adjustable via joystick.



## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### Penetrometer

EN 1426 - ASTM D 5 - AASHTO T 49 GOST 11501-78  
GOST 33136-2014 -78 - NF T 66-004

Stable frame with base plate, bubble level and adjustable feet as well as height-adjustable penetrometer arm with manual drop bar locking device. Complete with dial gauge 30 x 0.01 mm for reading the penetration depth and drop bar 97.5 g (drop bar 47.5 g available as additional option 20-2080E30). Without penetration needles and other accessories.

#### Technical specifications

|            |               |
|------------|---------------|
| Dimensions | 250x360x640mm |
| Weight     | 13.80 kg      |

20-2050

#### ACCESSORIES

see following pages



## Penetrometer with control unit

EN 1426 - ASTM D5 - AASHTO T 49 GOST 11501-78 – NF T66-004

Stable frame with base plate, bubble level and adjustable feet as well as a height-adjustable penetrometer arm with a time-controlled automatic fall arrest device using a multi-function time relay, adjustable from 0.1 seconds to 99.99 hours. To place the needle on the sample, a halogen lamp and measuring magnifier are attached to movable arms. Complete with dial gauge 30 x 0.01 mm for reading the penetration depth and drop bar 97.5 g (drop bar 47.5 g available as additional option 20-2080E30). Without penetration needles and other accessories.

### Technical specifications

|                 |                      |
|-----------------|----------------------|
| Dimensions      | 280x110x260mm        |
| Weight          | 16.00 kg             |
| Electrical data | 230V, 50/60Hz, 0.1kW |

20-2060





## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### Penetrometer digital

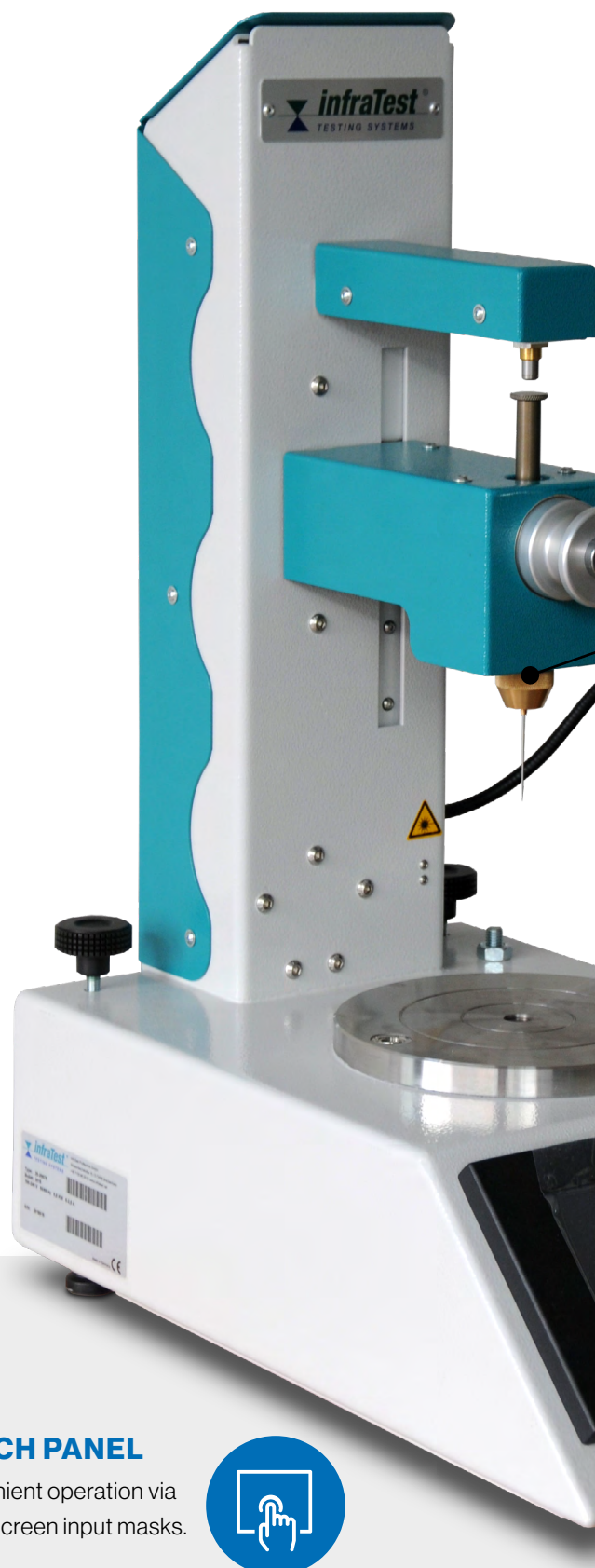
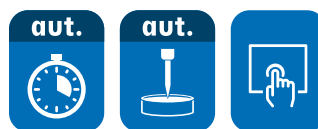
EN 1426 - ASTM D5 - AASHTO T 49 - GOST 11501-78 - NF T66-004 Device for determining needle penetration.

The distance that a standard needle penetrates the sample under standardized conditions (load, time, temperature) is measured. The penetration depth of the penetration needle is determined with an electronic distance measuring system, which is decoupled from the drop rod during the test. With this and with the free guidance of the drop rod, an influence on the load and friction is practically impossible. Before the start of each test, the path measuring system is automatically adjusted, and then the penetration needle is moved towards the sample with an electric drive, which is moved using a finely adjustable joystick (an ultra-bright LED lamp is used to help). The drop bar is then released via an automatic device and blocked again after the test time has elapsed. The test result is shown on the digital display. To calibrate the mass of the drop bar, it can be easily removed.

#### Technical specifications

|                 |                                                       |
|-----------------|-------------------------------------------------------|
| Dimensions      | 280x490x760mm                                         |
| Weight          | 24.00 kg                                              |
| Electrical data | 100/240V, 50/60Hz                                     |
| Measuring range | 0-400 Penetration Units<br>(corresponds to 0-40mm)    |
| Resolution      | 0.01mm                                                |
| Test load       | 100g<br>(drop rod 97.5g + 2.5g<br>penetration needle) |
| Test time       | free<br>(adjustable from 0.01 s)                      |

20-20665



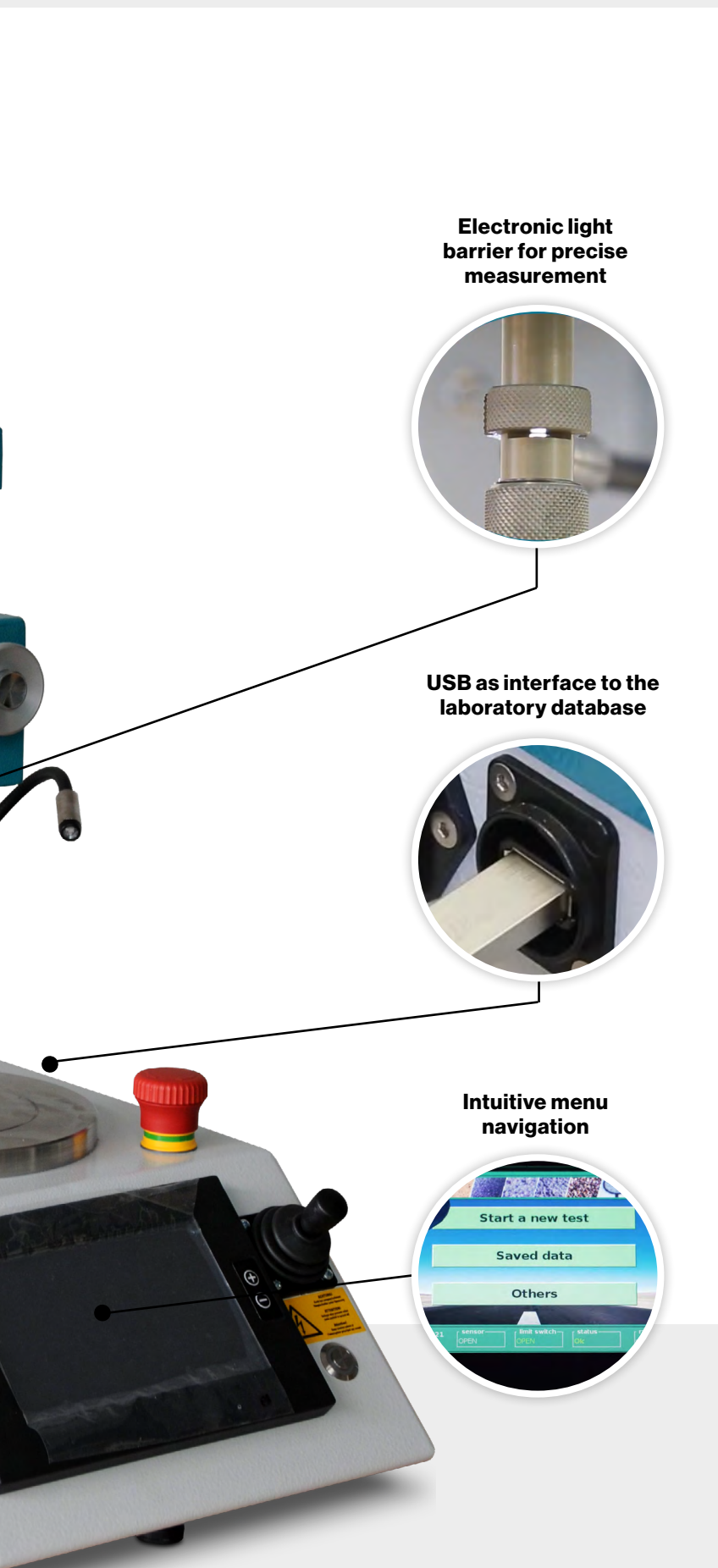
#### Advantages:

- ▶ High precision through automatic detection of the sample surface
- ▶ Manual operation possible
- ▶ Internal memory for up to 15,000 tests

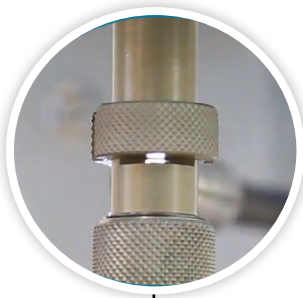
#### TOUCH PANEL

Convenient operation via touch screen input masks.





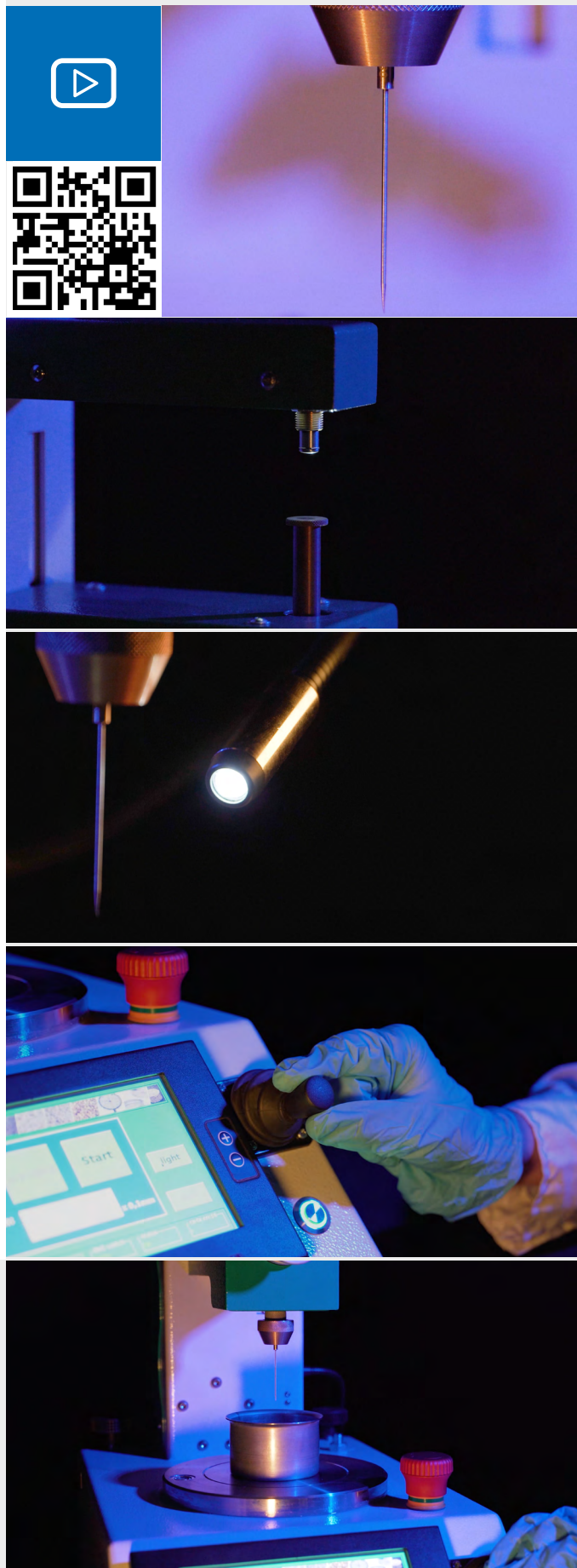
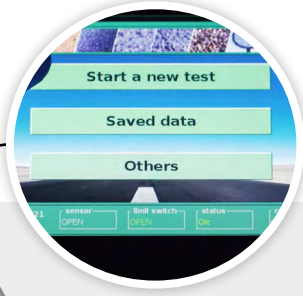
**Electronic light barrier for precise measurement**



**USB as interface to the laboratory database**



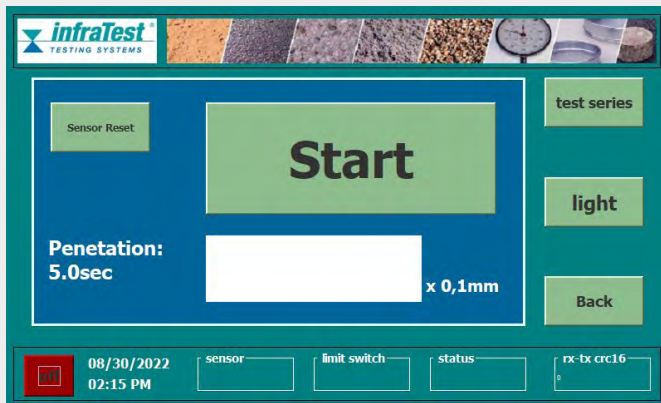
**Intuitive menu navigation**





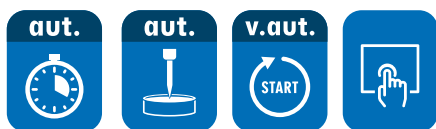
## AREA 20 ASPHALT & BITUMEN

### Bitumen



#### Advantages:

- ▶ High precision through automatic detection of the sample surface
- ▶ Manual and fully automatic operation possible
- ▶ Internal memory for up to 15,000 tests



## Penetrometer automatic

EN 1426 – EN13880-2 – EN 13880-3 -

ASTM D5 – AASHTO T 49

GOST 11501-78 – NF T66-004

To determine needle penetration.

The distance that a standard needle penetrates the sample under standardized conditions (load, time, temperature) is measured. The penetration depth of the penetration needle is determined with an electronic distance measuring system, which is decoupled from the drop rod during the test. With this and with the free guidance of the drop rod, an influence on the load and friction is practically impossible. Before each test begins, the position measuring system is automatically adjusted.

Approaching and placing on the sample is carried out fully automatically by means of a scanning system. Manual operation via the joystick is also possible. The drop bar is then released via an automatic device and blocked again after the test time has elapsed. The test result is shown on the graphic touch display. To calibrate the mass of the drop bar, it can be easily removed.

### Technical specifications

|                 |                                                          |
|-----------------|----------------------------------------------------------|
| Dimensions      | 280x490x760mm                                            |
| Weight          | 26.00 kg                                                 |
| Electrical data | 100/240 V, 50/60 Hz, 0.6 kW                              |
| Measuring range | 0-400 penetration units<br>(corresponds to 0-40 mm)      |
| Resolution      | 0.01mm                                                   |
| Test load       | 100 g<br>(drop rod 97.5 g + 2.5 g<br>penetration needle) |
| Test time       | free<br>(adjustable from 0.01 s)                         |

20-20670



### TOUCH PANEL

Convenient operation  
via touch screen input  
masks.



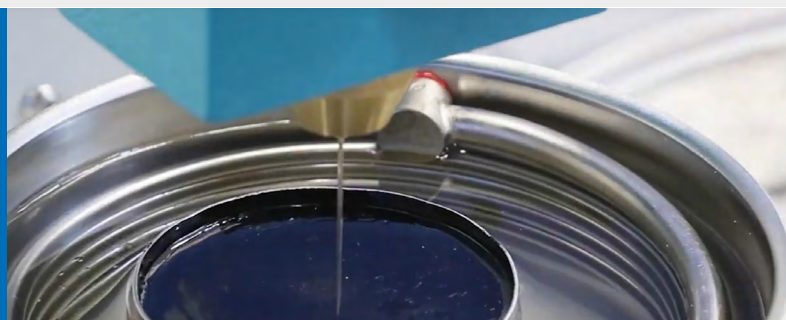


## AREA 20 ASPHALT & BITUMEN

### Bitumen

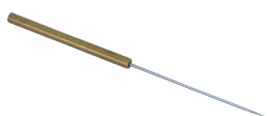
#### ACCESSORIES

for Penetrometer



#### Penetration needle 2.5 g / 3.2 mm magnet

EN 1426 - ASTM D5 - AASHTO T 49-07 With magnetic head and sequential identification number engraved on the barrel and shockproof packaging.



##### Technical specifications

Weight 0.025 kg

20-20711

#### Water bath Ø 95 x 60 mm

Without water connection nozzles, nickel-plated brass.



##### Technical specifications

Weight 0.10 kg

20-207200

#### Water bath Ø 160 mm without spouts

##### Technical specifications

Weight 1.00 kg



20-2074

#### Water bath Ø 160 mm

Stainless steel version with integrated pipe spiral and connection nozzles for tempering with water.



##### Technical specifications

Weight 1.00 kg

20-2076

#### Perforated base plate

DIN 52010 For placing in the penetration water bath and for setting up the test vessel.



##### Technical specifications

Weight 0.10 kg

20-2078

#### Drop rod 47.5 g

for the penetrometer 20-20665 and 20-20670 to hold the penetration ball and cone.

20-20670E35

#### Penetration bullet

EN 13880-3 With shaft Ø 3.2 mm, weight 27.5 +/- 0.1 g for use with drop rod 47.5 g.



##### Technical specifications

Weight 0.0275 kg

20-20810



## Penetration cone

EN 13880-2, ASTM D 217, ASTM D 937 With VA tip and shank Ø 3.2 mm, for use with drop rod 20-20670E35. When used with 20-20670 in manual mode only.



### Technical specifications

Weight 0.102 kg

20-20811

## Test vessel penetration

made of stainless steel for penetration attempts.



Ø mm

|         |               |               |
|---------|---------------|---------------|
| 20-2084 | Height 35 mm. | ID 55 / AD 60 |
| 20-2086 | Height 45 mm  | ID 55 / AD 60 |
| 20-2087 | Height 65 mm  | ID 55 / AD 60 |
| 20-2088 | Height 45 mm  | ID 70 / AD 78 |
| 20-2089 | Height 60 mm  | ID 70 / AD 78 |

ID = inner diameter / OD = outer diameter

## Penetrometer pre-tempering bath

Stainless steel design with cover and immersion heater 25 .. 100 x 0.05° C for preheating of penetration test samples. Complete with water circulation pump and hose connection fittings to connect 20-2076.



### Technical specifications

Heating capacity 1.5 kW

Working Temperature range +25... +100°C

*For cooling below 25°C, 20-2090E1 and a cooling system 20-1640 must be connected*

Temps. Constancy ±0.05°C

Dimensions 210x330x390mm

Weight 8.40 kg

Electrical data 230 V, 50/60 Hz, 2 kW

20-2090

## Cooling coil for tap water connection

Additional price to 20-2090

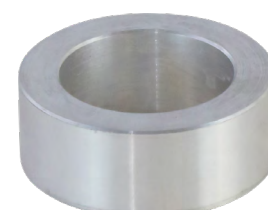
### Technical specifications

Weight 0.80 kg

20-2090E1

## Reducing ring

Ø 53/36 mm to reduce the amount of sample in penetration vessels.



20-2092 20mm 0.0667kg

20-2093 30mm 0.0975kg



## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### Ring and ball machine

EN 1427 - ASTM D36 - AASHTO T 53 - GOST 11506-73 To determine the softening point using ring and ball.

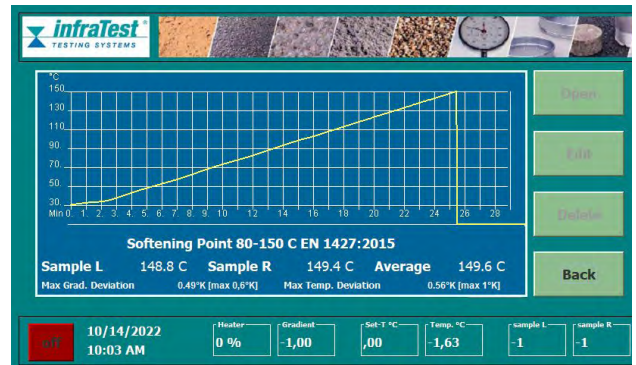
With glass ceramic plate, halogen lamp for heating and built-in magnetic stirrer underneath with adjustable speed. It is operated via a touch panel. For a standard temperature rise of 5 K/min. ensures a microprocessor-controlled regulation with continuous temperature measurement in the beaker. The temperature rise can be followed in real time on the touch display. The falling through of the balls is recorded by a light barrier on the right and left and the respective temperature value is displayed digitally. At the same time, the difference between sample 1 and 2 is output. The test data is saved via an internal log and can be called up at any time in the device or can be transmitted via a USB interface.

Three test types can be preselected, one for water from 30 to 80°C or one for glycerol from 80 to 150°C. In addition, we offer an optional test procedure for silicone oil from 80 to 200°C. Complete with 600 ml beaker, stirring rod and insert frame with 2 test rings, test balls and 2 ball centering devices. The user languages are German, English and French.

#### Technical specifications

|                 |                         |
|-----------------|-------------------------|
| Dimensions      | 290x580x380mm           |
| Weight          | 17.00 kg                |
| Electrical data | 230 V, 50/60 Hz, 0.7 kW |

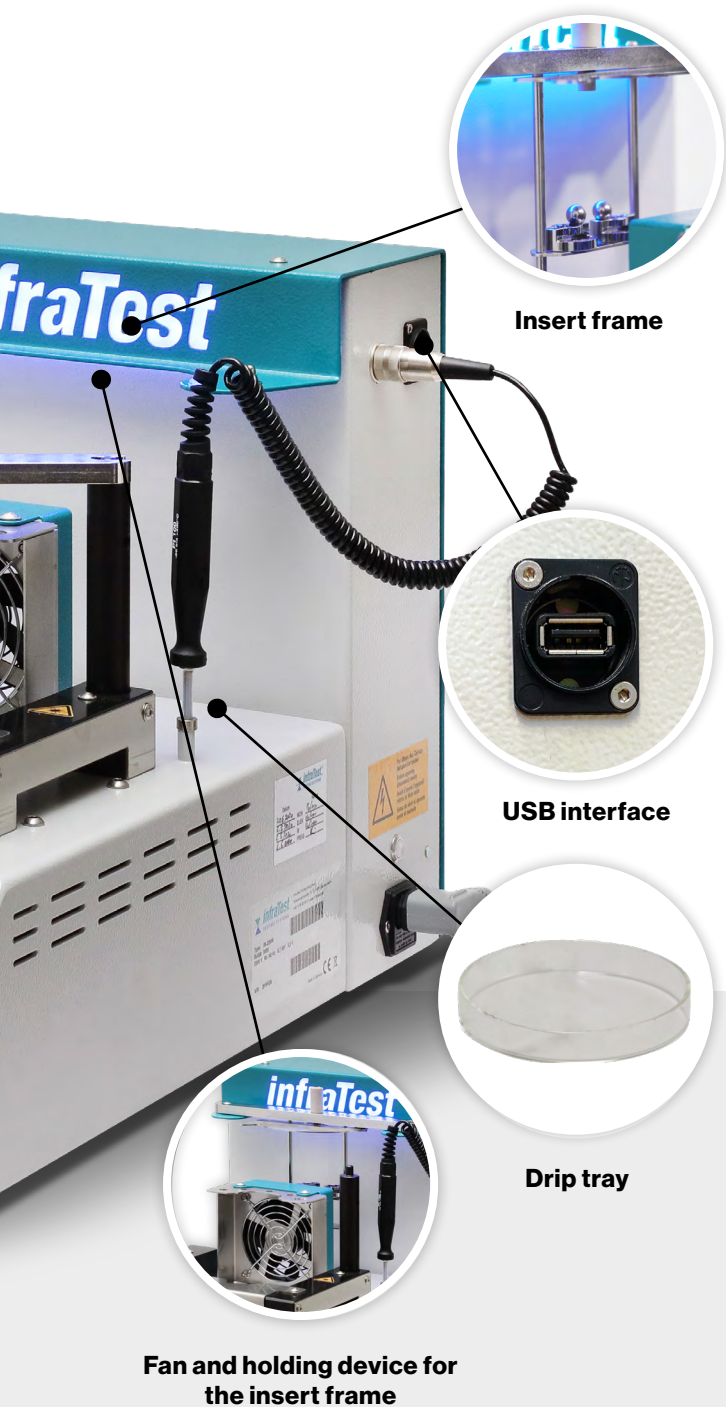
20-22000



#### Advantages:

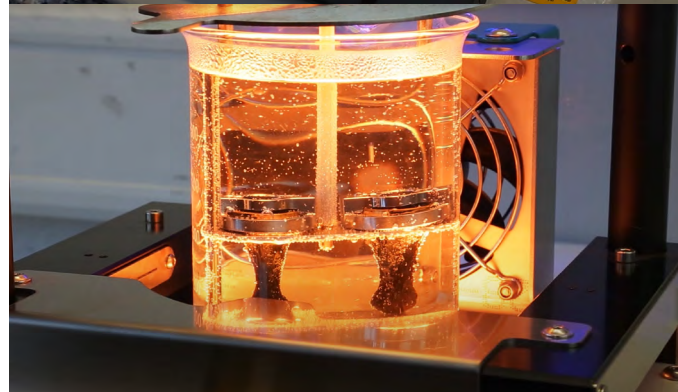
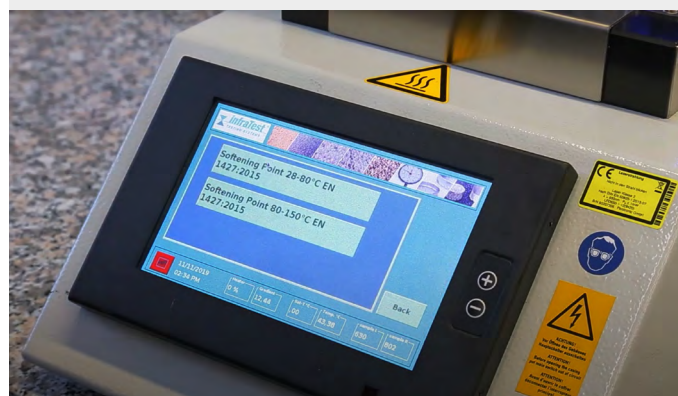
- ▶ Real-time temperature rise display and data storage
- ▶ Innovative infrared heating system
- ▶ Cooling function for beaker
- ▶ Up to 15,000 attempts can be saved
- ▶ Optional operation with silicone oil





## TOUCH PANEL

Convenient operation via touch screen input masks.



## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### ACCESSORIES

for Ring and Ball devices



#### Ring and ball insert frame

EN 1427 - ASTM D36 - AASHTO T 53 For performing ring and ball tests with manual temperature control on two samples simultaneously. Complete with 2 ball centering devices.

##### Technical specifications

Weight 0.20 kg

20-2120

#### Ring and ball insert frame for 20-2200

EN 1427 - ASTM D36 - AASHTO T 53 - GOST 11506-73



##### Technical specifications

Weight 0.40 kg

20-2215

#### Ring and ball insert frame for 20-22000

EN 1427 - ASTM D36 - AASHTO T 53 - GOST 11506-73



##### Technical specifications

Weight 0.40 kg

20-22150

#### Test ring with step

EN 1427 - ASTM D36 - AASHTO T 53 - GOST 11506-73



##### Technical specifications

Weight 0.01 kg

20-2125

#### Test ball Ø 9.5 mm

EN 1427 - ASTM D36 - AASHTO T 53 - GOST 11506-73



20-2135

#### Flat panel 150 x 150 mm

To prepare the test rings.



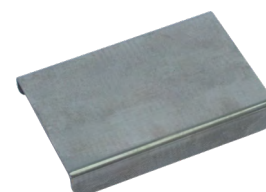
##### Technical specifications

Weight 0.10 kg

20-2140

#### Casting plate nickel-plated

EN 1427 brass nickel plated.



##### Technical specifications

Weight 0.10 kg

20-21420



### Sample cutter

With a straight cutting edge for cutting the test rings to size.



#### Technical specifications

Weight 0.10 kg

20-2145

### Stirring rod power magnet Ø 14 x 40 mm

For glycerol.



#### Technical specifications

Weight 0.03 kg

20-2217

### Beaker 600 ml

Low shape for ring and ball tests.



#### Technical specifications

Weight 0.20 kg

20-2150

### Magnetic stirring rod Ø 8 x 50 mm PTFE

For water experiments.



#### Technical specifications

Weight 0.01 kg

20-2218

### Test ball Ø 15 mm



#### Technical specifications

Weight 0.01 kg

20-2170

### Ball centering device RuK



#### Technical specifications

Weight 0.05 kg

F10.12.085





# AREA 20 ASPHALT & BITUMEN

## Bitumen

### Test device according to Wilhelmi

EN 1871 For testing potting compounds. Not for use with 20-22000.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.20 kg |
|--------|---------|

20-2160

### Test ring Wilhelmi 2-piece

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.05 kg |
|--------|---------|

20-2165

### Manual Fraass breaking point apparatus

Consisting of manual bending device with hand crank, test glass with rubber stopper, Dewar flask with foot and thermometer -30 +35° C. The test temperature is reached by adding carbon dioxide or dry ice.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.10 kg |
|--------|---------|

20-2250



### Fraass double breaking point apparatus

EN 12593-09 for determining the breaking point of bitumen at low temperatures. Device consisting of motor-driven bending device with test glass, Dewar flask with foot and thermometer -38 ... +30° C. The test temperature is reached by adding carbon dioxide or dry ice. This apparatus allows you to carry out tests with 2 test plates at the same time.

#### Technical specifications

|                 |                   |
|-----------------|-------------------|
| Dimension       | 230 x 280 x 602mm |
| Weight          | 7.80 kg           |
| Electrical data | 230V, 50Hz        |

20-22610



## Fraass breaking point apparatus

DIN EN 12593-09 In a robust plastic housing equipped with:

- ▶ Continuous force measurement up to breaking point detection
- ▶ Fully automatic control of the test plate bending cycles
- ▶ PC-based, fully automatic control of the cooling chamber temperature
- ▶ Standard-compliant glass insert for easy cleaning of the test chamber
- ▶ Digital video camera for the continuous observation of the test plate in the test chamber
- ▶ After completion of the breaking point test, the test chamber is heated up to ambient temperature to reduce the formation of condensation in the test chamber / on the sensor head
- ▶ Very fast testing through optimal control to the cooling rates permitted in the standard

In addition, the PC saves all of the measurement data from a bending test as a separate file. The measurement data of each test can also be printed out later at any time in a form. The measurement data are supplemented by graphics of the force measurement and the cooling rate during the test. The cooling of the breaking point device takes place via Peltier elements. This requires the device to be connected to the water pipe. At a water temperature of +10°C, a test temperature of up to approx. -30°C is reached. For lower temperatures, the connection of a refrigerated circulation thermostat 20-22660 is required. A Windows-capable PC, 500 MB processor and an RS232 or USB interface is also required.

### Technical specifications

|        |          |
|--------|----------|
| Weight | 30.00 kg |
|--------|----------|

20-22650

## Calibration set for the automatic breaking point 20-22650

Includes:

- ▶ holding frame
- ▶ Attachment adapter with temperature sensor and digital precision thermometer with USB interface and calibration certificate
- ▶ Up-path sensor for recording the bending distance with data cable, plug-in power supply and calibration certificate
- ▶ Set of test weights 50-100-200 g for calibrating the force sensor
- ▶ Digital caliper for calibrating the claw distance with calibration certificate
- ▶ Software for data acquisition and report creation

### Technical specifications

|        |         |
|--------|---------|
| Weight | 7.00 kg |
|--------|---------|

20-22655

## AREA 20 ASPHALT & BITUMEN

### Bitumen



#### Cooling thermostat

##### Technical specifications

|                                   |                                        |
|-----------------------------------|----------------------------------------|
| Dimension                         | 250x500x600mm                          |
| Weight                            | 39.00 kg                               |
| Working temperature range         | -20 ... +40 °C                         |
| Temperature consistency           | ±0.5 °C                                |
| Setting/display resolution        | 0.1 °C                                 |
| Temperature display               | LED                                    |
| Cooling capacity (medium ethanol) | °C 20100-10-20 kW<br>0.30.250.20.150.1 |
| Pump performance flow rate        | 15 l/min                               |
| Pump output delivery pressure     | 0.35 bar                               |
| Pump connection thread            | M16x1                                  |
| Hose olives Ø mm IW               | 8 / 12                                 |
| Filling volume (litres)           | 3 ... 4.5                              |
| Refrigerant                       | R134a                                  |
| Digital interfaces                | RS232                                  |
| Permissible ambient temperature   | 5...40 °C                              |

20-22660



#### Cooling thermostat

##### Technical specifications

|                                   |                                          |
|-----------------------------------|------------------------------------------|
| Dimension                         | 360x460x740mm                            |
| Weight                            | 38.20 kg                                 |
| Working temperature range         | -35 ... +200 °C                          |
| Temperature consistency           | ±0.01 °C                                 |
| Setting/display resolution        | 0.01 °C                                  |
| Temperature display               | VFD                                      |
| Cooling capacity (medium ethanol) | °C 200200-20-40 kW<br>0.60.680.50.320.04 |
| Pump performance flow rate        | 8-23 l/min                               |
| Pump output delivery pressure     | 0.1-0.6 bar                              |
| Pump connection thread            | M16x1                                    |
| Hose olives Ø mm IW               | 8 / 12                                   |
| Filling volume (litres)           | 8-10                                     |
| Refrigerant                       | R452A                                    |
| Digital interfaces                | RS232                                    |
| Permissible ambient temperature   | 5...40 °C                                |

20-22665

#### Test panel bending device breaking point according to Fraass



20-22700



## Gripping tongs

For inserting the Fraass test plates into the bending device.



### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.10 kg |
|--------|---------|

20-22750

## Thermometer for breaking point

Similar to IP 42 C, rod shape, white backing, -38+30:0.5°C, red special filling, enamel color, suitable for government certification.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.05 kg |
|--------|---------|

20-2277

## Electric melting device

DIN EN 12593

For the production of the binder plates according to Fraass.

Device consisting of a housing with 2 aluminum plates 140 x 100 mm, one of which is heated. The other plate is equipped with connection nozzles for water cooling and is used to cool down the binder plates.



### Technical specifications

|                 |            |
|-----------------|------------|
| Weight          | 7.70 kg    |
| Electrical data | 230V, 50Hz |

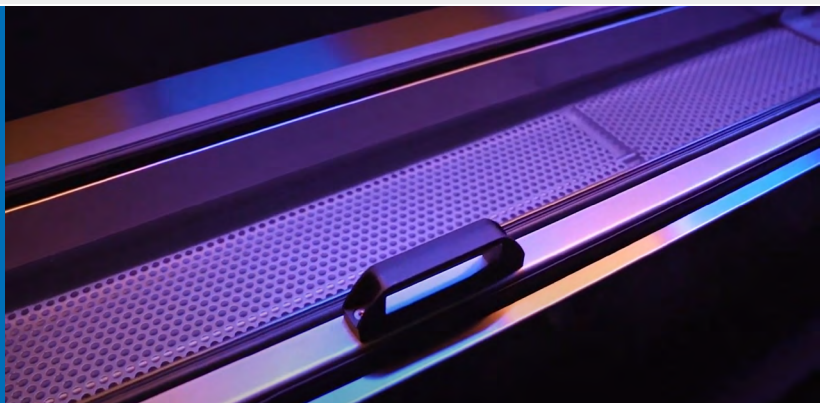
20-22800

## AREA 20 ASPHALT & BITUMEN

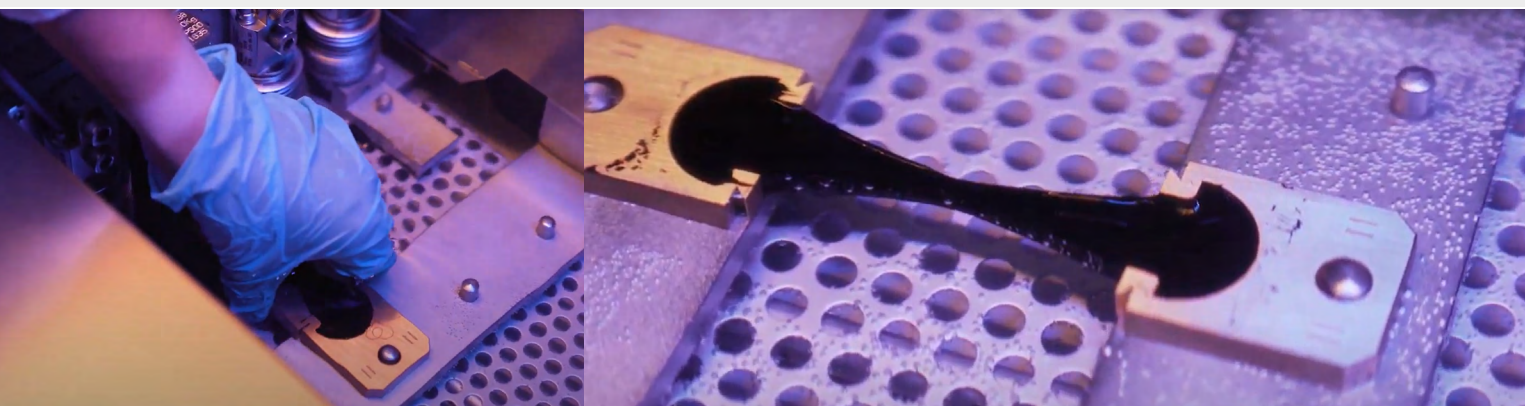
### Bitumen

#### Ductilometer

to determine the force ductility and the elastic resilience of bitumen.



| Item number     | 20-2331                                                                   | 20-2336                                                                              | 20-2341                                                                   |
|-----------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
|                 | Ductilometer 400 mm                                                       | Ductilometer 400 mm digital                                                          | Ductilometer 1000 mm                                                      |
| Electrical data | 230V, 50/60Hz, 0.5kW                                                      | 230V, 50/60Hz, 0.5kW                                                                 | 230V, 50/60Hz, 0.5kW                                                      |
| Weight          | 65.00 kg                                                                  | 90.00 kg                                                                             | 85.00 kg                                                                  |
| Dimensions      | 1300x500x380mm                                                            | 1300x500x380mm                                                                       | 1900x500x380mm                                                            |
| Norm            | EN 13398<br>ASTM D 113<br>AASHTO T 51<br>GOST 11505-75                    | EN 13398<br>EN13589<br>ASTM D 113<br>AASHTO T 51<br>GOST 11505-75                    | EN 13398<br>ASTM D 113<br>AASHTO T 51<br>GOST 11505-75                    |
| Accessories     | 20-2359<br>20-2360<br>20-2361<br>20-2362<br>20-2364<br>20-2370<br>20-2377 | 20-2357<br>20-2359<br>20-2360<br>20-2361<br>20-2362<br>20-2364<br>20-2370<br>20-2377 | 20-2359<br>20-2360<br>20-2361<br>20-2362<br>20-2364<br>20-2370<br>20-2377 |



|  | 20-2346                                                                              | 20-2351                                                                   | 20-2356                                                                              |
|--|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | Ductilometer 1000 mm digital                                                         | Ductilometer 1500 mm                                                      | Ductilometer 1500 mm digital                                                         |
|  | 230V, 50/60Hz, 0.5kW                                                                 | 230V, 50/60Hz, 0.5kW                                                      | 230V, 50/60Hz, 0.5kW                                                                 |
|  | 90.00 kg                                                                             | 100.00 kg                                                                 | 95.00 kg                                                                             |
|  | 1900x500x380mm                                                                       | 2400x500x380mm                                                            | 2300x500x380mm                                                                       |
|  | EN 13398<br>EN13589<br>ASTM D 113<br>AASHTO T 51<br>GOST 11505-75                    | EN 13398<br>ASTM D 113<br>AASHTO T 51<br>GOST 11505-75                    | EN 13398<br>EN 13589<br>ASTM D 113<br>AASHTO T 51<br>GOST 11505-75                   |
|  | 20-2357<br>20-2359<br>20-2360<br>20-2361<br>20-2362<br>20-2364<br>20-2370<br>20-2377 | 20-2359<br>20-2360<br>20-2361<br>20-2362<br>20-2364<br>20-2370<br>20-2377 | 20-2357<br>20-2359<br>20-2360<br>20-2361<br>20-2362<br>20-2364<br>20-2370<br>20-2377 |



AREA 20 ASPHALT & BITUMEN

Bitumen

Ductilometer 400 mm digital

EN 13398 - EN13587 - EN 13589 - AASHTO T 51 - ASTM D 113 - GOST 11505-75

For determining the force ductility and elastic recovery of bitumen.

Stainless steel housing with insulated water bath, hinged lid with glass cut-out and stepper motor-driven pulling device with constant feed speed and digital distance measuring device. The included software allows user-oriented sequence programming and controls the test procedure with online output of force and displacement and test evaluation with calculation of planimetry.

- ▶ Simultaneous testing of up to four samples
- ▶ Electronic version for PC operation with software under Windows 10 and higher
- ▶ To determine the force ductility, a measuring point is equipped with a 500 N force transducer, resolution 0.1 N (special version 100 N, resolution 0.01 N).
- ▶ Three additional force transducers can also be connected
- ▶ Storage of the tests in a database in dBase format

Thermometers are installed in the water bath to check the bath temperature. The temperature of the bath can be controlled either via a temperature control device with an immersion thermostat (20-2370), if necessary with an additional cooler (20-2375) or an external cooling thermostat.

A PC with screen and keyboard is required for operation. Without moulds, without bath temperature control device and without PC.

Technical specifications

|                 |                         |
|-----------------|-------------------------|
| Dimensions      | 1300x500x380mm          |
| Weight          | 65.00 kg                |
| Electrical data | 230 V, 50/60 Hz, 0.5 kW |
| Feed speed      | 1 to 50 mm/min.         |

20-2336

Ductilometer 400 mm

EN 13398 - AASHTO T 51 - ASTM D 113 - ASTM 6084-04

To determine elastic recovery.

Stainless steel housing with an insulated water bath and a stepper motor-driven pulling device with a constant feed rate as well as a digital distance measuring device.

- ▶ Simultaneous testing of up to four samples
- ▶ Complete with integrated control unit on the left side of the device

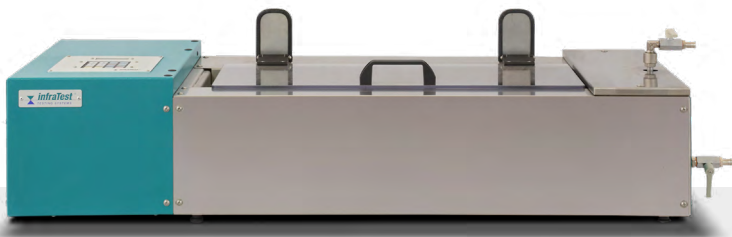
Thermometers are installed in the water bath to check the bath temperature. The temperature of the bath can be controlled either via a temperature control device with an immersion thermostat (20-2370), if necessary with an additional cooler (20-2375) or an external cooling thermostat.

Without moulds, without bath temperature control device for the bath.

Technical specifications

|                 |                         |
|-----------------|-------------------------|
| Dimensions      | 1300x500x380mm          |
| Weight          | 65.00kg                 |
| Electrical data | 230 V, 50/60 Hz, 0.5 kW |
| Feed speed      | 1 to 50 mm/min.         |

20-2331



## Ductilometer 1000 mm digital

EN 13398 - EN13587 - EN 13589 - AASHTO T 51 - ASTM D 113 - GOST 11505-75

For determining the force ductility and elastic recovery of bitumen.

Same as 20-2336.

- ▶ Simultaneous testing of up to four samples
- ▶ Electronic version for PC operation with software under Windows 10 and higher
- ▶ To determine the force ductility, a measuring point is equipped with a 500 N force transducer, resolution 0.1 N (special version 100 N, resolution 0.01 N).
- ▶ Three additional force transducers can also be connected
- ▶ Storage of the tests in a database in dBase format

A PC with screen and keyboard is required for operation. Without moulds, without bath temperature control device and without PC.

### Technical specifications

|                 |                         |
|-----------------|-------------------------|
| Dimensions      | 1900x500x380mm          |
| Weight          | 90.00 kg                |
| Electrical data | 230 V, 50/60 Hz, 0.5 kW |
| Feed speed      | 1 to 50 mm/min.         |

20-2346

## Ductilometer 1000 mm

EN 13398 - AASHTO T 51 - ASTM D 113 - ASTM 6084-04

For determining the elastic recovery of bitumen.

Stainless steel housing with an insulated water bath and a stepper motor-driven pulling device with a constant feed rate as well as a digital distance measuring device.

- ▶ Simultaneous testing of up to four samples
- ▶ Complete with integrated control unit on the left side of the device

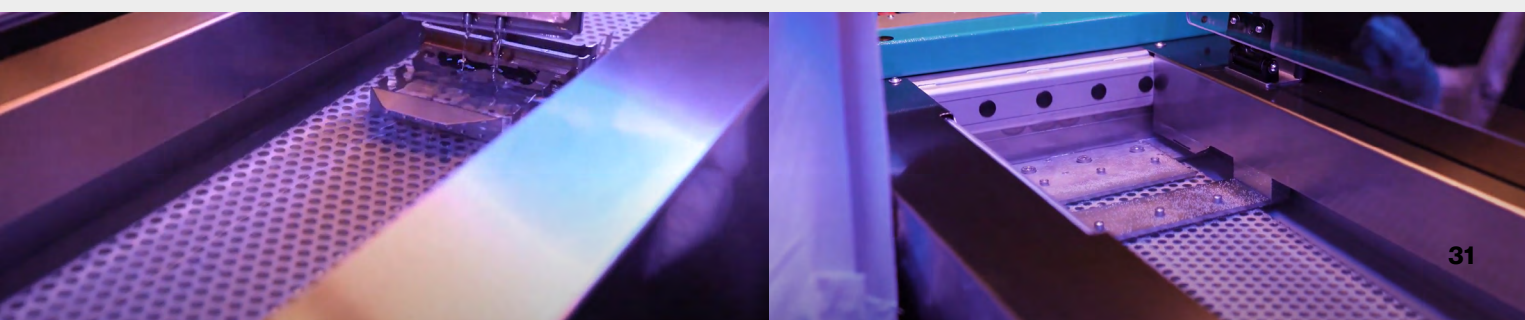
Thermometers are installed in the water bath to check the bath temperature. The temperature of the bath can be controlled either via a temperature control device with an immersion thermostat (20-2370), if necessary with an additional cooler (20-2375) or an external cooling thermostat.

Without moulds, without bath temperature control device and without a hinged lid for the bath.

### Technical specifications

|                 |                         |
|-----------------|-------------------------|
| Dimensions      | 1900x500x380mm          |
| Weight          | 90.00 kg                |
| Electrical data | 230 V, 50/60 Hz, 0.5 kW |
| Feed speed      | 1 to 50 mm/min.         |

20-2341



## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### Ductilometer 1500 mm digital

EN 13398 - EN 13589 - ASTM D 113 - AASHTO T 51 - GOST 11505-75 on determining the force ductility and elastic recovery of bitumen. Stainless steel housing with insulated water bath, hinged lid with glass cut-out and stepper motor-driven pulling device with constant feed speed and digital distance measuring device. The included software allows user-oriented sequence programming and controls the test procedure with online output of force and displacement and test evaluation with calculation of planimetry.

- ▶ Simultaneous testing of up to four samples
- ▶ Electronic version for PC operation with software under Windows 10 and higher
- ▶ To determine the force ductility, a measuring point is equipped with a 500 N force transducer, resolution 0.1 N (special version 100 N, resolution 0.01 N). Three additional force transducers can also be retrofitted.
- ▶ Storage of the tests in a database in dBase format

(A PC with screen and keyboard is required for operation. Without moulds, without bath temperature control device and without PC).

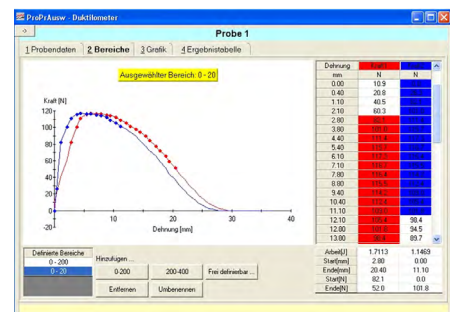
#### Technical specifications:

|                 |                         |
|-----------------|-------------------------|
| Dimensions      | 2300x500x380mm          |
| Weight approx.  | 95.00 kg                |
| Electrical data | 230 V, 50/60 Hz, 0.5 kW |
| Feed speed      | 1 to 50 mm/min.         |

20-2356

#### Advantages:

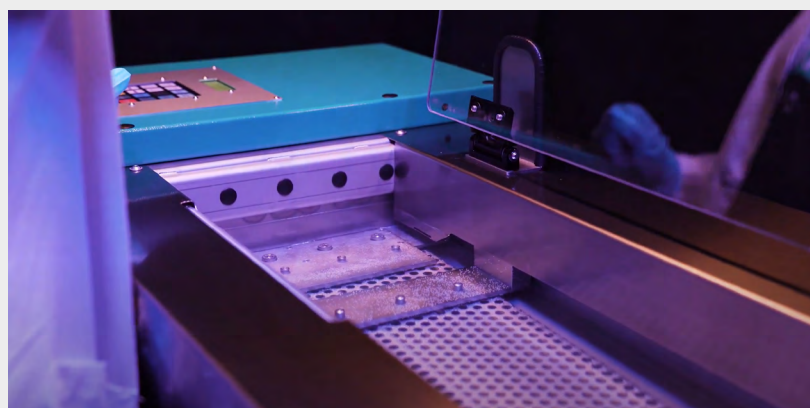
- ▶ Trial display in real time
- ▶ Automatic test execution with Windows-based software
- ▶ Fast calibration option
- ▶ Up to 4 equippable measuring stations
- ▶ test protocol



20-2356

#### ACCESSORIES

See the following page for accessories





### Advantages:

- ▶ Self-explanatory display
- ▶ User-friendly operation
- ▶ Short-term memory for current measurements
- ▶ Up to 4 test results can be measured and 3 can be saved



### Ductilometer 1500 mm

EN 13398 - ASTM D 113 - AASHTO T 51 - GOST 11505-75 on determining the elastic recovery of bitumen.

Stainless steel housing with an insulated water bath and a stepper motor-driven pulling device with a constant feed rate as well as a digital distance measuring device. Thermometers are installed in the water bath to check the bath temperature.

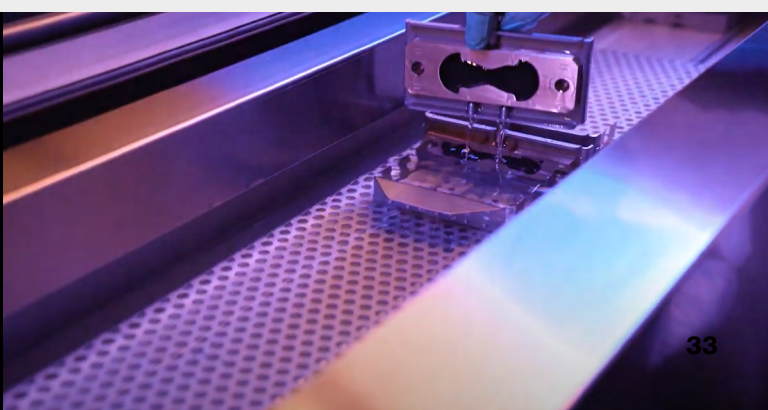
- ▶ Simultaneous testing of up to four samples
- ▶ Complete with integrated control unit on the left side of the device

(Without moulds, without bath temperature control device and without hinged lid for the bath)

### Technical specifications

|                 |                        |
|-----------------|------------------------|
| Dimensions      | 2400x500x380mm         |
| Weight          | 100.00 kg              |
| Electrical data | 230V, 50/60 Hz, 0.5 kW |
| Feed speed      | 1 to 50 mm/min.        |

20-2351

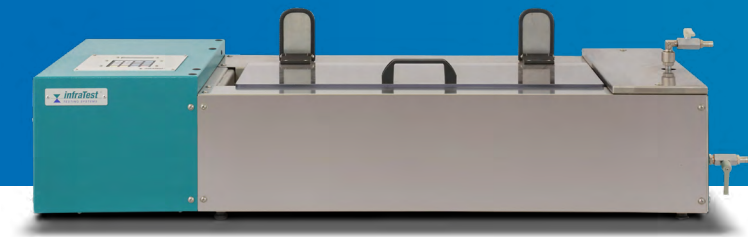


AREA 20 ASPHALT & BITUMEN

Bitumen

ACCESSORIES

for Ductilometer



Load transducer 500 N

Resolution 0.1 N (optionally 100 x 0.01 N) additionally installed in 20-2336/46/56.

Technical specifications

|        |         |
|--------|---------|
| Weight | 2.00 kg |
|--------|---------|

20-2357

Ductilometer mould 10 x 10 mm

made of brass. Complete with stainless steel base plate. As an accessory only with 20-2336 / 20-2346 and 20-2356 (shapes for force ductility only with the digital ones with the corresponding load cell!).



Technical specifications

|        |         |
|--------|---------|
| Weight | 0.50 kg |
|--------|---------|

|         |                |
|---------|----------------|
| 20-2362 | EN 13589       |
| 20-2364 | ASTM D 6084-04 |

Ductilometer mould

Made of brass. Complete with stainless steel base plate.



Technical specifications

|        |         |
|--------|---------|
| Weight | 0.50 kg |
|--------|---------|

|         |                          |
|---------|--------------------------|
| 20-2360 | AASHTO T 51 - ASTM D 113 |
| 20-2361 | EN 13398                 |

Temperature control device ductilometer

Installed in the ductilemeter bath of 20-2331... with circulation pump for experiments from room temperature (from +5°C in connection with 20-2377) to +95°C. Complete with digital temperature display and over-temperature limiter.



Technical specifications

|                 |                       |
|-----------------|-----------------------|
| Weight          | 4.30 kg               |
| Electrical data | 230 V, 50/60 Hz, 2 kW |

20-2370



### Temperature sensor ductilometer bath

For continuous recording of the bath temperature from 20-2336... One sensor permanently installed and one sensor mounted on the movable traverse.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.50 kg |
|--------|---------|

20-2359

### Base plate ductilometer form cpl.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.50 kg |
|--------|---------|

20-2361E10

### Through-flow cooler for ductilometer 400/1000/1500 mm

Through-flow cooler for carrying out ductile meter tests in connection with 20-2370. The continuous-flow cooler is placed behind or below the ductilometer, the power supply is provided via the immersion thermostat including connecting hoses with a length of 1.5m Cooling capacity: 395W.



#### Technical specifications

|                 |                       |
|-----------------|-----------------------|
| Dimensions      | 330x440x448mm         |
| Weight          | 18.00 kg              |
| Electrical data | 230 V, 50 Hz, 0.45 kW |

20-2377 Room temperature from +5° to +95°C

20-2378 Room temperature from -5°C to +50°C

### Ductilometer form without base plate

|            |          |        |
|------------|----------|--------|
| 20-2361E20 | EN 13398 | 0.35kg |
|------------|----------|--------|

|            |          |        |
|------------|----------|--------|
| 20-2362E20 | EN 13589 | 0.35kg |
|------------|----------|--------|



## AREA 20 ASPHALT & BITUMEN

### Bitumen



#### Tar Viscometer

EN12846 – EN-13357 - NF T 66-005 - BS 2000 For testing the viscosity of road tar, cut-off bitumen, etc. Equipped with a stainless steel bath and circulating pump with a digital display for the temperature and a connection for the cooling water supply. Outlet opening 10, 4 and 2 mm including ball valves and test vessels as well as control thermometer and glass cylinder 100 ml.

##### Technical specifications

|                 |                              |
|-----------------|------------------------------|
| Dimensions      | 265x270x550mm                |
| Weight          | 8.00 kg                      |
| Electrical data | 230 V, 50/60 Hz, 1ph., 300 W |

20-2400

#### Ball valve for 20-2400

##### Technical specifications

|            |         |
|------------|---------|
| Weight     | 0.01 kg |
| 20-2400E10 | 2mm     |
| 20-2400E11 | 4mm     |
| 20-2400E12 | 10mm    |

#### Test vessel with outflow opening to 20-2400

##### Technical specifications

|            |               |
|------------|---------------|
| Weight     | 0.01 kg       |
| 20-2400E20 | 2 mm orifice  |
| 20-2400E21 | 4 mm orifice  |
| 20-2400E22 | 10 mm orifice |

#### Closing rod to 20-2400

|            |      |
|------------|------|
| 20-2400E30 | 2mm  |
| 20-2400E31 | 4mm  |
| 20-2400E32 | 10mm |

#### Replacement measuring cylinder 100 ml

##### Technical specifications

|        |        |
|--------|--------|
| Weight | 0.2 kg |
|--------|--------|

20-2410



#### Testing device cut-off bitumen

EN 13358 - ASTM D 402

Contains:

- ▶ Distillation flask 500 ml
- ▶ Thermometer -2 .. +400 °C
- ▶ Glass condenser 450 mm
- ▶ Container with lid and ceramic wire mesh
- ▶ Graduated receiving tube 100:1 ml
- ▶ Two plate stands with clamps
- ▶ Electric heater with temperature control 230 V / 50/60 Hz

##### Technical specifications

|        |          |
|--------|----------|
| Weight | 10.50 kg |
|--------|----------|

20-2430

## Cleveland Flash Point Tester

EN 22592 - ASTM D92 / ISO 2592

For determining the flash and fire points of mineral and waste oils and bitumen above 80° C. Complete with electric heating with built-in controller, protective shield, thermometer -6 .. +400° C, brass crucible and gas ignition.

### Technical specifications

|                 |               |
|-----------------|---------------|
| Weight          | 3.60 kg       |
| Electrical data | 230V, 50/60Hz |

20-2450



## Pensky-Martens flash point tester

DIN EN ISO 2719 - ASTM D 93 For liquid petroleum products. Device for hand stirring with electric heating and gas ignition, test crucible and thermometer -5..+110°C.

### Technical specifications

|                 |            |
|-----------------|------------|
| Electrical data | 230V, 50Hz |
|-----------------|------------|

20-2470

## Pensky-Martens flash point tester

EN 22719 - ASTM D 93 For liquid petroleum products. Device for hand stirring with electric heating and gas ignition, test crucible and thermometer -5..+110° C. Also equipped with electric cooling fan.

### Technical specifications

|                 |            |
|-----------------|------------|
| Electrical data | 230V, 50Hz |
|-----------------|------------|

20-2475

## RVDV2T “EXTRA” viscometer

ASTM 6521, EN 14769, ASHTO R 28

- ▶ Rheocalc T software
- ▶ Operation takes place in dialogue with a built-in 5" color display.
- ▶ Display of % torque and measuring range, speed, viscosity, shear rate, shear stress, temperature and program level
- ▶ Speeds from 0.1 to 200 rpm
- ▶ Individually adjustable measurement programs
- ▶ With USB interface for using the device with a PC, printer output for space-saving high-speed printer. Can be used as a stand-alone device or PC-controlled. Individual password blocking of the functions possible
- ▶ Complete measuring station with standard spindle set, laboratory stand, Pt-100 temperature sensor, carrying case, USB stick and PG flash program loading software for automated processes with up to 25 levels with measurement data storage in the device or on a USB stick. Internal Memory Size 150MB
- ▶ Combination model: Including EZ coupling, ball bearings, Quick laboratory stand, Rheocalc T software

### Technical specifications

|                 |            |
|-----------------|------------|
| Electrical data | 230V, 50Hz |
|-----------------|------------|

20-2480

## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### Thermosel Thermo-Oven Viscometer

Thermal oven without controller for the viscometers DVT-2, DVT-3 for accommodating sample disposable chambers and multiple chambers. The controller model 106 is required for operation.

##### Technical specifications

|                 |                    |
|-----------------|--------------------|
| Weight          | 3.50 kg            |
| Electrical data | 230V, 50-60Hz, 1ph |
| Temperature     | 20 °C to 300 °C    |

20-2481

#### Controller Thermosel Model 106

Control unit for Thermosel Connection only to Thermosel oven in use with Brookfield DV2, DV3. For operation only in connection with Thermosel oven.

##### Technical specifications

|                 |                    |
|-----------------|--------------------|
| Weight          | 0.50 kg            |
| Electrical data | 230V, 50-60Hz, 1ph |

20-2482

#### Spindle Rotational Viscometer SC4-21

For low-viscosity materials made of stainless steel A rotational viscometer is required for operation.

20-2483

#### Sample chamber rotational viscometer

In use with a Thermosel Oven.

20-2484

#### Sayboldt viscometer 2-fold

ASTM D 88 - AASHTO T 72 For determining the viscosity of petroleum products such as bitumen, etc. Consisting of the water bath with thermostatically controlled heating device and 2 test vessels lying next to one another, as well as a ready-to-use built-in universal nozzle for flow times of up to 1000 seconds and an exchangeable Furol nozzle for flow times longer than that. Complete with two volumetric flasks 60 ml, thermometer 19 .. +27° C and contact thermometer 0 .. +100° C.

##### Technical specifications

|                 |            |
|-----------------|------------|
| Weight          | 12.00 kg   |
| Electrical data | 230V, 50Hz |

20-2540

#### Sayboldt viscometer

ASTM 88 - AASHTO T 72 Sayboldt viscometer (simple model) for determining the viscosity of bitumen. Contains:

- ▶ 2 viscometer inserts
- ▶ oil bath
- ▶ Digital thermostat
- ▶ stirrer
- ▶ funnel
- ▶ Thermometer 19-27 °C ASTM17C

##### Technical specifications

|                   |                    |
|-------------------|--------------------|
| Dimensions        | 270x270x500mm      |
| Weight            | 12.00 kg           |
| Electrical data   | 230V, 50-60Hz, 1ph |
| Temperature range | 20 to 99 °C        |

20-2530



### Replacement volumetric flask 60 ml



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.06 kg |
|--------|---------|

20-2550

### Engler viscometer 1-fold DIN

ASTM D 940 - ASTM D 1665 - AASHTO T 54 - OS 2000 - NF T 66-020 - CRN N° 102 Used to compare the specific viscosity of road oils and tar to the viscosity of water. It consists of a water bath complete with a precision digital thermoregulator, an electric stirrer, a refrigeration unit, and an Engler flask. The viscometer is equipped with a double safety thermostat to prevent accidental overheating.

#### Technical specifications

|                 |                       |
|-----------------|-----------------------|
| Dimensions      | 265x270x550mm         |
| Weight          | 12.00 kg              |
| Electrical data | 230V, 1ph, 50Hz, 300W |

20-2560

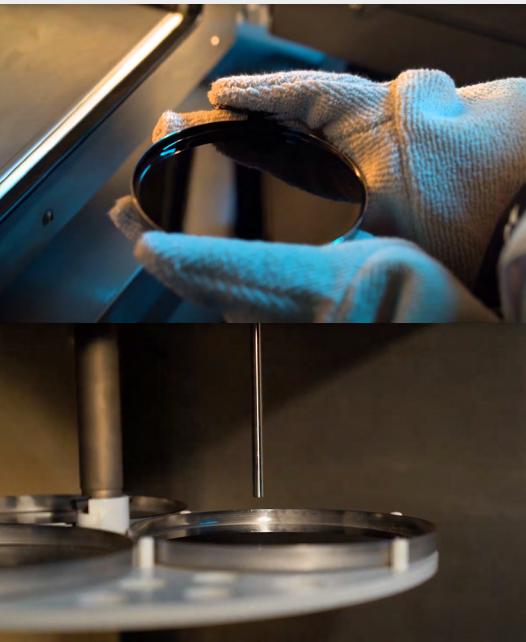
### Engler flask 100/100 ml

20-2560E10



# AREA 20 ASPHALT & BITUMEN

## Bitumen



### ACCESSORIES

#### Test vessel for PAV Ø 140 x 9.5 mm

EN 12607-2 - EN 13303 -  
ASTM D6 - ASTM D 1754 -  
AASHTO T 47 - AASHTO T179

#### Technical specifications

Weight 0.10 kg

20-2575



#### Loss on heating oven (TFOT)

EN 12607-2 - EN 13303 - ASTM D6 - ASTM D 1754 -  
AASHTO T 47 - AASHTO T179

To determine the resistance to hardening under the influence of heat and air. The device consists of a drying cabinet with a glass door with electrical control to maintain a constant internal temperature of 163°C. In the interior there is a motorized platform driven at 5-6 1/min for holding 3 test vessels Ø140mm or 9 pieces at Ø55 mm.

#### Technical specifications

|                 |                         |
|-----------------|-------------------------|
| Dimensions      | 850x730x620mm           |
| Weight          | 53.00 kg                |
| Electrical data | 230 V, 50/60 Hz, 2.5 kW |
| Volume          | 53 liters               |

20-25700



## Rolling Thin Film Oven Test (RTFOT)

EN 12607-1 - GOST 33140-2014 - ASTM D2872-12 (RTFOT) for measuring the effect of air and temperature on bitumen. Consisting of:

- ▶ Heated cabinet with viewing window in the door and thermostat-controlled temperature control
- ▶ Electric drive unit with holder for up to 8 test glasses
- ▶ Nozzle for applying the air to the sample, with a flow meter for controlling the air volume
- ▶ Fan to circulate the air in the interior
- ▶ Control thermometer inside

The heating cabinet is preset to a test temperature of 163°C. During the test, the user is informed about the process with optical and acoustic signals. The test procedure is automatic. A compressed air source or a 20-25770 compressor is required to carry out the experiment. The sample glasses 20-2573 or 20-2574 are also required.

### Technical specifications

|                 |                      |
|-----------------|----------------------|
| Dimensions      | 850x730x620mm        |
| Weight approx.  | 117.00 kg            |
| Electrical data | 230 V, 50 Hz, 2.5 kW |

20-25720



### Advantages:

- ▶ 4-line LCD display
- ▶ Customized test procedure
- ▶ Alternatively usable as a warming cabinet
- ▶ Standardized test procedure according to EN, ASTM and GOST
- ▶ Digital flow measurement
- ▶ Simple menu navigation and signal tone
- ▶ Fully calibratable

### ACCESSORIES

See following pages.



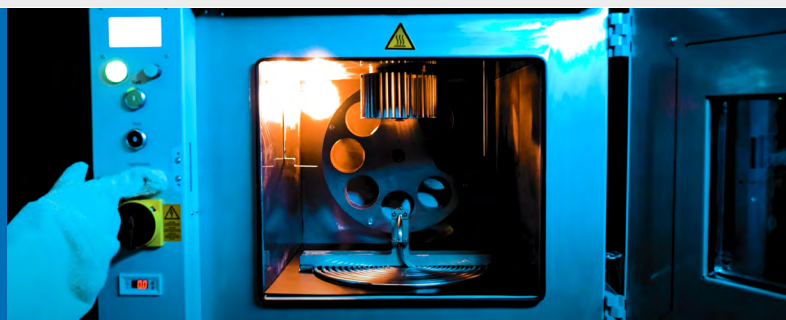


## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### ACCESSORIES

for Rolling Thin Film Oven Test  
RTFOT



#### Glass jar RTFOT - concave opening

With concave opening  $\varnothing 32 \pm 2$  mm  
outer diameter  $\varnothing 64 \pm 1.2$  mm.



##### Technical specifications

Weight 0.20 kg

20-2573

#### Stainless steel cup tongs 300 mm long

Stainless steel 18/10, ceramic insulated tip, for holding RTFOT glasses.



##### Technical specifications

Weight 0.20 kg

20-2578

#### Glass jar RTFOT - convex opening

With convex opening  $\varnothing 32 \pm 2$  mm  
outer diameter  $\varnothing 64 \pm 1.2$  mm.



##### Technical specifications

Weight 0.20 kg

20-2574

#### RTFOT glass scraper



##### Technical specifications

Weight 0.10 kg

20-2576

#### Compressor RTFOT

Compact device with robust base frame as well as compressed air tank and connecting hose for 20-25720.



##### Technical specifications

|                 |                       |
|-----------------|-----------------------|
| Dimension       | 380x380x385mm         |
| Weight          | 15.00 kg              |
| Electrical data | 230 V, 50 Hz, 0.75 kW |
| Intake power    | 105 l/min             |
| Pressure        | 8 bar                 |
| Volume          | approx. 59dB          |

20-25770

#### TSE Rapid Tar Detector

For the qualitative determination of tarry components in reclaimed asphalt. Consisting of hot air gun with built-on vacuum pump and holder for test tubes. See 20-2610...



##### Technical specifications

|                 |            |
|-----------------|------------|
| Weight          | 1.30 kg    |
| Electrical data | 230V, 50Hz |

20-2600

## Glass flask wash insert RTFOT glasses

Compatible only with our bitumen washing machines or with our extractors equipped accordingly.



20-1100E265

## Test tube

To the TSE device. Pack of 10 pcs

20-2610 Xylene

20-2612 Phenol



## Test tube opener

20-2615

## UV hand lamp

Battery powered.

### Technical specifications

Weight 0.20 kg

20-2632



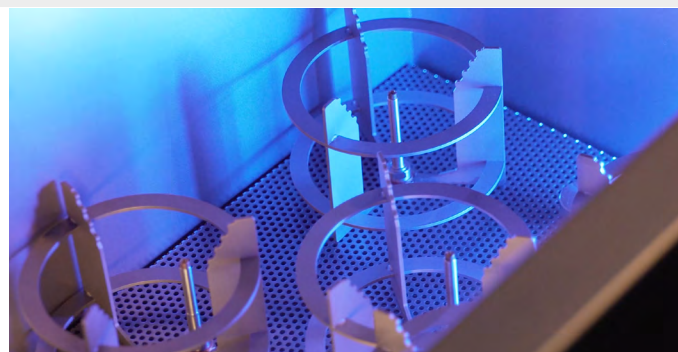
## PAK paint spray can

White for tar detection

### Technical specifications

Weight 0.50 kg

20-2635



Easy cleaning of the PAV test vessels in the asphalt analyzers or in the bitumen washing machine 20-11604.

## AREA 20 ASPHALT & BITUMEN

### Bitumen



### Pressure Aging Vessel (PAV)

EN 14769 - ASTM D 6521 - AASHTO R 28 For the long-term aging of bitumen and for simulating the aging of asphalt mixtures after 5 to 10 years.

Consisting of the pressure vessel with connection elements, pressure/temperature sensors, thermostat-controlled heating device as well as a PC touchscreen and 10 test vessels. A compressed air source >21 bar or compressor 20-44950 must be provided.

Up to 10 freely programmable pressure/time/temperature test sequences can be saved. Technical specifications: Compressed air, supply pressure: 21 - 25 bar

### Technical specifications

|                                 |                         |
|---------------------------------|-------------------------|
| Dimensions                      | 470x520x560mm           |
| Weight                          | 58.00 kg                |
| Electrical data                 | 230 V, 50/60 Hz, 0.6 kW |
| Compressed air, supply pressure | 21 bar - max. 25 bar    |

20-44000



Ergonomic handle

### Advantages

- ▶ Compact design
- ▶ Up to 10 freely programmable test sequences can be saved
- ▶ Graphical user interface
- ▶ Display of pressure and temperature in real time
- ▶ PC with touch screen
- ▶ Menu driven user control





## PAV – Pressure Aging Vessel with Vacuum Unit

EN 14769 - ASTM D 6521 - AASHTO R 28 For the long-term aging of bitumen and for simulating the aging of asphalt mixtures after 5 to 10 years.

Consisting of housing, pressure tank with connection elements, pressure/temperature sensors, controlled heating device and control with touchscreen. Integrated vacuum pump to use the device as a vacuum oven to vent the bitumen.

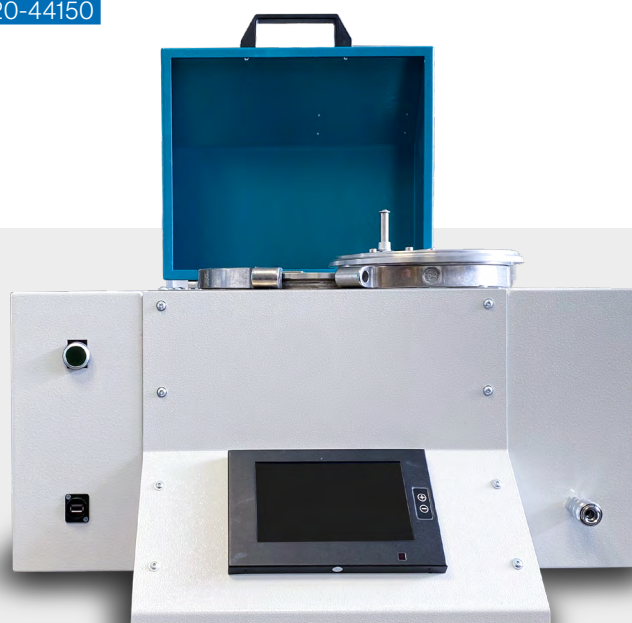
Up to 10 freely programmable pressure/time/temperature test sequences can be saved. Incl. insert frame with 10 metal shells for aging and insert frame with metal shell for venting the bitumen

A compressed air source >21 bar or compressor 20-44950 must be provided.

### Technical specifications

|                                     |                           |
|-------------------------------------|---------------------------|
| Dimensions                          | 720x700x475mm             |
| Weight                              | 85.00 kg                  |
| Electrical data                     | 230V, 50/60Hz, 1.2kW      |
| Temperature range aging             | 10°C ... 200°C            |
| Pressure range aging (rel)          | 0.5 MPa (rel) ... 2.1 MPa |
| Temperature range vacuum furnace    | 10°C ... 200°C            |
| Pressure range vacuum furnace (abs) | 15 kPa ... 95 kPa         |

20-44150



## ACCESSORIES

### Piston compressor

to the PAV device. Complete with frame and pressure vessel.

#### Technical specifications

|                      |                      |
|----------------------|----------------------|
| Dimensions           | 583 x 309 x 337mm    |
| Weight               | 16.2kg               |
| Electrical data      | 230 V, 50 Hz, 1.5 kW |
| Suction capacity     | 95 l/min at 6 bar    |
| Maximum overpressure | 34 bar               |
| Adjusted             | >23 bar              |
| Number of cylinders  | 2                    |
| Pressure tank        | 8.6 l                |
| Sound pressure       | 70 dBA               |

20-44950

### Soundproof cabin for PAV compressor

20-44952

### Test vessel for PAV Ø 140 x 9.5 mm

EN 12607-2 - EN14770

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.10 kg |
|--------|---------|

20-2575



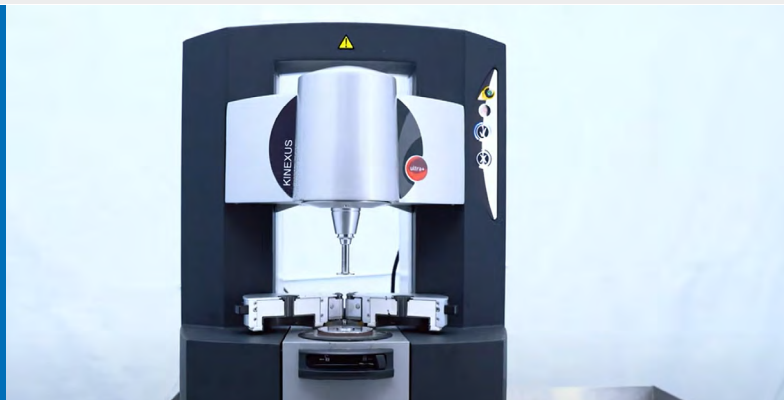
Easy cleaning of the PAV test vessels in the asphalt analyzers or in the bitumen washing machine 20-11604.

## AREA 20 ASPHALT & BITUMEN

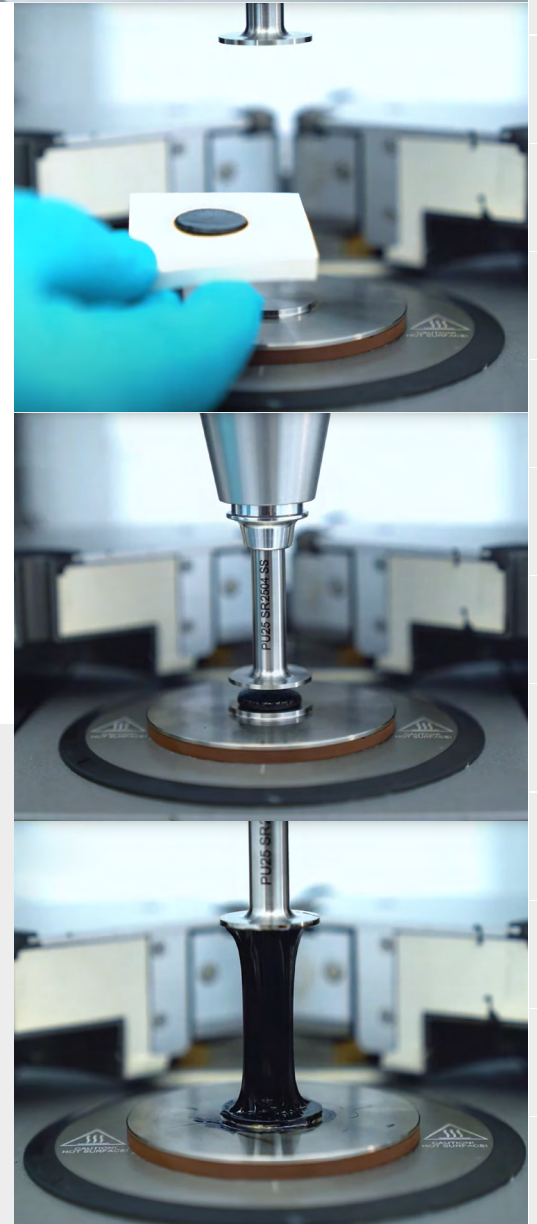
### Bitumen

#### Kinexus

For carrying out and evaluating rheological measurements.



| Article no.           | 20-44401                                             | 20-44404                                              | 20-44405                                                 |
|-----------------------|------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------|
|                       | Kinexus DSR rheometer platform incl. rSpace software | Kinexus DSR+ rheometer platform incl. rSpace software | Kinexus DSR-III rheometer platform incl. rSpace software |
| Electrical data       | 1/N/PE, 230V, 50Hz, 16A                              | 1/N/PE, 230V, 50Hz, 16A                               | 1/N/PE, 230V, 50Hz, 16A                                  |
| Weight kg             | 47.00 kg                                             | 47.00 kg                                              | 47.00 kg                                                 |
| Dimensions approx.    | 485x490x680mm                                        | 485x490x680mm                                         | 485x490x680mm                                            |
| Torque viscometry     | 10mNm - 200mNm                                       | 5nNm - 225mNm                                         | 100nNm - 150mNm                                          |
| Torque oscillation    | 5nNm - 200mNm                                        | 1nNm - 225mNm                                         | 100nNm - 150mNm                                          |
| Angular velocity      | 10 nrad/s - 325 rad/s                                | 1 nrad/s - 500 rad/s                                  | 10 nrad/s - 200 rad/s                                    |
| Oscillation frequency | 1μHz-100Hz                                           | 1μHz - 150Hz                                          | 1μHz-100Hz                                               |
| Vertical lift speed   | 0.1μm/s - 35mm/s                                     | 0.1μm/s - 35mm/s                                      | 0.1μm/s - 20mm/s                                         |





## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### Kinexus BTSV-DSR-III rheometer platform incl. rSpace software

EN 14770 - EN 13702 - EN 13302 - AASHTO TP 70 - AASHTO T 315 - ASTM D 7175 - ASTM D 7405 - ASTM D 4402

The Kinexus DSR-III from NETZSCH Analyzing & Testing is an entry-level rheometer for quality assurance tasks with a unique concept for parameterizing, performing and evaluating rheological measurements.

The following standard measurements are possible with the Kinexus DSR-III:

- ▶ Temperature sweep (T sweep)
- ▶ Multiple Stress Creep and Recovery Test (MSCR)
- ▶ Fast Bitumen Typing Method (BTSV)
- ▶ Phase Transition Temperature of Viscosity Changed Binders (Constant Shear Rate)

The results can be exported to other spreadsheet programs as a csv file. There is also an import function for existing measurement data.

#### Technical specifications

|                            |                         |
|----------------------------|-------------------------|
| Dimensions                 | 485x490x680mm           |
| Weight approx.             | 47kg                    |
| Electrical data            | 230V, 50 Hz             |
| Torque viscometry          | 100 nNm - 150 mNm       |
| Torque oscillation         | 100 nNm - 150 mNm       |
| Torque resolution          | 0.1 nNm                 |
| Drive moment of inertia    | 1.3e-5 kgm <sup>2</sup> |
| Angular velocity           | 10 nrad/s - 200 rad/s   |
| Deformation jump           | < 10 ms                 |
| Angular resolution         | < 10 nrad               |
| Oscillation frequency      | 1μHz to 100 Hz          |
| Normal force range         | 0.01 N to 20 N          |
| Normal force response time | < 10 ms                 |
| Vertical lift speed        | 0.1μm/s to 20mm/s       |
| Slit resolution            | 0.1 μm                  |
| Maximum data rate          | 5 kHz                   |

20-44405

#### Advantages:

- ▶ The quick coupling unit of the upper measuring plate enables quick and uncomplicated changing
- ▶ Sensitive spindle drive with air bearing
- ▶ User-friendly temperature control through the cylinder Peltier temperature control
- ▶ Uncomplicated exchange of geometry and tempering

#### More rheometers

**Kinexus DSR rheometer platform incl. rSpace software**

20-44401

**Kinexus DSR+ rheometer platform incl. rSpace software**

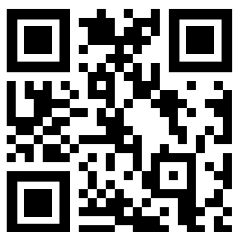
20-44404

**Kinexus DSR-III Rheometer Package-BTSV**

20-44405B

#### ACCESSORIES

see following pages



**Videos available!**

Discover the DSR and its test methods in our presentation video.



## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### ACCESSORIES

for Kinexus



#### Kinexus Plate-Peltier -40 to 200 °C

The active hood plate peltier is designed for optimized temperature control with minimal thermal gradients. It contains an integrated connection for inert gas purging. The plate Peltier with active hood can be used for all cone or plate geometries up to 61 mm in diameter in a temperature range from -40 °C to 200 °C. Contains a 61 mm lower removable plate for the "Plug & Play" temperature control cartridge. All mechanical and electrical connections are made using "Quick Connect". The Kinexus Rheometer automatically recognizes and configures the cartridge.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 4.40 kg |
|--------|---------|

20-44402

#### Kinexus Plate-Peltier -5 to 150 °C

The active hood plate peltier is designed for optimized temperature control with minimal thermal gradients. It contains an integrated connection for inert gas purging. The plate Peltier with active hood can be used for all cone or plate geometries up to 61 mm in diameter in a temperature range from -5 °C to 150 °C. With the low-temperature option 20-44411, the Peltier can be cooled down to -40 °C. Contains a 61 mm lower removable plate for the "Plug & Play" temperature control cartridge. All mechanical and electrical connections are made using "Quick Connect". The Kinexus Rheometer automatically recognizes and configures the cartridge.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 4.40 kg |
|--------|---------|

20-44402E

#### Kinexus heat exchanger

The heat exchanger allows you to work with plate and cylinder Peltiers in the temperature range down to a minimum of -5° C. It is automatically controlled by the Kinexus when required and enables optimal thermal efficiency.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.50 kg |
|--------|---------|

20-44403

#### Cooling liquid to the heat exchanger

Content: 700 ml.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.90 kg |
|--------|---------|

20-44403E10

#### Kinexus Solvent Trap

For Plate Peltier temperature control module with active upper hood The solvent trap is used to avoid solvent evaporation during the measurement. Consisting of two upper half-shells with an internal immersion ring and an upper solvent ring. Note: To use the solvent trap, the diameter of the top cone or plate geometry must be 15mm-60mm.

20-44406





### Kinexus cryogenic option

Serves to pre-cool the Peltier in the temperature range from -5 °C to -40 °C. Includes direct control through the Kinexus and rSpace software. Recommended temperature control fluid see 20-44412.

20-44411

### Kinexus Cylinder Peltier Temperature Control

Peltier-controlled temperature control unit for precise temperature setting (resolution 0.01 K) in the range from -30 °C to 200 °C. The Kinexus cylinder Peltier can be used for all cylinder and double-gap geometries or paddle stirrer systems. Note: For operation below -5° C, an additional refrigerated circulation thermostat is required for pre-cooling. All mechanical and electrical connections are made using "Quick Connect". The Kinexus Rheometer automatically recognizes and configures the cartridge.

#### Technical specifications

Weight 2.80 kg

20-44410

### Temperature control fluid for 20-44411

60:40 ethylene glycol water mixture for cryogenic experiments. Capacity 5 l.

#### Technical specifications

Weight 5.00 kg

20-44412

### Upper measuring plate

20-4456 Ø4mm 0.05kg

20-4454 Ø8mm

20-4452 Ø 25mm

### Lower measuring plate stainless steel

20-4457 Ø 4mm

20-4455 Ø8mm

20-4453 Ø25mm

### DSR silicone filling mould

20-44462 Ø 8 mm and Ø 25 mm 0.05 kg

20-44461 Ø 25mm 0.01kg

20-44463 Ø4mm 0.01kg

### DSR High Temperature Standard Cannon Oil

Filling quantity 50 ml.

#### Technical specifications

Weight 0.20 kg

20-44408



## AREA 20 ASPHALT & BITUMEN

### Bitumen

#### ACCESSORIES

for Kinexus



#### Solid state option "Torsion/DMA System"

Incl. alignment tool enables the determination of dynamic mechanical properties on rectangular or cylindrical solid samples. Intended for use in the Kinexus Peltier temperature control system (20-44410, sold separately). incl.alignment tool, 10 disposable measuring inserts for cylindrical specimens with maximum diameter of 13 mm, thermal cover, digital calliper, torque spanner and spacer. Maximum sample dimensions: -Rectangular specimens: 50 mm (height) x 15 mm (width) x 15 mm (thickness) -Cylindrical specimens: 50 mm (height) x 25 mm (diameter) Recommended temperature range from -20 °C\* to 200 °C (dry) and -20 °C\* to >100 °C\*\* (wet). \* with Kinexus low temperature option \*\* with suitable tempering fluid. The solid option supports the automatic geometry recognition of the Kinexus rheometer.

20-44413

#### RS232 cable 3m

Necessary for controlling the Kinexus low-temperature option 20-44411 from rSpace version 1.76.

20-44414

#### DIN outer cup for C25 cylinder system

DIN 53019 external cylinder C25 for use in the Kinexus cylinder Peltier. Material: stainless steel Contains an internal filling level mark for easier filling.

20-44421

#### DIN inner cylinder for C25 cylinder system

DIN 53019 inner cylinder with a diameter of 25 mm, material stainless steel. Suitable for automatic detection by the Kinexus Rheometer. The geometry is optimized in terms of compliance, inertia and thermal properties.

20-44430

#### Upper geometry C 14 cylinder DIN

20-44440

#### C25 Flat Cylinder Kit for Rubber

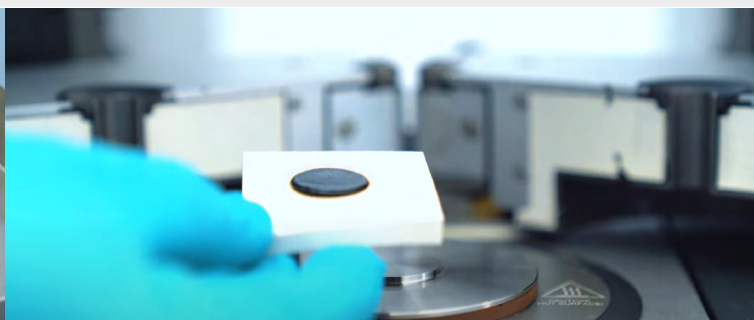
20-44441

#### DSR Cannon Test

20-44443

#### Asphalt Trim Tool

20-44451



### Standard viscosity oil 100 ml

Standard Newtonian material (UKAS certified) for verification of rheometer measurements. Standard oils are certified for use within 12 months of the specified packaging date.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.10 kg |
|--------|---------|

20-44452

### Lower removable plate Ø 25 mm stainless steel

AASHTO T 315-12 With plate shoulder 25 mm for optimal trimming of the sample when using an upper 25mm geometry.

20-4453

### DSR silicone filling mold Ø 4 mm

For sample preparation.

20-44463

### Air Compressor for Kinexus DSR

The air compressor is recommended if there is either no compressed air connection available on site or no oil-free compressor is in use.

- ▶ Oil-free air compressor including compressed air hoses
- ▶ Soundproof housing
- ▶ All necessary filters for operation are included
- ▶ Volume: 40 liter storage tank
- ▶ Flow rate: 90 liters/min at 8 bar pressure
- ▶ Noise level: 54 dB

#### Technical specifications

|                 |                   |
|-----------------|-------------------|
| Dimensions      | 675 x 731 x 857mm |
| Weight          | 3 kg              |
| Electrical data | 230V, 50Hz        |

20-44480

### Absorption dryer unit

Incl. manometer and particle filter for Kinexus 230V/50Hz

The absorption dryer is recommended if the compressed air provided on site does not have a pressure dew point of  $\leq -40^{\circ}\text{C}$ . Delivery incl. connections.

#### Technical specifications

|                 |            |
|-----------------|------------|
| Weight          | 2.20kg     |
| Electrical data | 220V, 50Hz |

20-44481



## AREA 20 ASPHALT & BITUMEN

### Bitumen

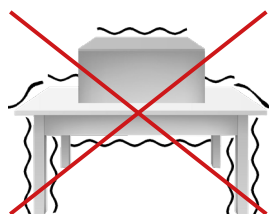
#### Bending Beam Rheometer (BBR)

EN 14771, NF T 66-062, ASTM D 6648, AASHTO T 313, PNST 79-2016, GOST 58400.8-2019 on determining the flexural creep resistance of bitumen at low temperatures. Among other things, the deflection is determined in order to evaluate the behavior of bituminous binders and similar products at low temperatures. The deflection of the sample is measured with a resolution of 1  $\mu\text{m}$ . The test force is controlled with an accuracy of  $< \pm 5 \text{ mN}$ . Automatic, software-controlled operation and standardised evaluation and presentation of the measurement results.

#### Technical specifications

|                                 |                                          |
|---------------------------------|------------------------------------------|
| Dimensions                      | 650 x 600 x 1500 mm                      |
| Width including PC support arm  | 1200 mm                                  |
| Weight approx.                  | 80 kg without accessories                |
| Weight thermostat               | 60.00 kg                                 |
| Total weight                    | 140.00 kg                                |
| Electrical data                 | 230/240 V, 50/60 Hz, 2 kW                |
| Test bath approx.               | 11 l                                     |
| Temperature range               | -40... + 20 °C                           |
| Resolution                      | $\pm 0.1\text{K}$                        |
| Electropneumatic load shaft     | max. stroke 10 mm,<br>max. force 2000 mN |
| Incremental encoder, resolution | 1 $\mu\text{m}$                          |
| Load cell accuracy class        | 0.1                                      |
| Force control                   | $< \pm 5 \text{ mN}$                     |
| Working range                   | 0... 1500 mN                             |
| Bath liquid (recommended)       | Silicone oil<br>(Fragol Therm X-T12)     |
| Compressed air                  | at least 5 bar                           |

20-44220



**DESKTOP DEVICE**



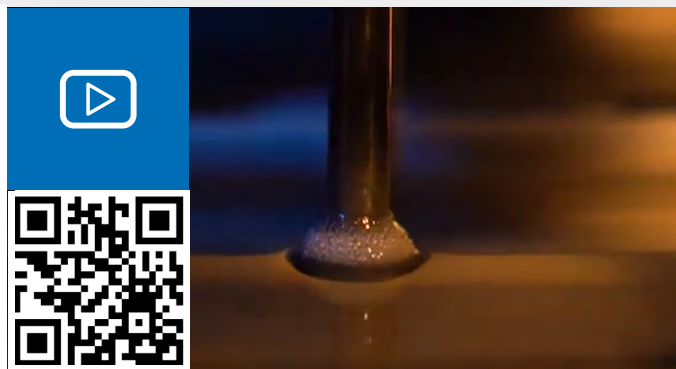
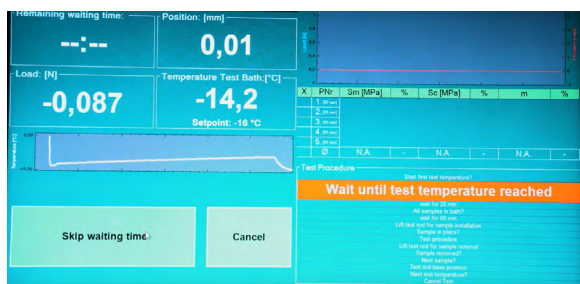
**STAND ALONE UNIT**





## TOUCH PANEL

Convenient operation  
via touch display

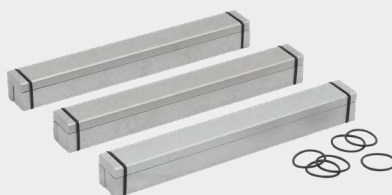


## Advantages:

- ▶ Integrated programmable software to control and record measurement data
- ▶ Compact temperature control unit with heating and compressor cooling
- ▶ Freely selectable test temperatures down to -40° C
- ▶ Test bath with overflow for constant fill level
- ▶ Own layout of the test reports
- ▶ All test data available as raw data for further processing (csv file)
- ▶ Stand alone device to avoid the transmission of vibrations

## ACCESSORIES

### Set of BBR molds (3 pieces)



### Technical specifications

Weight 0.40 kg

20-44230

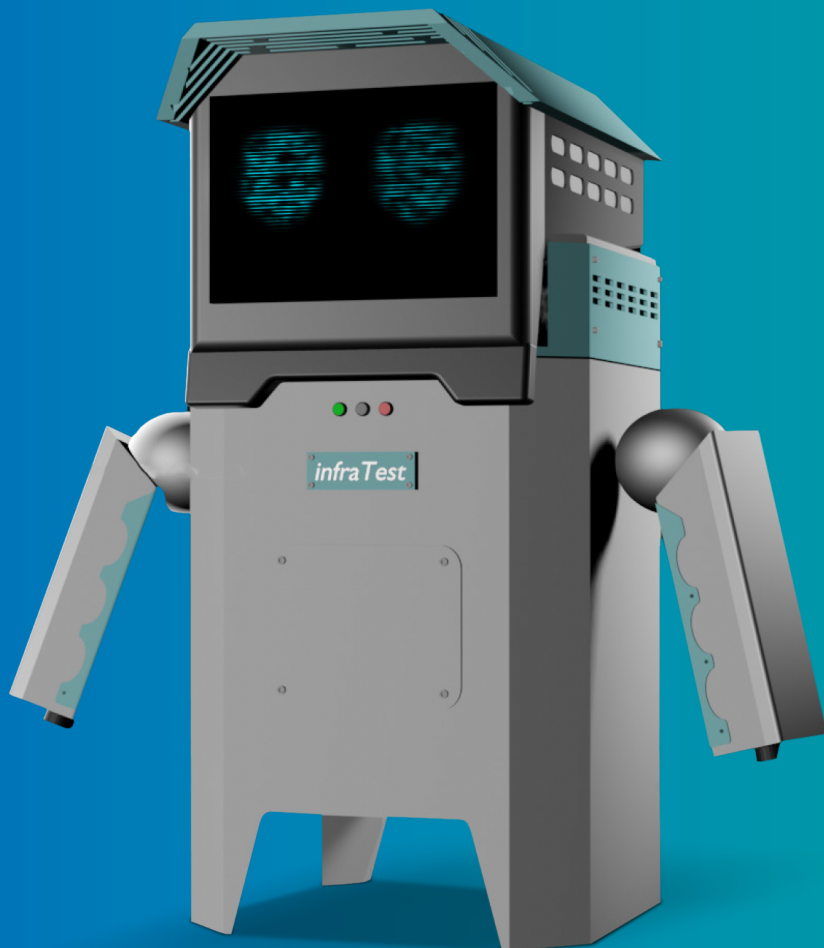
**AREA 20 ASPHALT & BITUMEN**

extraction



# ASPHALT ANALYZER

# THE ORIGINAL SINCE 1997



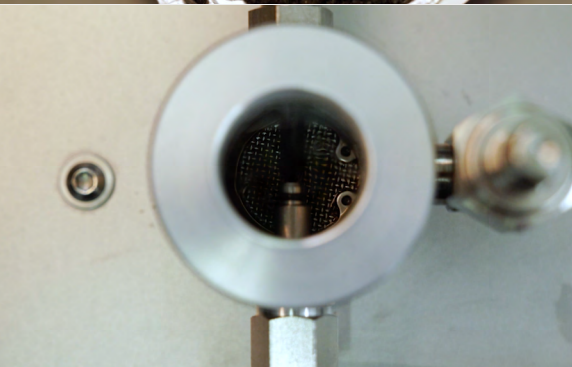




## AREA 20 ASPHALT & BITUMEN

Extraction

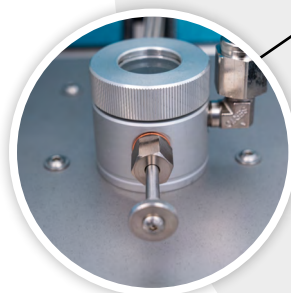
**YOU!**  
Safe Extractions



**Direct connection to the rotary evaporator**



**Washing chamber with ultrasound**



**Solvent wash option**



**Easily accessible temperature limiters**



Intuitive menu navigation

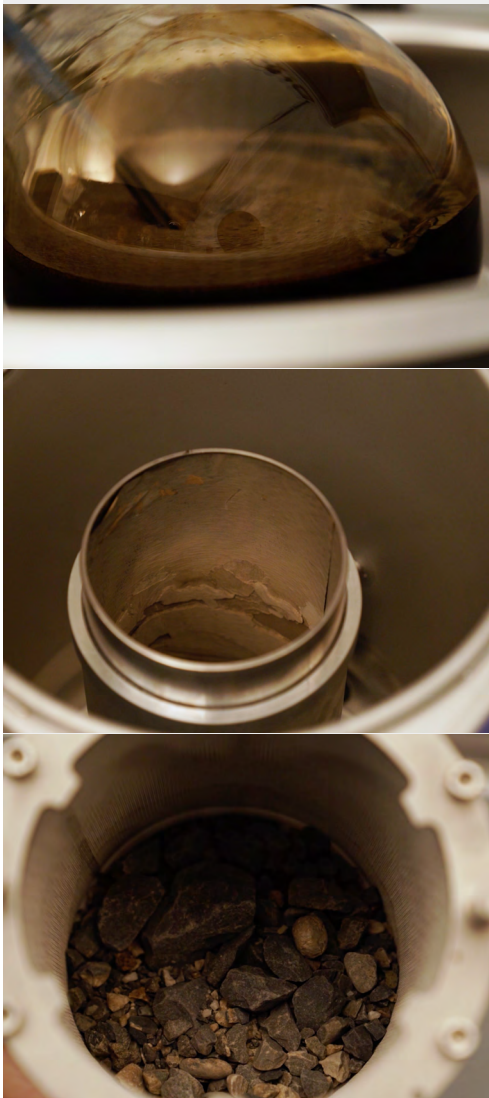


Viewing window in the recovery

Sieve to catch small particles

Copper cooling coil

Sampling device





## AREA 20 ASPHALT & BITUMEN

### Extraction

#### Asphalt analyzer YOU!

EN 12697-1 - ASTM D8159-2018 - AASHTO For safe extraction of reclaimed asphalt and binder content determination using non-flammable solvents.

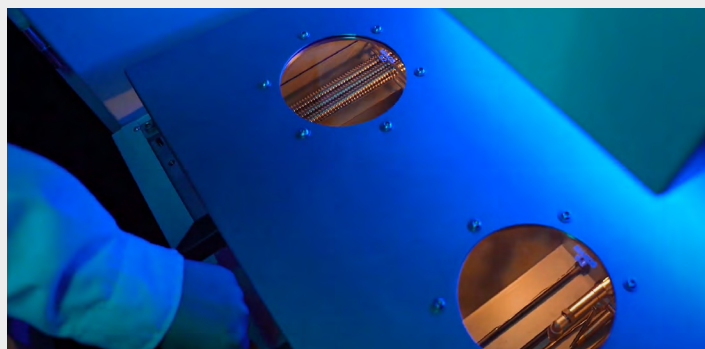
The asphalt mixture (up to 3.5 kg) is weighed into a sieve drum (20-1110..) and broken down into its components in the washing chamber using solvents and the use of ultrasound. The number of wash cycles can be preselected depending on the type of mix. The minerals remain in the washing drum, binders, solvents and fillers are washed out and further separated in the connected centrifuge. The filler is held back in the centrifugal sleeve 20-0330 or 20-0335 and the binder/solvent are then separated again in the recovery plant by distillation. The solvent is then reused and fed back into the solvent cycle. Subsequent to the washing process, minerals and fillers are automatically dried and can be further processed by sieve analysis at the end of the program.

- ▶ Optional direct connection to the rotary evaporator
- ▶ Use of the washing drums 2.5 kg or 3.5 kg
- ▶ Closed solvent circuit
- ▶ Fast throughput times (incl. drying approx. 35 to 45 minutes depending on the type of mix)
- ▶ Reduced environmental impact due to solvent losses < 20 ml per extraction



#### VISUAL RECOVERY

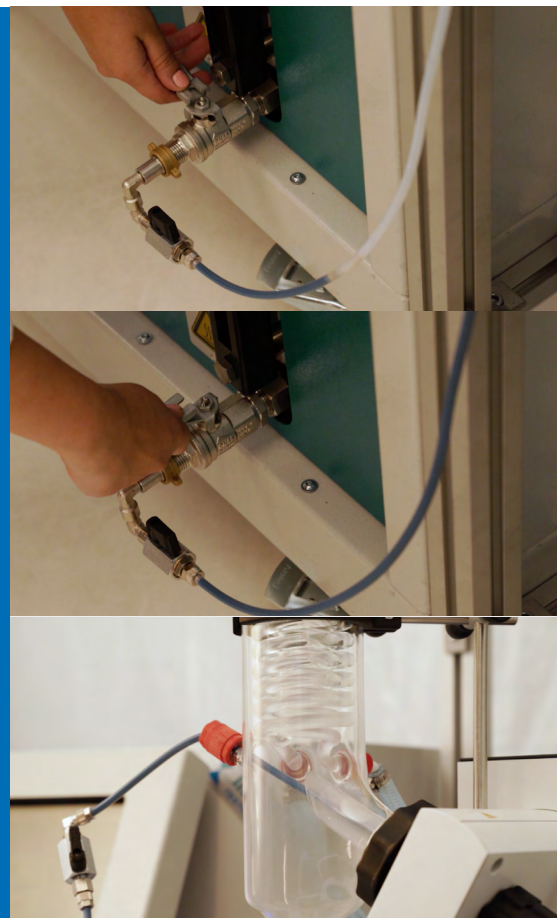
Two viewing windows ensure easy visual monitoring of the recovery process on the dirty and clean side of the recovery. Here, an additional inlet sieve holds back the light asphalt components that cannot be captured in the centrifuge. Two temperature limiters with LEDs above the recovery also ensure simple operation and monitoring of the heating processes. There is also the option of a direct connection for a rotary evaporator.



#### Advantages:

- ▶ Two viewing windows for visual monitoring of the recovery process
- ▶ Direct connection to the rotary evaporator
- ▶ Easily accessible temperature limiter
- ▶ Additional inlet sieve in the recovery catches the smallest asphalt components
- ▶ Maintenance & service friendly
- ▶ User-friendly software
- ▶ Proven Technology
- ▶ Assured, fast extraction results

Elevated **health protection** through **direct connection** to the rotary evaporator!



### Direct connection

The rotary evaporator is seamlessly connected to the recovery. By actuating a valve, the bitumen-solvent mixture is transferred to the rotary evaporator. Thus we close the last gap in handling the solvent.



## AREA 20 ASPHALT & BITUMEN

### Extraction

**YOU!**  
Safe Extractions

**NEW SAFE  
SUSTAINABLE**



**TOUCH  
PANEL**

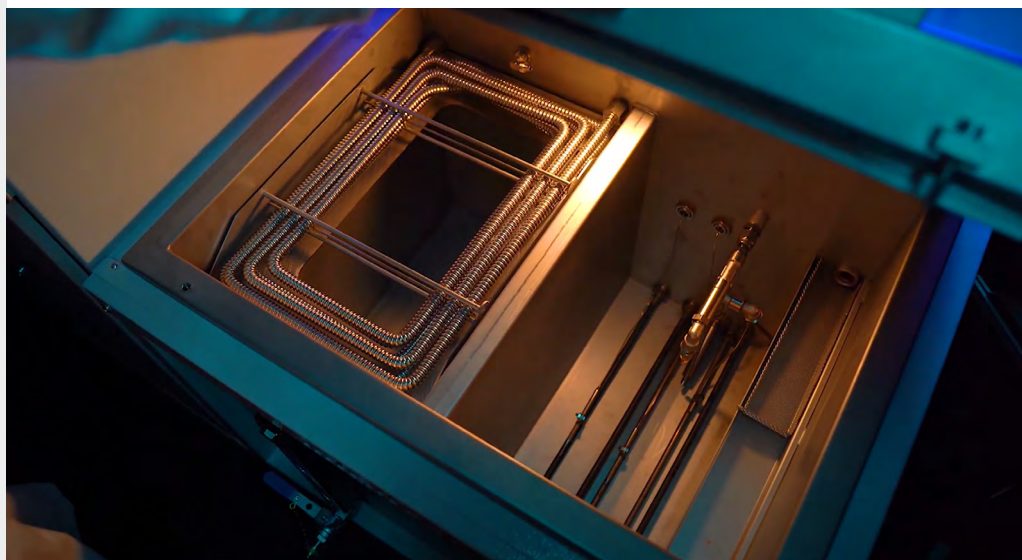
### Asphalt analyzer YOU! touch

EN 12697-1 - ASTM D 8159-2018 - AASHTO For extraction and binder content determination using non-flammable solvents. For the extraction of normal asphalts.

|             | Dimensions          | Weight    | Electrical data         |
|-------------|---------------------|-----------|-------------------------|
| 20-11320    | 1290 x 800 x 1400mm | 253.00 kg | 3/N/PE, 400V, 50Hz, 7kW |
| 20-11320-60 | 1290 x 800 x 1400mm | 253.00 kg | 3/N/PE, 400V, 60Hz, 7kW |

### Advantages:

- ▶ Smart creation and storage of test sequence programs for different types of mix
- ▶ Program sequence visually visible
- ▶ Storage of process-relevant test parameters (running time, wash cycles, drying cycles, temperatures, etc.)
- ▶ Error diagnosis on site or through remote maintenance via the Internet
- ▶ Changeover of solvents / program update e.g. B. possible via USB stick







**TOUCH  
PANEL**

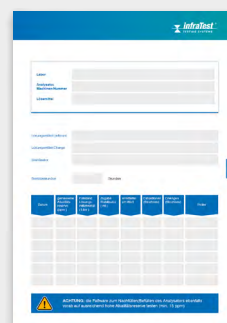
### Asphalt Analyzer YOU! PG

EN 12697-1 - ASTM D 8159-2018 - AASHTO For extraction and binder content determination using non-flammable solvents. For the extraction of rubber modified asphalt.

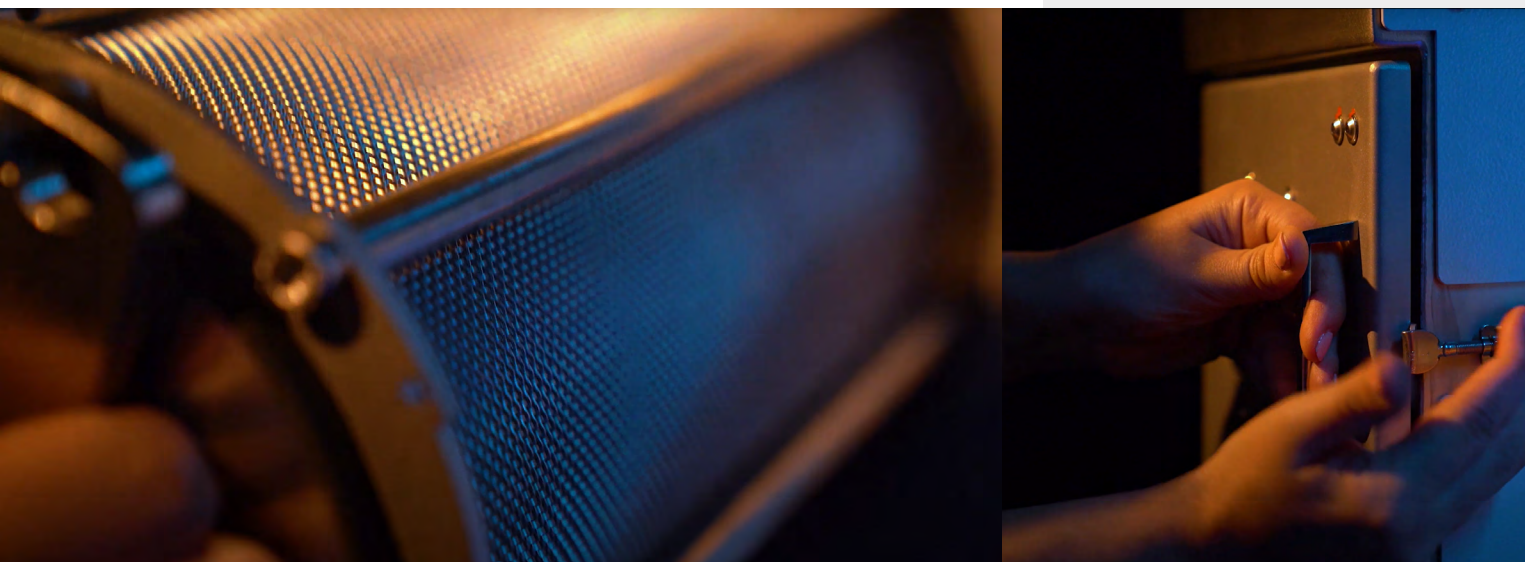
|             | Dimensions          | Weight    | Electrical data                |
|-------------|---------------------|-----------|--------------------------------|
| 20-11340    | 1290 x 960 x 1785mm | 280.00 kg | 400 V, 50 Hz, 3 P+N+PE, 8.5 kW |
| 20-11340-60 | 1290 x 960 x 1785mm | 280.00 kg | 400 V, 60 Hz, 3 P+N+PE, 8.5 kW |

### Advantages

- ▶ Multifunctional: Extracts normal and rubber-modified asphalt
- ▶ Optional automatic solvent wash cycle
- ▶ Two washing chambers, the first working on the washing drum principle and the second on the decanting principle



Solvent Logbook



## AREA 20 ASPHALT & BITUMEN

### Extraction

#### ACCESSORIES

for Asphalt Analyzer YOU!



#### Sampling device

With gas displacement line and clamp tongs for rotary evaporator flasks 1 and 2 l mounted on the top of the recovery system (inlet from centrifuge). In addition, the additional option for the analyzer with a closed first wash cycle 20-1100E220 is recommended.



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.30 kg |
|--------|---------|

20-1100E200

#### Sampling device below

With gas displacement line and clamps for rotary evaporator flask 1 l for attachment to the drain cock of the recovery system on the asphalt analyzer (below)..

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.50 kg |
|--------|---------|

20-1100E210

#### Sampling to the rotary evaporator

From the ball valve of the distillation (newer Heidolph glass sets with GL-18 thread)

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.50 kg |
|--------|---------|

20-1100E215

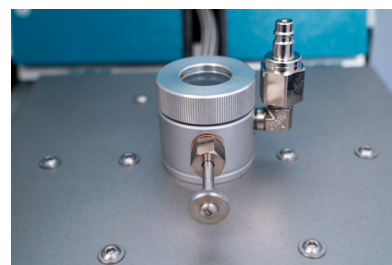
#### Rack rotary evaporator

20-1100E216

#### Dissolve wash option

To increase efficiency and speed up the washing process.

The inlet to the centrifuge can be closed using a manually operated



slide. A closed wash cycle with an adjustable duration of 3 to 15 minutes and an adjustable amount of solvent can then be run in advance under program control. The notification for unlocking appears automatically so that the inlet is opened manually and the further program sequence is released. The remaining washing time is thus significantly reduced.

20-1100E220

#### Option fully automatic solvent wash cycle

To the asphalt analyzer. The inlet of the washing chamber -> centrifuge can be closed by means of an electrically operated ball valve. A closed washing cycle with an adjustable duration of 3 to 15 minutes and an adjustable amount of solvent can then be run in advance via the program. After the time has elapsed, the inlet is opened automatically and the rest of the program is released. The concentrated bitumen/solvent mixture can then be drained off at the top of the recovery system drain valve. At the same time, the remaining washing time is significantly reduced.

Only in combination with 20-11000 / 20-11320.

20-1100E221



Washing drum

To the asphalt analyzer with replaceable stainless steel sieve body. The sealing cap 20-1106 is also required.

|         |                     |
|---------|---------------------|
| 20-1110 | Mesh size: 0.09 mm  |
| 20-1111 | Mesh size: 0.075 mm |
| 20-1112 | Mesh size: 0.063 mm |

Slingshot Sleeve

Ø 120 mm made of stainless steel



|         |                                         |
|---------|-----------------------------------------|
| 20-0330 | for holding filler up to approx. 200 g. |
| 20-0335 | for holding filler up to approx. 300 g. |

Inlay paper for centrifugal sleeve

20-0340



Washing drum 2.5 kg



20-1113

Screen body

Replacement for washing drum.

|             |                     |
|-------------|---------------------|
| 20-1110SE10 | 0.09 mm to 20-1110  |
| 20-1111SE10 | 0.075 mm to 20-1111 |
| 20-1112SE10 | 0.063 mm to 20-1112 |

Closing cover

For all infraTest washing drums.



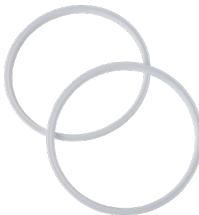
Technical specifications

|        |         |
|--------|---------|
| Weight | 0.80 kg |
|--------|---------|

20-1106

Washer PTFE pure white

D20-110088



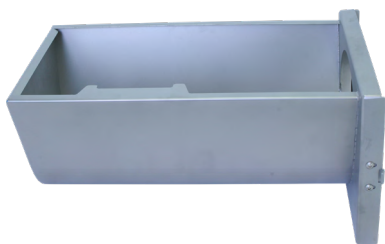


## AREA 20 ASPHALT & BITUMEN

### Extraction

#### ACCESSORIES

for Asphalt Analyzer YOU!



#### Filling tray

For hanging on the front of the washing chamber and for filling the washing drums 20-1110.. with pre-dissolved mix.

#### Technical specifications

Weight 3.10 kg

20-1109



#### Inlet strainer

20-11300E25

#### Dosing device stabilizer

20-11320E227

#### Filling funnel with plug-in coupling

And valve for direct filling of the analyzer centrifuge, e.g. B. from pycnometer flasks.



#### Technical specifications

Weight 1.20 kg

20-1118



For indoor and covered outdoor installation (not in direct sunlight) sufficient for the cooling water supply of up to 2 analyzers, extraction systems etc. Closed cooling water circuit with storage tank and electronic temperature control with digital display. When installed outdoors and the ambient temperature is <0 °C, a water/glycol mixture must be used as the cooling medium. The glycol content should not be less than 25 %. Appropriate installations must be made on site for this purpose.



Circulation cooling system

For reasons of corrosion protection and to avoid a biofilm, it is advisable to add antifreeze to the water (2xZ599.910)!

Technical specifications

|                                                    |                                               |
|----------------------------------------------------|-----------------------------------------------|
| Dimensions                                         | 880 x 750 x 1000 mm                           |
| Weight                                             | 111.00 kg                                     |
| Electrical data                                    | 3/N/PE, 400 V, 50 Hz, 4.4 kW, 16 A            |
| Water tank capacity                                | 26L                                           |
| Cooling capacity at an ambient temperature of 32°C | 6.4 kW at a medium flow temperature of + 15°C |
| Permissible ambient temperature                    | -20 to + 42°C                                 |
| Flow temperature                                   | 13.5 to 25°C                                  |
| Air performance                                    | 4500 m³/h                                     |
| Pump flow rate                                     | 2 m³/h                                        |
| Pump head                                          | 3.1 bars                                      |

20-1144

Circulation cooling system 60 Hz

For reasons of corrosion protection and to avoid a biofilm, it is advisable to add antifreeze to the water (2xZ599.910)!

Technical specifications

|                                                    |                                                             |
|----------------------------------------------------|-------------------------------------------------------------|
| Dimensions                                         | 880 x 750 x 1000 mm                                         |
| Weight                                             | 131.00 kg                                                   |
| Electrical data                                    | 220 V + -10%, 60 Hz, 5 kW, 3 / PE                           |
| Water tank capacity                                | 26L                                                         |
| Cooling capacity at an ambient temperature of 37°C | 2600/3900/6000 W at a medium flow temperature of -10/0/10°C |
| Permissible ambient temperature                    | +10 to + 42°C                                               |
| Pump head                                          | 3.1 bars                                                    |

20-1147

## AREA 20 ASPHALT & BITUMEN

### Extraction

#### Kit connecting parts 1 consumer

From 20-1144 e.g. asphalt analyzer/ aut. Extraction plant.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 3.20 kg |
|--------|---------|

20-1144E10

#### Kit connecting parts 2 consumers

From 20-1144 e.g. asphalt analyzer/ aut. Extraction system + other consumers eg 20-13... Vacuum rotary evaporator.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 6.50 kg |
|--------|---------|

20-1144E20

#### Kit filling cooler at 20-1148

Required to fill the recirculating cooler in the weatherproof housing 20-1148.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 3.40 kg |
|--------|---------|

20-1144E30

#### Weather protection housing for recirculating cooler

Made of galvanized sheet steel with lockable door for outdoor installation of 20-1144/20-11460.

RAL 7032 pebble grey. On the right is a service flap for easy filling and operation of the chiller. 20-1144E30 is also required to fill the cooler.

##### Technical specifications

|            |                     |
|------------|---------------------|
| Dimensions | 910 x 1010 x 1320mm |
| Weight     | 107.00 kg           |

20-1148



#### Vacuum gauge

With plug-in coupling for checking the system tightness of the drying area of the asphalt analyzer.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.30 kg |
|--------|---------|

20-1100E30

#### Extraction coupling supply center 4-pin

With 1.5 m fabric hose and plug-in coupling for connection to the analyzer.

20-9850E20

#### Extraction coupling supply center 3-pin

With 1.5 m fabric hose and plug-in coupling for connection to the analyzer.

20-9850E23



#### Insert tub

For cleaning small parts in the analyzer.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.00 kg |
|--------|---------|

20-1100E250



## Disposal trolley

20-9851



## Supply and disposal wagons

Includes:

- ▶ 20-9850E30 Mobile collection tray with push handle (L940xW500xH1080 mm), galvanized steel with small parts container
- ▶ 20-9850E50 Barrel adapter for installation in the 2" socket of the used goods drum with 3 m transparent PTFE hose with shut-off valve and vacuum limiter to protect the used goods drum. Hose length can be individually adjusted by the customer
- ▶ Overfill indicator for mounting in the 3/4" socket of the used goods barrel with hose to the vacuum pump (included in 20-9850E50) · 20-9850E40 Vacuum pump with 2.5 m power cable mounted in the small parts container of the collection pan
- ▶ D20.10839 Barrel key for opening and closing the closure plugs of the used goods barrel
- ▶ 20-9850E23 Extraction coupling supply center 3-pin
- ▶ Optional assembly of a Woulff bottle 30 L used goods barrel, safetainer and withdrawal coupling 20-9850E20 not included.

### Technical specifications

|        |          |
|--------|----------|
| Weight | 49.00 kg |
|--------|----------|

20-9850

## Fine filter water 90 µm

Both ends with hose nozzle 1/2 ".

### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.80 kg |
|--------|---------|

20-1100E230.1

## Drain rack for two flasks

### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.00 kg |
|--------|---------|

20-1100E270

## Glass flask wash insert RTFOT glasses



For cleaning up to 4 RTFOT glasses in the asphalt analyzer.

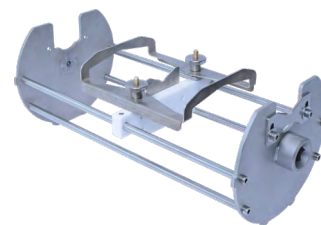
Analyzer must be equipped with the option Dissolving Wash 20-1100E220/E221.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.20 kg |
|--------|---------|

20-1100E265

## Glass flask wash insert



For cleaning up to 2 1000 ml evaporation flasks in the asphalt analyzer. Analyzer must be equipped with the option Dissolving Wash 20-1100E220/E221.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.10 kg |
|--------|---------|

20-1100E260

## AREA 20 ASPHALT & BITUMEN

### Extraction

#### THE ASPHALT ANALYZER PURE MODULAR SYSTEM

##### Advantages:

- ▶ Space-saving due to new device arrangement
- ▶ New recovery process for gentle and economical solvent treatment
- ▶ New control concept for online adaptation to modern extraction tasks
- ▶ Modular structure in expandable expansion stages
- ▶ Pure module, MODA module for modified binding agents, Rota module with rotary evaporator with integrated oil bath, rinsing unit module
- ▶ Suitable solvents Tri, Per, Methylene
- ▶ Possibility of fully automated bitumen removal including further use in the Rota module in just a few simple steps
- ▶ Standardized module width of 650 mm
- ▶ Double heating bath with multi-stage temperature control

Recovery in the  
PURE module



Wash chamber  
module MODA



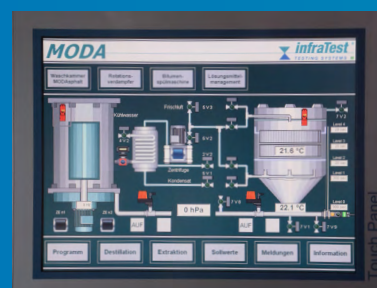
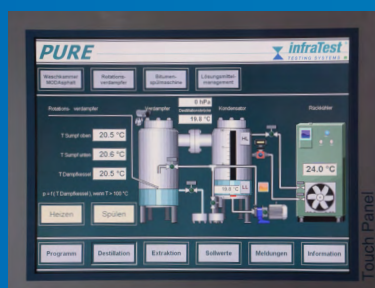
Wash chamber in  
the PURE module



Sampling device in the PURE  
module



#### Examples of the control concept



**Fully automatic  
module ROTA**

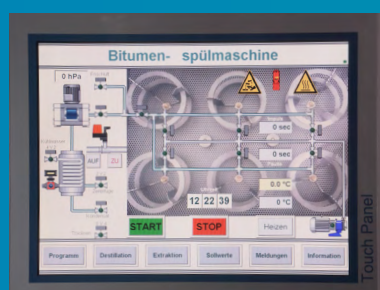
**Washroom in the parts  
cleaning module**



## Asphalt analyzer PURE

Analyzer PURE, the new generation of the proven asphalt analyzer technology in a space-saving device design is ready to meet the most modern extraction requirements in the laboratory. The composition of the mixed goods and the modification of bitumen is becoming more and more diverse and is now more extensive than it was when the first generation of asphalt analyzers from infraTest was introduced. With the addition of glass fibers, rubber-modified bitumen and asphalt granules, the demands on the extraction and quantification of the mix have become more diverse and comprehensive. Along with the increased demands in the laboratory, infraTest wants to offer a new space-saving concept for testing asphalt mixtures.

The modular composition of the PURE analyzer extraction section allows standard extraction in half of the space that is conventionally required. This means that two basic modules or two modules that can be combined in different ways can be accommodated in one fume cupboard. The modular design also allows the combination of different modules as double, triple and quadruple units, which can also be integrated into an existing system at a later date.



## Control concept

The intuitive and self-explanatory control concept allows the user in the laboratory to select and control all individual modules and the ongoing processes in real time. The extraction of the asphalt mixture, via the fully automatic separation of bitumen and solvents in the Rota module or the cleaning of bitumen-contaminated laboratory glassware in the rinsing unit module, including solvent management, can be provided via the innovative machine display with industrial control.



## AREA 20 ASPHALT & BITUMEN

### Extraction

#### THE ASPHALT ANALYZER PURE MODULAR SYSTEM



The MODA and ROTA modules can only be used in combination with the PURE basic module 20-11600.

#### Asphalt analyzer PURE basic module

EN 12697-1 - ASTM D 8159-2018 - AASHTO For extraction and binder content determination using non-flammable solvents.

The system can be factory-programmed for the following solvents: trichlorethylene, tetrachlorethylene (perchlorethylene) or dichloromethane (methylene chloride). The asphalt mixture (up to 3.5 kg) is weighed into a sieve drum (20-1110..) and broken down into its components in the washing chamber using solvents and the use of ultrasound. The minerals remain in the sieve drum, binders, solvents and fillers are washed out and separated again in the attached centrifuge. The filler is held back in the centrifugal sleeve 20-0330 or 20-0335 and the binder/solvent are then separated again in the recovery plant by distillation. The solvent is collected in the storage tank for further use.

The asphalt analyzer PURE basic module is equipped with a new, indirectly heated recovery system, which enables even more careful and safer handling of the solvents used. The control and entries are made via the "Prof.EX 4.0" software. The graphical user interface enables easy operation for tests with standard materials as well as an extended interface for determining the extraction parameters for challenging materials. Minerals and fillers are automatically dried in the machine and are then available for sieve analysis/weighing. Centrifugal sleeves (20-0330 or 20-0335), washing drums 20-1110 ... and washing drum covers 20-1106 are also required for operation. To cool the system, a continuous cooling water supply with 5 to 8 l/min is required in the laboratory. at 3 bar and 10 to 15°C flow temperature or a closed cooling system 20-1144 required. Approx. 20 l of highly stabilized solvent are required for commissioning. Available with 15" screen for simultaneous control of the following modules:

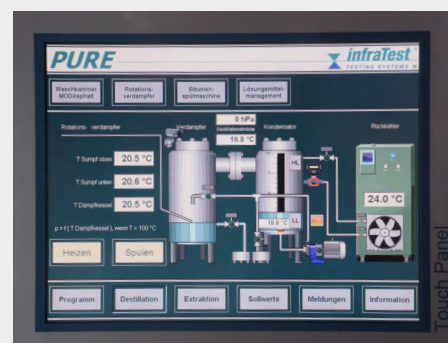
- ▶ 20-11600E10 Washing device module MODA
- ▶ 20-11600E20 ROTA rotary evaporator module Only available in combination with at least one 20-11600E... module. Not available as a single module.

#### Technical specifications

|                 |                                  |
|-----------------|----------------------------------|
| Dimensions      | 1300x960x1790mm                  |
| Weight          | 380.00 kg                        |
| Electrical data | 400 V, 50 Hz, 3 P + N + PE, 7 kW |

20-11600

### Central control via the PURE basic module



AREA 20 ASPHALT & BITUMEN

Extraction

THE ASPHALT ANALYZER  
PURE MODULAR SYSTEM



The MODA and ROTA modules can only be used in combination with the PURE basic module 20-11600.

Module washing device MODA

EN 12697-3 - ASTM D 8159-2018 - AASHTO For the extraction and determination of the binder content of modified asphalt building materials, in particular rubber-modified asphalt using non-flammable solvents, factory-programmed for: trichlorethylene, tetrachlorethylene (perchlorethylene).

The washing device module MODA can only be operated with the module asphalt analyzer Pure basic module. The asphalt mixture is loosened in the horizontal washing chamber by regular shaking and rinsing. Up to 3.5 kg can be filled for modified building materials. Rubber and floating components are suspended and separated by an overflow device. Undissolved floating components are collected on the scavenging ring.

The control and entries are made via the "Prof.EX 4.0" software on the asphalt analyzer PURE basic module. The graphical user interface enables easy operation for tests with standard materials as well as an extended interface for determining the extraction parameters for challenging materials.

The minerals remain in the strainer basket. Filler and the binder/solvent mixture are transferred to the centrifuge and recovery system of the basic module. Minerals and fillers are automatically dried in the machine and are then available for sieve analysis/weighing. The remaining suspended material is also dried on the flushing ring Incl. 1 set of wash bush and flushing ring 20-11600E523. A second set is recommended for continuous work.

The module is built on top of the basic module. No additional installation width is required. Supply is via the basic module. No additional power connection is required.

Technical specifications

|                 |                                    |
|-----------------|------------------------------------|
| Dimensions      | 650x960x1790mm                     |
| Weight          | 91.00 kg                           |
| Electrical data | 400 V, 50 Hz, 3 P + N + PE, 1.5 kW |

20-11600E10



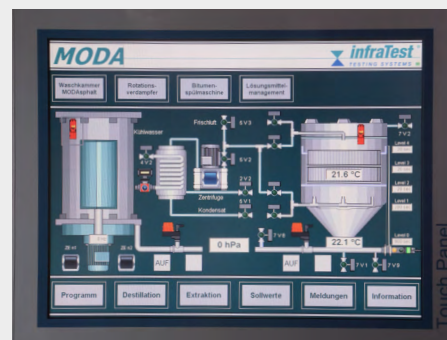




The MODA module is an extension of the basic module and differs optically only in the attachment on the recovery.



### Control of the MODA module via the PURE basic module



## AREA 20 ASPHALT & BITUMEN

### Extraction

#### THE ASPHALT ANALYZER PURE MODULAR SYSTEM



The MODA and ROTA modules can only be used in combination with the PURE basic module 20-11600.

#### Module rotary evaporator ROTA

EN 12697-3 For the fully automatic recovery of the binder after extraction. Here, the binder - solvent mixture from the recovery of the asphalt analyzer PURE basic module is introduced fully automatically into the evaporator flask of the integrated rotary evaporator. The module consists of a fully automatic rotary evaporator including glass set with linear and lifting drive, 2 heating baths with different controllable temperatures and the membrane vacuum pump installed in a stable module frame. The recovered solvent from the distillation is automatically diverted to either the solvent tank or the scrap bin. The rotary evaporator module can only be operated with the Pure basic module asphalt analyzer. The control and entries are made via the "Prof. EX 4 0" software on the asphalt analyzer PURE basic module. The graphical user interface enables easy operation and input. In particular, the temperature of the heating baths, the vacuum control, the horizontal and vertical traversing device and the times are specified.

#### Technical data:

- ▶ Evaporator drive 20 .. 280 rpm with digital display
- ▶ Glass set with vertical cooler
- ▶ evaporating flask 1000 ml
- ▶ 1000 ml receiving flask
- ▶ Heating bath temperature range 20 .. 210° C, accuracy +- 1° C with overtemperature protection
- ▶ boiling temperature probe
- ▶ 2-stage vacuum pump, resistant to chemicals, ultimate pressure 7 mbar
- ▶ Vacuum controller · Condensate cooler
- ▶ vacuum valve
- ▶ Vacuum and water hose set

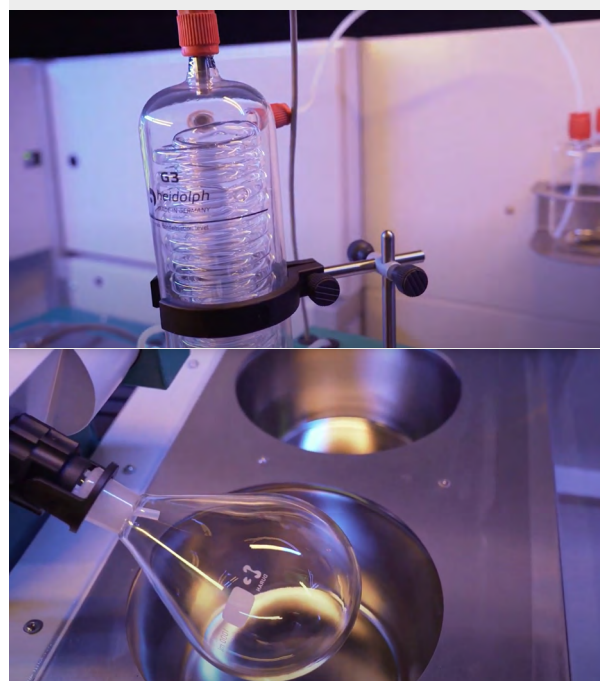
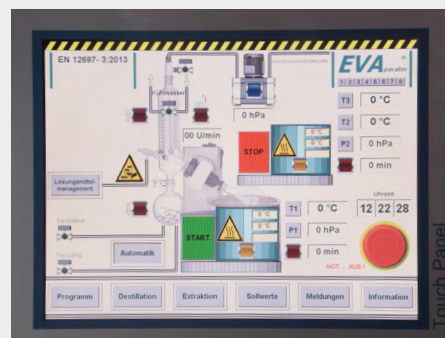
#### Technical specifications

|                 |                 |
|-----------------|-----------------|
| Dimensions      | 650x960x1790mm  |
| Weight          | 228.00 kg       |
| Electrical data | 400V, 50Hz, 16A |

20-11600E20



### Control via the PURE basic module



### Solvent handling module for 20-11600

For use with base module 20-11600 in connection with the modules MODA, ROTA and stand 20-11600E50.

20-11600E40



## AREA 20 ASPHALT & BITUMEN

Extraction

### THE ASPHALT ANALYZER PURE MODULAR SYSTEM

#### Parts cleaning module PURE

For removing bitumen residues on small parts and glassware with non-flammable solvents (TRI, PER, methylene). The control and entries are made via the "Prof.EX 4.0" software. The 7" graphical user interface enables easy operation.

- ▶ Heated washing area approx. 500x300x300 mm with spray nozzles for inside and outside cleaning of up to 8 parts
- ▶ Collecting sieve at the solvent outlet for coarse dirt
- ▶ Integrated circulating air drying at the end of the process
- ▶ Variable process control via integrated PLC with changeable rinsing and drying times
- ▶ Connections for solvent supply and disposal
- ▶ Various insert frames are optionally available

#### Technical specifications

|                 |                              |
|-----------------|------------------------------|
| Dimensions      | 650x960x1790mm               |
| Weight          | 193.00 kg                    |
| Electrical data | 400 V, 2 kW, 50 Hz, 3 P+N+PE |

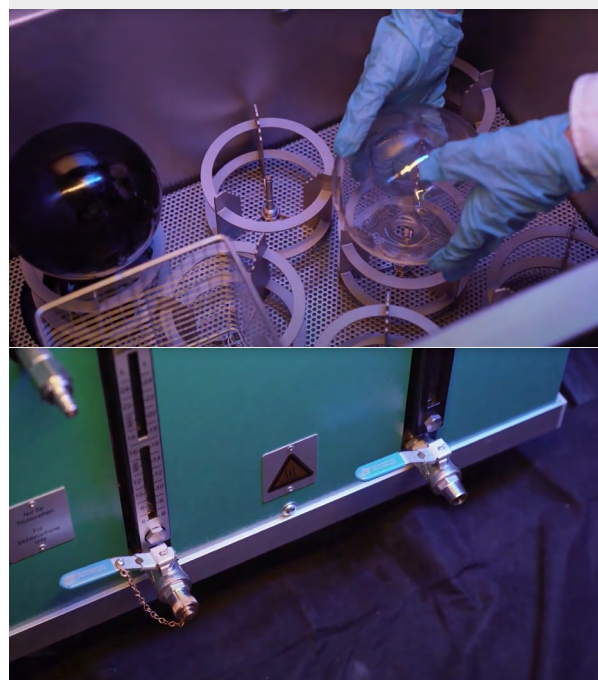
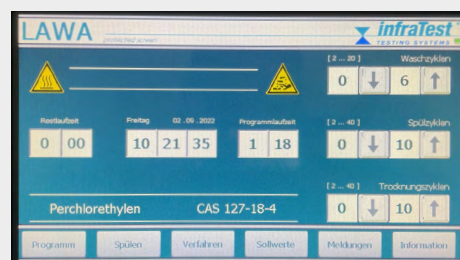
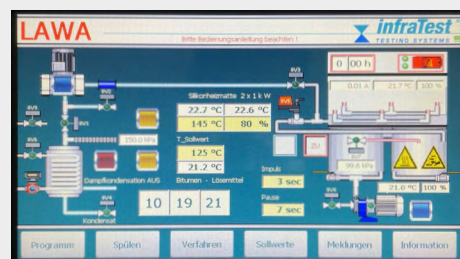
20-11604



The MODA and ROTA modules can only be used in combination with the PURE basic module 20-11600.



## Steering



## AREA 20 ASPHALT & BITUMEN

### Extraction

The modular system  
PURE can be combined  
in **various variants**.



#### **HIGHLIGHT**

##### **Indirect Recovery**

Gentle treatment of the solvent through indirect recovery. The recovery is equipped with a double-walled tank. The heat treatment is carried out using a water reservoir. This means that the solvent does not come into direct contact with the heat and is gently heated.





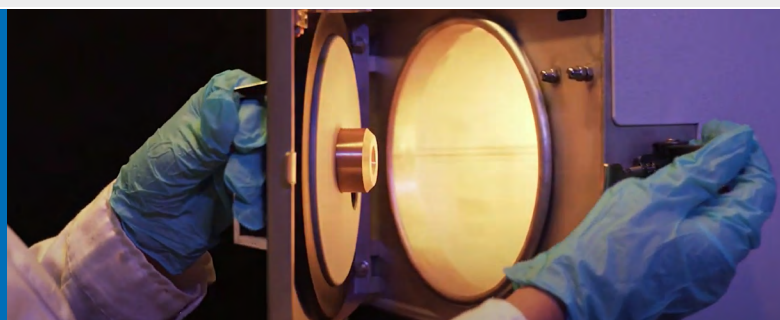


## AREA 20 ASPHALT & BITUMEN

### Extraction

#### ACCESSORIES

for PURE MODULAR SYSTEM



#### Closing cover

For washing drum.



#### Technical specifications

Weight

0.80 kg

20-1106

#### Centrifuge cup

Ø 120 mm made of stainless steel.



20-0330 for holding filler up to approx. 200 g.

20-0335 for holding filler up to approx. 300 g.



#### Washing drum

To the asphalt analyzer with replaceable stainless steel sieve body. The sealing cap 20-1106 is also required.

20-1110 Mesh size: 0.09 mm

20-1111 Mesh size: 0.075 mm

20-1112 Mesh size: 0.063 mm

#### Test case

For trichlorethylene and perchlorethylene. Defective solvent will lead to malfunctions in the extraction and damage to the equipment. For this reason, only highly stable solvents should be used for extraction. This should be checked regularly for the pH value and the alkalinity reserve using this test kit.



#### Technical specifications

Weight

2.20 kg

20-1190



#### Washing drum 2.5 kg

20-1113

#### Stabilizer TRI

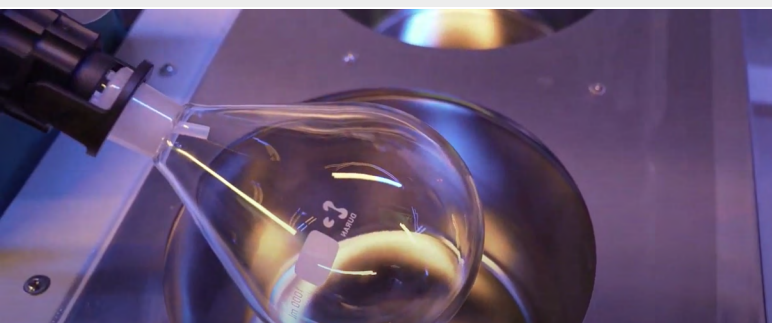
Container 1000 ml for post-stabilization of the solvent. Only suitable for the post-stabilization of HI-TRI-SMG from DOW.

#### Technical specifications

Weight

1.50 kg

20-1195



### Stabilizer PER

For perchlorethylene (tetrachlorethylene). Container 1000 ml for post-stabilization of the solvent.

#### Technical specifications

Weight 1.50 kg

20-1197G PROSTA

20-1197S PER

### Refill Pack 3 (Reagent 3)

For determining the pH-alkaline value Tri and Per. consisting of:

- ▶ Reagent 3 250mL x 3

#### Technical specifications

Weight 0.20 kg

20-1194

### Refill Pack 1 (Reagent 1, 2 + 3)

For determining pH alkalinity value tri and per, consisting of:

- ▶ Reagent 1 15mL
- ▶ Reagent 2 250mL
- ▶ Reagent 3 250ml

#### Technical specifications

Weight 0.80 kg

20-1191

### Refill pack 2 (reagent 1 + 2)

For determining pH alkalinity value tri and per, consisting of:

- ▶ Reagent 1 15mL
- ▶ Reagent 2 250 ml 2 x

#### Technical specifications

Weight 0.80 kg

20-1193



## AREA 20 ASPHALT & BITUMEN

### Extraction

#### ACCESSORIES

for PURE MODULAR SYSTEM



#### Removal coupling SAFE-TAINER 4-pin

Suitable for 33 and 54 l Safe-Tainer. Complete with foot pump, valves and 1.5 m connection hose with connection coupling for filling the asphalt analyzer.

##### Technical specifications

Weight 2.00 kg

20-9800

#### Removal coupling SAFE-TAINER 3-pin

Suitable for 33 and 54 l Safe-Tainer. Complete with foot pump, valves and 1.5 m connection hose with connection coupling for filling the asphalt analyzer.

##### Technical specifications

Weight 2.00 kg

20-9805

#### Extraction coupling supply center 4-pin

With 1.5 m fabric hose and plug-in coupling for connection to the analyzer.

##### Technical specifications

Weight 2.00 kg

20-9850E20

#### Extraction coupling supply center 3-pin

With 1.5 m fabric hose and plug-in coupling for connection to the analyzer.

##### Technical specifications

Weight 2.00 kg

20-9850E23



#### Supply and disposal wagons

Includes:

- ▶ 20-9850E30 Mobile collection tray with push handle (L940xW500xH1080 mm), galvanized steel with small parts container
- ▶ 20-9850E50 Barrel adapter for installation in the 2" socket of the used goods drum with 3 m transparent PTFE hose with shut-off valve and vacuum limiter to protect the used goods drum. Hose length can be individually adjusted by the customer
- ▶ Overfill indicator for mounting in the 3/4" socket of the used goods barrel with hose to the vacuum pump (included in 20-9850E50) · 20-9850E40 Vacuum pump with 2.5 m power cable mounted in the small parts container of the collection pan
- ▶ D20.10839 Barrel key for opening and closing the closure plugs of the used goods barrel
- ▶ 20-9850E23 Extraction coupling supply center 3-pin
- ▶ Optional assembly of a Woulff bottle 30 L used goods barrel, safetainer and withdrawal coupling 20-9850E20 not included.

##### Technical specifications

Weight 49.00 kg

20-9850



### Vacuum pump with assembly parts

For retrofitting to the mobile collection trays 20-9851E10 or 20-9850E30.

20-9850E40

### Vacuum extraction coupling

Consisting of:

- ▶ Barrel adapter for installation in the 2" socket of the used goods barrel with 3m transparent PTFE hose with shut-off valve and vacuum limiter to protect the used goods barrel. Hose length can be individually adjusted by the customer
- ▶ Overfill indicator for installation in the 3/4" socket of the used goods barrel
- ▶ A vacuum pump is also required

20-9850E50

### Bitumen washing machine collection bottle

Includes:

- ▶ 5 L glass bottle, plastic-coated
- ▶ Connecting elements to the bitumen washing machine
- ▶ Ball valves for removing used goods
- ▶ Small parts and tubing

A software update may also be required.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.00 kg |
|--------|---------|

20-9853



### Collecting bottle solvent rotary evaporator

For use in an enclosure and to return the solvent to the waste container or, as an option, to the analyzer via a hose line.



Contains:

- ▶ 5 L glass bottle, plastic-coated
- ▶ Special funnel
- ▶ Valves and hose line to the used goods container
- ▶ Accessories for solvent transfer to the fresh goods connection analyzer consisting of hose line with plug-in coupling and shut-off valve, see 20-9854E10.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.70 kg |
|--------|---------|

20-9854

## AREA 20 ASPHALT & BITUMEN

### Extraction

#### ACCESSORIES

for PURE MODULAR SYSTEM



#### Filter-extraction centrifuge 1500/3000 g

EN 12697-1 - EN 13108 - ASTM D 2172 - AASHTO T 164 For extraction of asphalt mixture using filter paper and centrifuge. Determination of binder content using the difference method. Speed adjustable up to 3600 rpm. Drain pan and hood as well as filter paper must be ordered separately.

##### Technical specifications

|                 |               |
|-----------------|---------------|
| Weight          | 50.00 kg      |
| Electrical data | 230V, 50/60Hz |

20-12000

#### Filter-extraction centrifuge 1500 g - 60 Hz

ASTM D 2172 - AASHTO T 164 For the extraction of asphalt mixture using filter paper and centrifuge. Speed adjustable up to 3000 rpm.

##### Technical specifications

|                 |            |
|-----------------|------------|
| Weight          | 49.00 kg   |
| Electrical data | 230V, 60Hz |

20-1200-60



#### Distillation Plant

For the recovery of non-flammable solvents from bitumen etc. The contaminated solvent is heated in the storage chamber. The volatile solvent is then cooled down again via a water-operated cooling coil and settles in the storage chamber. Hourly output approx. 10 l. Incl. overtemperature protection and level indicator.

|         |        | Weight | Electrical data         |
|---------|--------|--------|-------------------------|
| 20-1250 | 10 l/h | 20 kg  | 230V, 50/60Hz, 1.2kW    |
| 20-1260 | 40 l/h | 31 kg  | 230 V, 50/60 Hz, 3.5 kW |

#### Evaporation flask NS 29/32

|            |        |
|------------|--------|
| 20-1300.1  | 1000ml |
| 20-1300.7  | 2000ml |
| 20-1300.10 | 3000ml |



#### Piston clamp NS29

20-1300.11



### Receiving flask KS35

|            |                  |
|------------|------------------|
| 20-1300.12 | 1000 ml with tap |
| 20-1300.2  | 1000ml           |
| 20-1300.3  | 2000ml           |



### Cork ring for evaporating flasks 1000 - 2000 ml

OD 140mm

#### Technical specifications

Weight 0.07 kg

20-1300.4

### Wire clip 29/32 for evaporating flasks

#### Technical specifications

Weight 0.01 kg

20-1300.8

### Metal clip with locking mechanism

For evaporating/receiving flasks.

#### Technical specifications

Weight 0.01 kg

20-1300.9



Vacuum rotary evaporator

An operating concept reduced to the essentials: clear and always with direct access to the basic parameters of rotation speed and heating bath temperature.

Vacuum rotary evaporator

EN 12697-3 motor lift model with transparent G1 diagonal radiator Includes:

- ▶ Evaporator drive with infinitely variable speed from 10 to 280 rpm
- ▶ Digital display of speed and bath temperature
- ▶ A heating bath with temperature controller from 20 - 210° C
- ▶ A motor jack for raising and lowering the glass set
- ▶ Glass set complete with diagonal condenser and 1000 ml evaporating and receiving flask

20-13000

Vacuum rotary evaporator

EN 12697-3 Motor Lift Model with G3 Vertical Cooler Includes:

- ▶ Evaporator drive with infinitely variable speed from 10 to 280 rpm
- ▶ Digital display of speed and bath temperature
- ▶ A heating bath with temperature controller from 20 - 210° C
- ▶ A motor jack for raising and lowering the glass set
- ▶ Glass set complete with space-saving vertical condenser as well as 1000 ml evaporating and receiving flasks

20-13030

Vacuum rotary evaporator

EN 12697-3 hand lift model with G1 diagonal radiator Includes:

- ▶ Evaporator drive with infinitely variable speed from 10 to 280 rpm
- ▶ Digital display of bath speed and temperature
- ▶ A heating bath with a temperature controller of 20 - 210 C°
- ▶ A lifting tripod for raising and lowering the glass set
- ▶ Glass set complete with diagonal condenser and 1000 ml evaporating and receiving flask

20-13010

Vacuum rotary evaporator

EN 12697-3 motor lift model with transparent, plastic-coated G3 XL vertical cooler: 2,200 cm² cooling surface for maximum evaporation performance! Contains:

- ▶ Evaporator drive with infinitely variable speed from 10 to 280 rpm
- ▶ Digital display of speed and bath temperature
- ▶ A heating bath with temperature controller from 20 - 210° C
- ▶ A motor jack for raising and lowering the transparent, plastic-coated glass set
- ▶ Plastic coated glass set complete with space-saving XL vertical cooler (2,200 cm cooling surface for maximum evaporation performance!) as well as 1000 ml evaporating and receiving flask.

20-13040

ACCESSORIES

Heating bath liquid

5 l container for the oil bath rotary evaporator.

|            |       |
|------------|-------|
| 20-1300E86 | 170°C |
| 20-1300E87 | 220°C |

## Rotary evaporator set with vacuum unit

EN 12697-3 For recovery of the binder after extraction.

Contains:

- ▶ Evaporator drive with motor lifting stand
- ▶ Glass set with vertical condenser and evaporating and receiving flasks each 1000 ml with coating against glass breakage
- ▶ Heating bath for water or oil
- ▶ Diaphragm vacuum pump with automatic vacuum control using a digital controller with 3 digital displays for actual value, setpoint and operating mode. Programming possibility of ramp functions.

Thermal oil for the oil bath is also required. Technical specifications:

- ▶ Evaporator drive 10 .. 280 rpm with digital display
- ▶ Glass set with vertical cooler
- ▶ evaporating flask 1000 ml
- ▶ 1000 ml receiving flask
- ▶ Heating bath temperature range 20 .. 210°C, accuracy  $\pm 1^\circ\text{C}$  with overtemperature protection
- ▶ boiling temperature probe

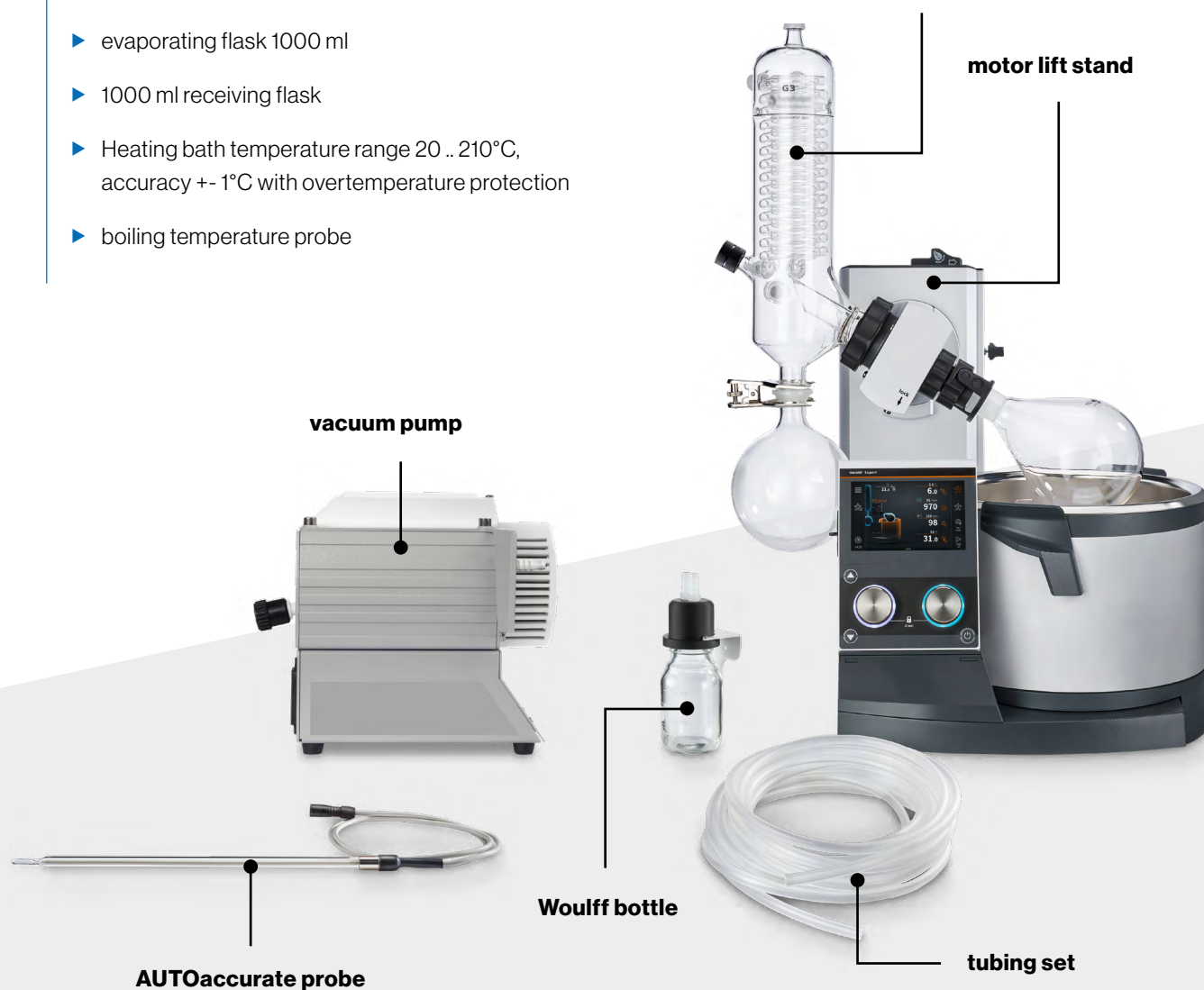
- ▶ 2-stage vacuum pump, resistant to chemicals, ultimate pressure 7 mbar
- ▶ Vacuum controller
- ▶ Condensate cooler
- ▶ Vacuum valve
- ▶ Woulf bottle
- ▶ Vacuum and water hose set

### Technical specifications

|                 |                   |
|-----------------|-------------------|
| Weight          | 25.00 kg          |
| Electrical data | 230V, 50Hz, 1400W |

20-13050

**Glass set complete, available in three variants (G1, G3, G3 XL)**





## AREA 20 ASPHALT & BITUMEN

### Extraction

#### Digital vacuum gauge

For absolute pressure measurement 0 - 1300 mbar, resolution 0.1 mbar. Switchable pressure units bar, mbar etc. with piezoresistive absolute pressure sensor and 4 mm connection sleeve. Battery operation 9 V.



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.17 kg |
|--------|---------|

20-1312

#### Woulff bottle 500 ml with shock protection and 3 necks



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.33 kg |
|--------|---------|

20-1315

#### Woulff bottle 500 ml

With two GL-threaded necks for use with 20-1320.



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.40 kg |
|--------|---------|

20-1316

#### Vacuum control and display device

Standing model or for wall mounting with manometer, absolute display 0-1200 mbar, fine adjustment valve and inlet and outlet nozzles. A Woulff bottle 20-1316 can be attached to the lower part and a digital vacuum gauge 20-1312 to the upper part.



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 4.30 kg |
|--------|---------|

20-1320



#### Pycnometer Rolling Device

For expelling the air from pycnometer bottles. Sheet steel housing designed as a drip pan at the bottom with a hinged lid and adjustable angle of inclination. Electric drive with variable speed 40 .. 60 rpm. with 4 support rollers for 3 pycnometer bottles from 500 to 2000 ml.

#### Technical specifications

|                 |               |
|-----------------|---------------|
| Dimensions      | 350x350x950mm |
| Weight          | 35.00 kg      |
| Electrical data | 230V, 50Hz    |

20-1350



#### Pycnometer Rolling Device

For expelling the air from pycnometer bottles. Sheet steel housing designed as a drip pan at the bottom with a hinged lid and adjustable angle of inclination. Electric drive with variable speed 40 .. 60 rpm. with 7 support rollers for pycnometer bottles from 500 to 2000 ml.

#### Technical specifications

|                 |                |
|-----------------|----------------|
| Dimensions      | 350x350x1350mm |
| Weight          | 47.00 kg       |
| Electrical data | 230V, 50Hz     |

20-1360



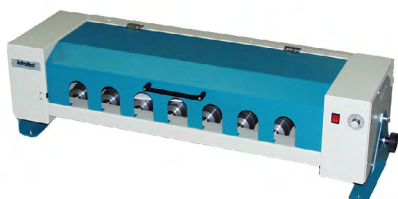
### Bottle rolling device

EN12697-5 – EN 12697 - 11 For testing the affinity using glass bottles 500 ml 99-0012 and for expelling air from pycnometer bottles. Sheet steel housing designed as a drip pan at the bottom with a hinged lid and adjustable angle of inclination. Electric drive with variable speed 40 .. 60 rpm. with 5 collecting rollers for glass bottles 99-0012 or pycnometer bottles of 500 and 1000 ml.

#### Technical specifications

|                 |               |
|-----------------|---------------|
| Dimensions      | 350x350x950mm |
| Weight          | 37.00 kg      |
| Electrical data | 230V, 50Hz    |

20-1352



### Bottle rolling device

EN 12697-5 – EN 12697-11 For testing the affinity using glass bottles 500 ml 99-0012 and for expelling air from pycnometer bottles. Sheet steel housing designed as a drip pan at the bottom with a hinged lid and adjustable angle of inclination. Electric drive with variable speed 40 .. 60 rpm. with 8 collecting rollers for glass bottles 99-0012 or pycnometer bottles of 500 and 1000 ml.

#### Technical specifications

|                 |                |
|-----------------|----------------|
| Dimensions      | 350x350x1350mm |
| Weight          | 48.00 kg       |
| Electrical data | 230V, 50Hz     |

20-1362

### Pycnometer calibrated

EN 12697-5 Consisting of wide-necked bottle with attachment, both numbered and record of the calibrated volume.



|         |        |        |
|---------|--------|--------|
| 20-1370 | 500ml  | 0.30kg |
| 20-1375 | 1000ml | 0.60kg |
| 20-1380 | 2000ml | 0.95kg |

### Wide-mouth bottle

With standard ground joint.  
Duran glass.



|         |                                     |         |
|---------|-------------------------------------|---------|
| 20-1385 | 500 ml with ground joint SGJ 45/60  | 0.30 kg |
| 20-1392 | 1000 ml with ground joint SGJ 60/46 | 0.60 kg |
| 20-1395 | 2000 ml with ground joint SGJ 60    | 0.95 kg |
| 20-1397 | 5000 ml with ground joint SGJ 85/55 |         |

### Octagonal Lid Stopper Glass



|         |           |         |
|---------|-----------|---------|
| 20-1393 | SGJ 60/45 | 0.10 kg |
| 20-1394 | SGJ 29/32 | 0.09 kg |

### Laboratory glass bottle 5000 ml

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.70 kg |
|--------|---------|

20-1398

### Pycnometer attachment

With measuring mark on the neck



|         |           |         |
|---------|-----------|---------|
| 20-1400 | SGJ 45/27 | 0.09 kg |
| 20-1405 | SGJ 60/37 | 0.13 kg |
| 20-1407 | SGJ 85/55 | 0.26 kg |

## AREA 20 ASPHALT & BITUMEN

### Extraction

#### Filling funnel

Made of aluminium.

|         |                |
|---------|----------------|
| 20-1410 | SGJ 45 0.10 kg |
| 20-1415 | SGJ 60 0.15 kg |



#### Density hydrometer

With thermometer 0..+35° C..

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.05 kg |
|--------|---------|

|         |                                                 |
|---------|-------------------------------------------------|
| 20-1419 | Density measurement range 1,200 to 1,300 g/cm³. |
| 20-1420 | Density measurement range 1,300 to 1,400 g/cm³. |
| 20-1422 | Density measuring range 1,400 to 1,500 g/cm³.   |



#### Stainless steel vacuum container

EN 12697-5 - ASTM D 2041 - AASHTO T 209

For venting pycnometer bottles for determining the bulk density of asphalt mix using water. Design for 4 1000 ml pycnometer bottles or 3 2000 ml bottles. The lid, which can be removed using a quick-release fastener, is equipped with a sight glass Ø 150 mm. Equipped with a support grid inside, a vacuum pressure gauge with a 5 mm hose nozzle for connecting a vacuum pump and a ventilation valve.



##### Technical specifications

|                                    |         |
|------------------------------------|---------|
| Weight                             | 8.80 kg |
| Container Ø inside                 | 315mm   |
| Height approx.                     | 270mm   |
| Max. permissible negative pressure | 15 mbar |

20-1435



#### Diaphragm vacuum pump

Chemical-resistant design. Pumping speed: 2.3 m³/h, final pressure <8 mbar.

##### Technical specifications

|                 |               |
|-----------------|---------------|
| Weight          | 10.80 kg      |
| Electrical data | 230V, 50/60Hz |

95-2475

#### Stainless steel vacuum container

EN 12697-5

For venting pycnometer bottles for determining the bulk density of asphalt mix using water. Design for 3 1000 ml pycnometer bottles or 1 piece 2000 ml. Removable lid with quick-release fastener. Equipped with a grate inside, one with a 5 mm hose nozzle for connecting a vacuum pump and a ventilation valve.



##### Technical specifications

|                                    |         |
|------------------------------------|---------|
| Weight                             | 6.00 kg |
| Container Ø inside                 | 250mm   |
| Height approx.                     | 270mm   |
| Max. permissible negative pressure | 15 mbar |

20-1436





### Vacuum control device

EN 12697-5 - EN 12697-12 With digital display and microprocessor for controlling a vacuum pump 95-2475 for experiments on ·Recovery of the binder with the rotary evaporator EN 12697/3 ·Apparent density test according to EN 12697/5 ·Determination of water sensitivity according to EN 12697/12 The device enables in 2 operating modes the generation of a vacuum in 3 preselectable levels from 1000 to 20 mbar. A preselectable monitoring and cycle time of 0 - 99.99 h/min/s can be preselected for each pressure stage. Operating mode 1 is used for tests according to EN 12697/5 and EN 12697/12 (standard levels 700-200-30 mbar). The preselected pressure of the respective stage is approached and the vacuum pump is switched off. After the cycle time has expired, the vacuum pump is switched on again and the next pressure stage is started. Operating mode 2 is used for tests according to EN 12697/3. The pressure is regulated in each pressure stage according to the set switching points. The vacuum pump 95-2475, the container for raw density or water sensitivity 20-1435... and the rotary evaporator 20-13000... are not included in the scope of delivery and are also required to carry out the experiment.

### Technical specifications

|                 |                         |
|-----------------|-------------------------|
| Weight          | 4.50 kg                 |
| Electrical data | 230 V, 50/60 Hz, 0.5 kW |

20-1437



## AREA 20 ASPHALT & BITUMEN

### Marshall



#### Marshall Compactor

ASTM D 1559 - ASTM D 6926-10 - AASHTO T 245  
Consisting of frame with wooden anvil and mold set holding device as well as drop hammer with drop weight. Without forms see 20-1480.. below

#### Technical specifications

|        |          |
|--------|----------|
| Weight | 51.00 kg |
|--------|----------|

20-1450

## Automatic Marshall Compressor

ASTM D 1559 - ASTM D 6926 - AASHTO T 245 - NF P98 251-2 Consisting of a frame with a wooden block, a stable holding device for the set of molds and a lifting device for the drop hammer. The drop weight is lifted by a chain and an electric gear motor. The number of impacts is set on a preset counter. After reaching the preselected number of impacts, the motor stops automatically. Specimen diameter 101.6 mm Without concrete base and forms - see 20-1480... Formwork box for concrete filling: 200 x 160 x 300 mm.

### Technical specifications

|                 |                           |
|-----------------|---------------------------|
| Dimensions      | 550x460x1350mm            |
| Weight          | 95.00 kg                  |
| Electrical data | 400 V, 50 Hz, 3<br>P+N+PE |

20-1471

## Impact compressor

EN 12697-30 B With wooden anvil. Base frame with mold box lower part for on-site filling with concrete and wooden anvil with base plate and stable eccentric clamping device for the set of molds including pull-up device for the drop hammer. The drop weight is lifted by a chain and an electric gear motor. The desired number of impacts is set on a preset counter. This stops the motor automatically after reaching the number of impacts. (delete pt). Without forms - see 20-1550...

### Technical specifications

|                 |                    |
|-----------------|--------------------|
| Dimensions      | 540x520x1970mm     |
| Weight          | 126.00 kg          |
| Electrical data | 3/N/PE, 400V, 50Hz |

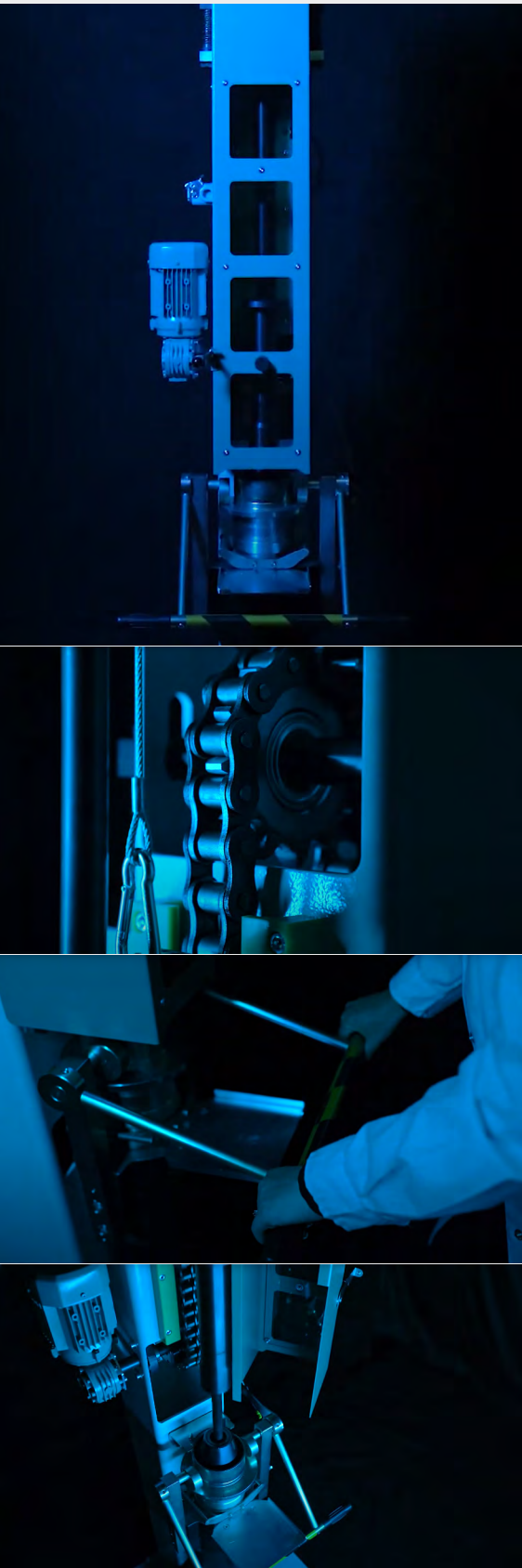
20-1475





## AREA 20 ASPHALT & BITUMEN

Marshall



**Advantages**

- ▶ Automated test procedure
- ▶ Window for monitoring the process
- ▶ More flexibility through sample production according to different standard specifications
- ▶ Quick release for reliable and efficient sample clamping
- ▶ Stable stand for precise sample formation
- ▶ User-friendly control panel

**Impact compressor Marshall**

EN 12697-30 A Frame with steel anvil, protective door and stable clamping device for the mold set. The drop weight is lifted by a chain and an electric gear motor. The desired number of impacts is set on a preset counter. This automatically stops the motor after the number of impacts has been reached. When the clamping device is opened, the drop hammer is automatically raised to enable easy turning or removal of the mold set. Without forms - see 20-1550..

**Technical specifications**

|                     |                    |
|---------------------|--------------------|
| Dimensions          | 600x610x2100 mm    |
| Installation height | 2200 mm            |
| Weight              | 300.00 kg          |
| Electrical data     | 3/N/PE, 400V, 50Hz |

20-1500

**Impact compressor Marshall 101.2/152.4 GOST**

GOST 110-2016 - ASTM D 5881-09 universal device for Marshall samples Ø 101.6 and 152.4 mm. Frame with steel anvil, protective door and stable clamping device for the mold set. The drop weight is lifted by a chain and an electric gear motor. The desired number of impacts is set on a preset counter. This automatically stops the motor after the number of impacts has been reached. When the clamping device is opened, the drop hammer is automatically raised to enable easy turning or removal of the mold set. Complete with interchangeable drop hammer for specimens 101.4 mm, but without molds - see 20-1481.. (152.4 mm) or 20-14800.. (101.6 mm)... Drop hammer 152.6 mm see 20 -1525.

**Technical specifications**

|                 |                           |
|-----------------|---------------------------|
| Weight          | 349.00 kg                 |
| Electrical data | 230 V, 50/60 Hz, 1 P+N+PE |

20-1506

**Impact compactor Marshall 100/150**

EN 12697-30 A universal device for Marshall samples Ø 100 and 150 mm. Frame with steel anvil, protective door and stable clamping device for the mold set. The drop weight is lifted by a chain and an electric gear motor. The desired number of impacts is set on a preset counter. This automatically stops the motor after the number of impacts has been reached. When the clamping device is opened, the drop hammer is automatically raised to enable easy turning or removal of the mold set. Complete with interchangeable drop hammer for specimens 100 mm, but without molds - see 20-1540.. (150 mm) or 20-1550.. (100 mm)... Drop hammer 150 mm see 20-1520.

**Technical specifications**

|                     |                       |
|---------------------|-----------------------|
| Dimensions          | 600x610x2200 mm       |
| Installation height | 2400 mm               |
| Weight              | 349.00 kg             |
| Electrical data     | 1/N/PE, 230V, 50/60Hz |

20-1505

## AREA 20 ASPHALT & BITUMEN

Marshall

### ACCESSORIES

for Marshall compressors



#### Falling hammer complete

To Marshall Compressor 20-1470.

##### Technical specifications

Weight 10.00 kg

20-1470E10

#### Kit drop hammer cpl.

##### Technical specifications

Weight 8.00 kg

20-1475E20

#### Base plate for 20-1450/70



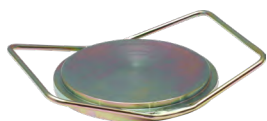
##### Technical specifications

Weight 2.70 kg

20-1480

#### Base plate Marshall 152.4 mm

ASTM D 5881-07a (2013) With grab handles for 20-1505.

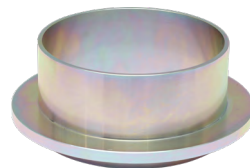


##### Technical specifications

Weight 2.80 kg

20-1481

#### Top piece for 20-1450/70



##### Technical specifications

Weight 1.90 kg

20-1482

#### Top piece for 20-1471 Ø 101.6 mm

Australia.

##### Technical specifications

Weight 1.90 kg

20-14822

#### Base plate for 20-1471

ASTM D 6926-2010 - GOST 110-2016.

##### Technical specifications

Weight 1.20 kg

20-14800

#### Top piece for 20-1471

ASTM D6926-2010 - GOST 110-2016.

##### Technical specifications

Weight 1.90 kg

20-14820



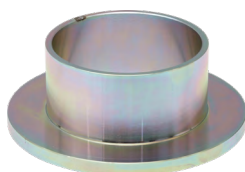
### Top piece Marshall 152.4 mm

ASTM D 5581-07a To 20-1505.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.30 kg |
|--------|---------|

20-1483



### Form cylinder Marshall

ASTM D 6926-2010 - GOST 110-2016.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.30 kg |
|--------|---------|

20-1485



### Marshall forme cylinder Ø 152.4 mm

ASTM D 5581-07a (2013).

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.70 kg |
|--------|---------|

20-1487



### Heating plate for Marshall monkeys

Heavy cast iron heating plate.

On/off switch with indicator light on the handle Diameter:

Ø 120 mm (heating plate)

Cable length 70 cm Handle length 110 mm.



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.00 kg |
|--------|---------|

|                 |                      |
|-----------------|----------------------|
| Electrical data | max 650W, 230V, 50Hz |
|-----------------|----------------------|

20-15100

### Monkey

For the production of marshall samples Ø 150 mm, suitable for 20-1505.

|         | Weight kg | Standard  |
|---------|-----------|-----------|
| 20-1520 | 15.00     | EN        |
| 20-1525 | 15.00     | ASTM/GOST |



## AREA 20 ASPHALT & BITUMEN

Marshall

### ACCESSORIES

for Marshall compressors



#### Measuring device compressibility

Additional equipment with corresponding adaptation parts for 20-1470/20-1475/20-1500 or 20-1505 for determining the compactibility of rolled asphalt via the change in thickness. A Windows computer is required for operation.

Contains:

- ▶ Displacement sensor 50 mm, Gen. +/- 0.15 %
- ▶ Impact detection microphone
- ▶ Electronics table housing with evaluation electronics and interface V 24/RS 232 C
- ▶ Software under Windows for carrying out tests  
Complete with test database according to the work instructions.

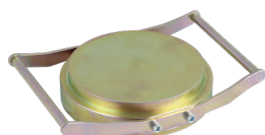
#### Technical specifications

|        |         |
|--------|---------|
| Weight | 5.80 kg |
|--------|---------|

20-1530

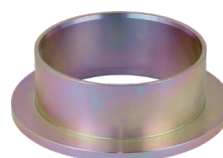
#### Base plate Marshall

With handles for 20-1475/20-1500/20-1505.



|         |          |         |
|---------|----------|---------|
| 20-1540 | Ø 150 mm | 6.50 kg |
| 20-1550 | Ø 100 mm | 3.30 kg |

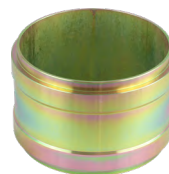
#### Top piece



|         |                        |         |
|---------|------------------------|---------|
| 20-1542 | to 20-1505.            | 2.60 kg |
| 20-1552 | to 20-1475/20-1500/05. | 2.00 kg |

#### Form cylinder

EN 12697-30 for 20-1475/20-1500/20-1505.



|         |            |         |
|---------|------------|---------|
| 20-1545 | Ø 150 mm   | 2.90 kg |
| 20-1555 | Ø 101.6 mm | 1.60 kg |

#### Filling funnel Marshall 101.6 mm



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.20 kg |
|--------|---------|

20-1557

#### Soundproof cabin

For the Marshall compaction device 20-1471/75 / 20-1500/05. Stable design made of coated wooden panels with large-area insulation on the inside and lockable door.



#### Technical specifications

|            |                |
|------------|----------------|
| Dimensions | 900x900x2200mm |
| Weight     | 140.00 kg      |

20-1570

## Hydraulic dispenser

For squeezing Marshall specimens out of forme cylinders 20-1485/20-1555.

### Technical specifications

|        |          |
|--------|----------|
| Weight | 24.20 kg |
|--------|----------|

20-1590



## Marshall dispenser 50 kN, electro-hydraulic

As a table model for Marshall bodies EN 12697-30.

- ▶ Easy to use thanks to spring return (no need to push back the cylinder)
- ▶ Stroke 150mm
- ▶ Operation by foot switch, hydraulic unit separated from the squeezing device for easier transport and better storage space
- ▶ Ejection stamp and counter ring for specimens Ø 101.6 mm



### Technical specifications

|                                       |                             |
|---------------------------------------|-----------------------------|
| Dimensions approx. (stamp with frame) | Ø 275 x 530 mm              |
| Tank capacity                         | 5 liters                    |
| Dimension                             | 350x200x550mm               |
| Weight                                | 65.00 kg                    |
| Electrical data                       | 3 Ph/N /PE 50Hz 400V, 1.8kW |

20-1595

## Marshall dispenser 100/150 50 kN, electro-hydraulic

As a table model for Marshall bodies EN 12697-30.

- ▶ Easy to use thanks to spring return (no need to push back the cylinder)
- ▶ Stroke 150mm
- ▶ Operation by foot switch, hydraulic unit separated from the squeezing device for easier transport and better storage space
- ▶ Ejection stamp and counter ring for specimens Ø 101.6 mm and Ø 150 mm

### Technical specifications

|                                       |                                  |
|---------------------------------------|----------------------------------|
| Dimensions approx. (stamp with frame) | Ø 275 x 530 mm                   |
| Tank capacity                         | 5 l                              |
| Dimension                             | 350x200x550mm                    |
| Weight                                | 70.00 kg                         |
| Electrical data                       | 3Ph /N /PE, 50 Hz, 400 V, 1.8 kW |

20-1596

## Storage plate

For cooling and storing Marshall specimens.



|         |          |         |
|---------|----------|---------|
| 20-1600 | 6-places | 4.10 kg |
|---------|----------|---------|

|         |          |         |
|---------|----------|---------|
| 20-1605 | 9-places | 6.00 kg |
|---------|----------|---------|

## Suspension device

Made of stainless steel for underwater weighing of Marshall specimens.



|         |       |
|---------|-------|
| 20-1610 | 100mm |
|---------|-------|

|         |       |
|---------|-------|
| 20-1612 | 150mm |
|---------|-------|



## AREA 20 ASPHALT & BITUMEN

Marshall

### Marshall Water Bath

EN 12697-34 - ASTM D 6927 -  
ASTM D 5581 - AASHTO T 245  
- EN 12697-23 Made of stainless  
steel with insulation, cover, floor  
grid and circulation pump. Bath  
dimensions 590x350x220 mm, capacity 5 l. Electric  
heating with PID controller and actual temperature  
display up to 95° C.



#### Technical specifications

|                 |                         |
|-----------------|-------------------------|
| Dimensions      | 679 x 554 x 398mm       |
| Weight          | 30.00 kg                |
| Electrical data | 230 V, 50-60 Hz, 2.8 kW |

20-16200

### Marshall water bath

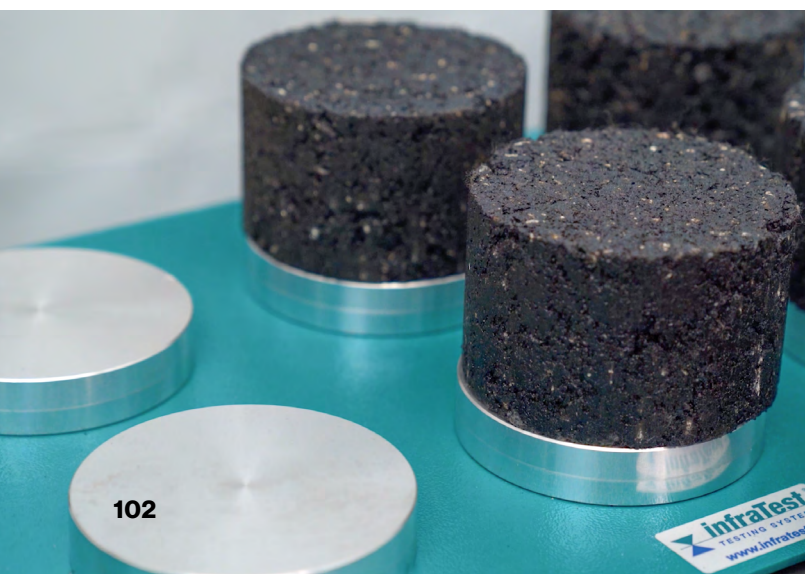
EN 12697-34 - ASTM D 6927 -  
ASTM D 5581 - AASHTO T 245  
- EN 12697-23 Made of stainless  
steel with insulation, cover, floor  
grid and circulation pump. Bath  
dimensions 590x350x220 mm, capacity 45 l. Electric  
heater with PID controller and actual temperature  
display up to 95°C.



#### Technical specifications

|                 |                      |
|-----------------|----------------------|
| Dimensions      | 800x570x380mm        |
| Electrical data | 230V, 50-60Hz, 2.8kW |

20-16205



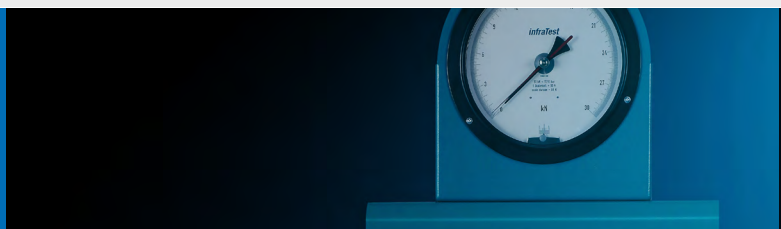


## AREA 20 ASPHALT & BITUMEN

Marshall

### COMPRESSION TESTING MACHINES

Testing the resistance to plastic  
flow



| Item number     | 20-1650                                   | 20-1672                                       | 20-1672-60                                    |
|-----------------|-------------------------------------------|-----------------------------------------------|-----------------------------------------------|
|                 | Marshall Compression Testing Machine 30kN | Marshall compression testing machine 30 kN-PC | Marshall compression testing machine 30 kN-PC |
| Electrical data | 3/N/PE, 400V, 50Hz, 0.3kW                 | 3/N/PE, 400V, 50Hz, 0.3kW                     | 230V, 60Hz, 0.3kW                             |
| Weight          | 156.00 kg                                 | 154.00 kg                                     | 154.00 kg                                     |
| Dimensions      | 780x360x1830 mm                           | 780x360x1480 mm                               | 780x360x1480 mm                               |
|                 | Asphalt: Marshall                         | Asphalt: Marshall, Indirect Tensile Test      | Asphalt: Shearing SCB, DSK, PNST              |





| 35-5100                                                 | 35-5110                                                 | 35-5115                                                 |
|---------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|
| Universal testing machine 50 kN                         | Universal testing machine 100 kN                        | Universal testing machine 200 kN                        |
| 230V, 50Hz, 0.25kW                                      | 230V, 50Hz, 1.20kW                                      | 230V, 50Hz, 1.20kW                                      |
| 153.00 kg                                               | 830.00 kg                                               | 830.00 kg                                               |
| 1900x500x380 mm                                         | 2400x500x380 mm                                         | 2300x500x380 mm                                         |
| Universal application for asphalt, soil, cement and KRL | Universal application for asphalt, soil, cement and KRL | Universal application for asphalt, soil, cement and KRL |



#### Marshall Compression Testing Machine 30 kN

ASTM D 1559 - AASHTO T 245 two-column standing model with electric motor and central spindle drive with 50.8 mm/min. feed rate. Hydraulic force measuring device with manometer Ø 250 mm and drag pointer for maximum value display. Including overload and travel limit switches as well as Marshall shear form, setting caliber and flow meter with holder.

##### Technical specifications

|                 |                              |
|-----------------|------------------------------|
| Dimensions      | 780 x 360 x 1830 mm          |
| Weight          | 156.00 kg                    |
| Electrical data | 3/N/PE, 400 V, 50 Hz, 0.3 kW |

20-1650

##### Advantages

- ▶ User-friendly control panel
- ▶ More flexibility through the use of different inserts
- ▶ Occupational safety through automation
- ▶ High-precision load measurement with manometer

##### ACCESSORIES

See the following page for accessories



## Marshall Compression Testing Machine 30 kN-PC

EN 12697-34 - ASTM D 1559 - AASHTO T 245 - GOST 12801-98

Two-column standing model with electric motor and central spindle drive with 50.8 mm/min. feed rate. Version with electronic force and displacement transducer 50 x 0.01 mm and microprocessor electronics with RS 232 C/V24 interface for transferring test data to a PC. Including control and data transmission software UNIPRESS under Windows with integrated test database, online graphics on the screen and additional evaluation software Marshall (optionally according to EN 12697/34, SN671969b, ASTM...). The software allows for the entry of Marshall sample heights and the output of stability and flow value averaging from 1 to 4 samples. Any printer supported by Windows can be used for log output. Including overload and travel limit switches as well as Marshall shear form, setting caliber and holder for displacement transducers.

### Technical specifications

|            |                |
|------------|----------------|
| Dimensions | 780x360x1480mm |
| Weight     | 154.00 kg      |

20-1672 3/N/PE, 400V, 50Hz, 0.3kW

20-1672-60 230V, 60Hz, 0.3kW

### Advantages

- ▶ User-friendly control panel
- ▶ More flexibility through the use of different inserts
- ▶ Occupational safety through automation
- ▶ Load measurement with PC Real-time recording of measurement data



### SOFTWARE PACKAGES

Evaluation software  
DIN 1996

90-0330

Evaluation software  
ASTM D 1559

90-0330

Evaluation software  
EN 12697-34

90-0330EN

Evaluation software  
PNST 179

90-0330PNST

## AREA 20 ASPHALT & BITUMEN

### Marshall

#### Universal testing machine 50 kN

EN 12697-34 - AASHTO T 245 - ASTM D 1559-2166  
DIN 18136 For displacement-controlled Marshall, CBR tests etc. as well as force-controlled tests with an additional option. Standing model in two-column design with electronic force transducer, flanged to the testing machine crosshead and adjustable electronic displacement transducer 50 mm. The machine is driven by a stepper motor with central spindle and pressure plate below. The control and measurement data acquisition takes place via an integrated microprocessor electronics with serial interface and Windows software UNIPRESS with the following main functions:

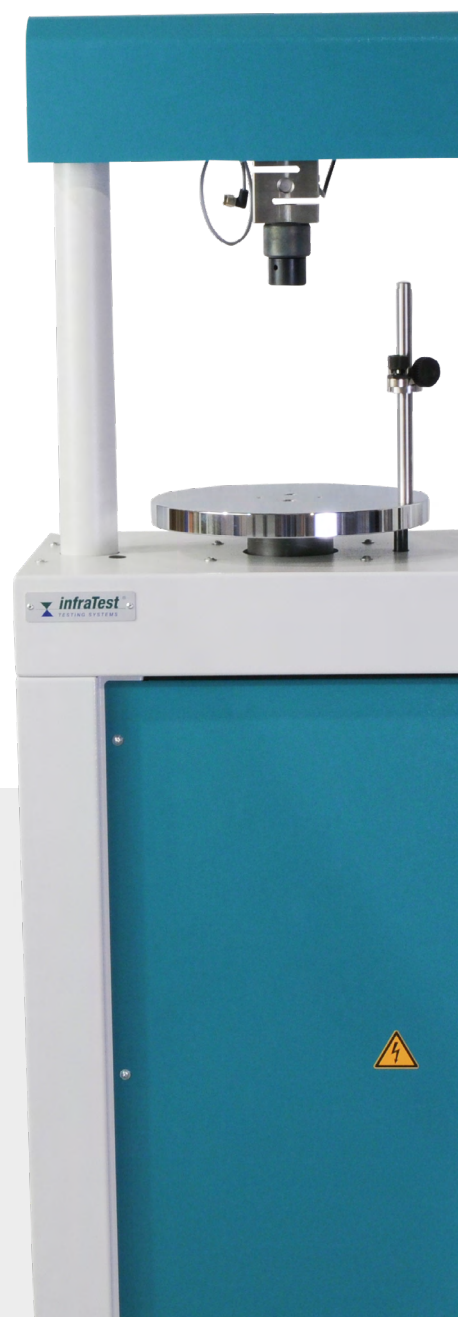
- ▶ Integrated test database
- ▶ Real-time graphic force/displacement or force/time
- ▶ Programmable for custom attempts
- ▶ Automatic zeroing
- ▶ Breakage detection with preselectable switch-off criteria
- ▶ Calibration mode Integrable special evaluation software for Marshall, CBR etc. available on request.

Not suitable for tensile tests. A PC is required for operation.

#### Technical specifications

|                              |                    |
|------------------------------|--------------------|
| Dimensions                   | 760x350x1620mm     |
| Weight                       | 153.00 kg          |
| Electrical data              | 230V, 50Hz, 0.25kW |
| Test force max.              | 50kN               |
| Grade 1                      | EN7500-1           |
| Feed rate                    | 0.001 to 51mm/min  |
| Displacement measuring range | 0 to 50 x 0.01 mm  |
| Printing plate stroke        | 90mm               |
| Pressure plate diameter      | Ø 250mm            |
| Test room height             | 325mm              |
| Clear Width Columns          | 350mm              |

35-5100



## Universal testing machine 100 kN

EN 12697-34 - AASHTO T 245 - ASTM D 1559-2166 DIN 18136

For path-controlled Marshall, CBR tests, etc., as well as, with an additional option, force-controlled test types and tensile tests. Free-standing model in four-column design with electronic force transducer, flanged to the movable testing machine crosshead and electronic displacement transducer for measuring the crosshead displacement. The machine is driven by a quartz-precise stepper motor with two ball screws. Complete with integrated displacement measuring device 0.01 mm over the entire travel as well as additional displacement transducer with connecting cable and holder, measuring range 50 mm, accuracy 0.01 mm. The control and measurement data acquisition takes place via an integrated microprocessor electronics with serial interface and Windows software UNIPRESS.

- ▶ Integrated test database
- ▶ Real-time graphic force/displacement or force/time
- ▶ Programmable for custom attempts
- ▶ Automatic zeroing
- ▶ Break detection
- ▶ Calibration mode

A PC is required for operation.

### Technical specifications

|                                   |                    |
|-----------------------------------|--------------------|
| Dimensions                        | 980x600x1915mm     |
| Weight                            | 840.00 kg          |
| Electrical data                   | 230V, 50Hz         |
| Test force max.                   | 100kN              |
| Grade 1                           | EN7500-1           |
| Feed rate                         | 0.001 to 100mm/min |
| Displacement measurement accuracy | 0.01 mm            |
| Pressure plate diameter           | 300mm              |
| Test space dimension              | 470x470mm          |
| Test room height movable          | 0 to 550mm         |

35-5110



## AREA 20 ASPHALT & BITUMEN

### Marshall

#### Universal testing machine 200 kN

EN 12697-34 - AASHTO T 245 - ASTM D 1559-2166  
DIN 18136

For displacement-controlled Marshall, CBR tests, etc. as well as, with an additional option, force-controlled test types and tensile tests. Free-standing model in four-column design with electronic force transducer, flanged to the movable testing machine cross-head and electronic displacement transducer for measuring the crosshead displacement. The machine is driven by a quartz-precise stepper motor with two ball screws. Complete with integrated displacement measuring device 0.01 mm over the entire travel as well as additional displacement transducer with connecting cable and holder, measuring range 50 mm, accuracy 0.01 mm. The control and measurement data acquisition takes place via an integrated microprocessor electronics with serial interface and Windows software UNIPRESS

With the following main functions:

- ▶ Integrated test database
- ▶ Real-time graphic force/displacement or force/time
- ▶ Programmable for custom attempts
- ▶ Automatic zeroing
- ▶ Break detection
- ▶ Calibration mode

Integrable special evaluation software for Marshall, CBR etc. available on request. A PC is required for operation.

#### Technical specifications

|                                   |                    |
|-----------------------------------|--------------------|
| Dimensions                        | 970x575x1870mm     |
| Weight                            | 830.00kg           |
| Electrical data                   | 230V, 50Hz         |
| Fmax.                             | 200kN              |
| Grade 1                           | EN7500-1           |
| Feed rate                         | 0.001 to 52mm/min. |
| Displacement measurement accuracy | 0.01 mm            |
| Pressure plate diameter           | 300mm              |
| Recording load cell               | M30x1.5            |
| Test space dimension              | 470x470mm          |
| Test room height movable          | 0 to 550mm         |

35-5115





**WE'VE GOT  
YOUR BACK –**  
ON EARTH AND ABOVE

## AREA 20 ASPHALT & BITUMEN

Marshall

### ACCESSORIES

for Marshall compression testing machine

#### Marshall shear form

In stable aluminum design with low-friction precision guide rods.



Standard(s)

20-1710

100mm

EN 12697-34  
ASTM D 1559  
AASHTO T 245

20-1712

150mm

EN 12697-34  
ASTM D 1559  
AASHTO T 245

#### Marshall shear form 152.4 mm ASTM

ASTM D 6927 - ASTM D 5581

##### Technical specifications

Weight 15.70 kg

20-1712ASTM

#### Setting caliber

To check the Marshall shear form.



##### Technical specifications

Weight 0.50 kg

20-1715

#### Flow meter

With parking brake. Measuring path 30 mm, gen. 0.01 mm.

##### Technical specifications

Weight 0.20 kg

20-1720

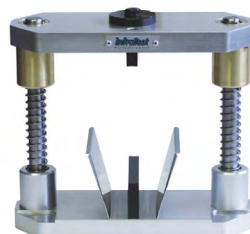
#### Recording paper

Recording width 250 mm with scale

##### Technical specifications

Weight 0.30 kg

20-1735



#### Split pulling device 100 mm

EN 12697-23 - ASTM D 6931 With pressure strips and centering device for specimens Ø 100 mm. Consisting of a base plate with 2 guide pillars and springs for weight compensation as well as the movable upper part. Complete with print strips width 12.7 mm, length 100 mm. For the test, the frame is placed in a testing machine with the appropriate test room (20-1672 or 35-5100). Evaluation software for UNIPRESS see 90-0305.

##### Technical specifications

Weight 7.00 kg

Fmax. 50 kN

Installation height 225mm

Dimensions 280x110x260mm

20-1760





### Split device 100 mm with transverse strain measuring device

EN 12697-23 With pressure strip and centering device, width 12.7 mm, length 100 mm and additionally equipped with a device for measuring the horizontal deformation in the center of the specimen. For this purpose, measuring sensors are attached on the right and left, the movement of which is transmitted to a displacement transducer via precision guides. For this purpose, the displacement transducer 30 x 0.01 mm of the testing machine 20-1672 or 35-5100... is used. Evaluation software see 90-0300. For the test, the frame is placed in a testing machine with the appropriate test room (20-1672 or 35-5100).

#### Technical specifications

|                     |               |
|---------------------|---------------|
| Weight              | 11.30 kg      |
| Fmax.               | 50 kN         |
| Installation height | 225mm         |
| Dimensions          | 280x110x260mm |

20-1762



### Universal splitting device

EN 12697-23 With replaceable pressure strips and centering device for specimens Ø 100 mm and with special accessories Ø 150 and 160 mm. Consisting of a base plate with 2 guide pillars and springs for weight compensation as well as the movable upper part. Complete with printing strips width 12.7, length 100 mm. Pressure strips and accessories for samples Ø 150 and 160 mm see 20-1770/72. For the test, the frame is placed in a testing machine with the appropriate test room (20-1672 or 35-5100). Evaluation software for UNIPRESS see 90-0305.

#### Technical specifications

|                     |               |
|---------------------|---------------|
| Weight              | 7.30 kg       |
| Fmax.               | 50 kN         |
| Installation height | 305mm         |
| Dimensions          | 280x110x260mm |

20-1765

### Print strip Ø 150 20-1505

#### Technical specifications

|            |             |
|------------|-------------|
| Dimensions | 150x20x13mm |
|------------|-------------|

20-1763

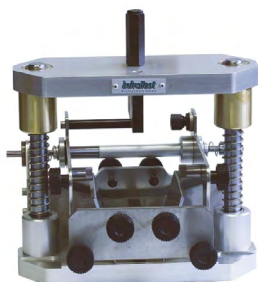


## AREA 20 ASPHALT & BITUMEN

Marshall

### ACCESSORIES

for Marshall compression testing machine



#### Universal splitting device with transverse strain measuring device

EN 12697-23 - ASTM D 4123 - CNR 134-91 With interchangeable pressure strips and centering device for specimens Ø 100 mm and with special accessories Ø 150 and 160 mm. Consisting of a base plate with 2 guide pillars and springs for weight compensation as well as the movable upper part. Complete with pressure strip width 12.7, length 100 mm and equipped with a device for measuring the horizontal deformation in the middle of the specimen. For this purpose, measuring sensors are attached on the right and left, the movement of which is transmitted to a displacement transducer via precision guides. For this purpose, the displacement transducer 30 x 0.01 mm of the testing machine 35-5100... is used. Evaluation software for UNIPRESS see 90-0300. Pressure strips and accessories for samples Ø 150 and 160 mm see 20-1770/72. For the test, the frame is placed in a testing machine with the appropriate test room (35-5100).

##### Technical specifications

|                     |               |
|---------------------|---------------|
| Weight              | 11.50 kg      |
| Fmax.               | 50 kN         |
| Installation height | 305mm         |
| Dimensions          | 400x310x260mm |

20-1767

#### Print stripe

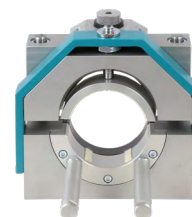
With centering device.

20-1770 19.1 x 100 mm for samples Ø 150 mm

20-1772 20 x 100 mm for samples Ø 160 mm

#### Shearing frame 100 mm

TP A-StB T80 For drill cores Ø 100 mm to test the layer bond (according to Leutner) and the shear strength. Aluminum test frame with hardened, exchangeable shear jaws and 2 guide columns, mounted in ball guide bushes. Suitable for testing machines 20-1650.



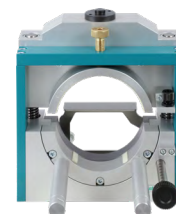
##### Technical specifications

|                     |               |
|---------------------|---------------|
| Weight              | 8.70 kg       |
| Installation height | 220mm         |
| Dimensions          | 240x220x240mm |

20-1780

#### Shearing frame 150 mm

TP A-StB Part 80 Shear test to test the layer bond (according to Leutner) on drill cores. Frame made of aluminum with 2 guide columns and movable upper part with ball guide bushes, specimen hold-down device and hardened, exchangeable shearing jaws  $r = 75$  mm for drill cores Ø 148 to Ø 150 mm. Shear jaws for other drilling diameters available on request. Suitable for 35-5100.



##### Technical specifications

|                             |               |
|-----------------------------|---------------|
| Weight                      | 18.00 kg      |
| Installation height         | 300mm         |
| Required test force approx. | 50 kN         |
| Dimensions                  | 280x265x300mm |

20-1790

## Conversion kit M KRC

### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.60 kg |
|--------|---------|

20-1773

## Shear jaws r=76 mm

For drill cores Ø 150 to Ø 152 mm. Replacement set complete with the appropriate support jaw for 20-1790.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.00 kg |
|--------|---------|

20-1790E10

## Replacement jaws

Interchangeable with 20-1790.

|            |        |
|------------|--------|
| 20-1790E15 | r=50mm |
|------------|--------|

|            |        |
|------------|--------|
| 20-1790E20 | r=75mm |
|------------|--------|

## Special shear jaw set r=73.5 mm

For drill cores Ø 145 to Ø 147 mm. Replacement set complete with matching support jaw and clamping jaw for 20-1790.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.90 kg |
|--------|---------|

20-1790E30

## Shear jaws r=75.5 mm

For drill cores Ø 149 to Ø 151 mm. Replacement set complete with matching support jaw and clamping jaw for 20-1790.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.60 kg |
|--------|---------|

20-1790E40

## Shear jaws r=76.5 mm

For drill cores Ø 151 to Ø 153 mm. Replacement set complete with matching support jaw and clamping jaw for 20-1790.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.50 kg |
|--------|---------|

20-1790E50

## Shear jaws r=77.5 mm

For drill cores Ø 153 to Ø 155 mm. Replacement set complete with matching support jaw and clamping jaw for 20-1790.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.30 kg |
|--------|---------|

20-1790E60

## Shear jaws r=77.5 mm SN

SN 671 961 / SN 670 461 For drill cores Ø 153 to Ø 155 mm. Replacement set complete with matching support jaw and clamping jaw for 20-1790.

### Technical specifications

|        |         |
|--------|---------|
| Weight | 2.50 kg |
|--------|---------|

|            |              |
|------------|--------------|
| Dimensions | 200x200x30mm |
|------------|--------------|

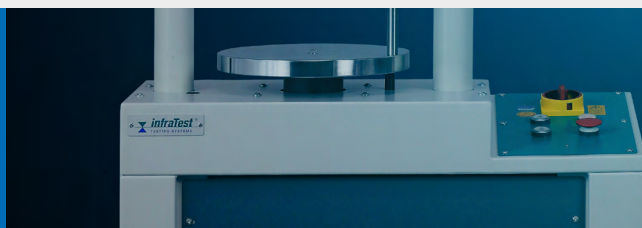
20-1790E70

## AREA 20 ASPHALT & BITUMEN

Marshall

### ACCESSORIES

for Marshall compression testing machine



#### Test stand SCB (semi-circular bending test)

EN 12697-44 For the determination of crack growth by a flexural test applying a three-point load on notched, semicircular specimens (radius 75mm, width 50mm). Version with a test frame made of aluminum with two steel rollers on ball bearings ( $\varnothing$  35 mm, distance 120 mm). The pressure piece (10 x 20 mm) is mounted in the movably guided upper part. For quick installation and alignment of the cooled sample, the test stand is designed in such a way that the sample can be accessed from three sides. A 35-5100, 35-5110 or 35-5115 testing machine is recommended for carrying out the test.

##### Technical specifications

|                     |               |
|---------------------|---------------|
| Weight              | 8.00 kg       |
| Fmax.               | 50kN          |
| Installation height | 200mm         |
| Dimensions          | 280x290x250mm |

20-1795

#### Bending device according to PNST 179

For prism specimens 50x50x220 mm to 80x80x220 mm for use in a compression testing machine. Consisting of an upper and lower pressure plate, connected with 2 guide columns and springs for weight compensation.



##### Technical specifications

|                  |               |
|------------------|---------------|
| Dimensions       | 230x170x215mm |
| Weight           | 6.30 kg       |
| Test force max.  | 40 kN         |
| Test room height | 215mm         |

20-1796

#### Test stand for tensile strength DSK ZTV-SIB 90

For determining the adhesive strength of thin layers in cold installation (DSK) based on Appendix 2 of ZTV-SIB90. Frame can be used in compression testing machines with load increase control consisting of a base plate with a guided upper part, retaining ring for 150 mm drill cores and exchangeable test stamps  $\varnothing$  100 mm for sticking the sample. Fmax. 20 kN.

##### Technical specifications

|            |               |
|------------|---------------|
| Dimensions | 210x160x300mm |
| Weight     | 15.00 kg      |

20-1800

### Test rig adhesive strength DSK TP A-StB 81/2009

For determining the adhesive strength of thin layers in cold installation (DSK). Similar to TPA-StB 81/2009. Frame can be used in compression testing machines with load increase control. Consisting of the base plate with guided upper part, the retaining ring (inside Ø105mm, outside Ø 160mm) for drill cores 150 mm and exchangeable test stamp Ø 100 mm for sticking the sample. Fmax. 30kN. Software 90-0340 additionally required.

#### Technical specifications

|            |               |
|------------|---------------|
| Weight     | 15.30 kg      |
| Fmax.      | 30 kN         |
| Dimensions | 210x145x300mm |

20-1802

### Replacement test stamp Ø 100 mm

20-1800E10 With admission to 20-1800

20-1802E10 With admission to 20-1802



### Test rig bond strength TP Asph. T.81

For determining the tensile strength between the thin asphalt wearing courses in hot or cold construction. Frame can be used in testing machines with load increase control consisting of a base plate with a guided upper part, retaining ring for drill cores and exchangeable test stamps Ø 50 mm for gluing the sample. Fmax. 30kN.

#### Technical specifications

|            |               |
|------------|---------------|
| Weight     | 15.30 kg      |
| Fmax.      | 30 kN         |
| Dimensions | 210x145x300mm |

20-1805





## AREA 20 ASPHALT & BITUMEN

### Granulate



According to EN 12697/5, the vacuum method with water is mainly used today to determine the bulk density of asphalt building materials instead of the solvent used in the past.

Appropriate containers with vacuum devices are required for this. In order to achieve comparable and reproducible test results, it is also necessary to granulate the asphalt mixture evenly in such a way that all cavities are accessible to the water. Manually, this task is time-consuming and very often the necessary quality is not achieved.

Appropriate vacuum devices have been available for this for a long time. A new addition is an electrical granulating device, which shortens the granulating process to just a few minutes and ensures the necessary quality.



#### Granulator

EN 12697-5 for crushing asphalt samples to determine raw density. Mortar container made of stainless steel is filled with approx. 1 kg of roughly divided asphalt test pieces at room temperature and closed with a lid. Complete with timer, start/stop button and switch for manual reverse operation. Timer between 0 and 60 minutes.

|            | Weight   | Electrical data   | Dimensions    |
|------------|----------|-------------------|---------------|
| 20-1440    | 85.00 kg | 230V, 50Hz, 1.5kW | 410x550x835mm |
| 20-1440-60 | 85.00 kg | 115V, 60Hz        | 410x550x835mm |

## ACCESSORIES

#### Kit replacement wings steel

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.20 kg |
|--------|---------|

20-1440E10



#### Separation apparatus

EN 12697-15 Consisting of a detachable double-walled insulated hopper with pivoting slide closure and the stand with platform and built-in closure caps with slider.

##### Technical specifications

|            |                |
|------------|----------------|
| Dimensions | 800x800x1600mm |
| Weight     | 54.00 kg       |

20-4300





**Device opened for filling**



**Device in emptying position**

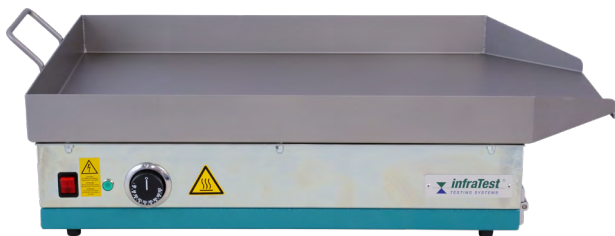
**Advantages:**

- ▶ Short turnaround time
- ▶ Interchangeable granulating tool
- ▶ Integrated timer
- ▶ Reduced noise level



# AREA 20 ASPHALT & BITUMEN

## Mixing/Sample Preparation



### Electrical mixing sheet inside dim. 620x440x60mm

Made of stainless steel for heating and mixing asphalt samples. Complete with electric heater mounted on the bottom of the mixing tray with thermostatic temperature control up to 200°C. Mixing tray internal dimensions approx. 620x440x60 mm.

#### Technical specifications

|                 |                         |
|-----------------|-------------------------|
| Dimensions      | 800x460x240mm           |
| Weight          | 18.00 kg                |
| Electrical data | 230 V, 50/60 Hz, 2.5 kW |

20-0120



### Electrical mixing sheet inside dim. 880x620x60mm

Made of stainless steel for heating and mixing asphalt samples. Heater with two separate heating circuits mounted on the bottom of the mixing tray with thermostatic temperature control up to 200 ° C. Not tiltable.

#### Technical specifications

|                 |                              |
|-----------------|------------------------------|
| Dimensions      | 940x670x205mm                |
| Weight          | 50.00 kg                     |
| Electrical data | 3/N/PE, 400 V, 50 Hz, 3.5 kW |

20-0125

### Electrical mixing sheet 1000 x 750 x 60 mm

#### Technical specifications

|        |          |
|--------|----------|
| Weight | 50.00 kg |
|--------|----------|

20-0128





### Electrical mixing sheet 1500 x 1000 x 210 mm

Made of stainless steel for heating and mixing asphalt samples. Electric heater with 3 heating circuits, mounted on the bottom of the mixing plate with thermostatic temperature control up to 200° C. Mixing plate internal dimensions approx. 1500x1000x210 mm.

#### Technical specifications

|                 |                              |
|-----------------|------------------------------|
| Weight          | 77.00 kg                     |
| Electrical data | 400 V, 50 Hz, 3 P+N+PE, 7 kW |

20-0130







Lab mixer

EN-12697-35- DIN 1996 P. 3 - BS 598 P. 3 - ASTM D 1559 table model with electric drive motor and 3-speed full gear transmission. Incl. slip-on hub, 20 l stainless steel kettle, flat beater made of light metal and wire whisk with CrNi wires.

Technical specifications

|                        |                      |
|------------------------|----------------------|
| Content of mixing tank | 20 liters            |
| Dimensions             | 497x450x805mm        |
| Weight                 | 85.00 kg             |
| Electrical data        | 3 P+N+PE, 400V, 50Hz |

20-0010



Lab mixer

EN-12697-35 - DIN 1996 P. 3 - BS 598 P. 3 - ASTM D 1559 floor model safety hinged lid according to CE. Complete with electric drive motor and 3 speed full gear transmission. Incl. slip-on hub, 20 l stainless steel kettle, flat beater made of light metal and wire whisk with CrNi wires.

Technical specifications

|                        |                                 |
|------------------------|---------------------------------|
| Content of mixing tank | 20 l                            |
| Dimensions             | 400x550x1160mm                  |
| Weight                 | 93.00 kg                        |
| Electrical data        | 3 P+N+PE, 400 V, 50 Hz, 0.37 kW |

20-0020

Kneading arm stainless steel for kettle 16 l

Technical specifications

|        |         |
|--------|---------|
| Weight | 1.00 kg |
|--------|---------|

20-01000E30

Special boiler 16 l

20-0100E10

Beating whisk for cauldron 16 l

20-0100E15

Beater for kettle 16 l

20-0100E20

Kneading arm stainless steel for kettle 20 l

Technical specifications

Weight 1.00 kg

20-0100E30

6-wire beater for kettle 20 l

Technical specifications

Weight 1.50 kg

20-0100E40

Beating machine boiler 20 l

Technical specifications

Weight 4.00 kg

20-0100E50

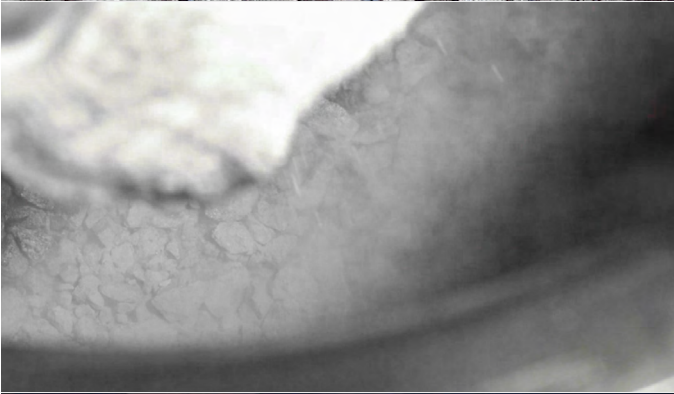
REGO laboratory mixer - standing model

With planetary mixer for the production of asphalt mix for suitability tests. Complete with stainless steel bowl 20 l (16 l on request), beater and kneading arm and electric boiler heating.

Technical specifications

|                 |                 |
|-----------------|-----------------|
| Dimensions      | 600x790x1520mm  |
| Weight          | 230.00 kg       |
| Electrical data | 400V, 50Hz, 3ph |

20-0105



## AREA 20 ASPHALT & BITUMEN

### Mixing/Sample Preparation

#### Laboratory mixer 30 I

EN 12697-35 - for the production of asphalt mix samples from rolled and mastic asphalt up to a maximum grain size of approx. 31.5 mm.

The tight-fitting lid can be lifted by a motor for filling and emptying. The lid is equipped with a viewing window to monitor the mixing process. This can be replaced by the optionally available filling funnel 20-0160E10.

In addition, connections for adding inert gas or similar are provided in the cover. The powered mixing tank, made of stainless steel with constant speed and right/left switching, is equipped with electric heating and PID controller on the bottom and the side walls.

The mixing container can be tilted forwards using a motor to take samples. The specially shaped mixing tool with speed control is optimized for asphalt building materials.

#### Technical specifications

|                           |                       |
|---------------------------|-----------------------|
| Dim. approx.              | 1015 x 1015 x 1490 mm |
| Power                     | 12kW                  |
| Connection                | 3/N/PE, 400 V, 50 Hz  |
| Weight approx.            | 515.00 kg             |
| Mixing container capacity | 30 l                  |
| Max. sample weight 7      | 5.00 kg               |
| Mixing tool speed         | 25...60 rpm           |
| Mixing vessel temperature | 25...250° C           |

20-0160

#### Advantages:

- ▶ User-friendly display
- ▶ Controller guides you through the mixing process in German, English and French
- ▶ Message at process start/end and intermediate steps
- ▶ Optional torque measurement
- ▶ Two freely programmable mixing programs with automated menu navigation
- ▶ Display of the respective process steps

#### Laboratory mixer 30 I 60Hz

20-0160-60



**Back-friendly emptying**

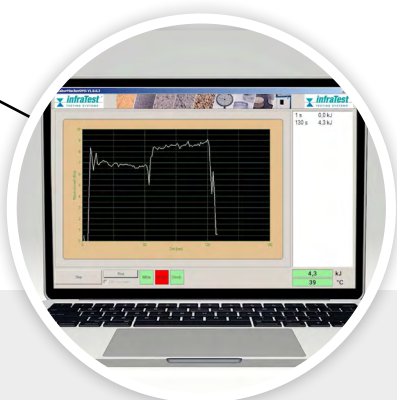




**Device in emptying position**



**Device opened for filling**



**Optional torque measurement**





## AREA 20 ASPHALT & BITUMEN

### Mixing/Sample Preparation

#### Laboratory mixer 4-15 kg

EN 12697-35 - ASTM D1559

For the production of asphalt mix samples from rolled and mastic asphalt up to a maximum grain size of approx. 16 mm.

Removable stainless steel mixing container, mixing tool that can be changed without tools, electrical movement of the mixing container in the mixing and removal position, torque measurement of the mixing tool with load cell, display and setting of the mixing parameters (duration, temperature, speed, ...) and the process steps via touch display, interval mixing function for heating operation, temperature measurement in the material to be mixed and on the outside of the container. Additional mixing tank 20-0150E10 available.

#### Technical specifications

|                              |                         |
|------------------------------|-------------------------|
| Dim. approx.                 | 935 x 1100 x 1700 mm    |
| Power                        | 3.1kW                   |
| Connection                   | 3/N/PE, 400 V, 50/60 Hz |
| Weight approx.               | 380 kg                  |
| Mixing container capacity    | 10 l                    |
| Max. sample weight           | 4-15 kg                 |
| Mixing tool speed            | 30...38 rpm             |
| Mixing container temperature | 25...260° C             |

20-0150



**TOUCH  
PANEL**



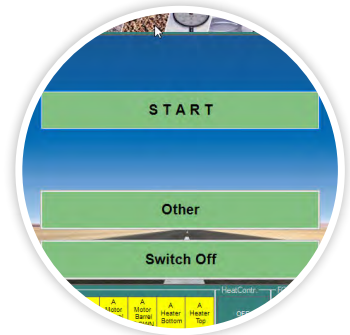
#### Advantages:

- ▶ Tool-free changing mixing tool
- ▶ Torque measurement of the mixing tool
- ▶ Intuitive operation via a touch display
- ▶ Less contamination of the laboratory mixer thanks to the dirt trap





**Dirt trap mat prevents contamination of the laboratory mixer when opening**



**Intuitive touch screen**



**Insertion of the mixing container**



**Simple mixing process**



## AREA 20 ASPHALT & BITUMEN

### Mixing/Sample Preparation

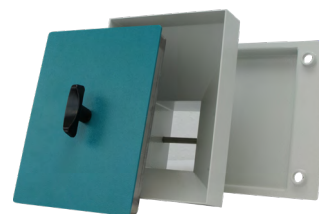
#### ACCESSORIES

Laboratory mixer 30 l



#### Funnel attachment with insulated lid

Lid, interchangeable instead of the viewing window.



#### Technical specifications

Weight 6.20 kg

20-0160E10

#### Kit impeller laboratory mixer 30 l

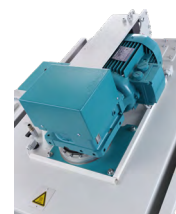
#### Technical specifications

Weight 2.00 kg

20-0160E500

#### Additional device mixing torque

For determining the mixing torque that occurs during the mixing process. The force is measured via the rotatably mounted mixer drive and a load cell attached to a lever arm and displayed digitally. All measurement data can be read out via the interface. The device is only available in connection with a new device 20-0160.



#### Technical specifications

Weight 0.10 kg

20-0165



## ACCESSORIES

Laboratory mixer 4-15 kg

### Additional mixing tank

To 20-0150



#### Technical specifications

Weight 8.70 kg

20-0150E10

### Kit anti-drip/splash protection

#### Technical specifications

Weight 6.20 kg

20-0150E15

### Kit replacement agitator blades

#### Technical specifications

Weight 6.20 kg

20-0150E20

### Funnel attachment for 20-0150

#### Technical specifications

Weight 6.20 kg

20-0150E30





## AREA 20 ASPHALT & BITUMEN

### Mixing/Sample Preparation



#### High shear mixer

For bitumen modification

##### Technical specifications

|                               |                                    |
|-------------------------------|------------------------------------|
| Dimensions                    | 125x120x367mm                      |
| Electrical data               | 230V, 50/60Hz, 1.1kW, IP20         |
| Rpm range                     | 500 - 10000 rpm                    |
| Temperature range             | 5 - 40 °C                          |
| Permissible relative humidity | 80%                                |
| Mixing volume                 | 0.25 to 30 l                       |
| Protection class              | according to DIN EN 60529<br>IP 20 |

20-0180

#### Dispersing tool for 20-0180

20-0180E10

#### Telescopic stand for 20-0180

20-0180E20

#### Clamp for 20-0180E20

20-0180E40

#### Cross socket for 20-0180E20

20-0180E30







# PERFORMANCE TESTING





***MOST PRECISE  
TECHNOLOGY –***  
*ON EARTH AND ABOVE*



## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### Track formation tester water / air

EN 12697-22 • AASHTO T 324 small wheel air/water.

Consisting of a heat-insulated stainless steel housing in the form of a desk with a hinged cover and insulating glass panes. Two sample installation spaces are available in the interior. A frequency-controlled drive motor drives the test unit.

The heating takes place by means of heating rods, PID controller and circulation pump for experiments with water. Warm air blowers are used for experiments with air temperature control.

The sample base plates are height-adjustable via a threaded spindle. Various specimen holding devices or plaster molds can be attached to the base plates. Fully equipped with an integrated control and evaluation unit with touch screen monitor and Windows software for test control and data acquisition. In addition, the software offers the option of standardized pre-temperature control with an automatic start after a preselected time.

Specimen holding devices 20-4020... or plaster molding box 20-4015... are not included in the scope of delivery.

#### Technical specifications

|                                |                                             |
|--------------------------------|---------------------------------------------|
| Sample dimensions max.         | 300 x 400 mm                                |
| Specimen base plate adjustable | 40...120 mm for specimen heights            |
| Roller wheel                   | Ø 203 mm, width 50 mm with rubber pad 20 mm |
| Rolling path                   | 230 mm                                      |
| Measuring path                 | 65...165 mm                                 |
| Load                           | 710 N                                       |
| Test temp.                     | 30 ... 70° C water or air                   |
| Measuring range settlement     | 0..20 mm, resolution 0.01 mm                |
| User languages                 | German, English, French, Russian            |
| Dimensions approx.             | 2500 x 700 x 1500 mm                        |
| Weight approx.                 | 583.00 kg                                   |
| Electrical data                | 3/N/PE, 400V, 50Hz, 4kW                     |

20-4000

#### Air tracking tester

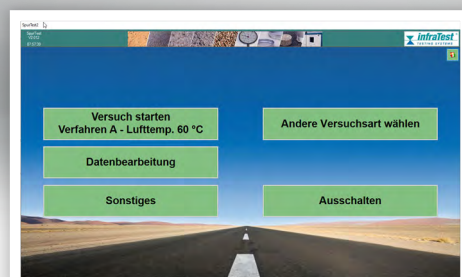
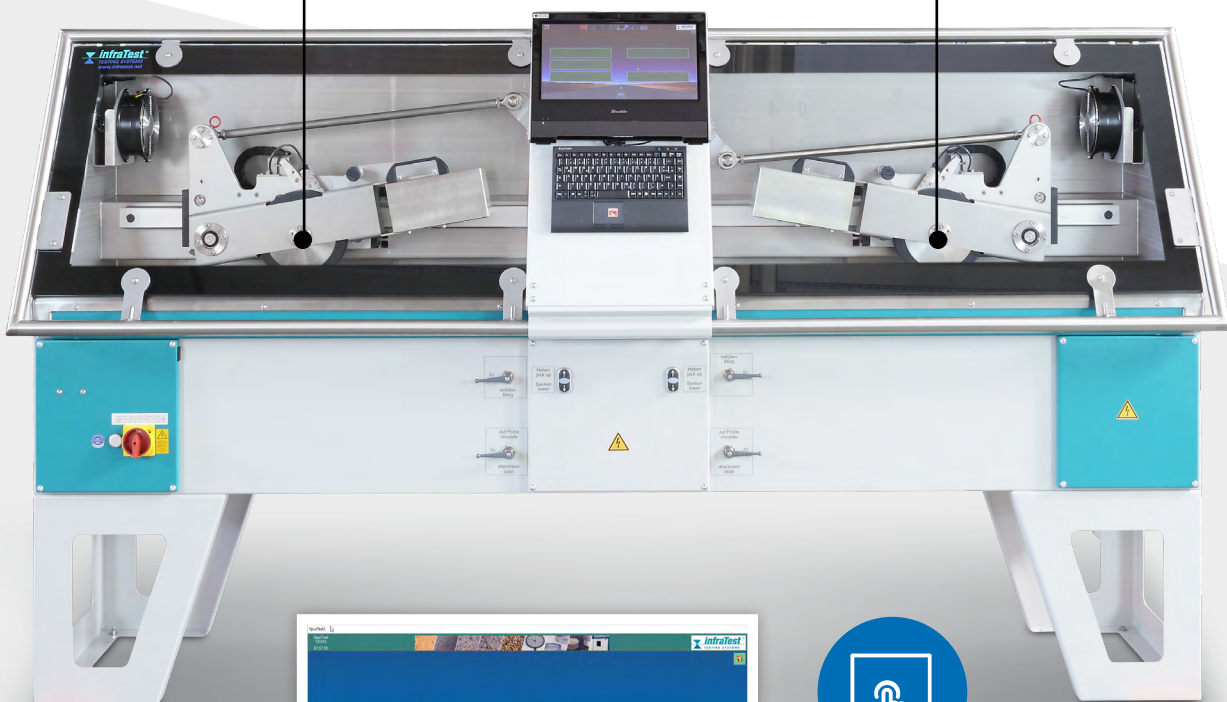
20-4001

#### Advantages:

- ▶ **Use of sample clamping plate sets of different sizes** for fixing asphalt samples with or without gypsum embedding possible.
- ▶ **Use of plaster molds of different sizes** for embedding the asphalt samples in a gypsum bed in accordance with TP-Asphalt 22 and installing them in the track formation device without removing the formwork beforehand.
- ▶ **Automatic lift function.** To protect the test plates and the test wheels, the rolling wheel units are automatically lowered or raised at the beginning and end of the test.
- ▶ **Wear marker** on the rubber wheels for visual roundness control.
- ▶ **Touch screen.** The machine and sequence control takes place via an integrated input and output unit with touch screen. Optionally, the input can also be made via a keyboard.
- ▶ Try with **water or air temperature control** possible.
- ▶ **Acquisition of an individual profile** and up to 40,000 single rollovers.
- ▶ **15,000** storable tests.

**The following options are available as a special version:**

- ▶ Variable load 710 ... 1420 N with additional weights. The set load is automatically recorded and saved when the test starts
- ▶ Roller wheels with a width of 30 and 40 mm in steel
- ▶ Rubberized version to change the surface pressure
- ▶ Different speeds due to the frequency-controlled drive
- ▶ Device with a precision dial gauge for checking the wheel running accuracy of the roller wheels
- ▶ Installation gauge for the exact alignment of the samples in the molding box when plastering
- ▶ Plastering aid for drill cores Ø 200 to 300 mm available



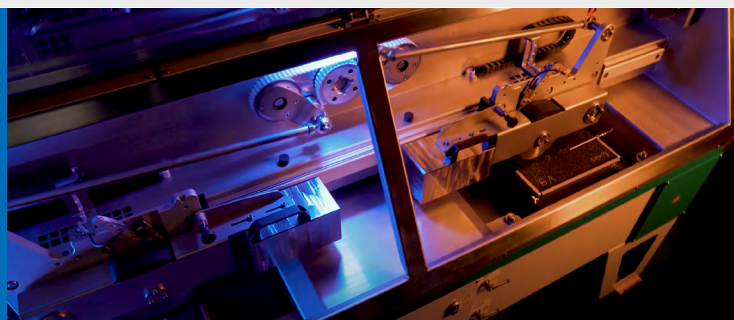
**TOUCH  
PANEL**

## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### ACCESSORIES

Tracking tester



#### Stainless steel - rolling wheel

Ø 203 x 47 mm. Complete with bearing set.

##### Technical specifications

|        |          |
|--------|----------|
| Weight | 11.70 kg |
|--------|----------|

20-4000E100

#### Kit replacement wheel rubberized Ø 203

Width 50 mm complete with bearing set. \*\*\* Exchange price only valid if you send in the existing bikes free of charge\*\*\*

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 8.50 kg |
|--------|---------|

20-4000E120

#### Option increased load 1400N

Retrofitting a track formation measuring device 20-4000 with an existing electrical lifting device Retro-fitting includes: Installation of two additional lifting cylinders Replacement of power supply unit Weight to increase to 1400 N Replacement of base plate The retrofitting can be carried out at the factory or must be carried out on site by infraTest technicians. The resulting working time will be charged additionally.



20-4000E300

#### Plaster gauge

For parallel alignment of the asphalt sample plate on the plaster mold. This is fixed with an assembly tie 20-4012 during plastering. Mounting binders and plaster molds are also required.



|         |       |
|---------|-------|
| 20-4010 | 280mm |
|---------|-------|

|         |       |
|---------|-------|
| 20-4011 | 260mm |
|---------|-------|

#### Mounting binder for 20-4010/20-4011

Roll 15 running meters.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.40 kg |
|--------|---------|

20-4012

#### Casting mould

Exclusively for experiments with air heating made of galvanized steel. Can be used either only for plastering the asphalt sample in accordance with TP-A 22 or for direct installation in the track formation device 20-4000 with the plastered sample. Complete with carrying handles and side panels fitted with hinges and a central tightening screw. The base plate is height-adjustable for sample heights of 40 - 60 - 80 - 100 - 120 mm.



|         |                               |
|---------|-------------------------------|
| 20-4015 | 260 x 320 mm (right/left set) |
|---------|-------------------------------|

|         |                               |
|---------|-------------------------------|
| 20-4016 | 280 x 340 mm (right/left set) |
|---------|-------------------------------|

|         |                               |
|---------|-------------------------------|
| 20-4018 | 280 x 430 mm (right/left set) |
|---------|-------------------------------|





### Specimen clamping plate

For use in the track formation device for asphalt samples 40 .. 120 mm high. Version in stainless steel with two fixed and two removable side parts, fixed with quick-release elements. Complete with height-adjustable shelf in 20 mm increments and additional insert panels 2, 5 and 10 mm high.

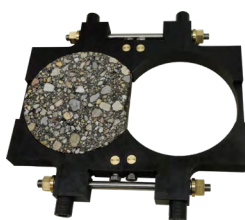


|         |           | Weight   |
|---------|-----------|----------|
| 20-4020 | 260x320mm | 43.00 kg |
| 20-4021 | 280x340mm | 23.40 kg |
| 20-4022 | 260x410mm | 20.00 kg |
| 20-4023 | 300x300mm | 44.00 kg |
| 20-4025 | 400x300mm | 44.00 kg |

### Specimen clamping device Ø152 mm (set right/left)

For use in the tracking device for drill cores and gyrator samples of Ø150-152mm.

Made of glass fiber reinforced polyamide. 25mm high in connection with the VA specimen clamping device 20-4023.



#### Technical specifications

Weight 5.00 kg

20-4024

## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### Scuffing Device

EN 12697-50 B

For determining the shear sensitivity of asphalt wearing courses Includes:

- ▶ Test frame with test wheel
- ▶ Test wheel with vertical force measurement and pneumatic loading device (automatic)
- ▶ Heated sample mold for sample dimensions 260x260mm
- ▶ Drive motor for a coupled turning and driving movement of the test wheel on the sample
- ▶ Test room enclosed with a transparent safety door
- ▶ Measurement and logging of sample surface temperature with IR thermometers
- ▶ Suction device with cyclone separator for loose grains
- ▶ Control via PC with screen and keyboard
- ▶ Configurable test procedure (number of cycles, double thrust, speed, load, ...) · Compressed air connection min. 5 bar

#### Technical specifications

|                 |                 |
|-----------------|-----------------|
| Dimensions      | 950x1010x1870mm |
| Weight          | 310.00 kg       |
| Electrical data | 230V, 50Hz, 2kW |

20-40030



**Simulates turning on asphalt**





### Advantages

- ▶ Space-saving design
- ▶ Integrated suction device
- ▶ Graphics in real time
- ▶ In addition, the rotating table can also be used manually
- ▶ Security door
- ▶ Interior lighting
- ▶ Customer-specific settings, such as load or number of double thrust cycles, are possible
- ▶ USB interface for fast data export





## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### Roller sector compactor 30 kN

EN 12697-33 part 5.2 - TP A 33-2007 For the production of rolled asphalt samples 320 x 260 mm, height 40 ... 120 mm.

Sturdy sheet steel housing with a highly rigid test frame, safety door and electrically driven base crossbeam with the sample form built on it. Compaction takes place from above via a roller segment with a force/displacement-controlled drive device. The sample form and the rolling segment are equipped with a software-controlled heater. The force and sample height are measured using electronic sensors.

The entire compression process is controlled with Windows software via preselectable sequence programs. These can also be created individually by the user. The machine and sequence control is carried out via an integrated input and output unit with touch screen mounted on a swivel arm. Optionally, the input can also be made via a keyboard.

#### Technical specifications

|                     |                      |
|---------------------|----------------------|
| Dim. approx. 1      | 310 x 850 x 2220 mm  |
| Weight approx.      | 1400.00 kg           |
| Power               | 8kW                  |
| Electrical data     | 3/N/PE, 400 V, 50 Hz |
| Rolling force       | 0...30 kN            |
| Roll segment radius | 550 mm               |
| Sample dimensions   | 320 x 260 mm         |
| Sample height       | 40...120 mm          |
| Rolling speed       | up to 45 passes/min  |
| Temperature         | 30 -135°C            |

20-4030



#### Advantages:

- ▶ Automatic hydraulic demolding
- ▶ Direct distance and force measurement
- ▶ Standardized process log for standard-compliant results
- ▶ Heated bottom plate and compaction pendulum
- ▶ Freely programmable compression programs
- ▶ 15.6" touch screen
- ▶ Transport height 1980 mm



**TOUCH  
PANEL**



**Freely programmable software**



**In addition, machines are available for the following sample sizes:**

**20-4031** 410 x 260 mm / max. height 120 mm

**20-4034** 455 x 300 mm / max. height 120 mm

**20-4035** 400 x 300 mm / max. height 120 mm



## AREA 20 ASPHALT & BITUMEN

Performance testing



### Advantages

- ▶ Automatic hydraulic demolding
- ▶ Direct distance and force measurement
- ▶ Standardized process log for standard-compliant results
- ▶ Heated bottom plate and compaction pendulum
- ▶ Freely programmable operation
- ▶ 15.6" touch display



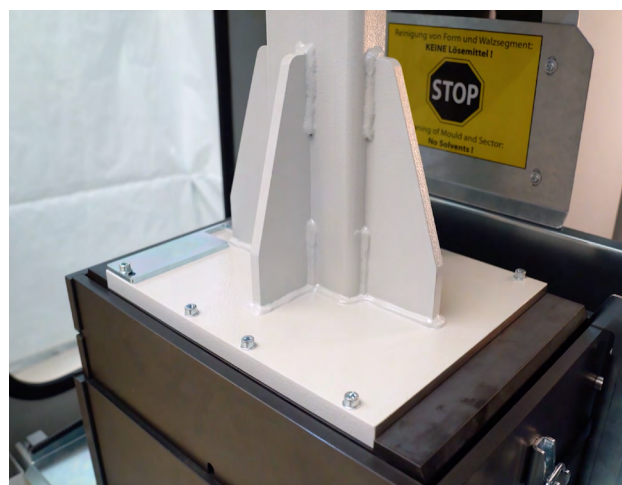
## Roller Sector compactor 40 kN

EN 12697-33 part 5.2 - TP A 3-2007 For the production of rolled asphalt samples. Sturdy sheet steel housing with safety door and electrically driven base traverse with sample form built on it. Compaction takes place from above via a roller segment with a force/displacement-controlled drive device. The sample form and the rolling segment are equipped with a software-controlled heater. The force and displacement are measured using electronic sensors. The filling and sampling takes place on the side next to the test frame. For this purpose, the molding box can be moved laterally manually via linear guides. The force and displacement are measured using electronic sensors. The entire compression process is controlled with Windows software via preselectable sequence programs. These can also be created individually by the user. The machine and sequence control is carried out via an integrated input and output unit with touch screen mounted on a swivel arm. Optionally, the input can also be made via a keyboard.

### Technical specifications

|                   |                                                              |
|-------------------|--------------------------------------------------------------|
| Dimensions        | 2100x900x1950mm                                              |
| Weight            | 1,650.00 kg                                                  |
| Rolling force     | 0 to 40 kN                                                   |
| Rolling speed     | 10..30 transitions/min                                       |
| Sample dimensions | 500x300mm                                                    |
| Sample height     | 40 to 300 mm Other specimen dimensions available on request. |

20-4050



### Technical specifications

|                   |                        |
|-------------------|------------------------|
| Dimensions        | 2500x950x1950mm        |
| Weight            | 1,830.00 kg            |
| Rolling force     | 0 to 40 kN             |
| Rolling speed     | 10..30 transitions/min |
| Sample dimensions | 500x260mm              |
| Sample height     | 40 to 200 mm           |

20-4050



## AREA 20 ASPHALT & BITUMEN

### Performance testing

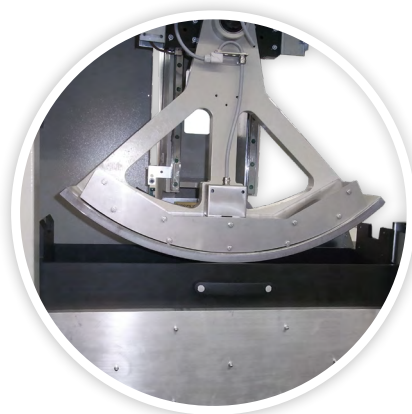
#### Roller sector compactor 820x260mm

In accordance with EN 12697-33 part 5.2 - TP A 33-2007 For the production of 820 x 260 mm rolled asphalt samples with a height between 40 and 240 mm. Stable steel housing with two protective doors and motorized sample handling unit. The compaction load is applied horizontally by an electronically operated load and displacement controlled system with a roller segment and load and displacement transducers. The roller segment is equipped with thermostatically controlled electrical heating elements. The machine chamber is divided into two machine parts: sample preparation unit and compression unit. The sample form can be preheated with a separate, height-adjustable preheater and is moved into the compression unit after the sample has been filled. The entire process is controlled by selectable compression programs using Windows software. The user can create and save individual test sequences himself. The machine and process are controlled via an integrated input/output unit with a touchscreen, which is attached via a swivel arm. Optionally, the input can also be made via a keyboard.

#### Technical specifications

|                   |                    |
|-------------------|--------------------|
| Dimensions        | 2900x850x3600mm    |
| Weight            | 4,500.00 kg        |
| Electrical data   | 400V, 50/60Hz, 8kW |
| Rolling force     | 0 to 30 kN         |
| Roll speed        | 45 crossings/min   |
| Sample dimensions | 820x260mm          |
| Sample height     | 40 to 120 mm       |

20-4060

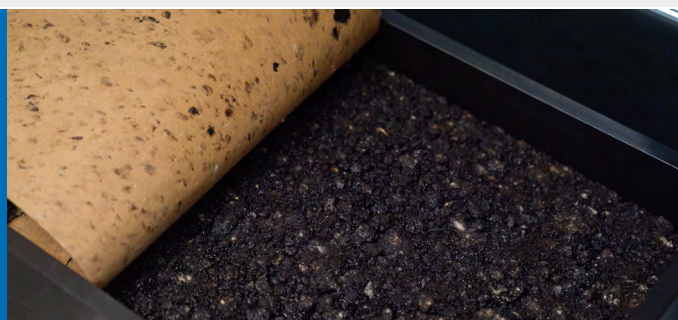


#### A notice:

The distribution of the asphalt in terms of grain size is responsible for a smooth sample surface. Additional sample inserts are recommended for use with the machine.

**ACCESSORIES**

for Roller Sector Compactor

**Top box**

To 20-4030. Complete with insert sheet.

|            |           |
|------------|-----------|
| 20-4030E10 | 260x320mm |
|------------|-----------|

|            |           |
|------------|-----------|
| 20-4031E10 | 260x410mm |
|------------|-----------|

**Top box 400 x 300 mm**

To 20-4035. Complete with 2x insert sheets.

**Technical specifications**

|        |          |
|--------|----------|
| Weight | 21.00 kg |
|--------|----------|

|            |
|------------|
| 20-4035E10 |
|------------|

**Top box 260 x 500 mm**

To 20-4051.

**Technical specifications**

|        |          |
|--------|----------|
| Weight | 30.30 kg |
|--------|----------|

|            |
|------------|
| 20-4051E10 |
|------------|

**Insert paper 260 x 320 mm**

On the sample form of a roller sector compactor. Pack 1000 sheets.

**Technical specifications**

|        |         |
|--------|---------|
| Weight | 8.70 kg |
|--------|---------|

|         |
|---------|
| 20-4040 |
|---------|

**Handling device asphalt sample WSV**

For sample sizes from 320 - 410 mm from WSV for loading directly at the workplace with manual height adjustment from 715 to 1115 mm. Including undercarriage with 4 lockable castors.

**Technical specifications**

|        |           |
|--------|-----------|
| Weight | 140.00 kg |
|--------|-----------|

|         |
|---------|
| 20-4033 |
|---------|



## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### Gyrator iT (centrifugal compressor)

EN 12697-31 - ASTM 6925-15 - ASTM 7715-10 -  
GOST R 52519-2006 For the manufacture of gyrator  
samples with a diameter of 100 and 150 mm

- ▶ Fully automatic control of compaction and rotation for asphalt test specimen production
- ▶ Powerful, electromechanical drive
- ▶ Recording of the sample height via a force measuring device
- ▶ Integrated test dispenser
- ▶ Angle adjustment via the software and cross table
- ▶ Integrated PC for process monitoring with software and compaction protocol
- ▶ Ethernet port for updates and remote maintenance etc.

#### Technical specifications

|                      |                                  |
|----------------------|----------------------------------|
| Dimensions           | 803 x 703 x 1800mm               |
| Weight               | 538.00 kg                        |
| Electrical data      | 3/N/PE, 400V, 50Hz, 7kW          |
| Compression pressure | up to 1000 kPa                   |
| Compression          | 10 mm per second                 |
| Interfaces           | 1x USB, 1x RS232, 1x Ethernet    |
| Speed                | up to 30 rpm ( $\pm 0.5^\circ$ ) |
| Angle                | selectable 0 to 3.5°             |
| Sample dimensions    | Ø 100 and 150 mm                 |

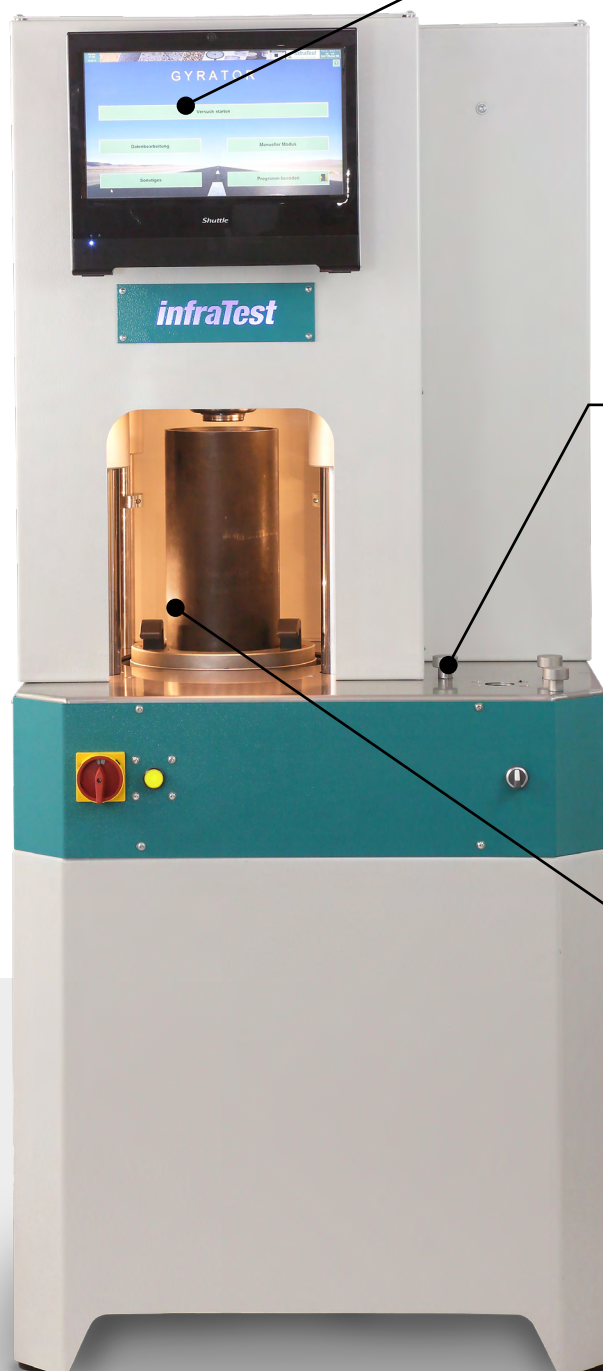
20-42000

#### Advantages

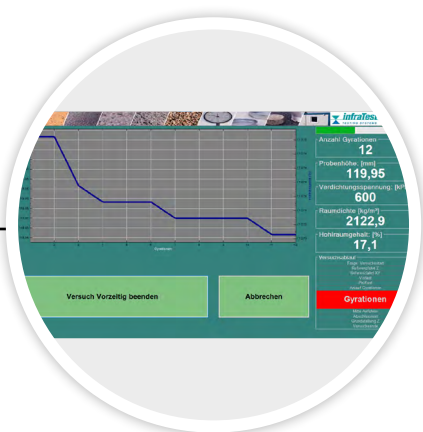
- ▶ Display of the working status by different colors
- ▶ Innovative light barrier for safe working
- ▶ Real-time display of test data
- ▶ 14" touch display
- ▶ Highly rigid test frame
- ▶ Easy to assemble seam clamps



**TOUCH  
PANEL**



Specially developed for  
temperature-reduced  
asphalt.



## ACCESSORIES

### Gyrator iT compression form



|          |          |          |
|----------|----------|----------|
| 20-42100 | Ø 100 mm | 10.10 kg |
| 20-42150 | Ø 150 mm | 15.10 kg |

### Filter Paper

Pack of 1000 pieces.

|         |          |
|---------|----------|
| 94-0130 | Ø 100 mm |
| 94-0140 | Ø 150 mm |

### Gyrator shape Ø150 mm , soil)

- ▶ Perforated shape to drain excess water
- ▶ Use for soil and asphalt emulsion applications

(in use with 20-42000 gyrator)

### Technical specifications

|                   |                |
|-------------------|----------------|
| Dimension approx. | Ø 150 x 336 mm |
| Weight approx.    | 15.10kg        |

20-42151

### Gyrator calibration kit

20-42190





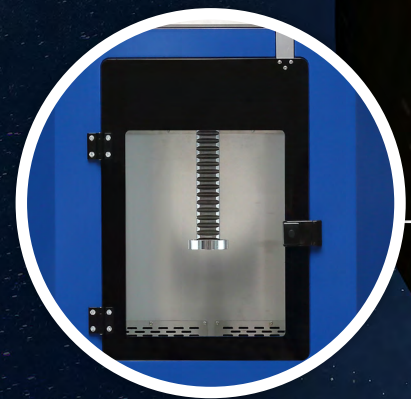
## AREA 20 ASPHALT & BITUMEN

Performance testing

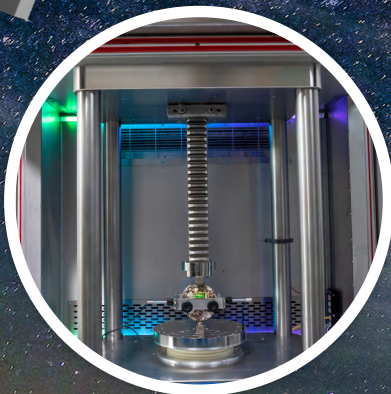
### THE VOYAGER PERFORMANCE SYSTEM



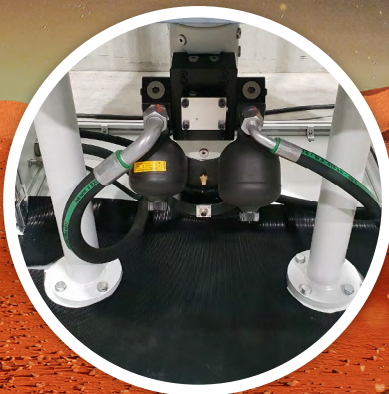
Space-saving sliding door  
enables 180° opening to the  
work area



Movable crosshead for  
very large and small test  
applications



Rigid load frame for mini-  
mal machine vibration



Hanging drive cylinder: saves installa-  
tion space above, is easier to access  
and avoids the risk of crushing



Large hydraulics 50 kN



Drive cylinder from above

Additional window for quick adjustment

**infraTest**  
TESTING SYSTEMS

Small hydraulics 30 kN





## AREA 20 ASPHALT & BITUMEN

### Performance testing



| Item number              | 20-60000                                                                                                                   | 20-60100                                                                                                                | 20-60200                                                                                                                                                                    |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test areas               | Cyclic compression test,<br>Dynamic penetration test, for<br>mastic asphalt, for hot mix<br>asphalt                        | Cyclic compression test,<br>Repeated load test, Dynamic<br>penetration test, for mastic<br>asphalt, for hot mix asphalt | Cyclic compression test, Repeated load test,<br>Dynamic penetration test, for mastic asphalt,<br>for hot mix asphalt                                                        |
| Load/frequency           | 10 kN/10 Hz                                                                                                                | 10 kN/10 Hz                                                                                                             | 20 kN/25 Hz                                                                                                                                                                 |
| Test<br>temperature      | <br>Ambient temperature up to<br>+ 60°C | <br>-20°C to + 60°C                  | <br>-20°C to + 60°C                                                                    |
| Application<br>areas     | Testing and quality assurance,<br>mix design development                                                                   | Testing and quality assurance                                                                                           | Testing, quality assurance and research                                                                                                                                     |
| Fields of<br>application |                                         |                                      |   |



| 20-60550                                                                                                                                                                                                                                           | 20-60500                                                                                                                                                                                                                                           | 20-65200                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cyclic loading, Permanent deformation, Elastic modulus, Indirect tensile test, Texas Overlay test, Four-point bending test, Dynamic modulus, Flow number, Triaxial tests                                                                           | Cyclic loading, Permanent deformation, Elastic modulus, Indirect tensile test, Texas Overlay test, Four-point bending test, Dynamic modulus, Flow number, Triaxial tests                                                                           | Direct tensile test (UTST), Thermal Stress Restrained Specimen Test (TSRST), Tensile creep test, Relaxation test                                                                                                                                       |
| 30 kN/25 Hz                                                                                                                                                                                                                                        | 50 kN/60 Hz                                                                                                                                                                                                                                        | 50 kN/60 Hz                                                                                                                                                                                                                                            |
| <br>-20°C to +80°C                                                                                                                                              | <br>-20°C to +80°C                                                                                                                                              | <br>-40°C to +50°C                                                                                                                                                |
| Research and development of new recipes                                                                                                                                                                                                            | Research and development of new recipes                                                                                                                                                                                                            | Research and development of new recipes                                                                                                                                                                                                                |
| <div> <div>QUALITY ASSURANCE</div>  </div> <div> <div>RESEARCH</div>  </div> | <div> <div>QUALITY ASSURANCE</div>  </div> <div> <div>RESEARCH</div>  </div> | <div> <div>QUALITY ASSURANCE</div>  </div> <div> <div>RESEARCH</div>  </div> |



## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### Dynamic compact testing system 10 kN / 10 Hz

EN 12697-24..26

For carrying out fatigue and stiffness tests under alternating loading and unloading within a heating chamber.

Contains:

- ▶ Machine frame with integrated heating chamber
- ▶ High-performance hydraulic unit with servo valve integrated in the base of the machine frame
- ▶ Rigid load frame 10 kN with adapted hydraulic cylinder as well as force and deformation measuring device, installed in the climatic chamber
- ▶ Input and output unit with touch screen and keyboard
- ▶ Control software BASDA

The entire test procedure, including the control of the hydraulic system and the heating cabinet and the acquisition of the measurement data, is carried out via BASDA. The software with online graphics and test database enables the creation and storage of different of the additionally required test plates or test frames or can also be adapted or created by the user himself. The test area of the load frame is prepared for the use of different test frames for dynamic tests, for split tensile and bending tests, etc. The test plates and test frames required for the various standards as well as sequence programs must be ordered separately.



**Test rack**



**Load cell**



**Test rack**



**Small hydraulics**



### Dynamic thermo-compaction testing system 10 kN / 10 Hz

#### Technical Data

|                             |                                        |
|-----------------------------|----------------------------------------|
| Test force                  | 10 kN                                  |
| Frequency                   | $\leq 10$ Hz                           |
| Force measurement           | DMS GKL 1                              |
| Displacement resolution     | 0.001 mm                               |
| Selectable upper load       | 0.2 to 10 kN                           |
| Selectable underload        | 0.1 .. 9.99 kN                         |
| Waveforms                   | Haversine, trapezoid, sine             |
| Dwell times over/under load | 0.1..9.99 sec.                         |
| Test temperature            | up to +60°C (from ambient temperature) |
| Dimensions approx.          | 900 x 600 x 1850 mm                    |
| Electrical data             | 3/N/PE, 400 V, 50 Hz, 4 kW             |
| Weight approx.              | 440.00 kg                              |

20-60000



### Dynamic cold compaction testing system 10 kN / 10 Hz -20 to +60 °C

#### Technical Data

|                             |                            |
|-----------------------------|----------------------------|
| Test force                  | 10 kN                      |
| Frequency                   | $\leq 10$ Hz               |
| Force measurement           | DMS GKL 1                  |
| Displacement resolution     | 0.001 mm                   |
| Selectable upper load       | 0.2 to 10 kN               |
| Selectable underload        | 0.1 .. 9.99 kN             |
| Waveforms                   | Haversine, trapezoid, sine |
| Dwell times over/under load | 0.1..9.99 sec.             |
| Test temperature            | -20 .. +60° C              |
| Dimensions approx.          | 1450x820x1940 mm           |
| Electrical data             | 3/N/PE, 400V, 50Hz, 8kW    |
| Weight approx.              | 660.00 kg                  |

20-60100



#### TOUCH PANEL

Easy and fast control via the well arranged display.

## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### Dynamic compact testing system

EN 12697-24..26 - ASTM - AASHTO dynamic compact testing system for carrying out fatigue and stiffness tests under alternating loading and unloading.

Consisting of:

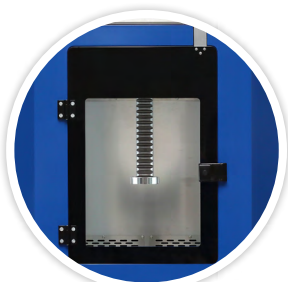
- ▶ Rigid load frame 50/63 kN in four-column design with adapted hydraulic cylinder and force and deformation measuring device, can be used within a temperature control chamber and prepared for the adaptation of additionally available insert frames for different types of tests
- ▶ The precision force transducer is designed for the special requirements of dynamic tests
- ▶ The hydraulic test cylinder is mounted on the integrated test frame from below and the load cell on the electrically height-adjustable push rod can be easily adapted to different test applications
- ▶ High-performance hydraulic unit with power-controlled radial piston pump with variable flow rate depending on the required performance, servo valve and substructure for separate installation and connection to the test facility using flexible high-pressure hoses
- ▶ A water cooling system is installed to cool the hydraulic oil and for noise protection reasons. This is to be supplied with cooling water on site
- ▶ Version with air cooler available as an option
- ▶ Input and output unit with microcontroller, monitor and keyboard Control and measurement data acquisition software BASDA under Windows with online graphics and test database. BASDA controls and monitors the dynamic test facility with temperature chamber using test-specific sequence programs. These can also be programmed by the user himself. For the additionally available insert frames 20-62500... for different types of experiments, ready-made sequence programs, some with integrated evaluation, are part of the scope of delivery. The temperature chamber can be switched on and off time-controlled using software
- ▶ A second measuring range with a load cell, optionally 5 or 10 kN, accuracy 0.06% is available.

The insert frames and test panels required for carrying out the experiment, if necessary with integrated sequence programs, must be ordered separately.

**Space-saving sliding door  
enables 180° opening to the  
work area**



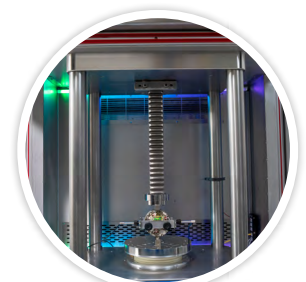
**Hand controller**



**Movable crosshead for  
very large and small test  
applications**



**Drive cylinder from above is  
absolutely necessary for layer  
bond tests and TRAVIS**



**Rigid load frame for  
minimal machine  
vibration**





## Dynamic compact testing system 30 kN / 25 Hz

### Technical Data

|                                                      |                                                                        |
|------------------------------------------------------|------------------------------------------------------------------------|
| Dynamic test force                                   | 30 kN                                                                  |
| Frequency                                            | <= 25 Hz                                                               |
| Precision force transducer measuring range           | 50 kN, accuracy 0.06 % (load cell 63 kN as an option)                  |
| Displacement measuring device                        | Resolution 0.001mm                                                     |
| Upper load selectable                                | 0.2 to 30 kN                                                           |
| Selectable underload                                 | 0.1 to 30 kN                                                           |
| Waveforms                                            | Haversine - trapezoid - sine                                           |
| Dwell times for upper/lower load can be pre-selected | 0.1 to 9.99 sec.                                                       |
| Dim. Hydraulic unit WxDxH approx.                    | 1350 x 870 x 1500 mm (air cooler version approx. 1780 x 870 x 1400 mm) |
| Weight hydraulic unit approx.                        | 560.00 kg (without oil filling)                                        |
| Volume                                               | 73 db(A) (82 db(A) with air cooler)                                    |
| Cooling water requirement                            | on site 12 l/min. at 23°C                                              |
| Electrical data                                      | 400 V, 50 Hz, 14 kW, 3 P+N+PE. On-site fuse 3 x 32 A                   |
| Usable volume test space                             | 500x500x700mm                                                          |

20-60550



## Dynamic compact testing system 50 kN / 60 Hz

### Technical Data

|                                                      |                                                                        |
|------------------------------------------------------|------------------------------------------------------------------------|
| Dynamic test force                                   | 50 kN                                                                  |
| Frequency                                            | <= 60 Hz                                                               |
| Precision force transducer measuring range           | 50 kN, accuracy 0.06 % (load cell 63 kN as an option)                  |
| Displacement measuring device                        | Resolution 0.001mm                                                     |
| Upper load selectable                                | 0.2 to 50 kN                                                           |
| Selectable underload                                 | 0.1 to 49.99 kN                                                        |
| Waveforms                                            | Haversine - trapezoid - sine                                           |
| Dwell times for upper/lower load can be pre-selected | 0.1 to 9.99 sec.                                                       |
| Dim. Hydraulic unit WxDxH approx.                    | 1350 x 870 x 1500 mm (air cooler version approx. 1780 x 870 x 1400 mm) |
| Weight hydraulic unit approx.                        | 560 kg (without oil filling)                                           |
| Volume                                               | 73 db(A) (82 db(A) with air cooler)                                    |
| Cooling water requirement                            | on site 12 l/min. at 23°C                                              |
| Electrical data                                      | 400 V, 50 Hz, 14 kW, 3 P+N+PE. On-site fuse 3 x 32 A                   |
| Usable volume test space                             | 500x500x700mm                                                          |

20-60500

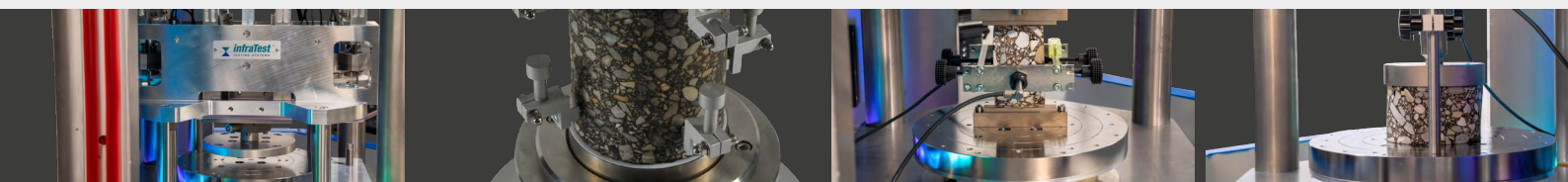
### Technical specifications Temperature chamber

|                                 |                                  |
|---------------------------------|----------------------------------|
| Temperature chamber             | 500l                             |
| Temperature range               | -20 to +80 °C with machine frame |
| External dimensions             | 1200x1000x2100mm                 |
| Temperature range               | -20 to +80°C                     |
| Permissible ambient temperature | 15 to 25°C                       |
| Interior                        | 1000x600x800mm                   |
| Volume approx.                  | 500 l                            |
| Weight approx.                  | 1000.00 kg                       |
| Electrical data                 | 400 V 50 Hz 3 P+N+PE, 11 kW      |



## AREA 20 ASPHALT & BITUMEN

### Performance testing



#### Dynamic Cold Compaction Testing System 20 kN / 25 Hz

EN 12697-24..26

For performing fatigue and stiffness tests under alternating loading and unloading within a temperature-controlled chamber.

Includes:

- ▶ Machine frame with integrated temperature-controlled chamber
- ▶ High-performance hydraulic power unit with servo valve integrated in the base of the machine frame
- ▶ High-rigidity load frame 20 kN with adapted hydraulic cylinder as well as force and deformation measuring system, installed in the climate chamber
- ▶ Input and output unit with microcontroller, touch screen and keyboard
- ▶ Control and data acquisition software BASDA under Windows with online graphics and test database.

BASDA controls and monitors the dynamic testing system with temperature-controlled chamber using test-specific operating programs. These can also be programmed by the user. The temperature-controlled chamber can be switched on and off via software using a timer.

20-60210

#### Technical Data

|                                     |                                          |
|-------------------------------------|------------------------------------------|
| Test force                          | 20 kN                                    |
| Frequency                           | $\leq 25$ Hz                             |
| Force measurement                   | Strain gauge load cell GKL 1             |
| Displacement measurement resolution | 0.001 mm                                 |
| Upper load selectable               | 0.2 to 20 kN                             |
| Lower load selectable               | 0.1 to 19.99 kN                          |
| Waveforms                           | Haversine, trapezoidal, sinusoidal       |
| Upper/lower load dwell time         | 0.1 to 9.99 s                            |
| Test temperature                    | -20 to +60 °C (from ambient temperature) |
| Dimensions approx                   | 1900 x 1000 x 1960 mm                    |
| Electrical data                     | 3/N/PE, 400 V, 50 Hz, 8 kW               |
| Weight approx.                      | 1200.00 kg                               |



#### TOUCH PANEL

Easy and fast control via the well arranged display.





### Complete test system

|                                   |                                   |
|-----------------------------------|-----------------------------------|
| Dimensions approx.                | 2600 x 1000 x 2000 mm             |
| Weight approx.                    | 800.00 kg                         |
| Noise level                       | < 65 dB(A)                        |
| Climate chamber connection        | 3/N/PE, 400 V, 50 Hz, 32 A, 10 kW |
| Cooling water connection approx.: | >10 l/min, 22°C                   |



### Climate chamber

|                                 |                                            |
|---------------------------------|--------------------------------------------|
| Volume                          | 760 l                                      |
| Internal dimensions approx.     | 1240 x 600 x 1020 mm                       |
| Temperature range               | -40 .. +50°C (at ambient temperature 25°C) |
| Temperature constancy over time | +/-0.2 to 0.5K                             |

## TRAVIS Low-Temperature Compaction Testing System TSRST, 25 kN / 50 Hz

EN 12697-46, TP A-StB 46

For performing direct (uniaxial) tensile tests UTST and cooling tests with restrained thermally induced longitudinal expansion TSRST on asphalt specimens.

The system consists of a climate chamber and a TRAVIS testing machine. The machine is equipped with a high-rigidity load frame and a precision screw lifting mechanism with stepper motor drive for tensile testing.

Special adaptation elements at the top and bottom enable stress-free installation of an asphalt specimen 40 x 40 x 160 mm.

For deformation measurement, four precision deformation sensors are used, which are mounted on temperature-independent measuring bases. These ensure that their reference lengths do not change under the influence of temperature.

InfraTest climate chamber system:

- ▶ New innovative energy-efficient cooling system with two parallel evaporators of the highest energy efficiency class
- ▶ Insulated plastic interior to minimize heat losses
- ▶ Minimal space requirement due to split folding door with integrated window (mounted on the left)
- ▶ Control computer with swivel arm (mounted on the right)

20-65200





**BASDA -**  
**Software for the**  
**dynamic system**  
freely programmable  
and selectable.

### What is BASDA?

BASDA is a very powerful and universal software package for configuring and executing technical processes. It has a large number of hardware interfaces that allow the required measurement and control systems to be connected. All measurement and control data as well as operator inputs end up in the same data pool and are used by the ScriptEngine to control the process.

### Where is the BASDA used and what does the software process?

BASDA is the software for dynamic test systems from infraTest.

The focus of our dynamic testing machines is on the digital controller, which applies defined stresses and strains via servo-hydraulics. The temperature control device is addressed via MODBUS, TCP-IP or other protocols. Other devices such as pressure regulators for triaxial tests, clamping or bending devices, additional temperature sensors or simply digital and analog inputs and outputs can also be connected via the many additional interfaces.

### What is the advantage of BASDA?

A wide variety of processes can be controlled with BASDA. Interactive input masks are configured via the script engine, measured value displays, curves, etc.

Extensive libraries allow complicated online calculations in real time. Numerical calculations and data preprocessing with nonlinear regressions are calculated in milliseconds in the background. The resulting data can be stored with high data rates and resolutions in efficient fixed-point formats.

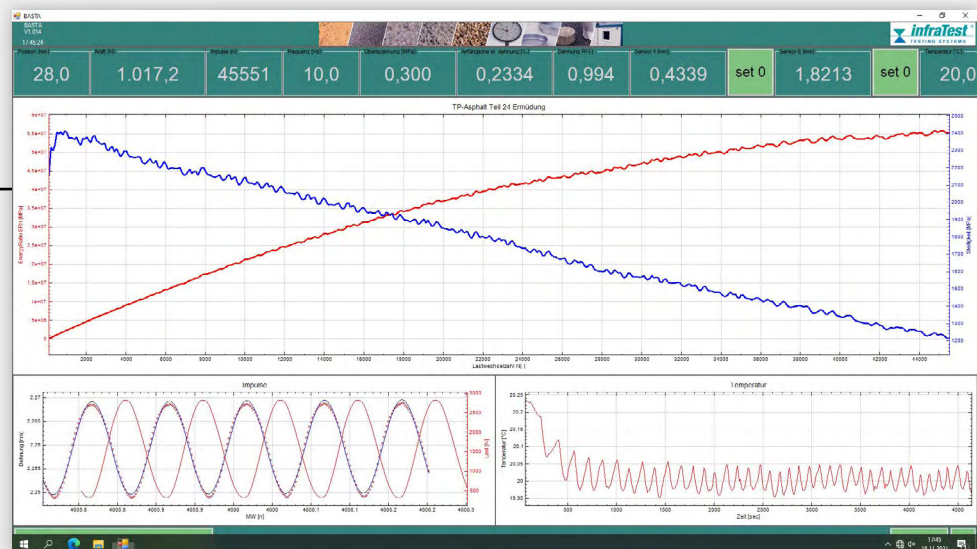


Input mask of a fatigue test

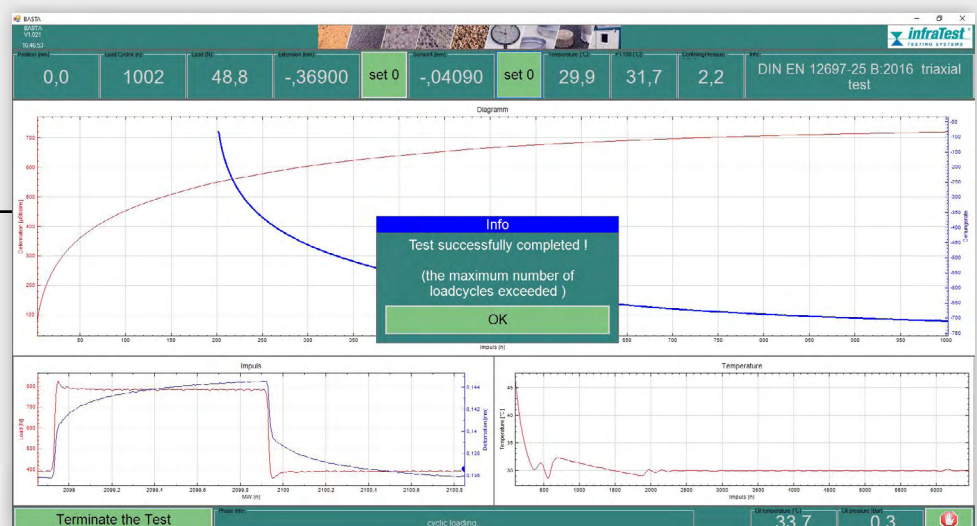
DNIT 183/2018 Parameter [1./3]

|                                    |             |
|------------------------------------|-------------|
| Sample name                        | Sample name |
| Sample height [mm]                 | 60,0        |
| Sample diameter [mm]               | 100,0       |
| Voidcontent [g/cm³]                | 3,0000      |
| Type of displacement measurement   | 1           |
| Test with temperature conditioning | No          |
| Test Temperature [°C]              | 25,0        |
| Continue                           | Cancel      |

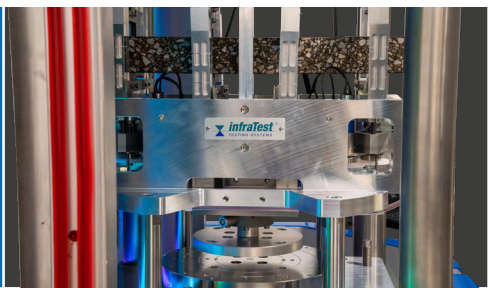
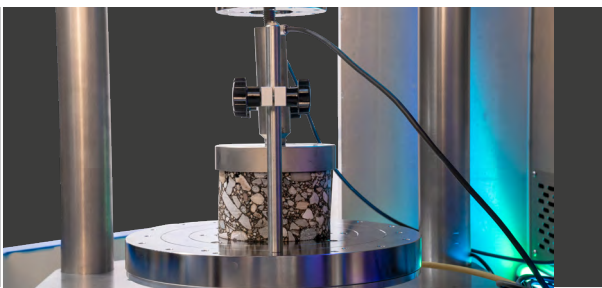
Input screen



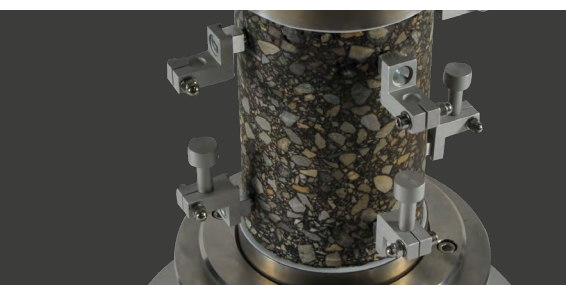
Completion mask of a completed attempt



## Dynamic asphalt testing

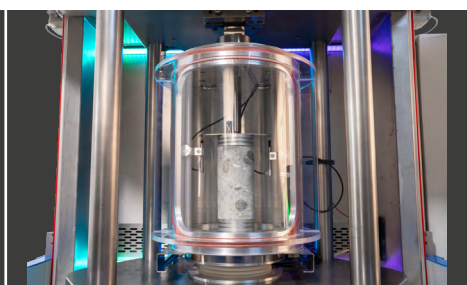
|                         |                                                                                                                                                             |                                                                                                                                                                        |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         |                                                                            |                                                                                      |
| <b>Attempt</b>          | <b>Four point bend test</b>                                                                                                                                 | <b>Pressure swell test</b>                                                                                                                                             |
| <b>Standards</b>        | <ul style="list-style-type: none"> <li>▶ EN 12697-24D Fatigue</li> <li>▶ EN 12697-26B stiffness</li> <li>▶ AASHTO TP8/94</li> <li>▶ T321 fatigue</li> </ul> | <ul style="list-style-type: none"> <li>▶ EN 12697-25A pressure fatigue test</li> </ul>                                                                                 |
| <b>Fitting products</b> | <p><b>Insert frame four-point bending test</b></p> <p>20-60599E230</p>                                                                                      | <p><b>Test procedure</b></p> <p>20-60599E305</p> <p><b>Plate set penetration tests</b></p> <p>20-60599E220</p> <p><b>Stamp penetration rack</b></p> <p>20-62500-IT</p> |





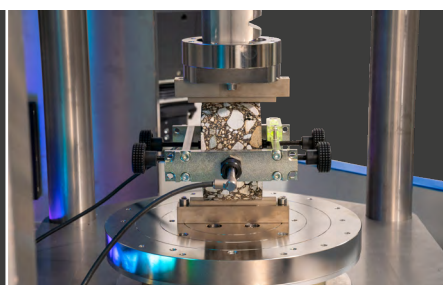
### Test modulus of elasticity on asphalt samples

- ▶ AASHTO TP79-15 Dynamic Modulus Flow Number



### Triaxial compression test

- ▶ EN 12697-25 B



### Indirect Tensile Strength

- ▶ EN 12697-24 E Fatigue
- ▶ EN 12697-24F
- ▶ EN 12697-26 C stiffness

#### Pressure swelling test

20-60599E241

#### AASHTO compression plates

20-60599E240

#### Mounting device for gluing

20-62581

#### Pressure swelling test

20-60599E241

#### Test procedure

20-60599E307

#### Assembly device

20-62581

#### Use of splitting-swelling test

20-62600

#### Test procedure

20-60599E341

#### Pressure stripe

20-60599E200

#### Additional force transducer 10kN

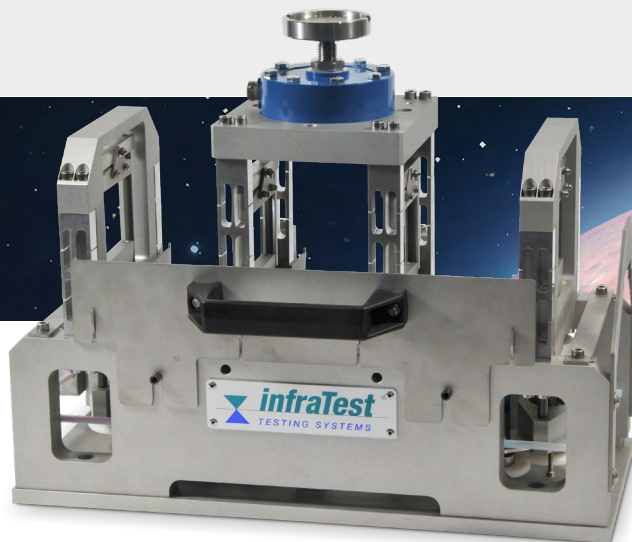
20-60599E120

## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### VOYAGER 1

Four point bending test



#### Insert frame four-point bending test

EN 12697-24 (D) Fatigue - EN 12697-26(B) Stiffness - AASHTO TP8/94 - T321

For carrying out four-point flexural tests on prismatic specimens with the dimensions 50x50/ 70x70 / 50x63 x 470 mm. The bending insert is installed in a dynamic test system 20-605xx with drive from below. During the test to compensate for settlement effects, the asphalt sample clamped in the bending test device is tensioned evenly and force-controlled via 4 DC motors with ball screws. Complete with force and deformation measuring device. The entire control and measurement data acquisition takes place via the dynamic test system and the Windows software BASDA.

A transport trolley 20-6071 is recommended for handling the device.

#### Technical specifications:

|                                                  |                                                                |
|--------------------------------------------------|----------------------------------------------------------------|
| Dimensions                                       | 500x500x350mm                                                  |
| Test force                                       | 5 kN                                                           |
| Accuracy                                         | 0.1%                                                           |
| Strain transducer                                | ± 5mm                                                          |
| Resolution                                       | 0.001mm                                                        |
| Hub                                              | ± 5mm                                                          |
| Frequency                                        | 0.1 - 30Hz                                                     |
| Temperature range                                | -20 to + 60 ° C                                                |
| Specimen dimensions                              | 50 x 50 x 470 mm /<br>70 x 70 x 470 mm /<br>50 x 63 x 470 mm / |
| Number of supports                               | 4                                                              |
| Support distance                                 | 118.5 mm                                                       |
| Specimen clamping automatically via servo motors |                                                                |

20-60599E230

## VOYAGER 2

### layers bond

20

### Test insert layer composite

EN12697-48

For dynamic testing of the layer bond of asphalt specimens up to Ø 102 mm according to draft TP Asphalt-StB Part 48

Testing device for holding asphalt test specimens with a diameter of up to 102 mm, for installation in a universal testing machine

Maximum load of the device up to 20 kN and test frequencies up to 10 Hz.

Necessary accessories, not included in the test device:

- ▶ 2 \* +/-1 mm precision displacement transducer for dynamic tests, cl. 0.2%
- ▶ 2 x high-speed measuring amplifiers for both displacement transducers
- ▶ Compressed air regulator for generating the normal force via the pneumatic cylinder
- ▶ Clamping jaws for gluing the specimens for 98, 100 or 102 mm (optionally smaller)
- ▶ Gluing device for holding the clamping jaws
- ▶ Control and data acquisition software to conduct the test

### Technical specifications:

|                 |               |
|-----------------|---------------|
| Dimensions      | 330x600x440mm |
| Weight          | 60kg          |
| Supply pressure | 5 bar         |

20-60599E250



### Test procedure

EN ISO 7389

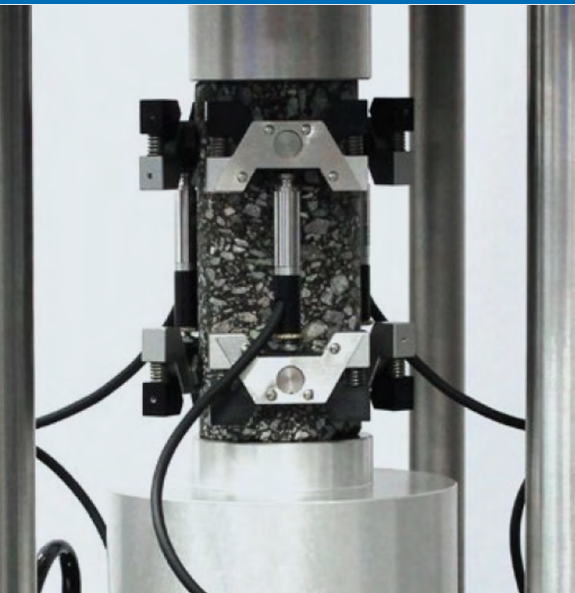
20-60599E330



## AREA 20 ASPHALT & BITUMEN

Performance testing

### VOYAGER 3 E module



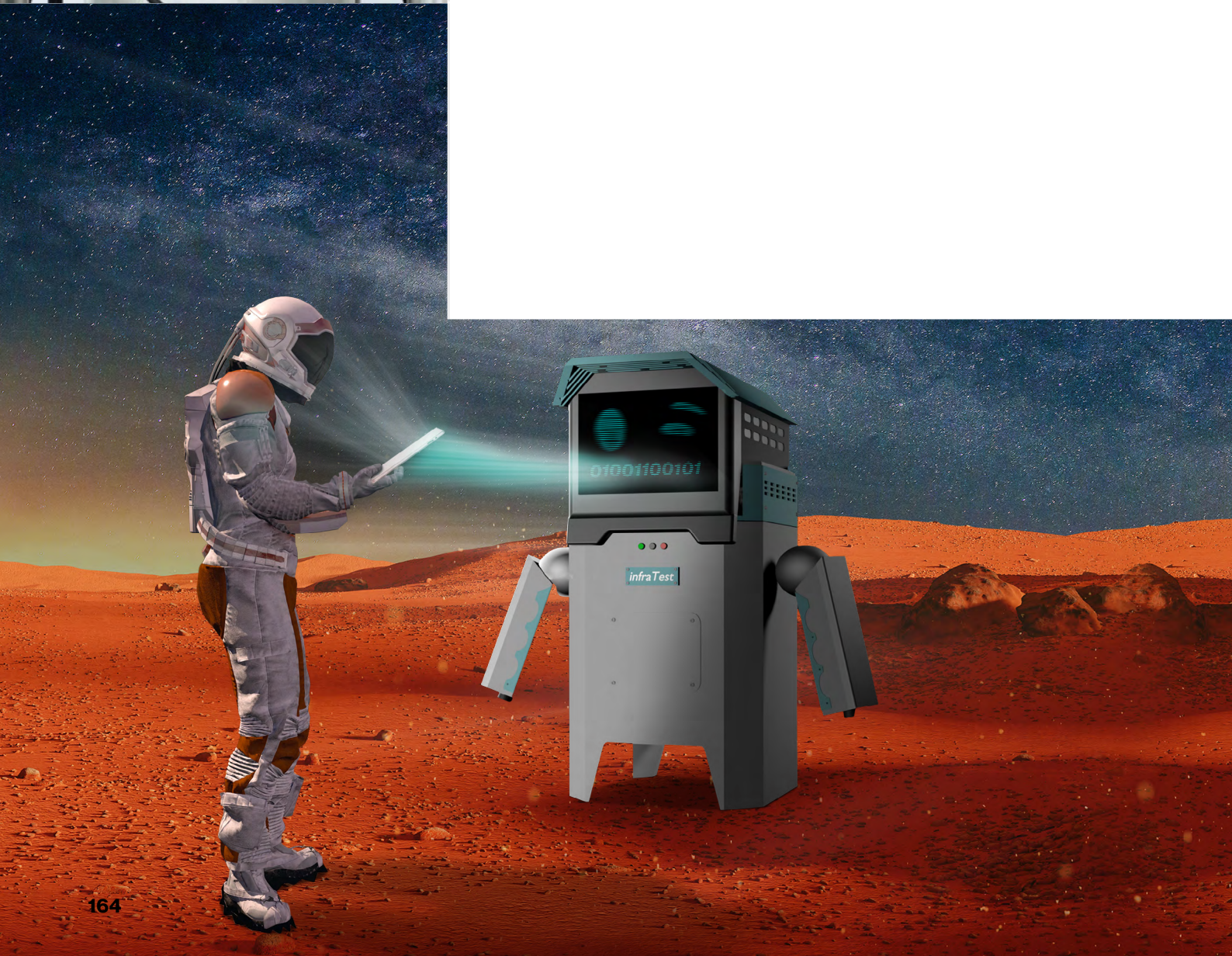
#### Magnetic holder with adhesive device

ASTM D7369, AASHTO TP79, T342-11, DNIT 135.

#### Technical specifications:

|                  |                    |
|------------------|--------------------|
| Sample alignment | standing and lying |
| Sample diameter  | 100 and 150 mm     |
| Sample height    | 38 to 89 mm        |

20-60599E206





**VOYAGER 4**  
*Indirect tensile test*

20

**Dial indicator holder**

ASTM D7369 - AASHTO TP79 - DNIT 135

4 sensors mounted directly on the sample.

The item includes:

- ▶ 20 measuring pads for sticking
- ▶ 10 adhesive pads for sensor head mounting
- ▶ 10 adhesive pads for sensor base mounting
- ▶ Adhesive device for 4" and 6" samples

2 additional sensors 20-60599E100 / 101 are required.

**Technical specifications:**

|                 |                |
|-----------------|----------------|
| Sample diameter | 100 and 150 mm |
| Sample height   | 38-63 mm       |

20-60599E203

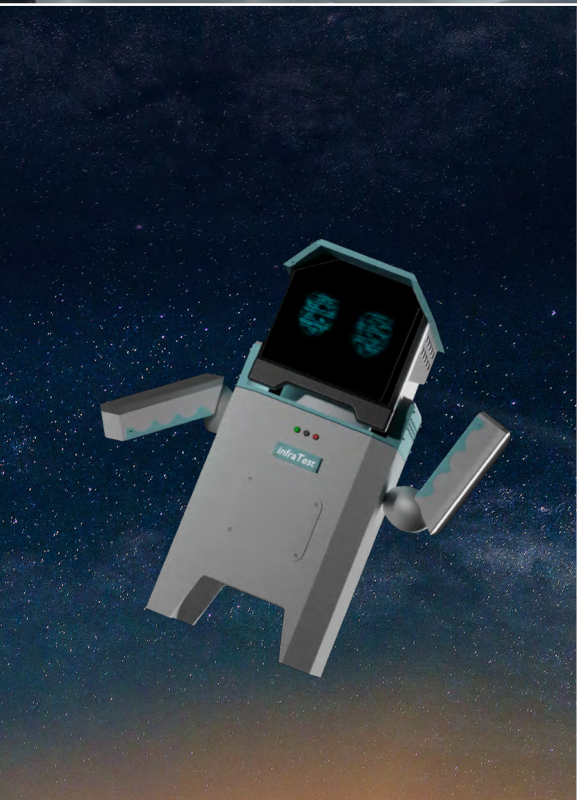
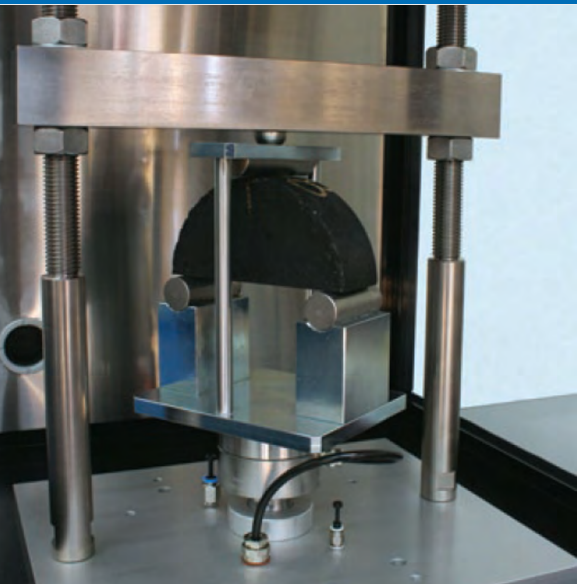




AREA 20 ASPHALT & BITUMEN

Performance testing

VOYAGER 5  
Semi-circular bending test



Test frame SCB (semi-circular bending test)

EN12697-44.

To determine crack growth by a flexural test applying a three-point load on notched, semicircular specimens (radius 75mm, width 50mm). Version with a test frame made of aluminum with two steel rollers on ball bearings (Ø 35 mm, distance 120 mm). The pressure piece (10 x 20 mm) is mounted in the movably guided upper part. For quick installation and alignment of the cooled sample, the test stand is designed in such a way that the sample can be accessed from three sides. A 35-5100, 35-5110 or 35-5115 testing machine is recommended for carrying out the test.

Required installation height 200mm,

Technical specifications:

|                              |        |
|------------------------------|--------|
| Weight                       | 8kg    |
| F max                        | 50 kN  |
| Required installation height | 200 mm |

20-1795



### Pressure strips for indirect tensile tests V2020

Mounting device for easy alignment of the print strips

#### Technical specifications:

|                 |                |
|-----------------|----------------|
| Sample diameter | 100 and 150 mm |
| Sample height   | 38 to 89 mm    |

20-60599E200

### Dial gauge holder frame V2020

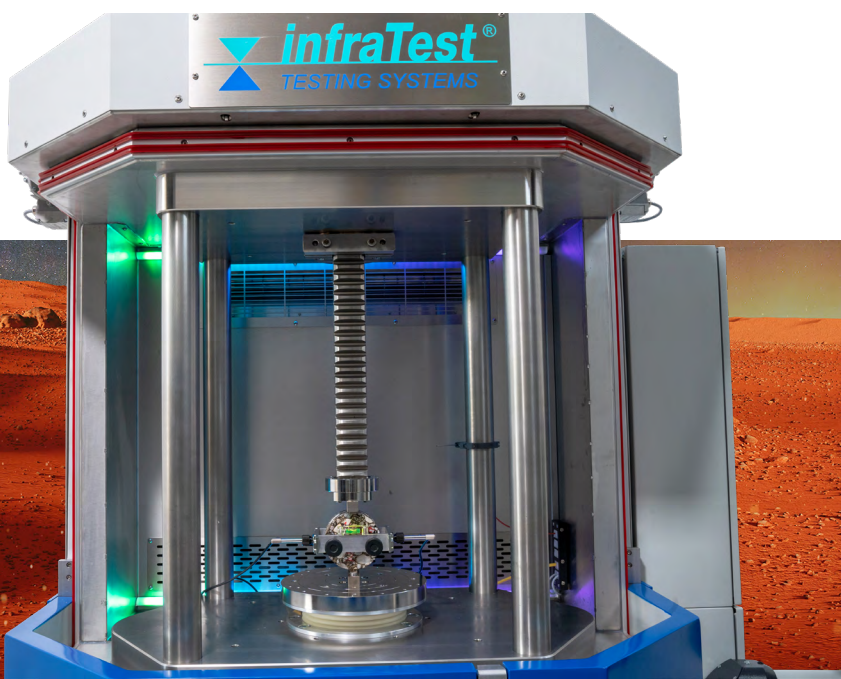
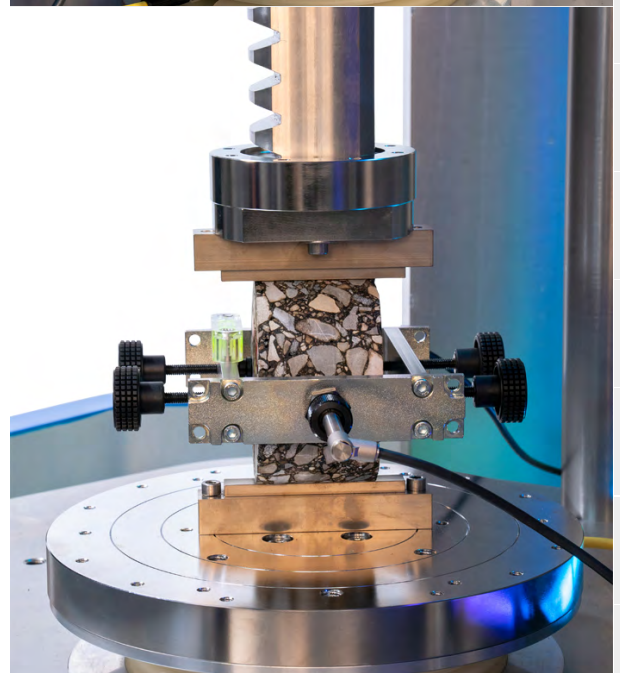
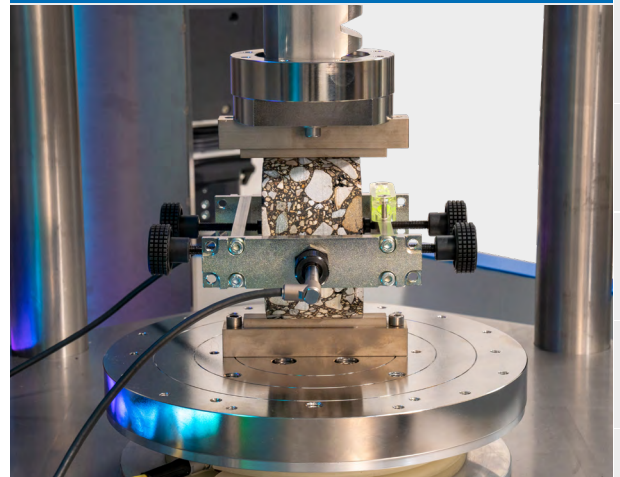
2 sensors, for measuring the specimen deformation with an additional frame attached to the specimen  
Mounting frame for D100 and D150mm specimens for fastening displacement sensors to the specimen.

#### Technical specifications:

|                 |                |
|-----------------|----------------|
| Sample diameter | 100 and 150 mm |
| Sample height   | 38 to 89 mm    |

20-60599E201

### VOYAGER 6 cleavage swelling test

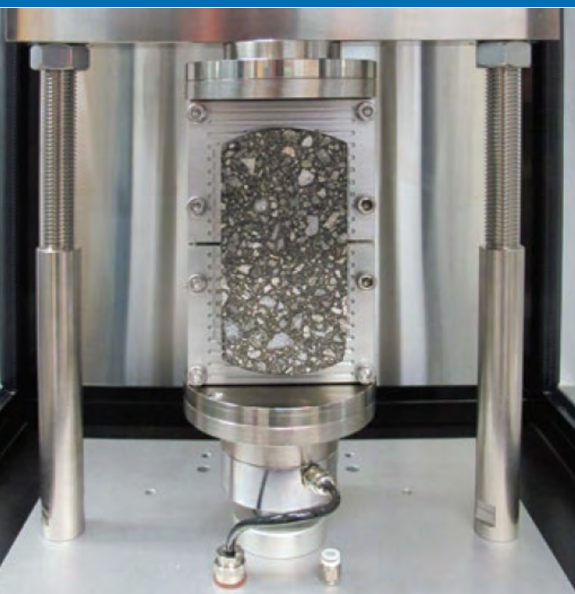




## AREA 20 ASPHALT & BITUMEN

Performance testing

**VOYAGER 7**  
*Texas overlay*



### Pressure strips for indirect tensile tests V2020

20-60599E200

### Dial gauge holder frame V2020

2 sensors, for measuring the specimen deformation with an additional frame attached to the specimen  
Mounting frame for D100 and D150mm specimens for fastening displacement sensors to the specimen.

20-60599E201





### Plate set for penetration tests V2020

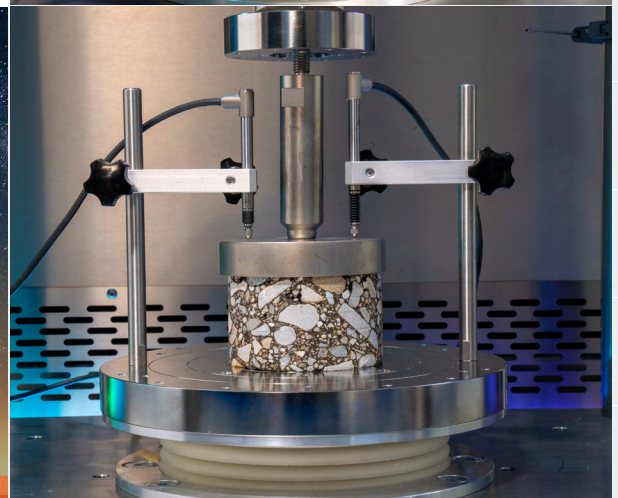
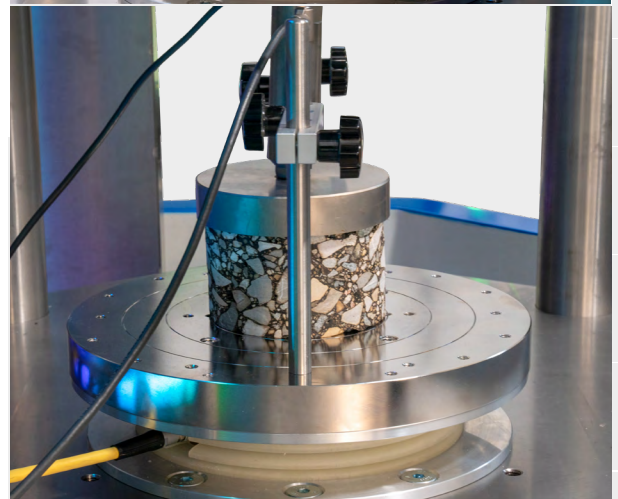
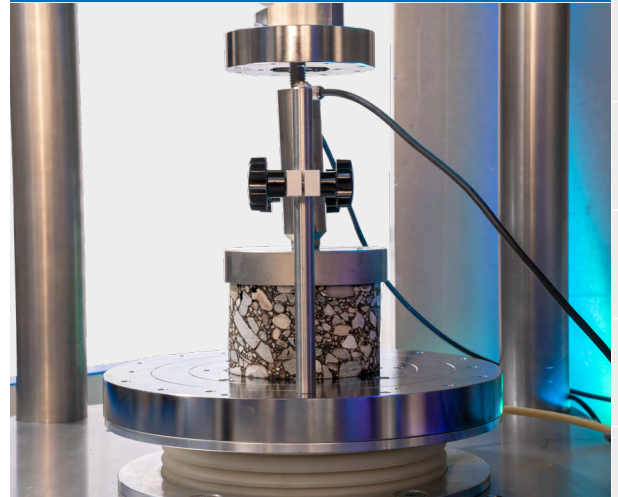
2 holders for displacement sensors. Centering device for a diameter of 150 mm and forme cylinder for a diameter of 150 x 70 mm.

#### Technical specifications:

|                 |              |
|-----------------|--------------|
| Sample diameter | 50 to 150 mm |
| Sample height   | any          |

20-60599E220

### VOYAGER 8 *intrusion attempt*





## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### **VOYAGER 9** *triaxial tests*



#### **Test use for ground tests**

DNIT 134 - DNIT 179.

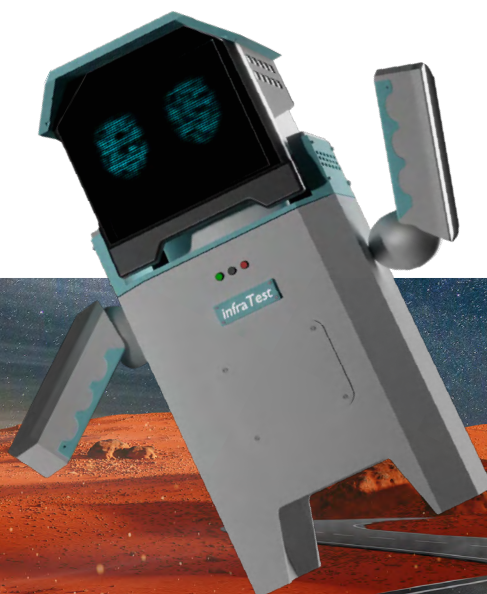
Consists:

- ▶ Test adapter for assembly in dynamic test systems
- ▶ Sample former for compacting the samples
- ▶ Pressure valve with cell pressure control, for assembly in dynamic testing machines for cell pressures up to 200 kPa
- ▶ Transparent plexiglass cylinder
- ▶ Top and bottom pressure plate
- ▶ Membrane stretcher

#### **Technical specifications:**

|                   |          |
|-------------------|----------|
| Sample dimensions | D100x200 |
|                   | D150x300 |

20-60599E260





**VOYAGER 10**  
**REVIS**

20

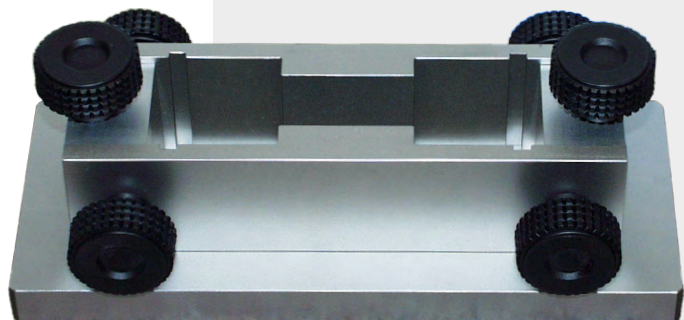
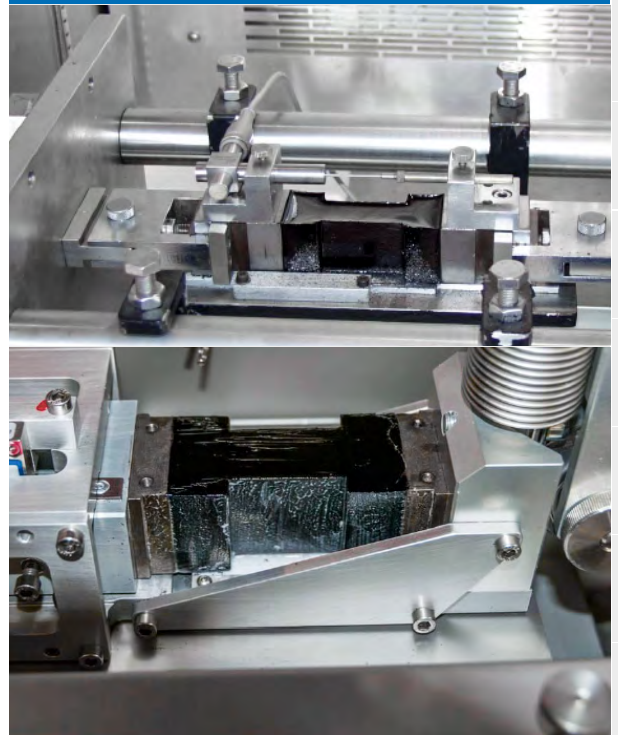
**Test option tensile creep test TCT (retardation)**

On mortar samples 40 x 20 mm. The device consists of a frame for horizontal installation of the testing machine 20-65300 in the climate chamber 20-61300 and the device for tensile creep tests with a precision-guided sample trolley, the floating sample support and the 20 mm deformation measuring device installed on it, resolution 0.2 µm. Complete with TCT - software module for test execution and evaluation.

20-65700

**A notice:**

To be used exclusively in connection with 20-65000



## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### ACCESSORIES

for Dynamic testing systems



#### Stamp penetration test (D80)

TPA StB Part 25 A2 Additionally 1x 20-60199E200 is required.

20-60199E210

#### Swelling Pressure Test

Requires additional 20-60199E200.

|              |        | Standard(s)        |
|--------------|--------|--------------------|
| 20-60199E220 | (D100) | DIN EN 12697-25A1  |
| 20-60199E230 | (D110) | TPA Stb Part 25 B1 |

#### Stamp penetration test (D56,4) GA

EN 12697-25 A2 - TPA StB 25-A1-SN Additionally 20-60199E200 required.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.00 kg |
|--------|---------|

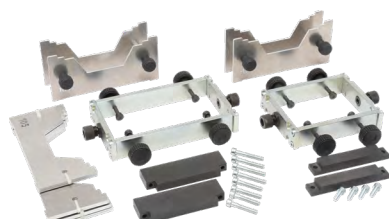
20-60199E250

#### Displacement sensor

|              |                 |
|--------------|-----------------|
| 20-60599E100 | Accuracy 1 µm   |
| 20-60599E101 | Accuracy 0.1 µm |

#### Pressure strips for indirect tensile tests V2020

20-60599E200



#### Used for splitting-swelling test

EN 12697-24 (E) / 12697-26 (C) ASTM D 4123 - AASHTO TP 31 supplementary module for 20-60100 for test specimens Ø 100 and Ø 150 mm Includes:

- ▶ Centering device for samples Ø 100 and 150 mm
- ▶ Spacers Set of interchangeable pressure bars at top/bottom, width 12.7 mm, r = 50 mm for specimens Ø 100 mm (EN12697-24E)
- ▶ Replaceable pressure bar at the top width 12.7 mm, r = 50 mm for samples Ø 100 mm (EN12697-26C)
- ▶ Set of interchangeable pressure bars top/bottom width 19.1 mm, r = 75 mm for specimens Ø 150 mm (EN12697-24E)
- ▶ Exchangeable pressure bars at the top width 19.1 mm, r = 75 mm for samples Ø 150 mm (EN12697-26C)
- ▶ Holding frame with specimen clamping device and adapter for probes for specimens Ø 100 and 150 mm
- ▶ 2 probes 12 mm, resolution 0.0001 mm (0.1 µm)
- ▶ Evaluation software for DYNASOFT to determine the stiffness modulus according to 26C and the fatigue function according to 24E

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 3.00 kg |
|--------|---------|

20-60199E260

#### Dial gauge holder frame V2020

2 sensors, for measuring the specimen deformation with an additional frame attached to the specimen Mounting frame for D100 and D150mm specimens for fastening displacement sensors to the specimen.

20-60599E201



### Dial indicator holder glued EN

2 sensors, mounted on the specimen for indirect tensile testing with 2 sensors, incl. mounting strip, adapter.

20-60599E202



### Dial indicator holder ASTM

4 sensors mounted directly on the sample. For indirect tensile tests according to: ASTM D7369 - AASHTO TP79 - DNIT 135.

Contains:

- ▶ 20 measuring pads for sticking
- ▶ 10 adhesive pads for sensor head mounting
- ▶ 10 adhesive pads for sensor base mounting

Adhesive device for 4" and 6" samples Requires 2 additional sensors 20-60599E100 / 101.

#### Technical specifications

Weight 9.70 kg

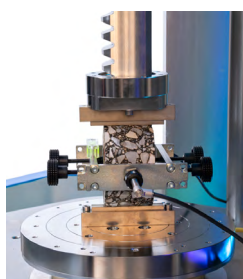
20-60599E203



### Print strip with alignment device

DNIT 135/136/138.

20-60599E204



### Insert frame four-point bending test EN 12697-24D / -26B

EN 12697-24 (D) Fatigue - EN 12697-26 (B) Stiffness - AASHTO TP8/94 - T321

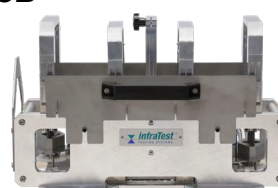
For performing four-point flexural tests on prismatic specimens with dimensions 50x50 / 70x70 / 50x63 x 470 mm. The bending insert is installed in a dynamic test system 20-605xx with drive from below. During the test to compensate for settlement effects, the asphalt sample clamped in the bending test device is tensioned evenly and force-controlled via 4 DC motors with ball screws. Complete with force and deformation measuring device. The entire control and measurement data acquisition takes place via the dynamic test system and the Windows software DYNASOFT.

A transport trolley 20-6071 is recommended for handling the device.

#### Technical specifications

|                             |                                |
|-----------------------------|--------------------------------|
| Test force 5 kN Accuracy    | 0.1%                           |
| Deformation transducer      | ± 5mm                          |
| Resolution                  | 0.001mm                        |
| Hub                         | ± 5mm                          |
| Frequency                   | 0.1 to 30Hz                    |
| Temperature range           | -20° to 60°C                   |
| Automatic specimen clamping | via servomotors                |
| Test specimen dimensions    | 50x50 / 70x70 / 50x63 x 470 mm |
| Number of supports          | 4                              |
| Support distance            | 118.5mm                        |
| Dimensions approx.          | 500x500x350mm                  |
| Weight approx.              | 32.00 kg                       |

20-60599E230



## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### ACCESSORIES

for Dynamic testing systems



#### Plate set for penetration tests V2020

20-60599E220

#### Pressure plates DNIT / AASHTO

For displacement sensors for dynamic module and flow tests according to:

- ▶ AASHTO TP79 - DNIT 184

For sample size D100, consisting of:

- ▶ 40x adhesive adapter
- ▶ 8x sensor holder · 8x measuring block
- ▶ Upper and lower pressure plates

2-component adhesive Requires 2 additional sensors  
20-60599E100 / 101.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 3.30 kg |
|--------|---------|

20-60599E240

#### Pressure test according to EN12697-25B +

AASHTO TP 79 - NCHRP 9-19 - NCHRP 9-29 - EN 12697-25 B Consisting of a triaxial cell, a base plate and an integrated load cell for testing the dynamic modulus, flow number and flow time for use in dynamic test systems · 20-60550: 30 kN · 20-60500: 50 kN · 20- 60400: 100 kN Triaxial cell with a transparent glass cylinder Quick coupling system for cell pressure Integrated valve system for stable cell pressure conditions and cell closure Pneumatic lifting system for quick sample adjustment Integrated water separator system Sensor and load cell connection through the cover plate Software for test procedure and test evaluation using BASDA software .

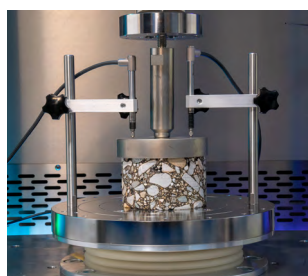
#### Technical specifications

|                  |                     |
|------------------|---------------------|
| Dimensions       | 500x500x350mm       |
| Weight           | 28.60 kg            |
| Load range       | 25 kN (dynamic)     |
| Trial dimensions | 100x200mm 100x150mm |
| Accuracy         | 0.1%                |
| Max pressure     | 3.0 bars            |
| Work pressure    | 2.25 bars           |

20-60599E241

#### Additional force transducer 10 kN V2020

20-60599E120





### Measuring device for tensile tests according to EN12697-26E

20-60599E246

### Test procedure for EN 12697-24 E

For dynamic indirect tensile tests on asphalt samples

20-60599E304

### Test insert layer composite EN 12697-48

For dynamic testing of the layered bond of asphalt test specimens up to Ø 102 mm according to draft TP Asphalt-StB Part 48 Test device for holding asphalt test specimens with a specimen diameter of up to 102 mm, for installation in a universal testing machine Maximum load on the device up to 20 kN and test frequencies up to 10 Hz Technical specifications: ·Supply pressure: 5 bar Necessary accessories, not included in the test device: ·2 \* +/-1 mm precision displacement transducers for dynamic tests, class 0.2% ·2 x high-speed measuring amplifiers for both displacement transducers ·Compressed air regulator to generate the normal force via the pneumatic cylinder ·Clamping jaws for gluing the specimens for 98, 100 or 102 mm (optionally smaller) ·Adhesive device for holding the clamping jaws ·Control and data acquisition software for carrying out the test.

#### Technical specifications

|            |               |
|------------|---------------|
| Dimensions | 330x600x440mm |
| Weight     | 60.00 kg      |

20-60599E250



### Test procedure for EN 12697-26C

Indirect Tensile Testing on Cylindrical Specimens (IT-CY).

20-60599E311



Discover the new and improved software **BASDA** for test procedures and evaluations!

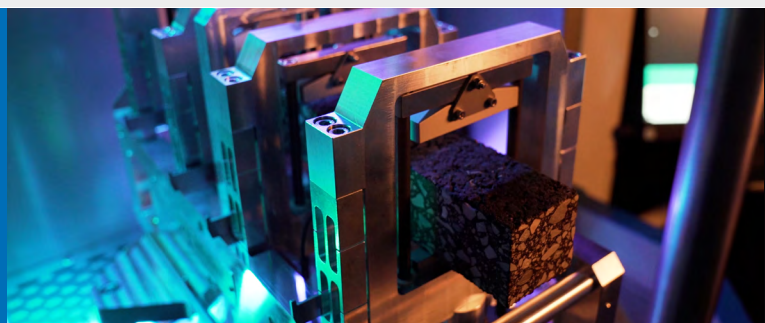


## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### ACCESSORIES

for Dynamic testing systems



#### Test procedure for EN 12697-26D

Direct Tensile and Compression Testing on Cylindrical Specimens (DTC-CY).

20-60599E312

#### Test procedure for TP-Asphalt StB Part 46B

EN 12697-46 - UCT ST.

20-60599E348

#### Test procedure for EN 12697-26E

Direct tensile testing on cylindrical specimens (DT-CY) or on prismatic specimens (DT-PR).

20-60599E313

#### Experimental process

|              |                                      |
|--------------|--------------------------------------|
| 20-60599E360 | NF P 98-260-1                        |
| 20-60599E400 | AASHTO T321 four-point bend          |
| 20-60599E401 | AASHTO TP79 Dynamic Modulus          |
| 20-60599E402 | AASHTO TP79 Flow Number              |
| 20-60599E403 | AASHTO T342-11                       |
| 20-60599E404 | AASHTO T322-07 Indirect Tensile Test |
| 20-60599E450 | ASTM D7369 Indirect Tension Test     |

#### Experimental process

Including machine setup and testing and user instruction during commissioning.

|              |                                           |
|--------------|-------------------------------------------|
| 20-60599E340 | Test procedure for TP-Asphalt StB Part 23 |
| 20-60599E341 | TP-Asphalt StB Part 24                    |
| 20-60599E342 | TP-Asphalt StB Part 25A1                  |
| 20-60599E343 | TP-Asphalt StB Part 25A2                  |
| 20-60599E344 | TP-Asphalt StB Part 25B1                  |
| 20-60599E345 | TP-Asphalt StB Part 26                    |
| 20-60599E346 | TP-Asphalt StB Part 80                    |
| 20-60599E347 | TP-Asphalt StB Part 81                    |
| 20-60599E350 | AL-SP - ASPHALT 09                        |
| 20-60599E380 | DNIT 135                                  |
| 20-60599E381 | DNIT 136                                  |





## AREA 20 ASPHALT & BITUMEN

### Performance testing

#### ACCESSORIES

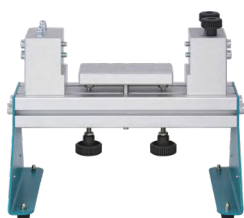
for Dynamic testing systems



#### Sample mounting device

For centric gluing of the sample adaptation plates 62x42, 62x52 or 62x62 mm using 2-component adhesive.

Complete with height-adjustable specimen storage and length adjustment. The device can be easily dismantled for cleaning purposes.



##### Technical specifications

|        |         |
|--------|---------|
| Weight | 5.80 kg |
|--------|---------|

20-65550

#### Kit 2-component adhesive

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.00 kg |
|--------|---------|

20-65551

#### Syringe for 2-component glue

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.00 kg |
|--------|---------|

20-65552

#### Test option relaxation test RT

Functional expansion through an additional RT software module for test execution and evaluation.

20-65600

#### Test option tensile creep test TCT (Retardation)

On mortar samples 40 x 20 mm. The device consists of a frame for horizontal installation of the testing machine 20-65300 in the climate chamber 20-61300 and the device for tensile creep tests with a precision-guided sample trolley, the floating sample support and the 20 mm deformation measuring device installed on it, resolution 0.2  $\mu\text{m}$ . Complete with TCT - software module for test execution and evaluation.

20-65700

#### Casting mold for TCT specimen production

Complete with base plate.

20-65770

#### Handle for casting mold 20-65770

For the transport and storage of specimens for the tensile creep test.



20-65775





### Handling device lifting table TSRST

For filling the temperature control cabinet 20-6000.

#### Technical specifications

|        |           |
|--------|-----------|
| Weight | 100.00 kg |
|--------|-----------|

20-6070

### Lifting table for dynamic system

For loading and unloading the test inserts in the temperature test cabinet.

#### Technical specifications

|        |          |
|--------|----------|
| Weight | 80.00 kg |
|--------|----------|

20-6071

### Sample plate set 40 x 40 mm TCT

Consisting of 2 sample plates 40x40 for retardation test.



20-60750

### TRAVIS test frame 4 sensors

EN 12697-46 can be used with 20-65000 for simultaneous testing on 2 asphalt specimens. Complete with stepper motor drive and force and deformation measuring device. The test frame is set up inside the climatic chamber next to the test frame included in the scope of delivery of 20-65000 and operated via the TRAVISOFT control and software.

#### Technical specifications

|        |           |
|--------|-----------|
| Weight | 132.00 kg |
|--------|-----------|

20-65300

### TRAVIS test frame 2 sensors

#### Technical specifications

|        |           |
|--------|-----------|
| Weight | 132.00 kg |
|--------|-----------|

20-65301

### Sample plate set TSRST

Made of stainless steel 14 mm thick. Set of 2 pieces.



|          |          |
|----------|----------|
| 20-65500 | 62x62 mm |
|----------|----------|

|          |          |
|----------|----------|
| 20-65510 | 62x42 mm |
|----------|----------|

|          |          |
|----------|----------|
| 20-65520 | 62x52 mm |
|----------|----------|

## AREA 20 ASPHALT & BITUMEN

### Miscellaneous

#### Water content test facility EN 12697-14

EN 12697-14 For the determination of the water content of asphalt by the Dean and Stark distillation method. Contains:

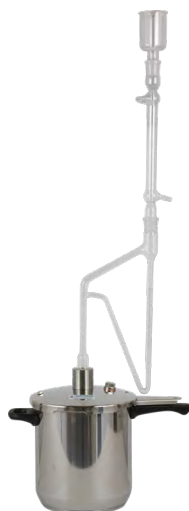
- ▶ Stainless steel container with removable lid and base for heating via an electric heating plate
- ▶ Holder for attachable glass set
- ▶ Screen basket 180 mm
- ▶ Tripod
- ▶ 20-0248 Measuring template 20 ml, graduation 0.1 ml with ground joint NS 29/32 at the top and drain valve

20-0249 Mohr cooler 300 mm NS 29/32 · 20-0251 odor trap A hotplate (50-04551) and a cooling water connection are also required to carry out the experiment.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 5.20 kg |
|--------|---------|

20-0230



#### Round-bottom flask 1000 ml NS 29/32

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.30 kg |
|--------|---------|

20-0247

#### Measuring tube 20 ml

EN 12697-14 Graduation 0.1 ml.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.20 kg |
|--------|---------|

20-0248



#### Mohr cooler 250 mm

DIN 12576 Liebig cooler Jacket length: 250 mm Cooling surface: 130 cm<sup>2</sup> Sleeve and core: NS 29/32.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.30 kg |
|--------|---------|

20-0249



#### Electric mushroom heating hood 1000ml

##### Technical specifications

|                 |            |
|-----------------|------------|
| Electrical data | 230V, 50Hz |
|-----------------|------------|

20-0245

#### Retaining ring for 20-0245

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.30 kg |
|--------|---------|

20-0246



#### Glass cooler with standard ground joint

20-0250



#### Electric mushroom heating hood 500 ml

##### Technical specifications

|                 |            |
|-----------------|------------|
| Weight          | 1.80 kg    |
| Electrical data | 230V, 50Hz |

20-0255

### Retaining ring for mushroom heating mantle 500 ml

20-0256

### Round-bottom flask 500 ml NS 29/32



#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.16 kg |
|--------|---------|

20-0257

### Cork ring for round bottom flask 500 ml Ø 110mm

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.07 kg |
|--------|---------|

20-0257.4

### Measuring tube 25 ml

Graduation 0.1 ml with tap according to EN 1428.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 0.20 kg |
|--------|---------|

20-0258

### Mohr cooler 400 mm long NS 29/ 32



20-0259

### Electric mushroom heating hood 2000 ml

600 W, Tmax. 450°C

20-0265

### Carrying ring for mushroom heating hood 2000 ml

20-0267

### Electric mushroom heating hood 3000 ml

Ø 185 mm, max. temperature: 450°C.

#### Technical specifications

|                 |                   |
|-----------------|-------------------|
| Electrical data | 230V, 50Hz, 0.7kW |
|-----------------|-------------------|

20-0270

### Tripod for mushroom heating hood 20-0270

20-0272

### Expansion Tester

EN 12272-1 Consisting of tray with spring balance and suspension chains.

20-9410

### Vialit Adhesion Tester

EN 12272-3 To determine the adhesion force between binder and rock. Consisting of: Test roller with rubber pad and handle 6 test plates Steel ball Ø 50 mm Test frame with rod 500 mm high.

20-9420

### Sampling shovel for asphalt and aggregate

DIN EN 932-1:1996-11 - ÖNORM EN 12697-27 Typical sampling shovel with raised sides for sampling hot asphalt and aggregates according to the standard.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.20 kg |
|--------|---------|

20-9430



**NEW  
ELECTRICALLY  
SUSTAINABLE**





# DRILLING & SAWING

60



***MOST PRECISE  
TECHNOLOGY –***

***ON EARTH AND ABOVE***



## RANGE 60 DRILLING & CUTTING EQUIPMENT

### Road Core Drill

#### Electric Road Core Drilling machine

Electric Road Core Drilling machine (lightweight version) with spring-loaded and ax with rubber and standard suspension. Powerful water-cooled electric drill motor with selectable speed of 180-1370 rpm with 18 levels and display. Infinitely adjustable, load-dependent electric drill feed (no hydraulic drive necessary). 3 foldable electric supports for adjustment in two axes. Each carrier has single and synchronous operation.

- ▶ GRP water tank with a volume of 320 l
- ▶ LCD display for water level 0-100%
- ▶ Additional quick coupling for cleaning devices
- ▶ Stable, corrosion-resistant aluminum frame
- ▶ All fairing and accessories in painted aluminum sheet
- ▶ Electrical emergency stop function
- ▶ Economical LED lighting
- ▶ Integrated LED lighting and warning light
- ▶ Remote control operation

**Rechargeable battery pack:** Includes 24V LiFePO4 smart battery pack with 5120Wh, Bluetooth app to monitor voltage and temperature. Illuminated LCD display for battery status (% or Ah), remaining time, current status and voltage. Integrated charge controller with inverter (230 V. Including charging cable for 230 V socket. Socket for the additional use of devices (max. 3 kW, switched off during drilling).

Rigid linear guide with stainless steel trapezoidal spindle with a drilling feed of 800 mm.

#### Technical specifications

|                         |                                                                    |
|-------------------------|--------------------------------------------------------------------|
| Dimensions<br>(LxWxH)   | 2100x1620x2000mm<br>(3300 mm total length with<br>trailer drawbar) |
| Curb weight             | 550.00 kg                                                          |
| Total weight (filled)   | 750.00 kg                                                          |
| Drill feed              | 800mm                                                              |
| Maximum towing capacity | 50.00 kg                                                           |
| Drill connection        | 1 1/4 UVC                                                          |



LED warning light



LED work light



Remote control



Digital display of  
drilling depth





**Power plug****Storage box****Min. 6 hours  
running time****LCD display for water  
level and battery level****More specifications**

|                                  |                      |
|----------------------------------|----------------------|
| Electrical data                  | 3.7 kW               |
| Rotation speed                   | 180-1370 rpm         |
| Battery operation                | up to 6 hours        |
| Water tank                       | 320 L<br>(with pump) |
| Drilling diameter                | up to 350 mm         |
| Drilling depth                   | up to 700 mm         |
| Feed speed infinitely adjustable |                      |

The CO<sub>2</sub>-neutral road drilling rig is the sustainable answer to climate change. It produces no emissions and saves both resources and costs by being independent of fossil fuels.

**Advantages:**

- ▶ Environmentally friendly
- ▶ Easy charging
- ▶ Very light so no trailer license is required
- ▶ A complete working day without reloading
- ▶ Built-in remote control for maximum work safety



## AREA 60 DRILLING & CUTTING EQUIPMENT

### Road Core Drill

#### Road core drill hydraulic GASOLINE

On a single-axle trailer with stainless steel water tank, oil tank and hydraulic unit with 4-stroke petrol engine. Two hydraulically operated cylinders move the drill rig up and down to ensure stability while drilling. The hydraulically operated drill motor with 1¼" UNC shaft for the drill connection and the internal cooling water supply is operated hydraulically or manually using a handwheel and a threaded spindle. Supplied with electric water pump and controls on the right side. A base plate that can be swiveled by approx. 5° and a drill centering with foot pedal are available as options.

##### Technical specifications

|                          |                                          |
|--------------------------|------------------------------------------|
| Dimensions               | 3350x1600x1700mm                         |
| Curb weight              | 810.00 kg                                |
| Total mixture (filled)   | 1300.00 kg                               |
| V max.                   | 80 km/h 100 km/h on request              |
| 4-stroke engine          | 23 Hp                                    |
| Drive torque             | 190 Nm to 550 rpm<br>170 Nm to 800 rpm   |
| Volume of the water tank | 400 l                                    |
| Fuel tank volume         | 20 l                                     |
| Volume of the oil tank   | 70 l                                     |
| Drill connection         | 1¼" UNC                                  |
| Drilling diameter        | 80-250 mm,<br>optionally max. 300-330 mm |
| Drill feed               | 600 mm                                   |

60-0110

#### Hydraulic DIESEL road core drill

Deviating from 60-0110, on a single-axle trailer with stainless steel water tank, oil tank and hydraulic unit with diesel engine. Two hydraulically operated cylinders ensure the up and down movement of the drilling rig and ensure a stable position during drilling.

##### Technical specifications

|                          |                             |
|--------------------------|-----------------------------|
| Dimensions               | 3350x1600x1700mm            |
| Total weight (filled)    | 1450.00 kg                  |
| V max.                   | 80 km/h 100 km/h on request |
| Diesel engine            | 9.6 kW                      |
| Drive torque             | up to 500 rpm. 110 Nm       |
| Volume of the water tank | 400 l                       |
| Fuel tank volume         | 20 l                        |
| Volume of the oil tank   | 70 l                        |
| Drill connection         | 1¼" UNC                     |
| Drilling diameter        | 80-250 mm                   |
| Drill feed               | 600 mm                      |

60-0105



Diamond core bits with direct connection thread 1 1/4" or separate holder for open core bit tubes, see 60-0300... In addition, special clamping devices are available to prevent connected core bits from loosening, especially when turning left and right - see R05.12.665 for SW 41 or R05. 12.660 for SW 50.





## Road core drill semi-hydraulic

On a single-axle trailer with stainless steel water tank, oil tank and hydraulic unit with 4-stroke petrol engine. Two hydraulically operated cylinders ensure the up and down movement of the drill stand, so that a stable stand is guaranteed when drilling. The hydraulically operated drill motor with 1¼" UNC shaft for the drill connection and the internal cooling water supply is operated manually using a handwheel and a threaded spindle. Supplied with electric water pump and controls on the right side. A base plate that can be swiveled by approx. 5° and a drill centering with foot pedal are available as options.

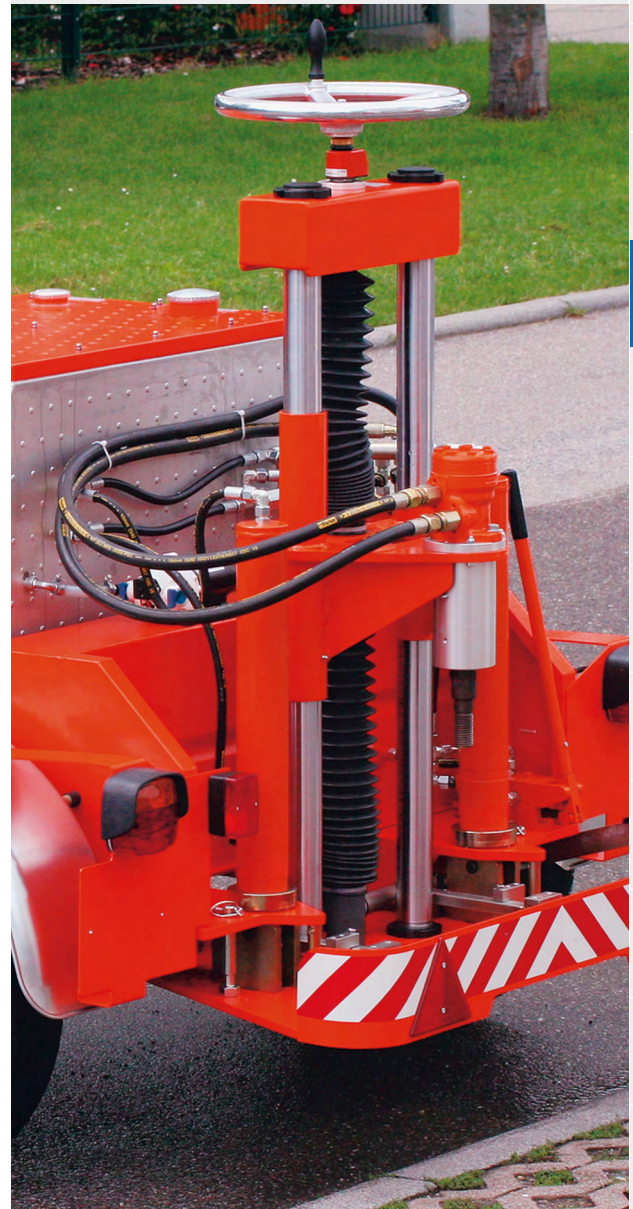
### Technical specifications

|                          |                                                    |
|--------------------------|----------------------------------------------------|
| Dimensions               | 3350x1600x1700mm                                   |
| Curb weight              | 820.00 kg                                          |
| Total weight (filled)    | 1300.00 kg                                         |
| V max.                   | 80 km/h 100 km/h on request                        |
| Drive power              | 11.4 kW                                            |
| Drive torque             | 110 Nm up to 550 rpm<br>100 Nm from 550 to 720 rpm |
| Volume of the water tank | 400 l                                              |
| Fuel tank volume         | 20 l                                               |
| Volume of the oil tank   | 70 l                                               |
| Drill connection         | 1¼" UNC                                            |
| Drilling diameter        | 80-250 mm,<br>optionally max. 300-330 mm           |
| Drill feed               | 600 mm                                             |

60-0100

### Drill holder view

(road core drill 60-0100)





## AREA 60 DRILLING & CUTTING EQUIPMENT

### Road Core Drill

#### ACCESSORIES

for Road Core Drill



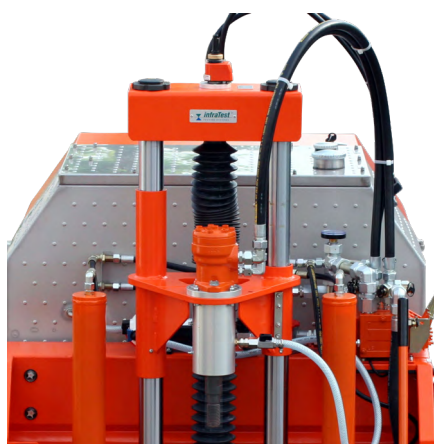
#### HONDA 22.1HP drive surcharge

Includes: HONDA special exhaust manifold, HONDA special engine cover.

##### Technical specifications

|        |         |
|--------|---------|
| Weight | 6.00 kg |
|--------|---------|

60-0110HONDA



#### Increase of the drilling stroke 990 mm

Extension for road core drill 60-0110

- ▶ Extension of the carriage up to 1000 mm
- ▶ With powerful hydraulic motor
- ▶ Available only with 60-0112, increase in weight 1500 kg

60-0111

1.5t  
4 bar / 58 psi

#### Increase in weight

For road core drill TYPE 60-0110 (1500 kg)

- ▶ Including reinforced brake
- ▶ Including reinforced axle weight

60-0112

#### Hydraulic hammer upgrade

For connection to the road core drill type 60-0110.  
The hammer is used for compacting and compacting asphalt and road surfaces.

Including extension of the hydraulic valve, all hydraulic connections, bracket and pneumatic hammer type Atlas Copco LH 190. Tamping plates (60-0113E30 / E40) are also required.

- ▶ Only available with 60-0112

##### Technical specifications

|             |                      |
|-------------|----------------------|
| Weight      | 20.00 kg             |
| Stroke rate | up to 1400 beats/min |

60-0113



### Option 100km/h

with reinforced chassis

Surcharge at price 60-0100/10.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 5.00 kg |
|--------|---------|

60-0114

### Illumination of the drilling site

Auxiliary headlights for drill rigs.

#### Technical specifications

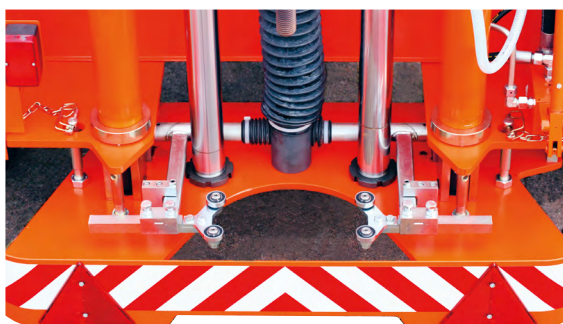
|        |         |
|--------|---------|
| Weight | 2.00 kg |
|--------|---------|

60-0118

### White side marker lights

1 set right/left.

60-0119



### Base plate 5°

Can be moved horizontally around its longitudinal axis and is equipped with a drill centering unit operated by a foot pedal. Option for 60-0100/0110.

60-0115

### Water control device

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 1.00 kg |
|--------|---------|

60-0117

## AREA 60 DRILLING & CUTTING EQUIPMENT

### Saws

#### Parallel grinding and cutting machine

With two electric motors, equipped with diamond grinding heads for simultaneous plane-parallel grinding of samples. Both grinding units can be fine-tuned to achieve parallel sample surfaces. The samples are fixed on an electrically driven, movable carriage with a variable speed range. The diamond grinding heads are equipped with a cooling water connection for the city water installation. Supplied with protective hood and clamping device for cubes 100 to 150 mm and cylindrical specimens  $\varnothing$  100 to  $\varnothing$  150 mm. Clamping devices for 50 mm cubes, 200 mm cubes and  $\varnothing$  50 mm cylindrical specimens are available as an option. Supplied with cutting head for diamond saw blades  $\varnothing$  450 mm. If required, a second diamond saw blade can be attached with variable spacing from 25 to 60 mm.

Two diamond grinding heads  $\varnothing$  210 mm. 60-12200 for bituminous mix or 60-12210 for concrete and diamond saw blades 450 mm dia. 60-12300 must be ordered separately.

#### Advantages:

- ▶ Automatic operation for cutting and grinding
- ▶ Control-guided sawing and grinding process
- ▶ One process: only one-time installation for sawing and grinding
- ▶ Various saw attachments





### Parallel grinding and cutting machine 450 mm

Supplied with cutting head for diamond saw blades Ø 450 mm. If required, a second diamond saw blade can be attached with variable spacing from 25 to 60 mm. This system is suitable for cutting particularly prismatic samples from sample plates up to 410 x 260 x 120 mm.

Two diamond grinding heads Ø 210 mm. 60-12200 for bituminous mix or 60-12210 for concrete and diamond saw blades 450 mm dia. 60-12300 must be ordered separately.

#### Technical specifications

|                      |                                                                         |
|----------------------|-------------------------------------------------------------------------|
| Dimensions           | 1850 x 2150 x 1720mm<br>(height = 2230mm when<br>safety cover open)     |
| Weight               | 900.00 kg                                                               |
| Electrical data      | 2 x 3 kW for<br>grinding, 4 kW for sawing                               |
| Specimen length min. | 50 mm                                                                   |
| Clamping device      | for cubes 100 to 150 &<br>cylindrical samples<br>100 to 150 mm diameter |

60-1200

### Parallel grinding and cutting machine 650 mm

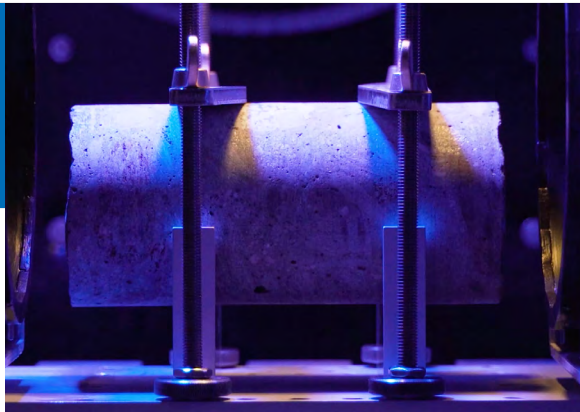
Supplied with a cutting head for diamond saw blades Ø 650 mm. If required, a second diamond saw blade can be attached with variable distances from 25 to 60 mm. This system is suitable for cutting particularly prismatic samples from sample plates up to 410 x 260 x 230 mm.

Two diamond grinding heads Ø 210 mm. 60-12200 for bituminous mix or 60-12210 for concrete and diamond saw blades Ø 650 mm 60-12400 must be ordered separately.

#### Technical specifications

|                      |                                                                         |
|----------------------|-------------------------------------------------------------------------|
| Dimensions           | 1850 x 2150 x 1900mm<br>(height = 2500mm when<br>safety cover open)     |
| Weight               | 950.00 kg                                                               |
| Electrical data      | 2 x 3 kW for<br>grinding, 4 kW for sawing                               |
| Specimen length min. | 50 mm                                                                   |
| Clamping device      | for cubes 100 to 150 &<br>cylindrical samples<br>100 to 150 mm diameter |

60-1202



## AREA 60 DRILLING & CUTTING EQUIPMENT

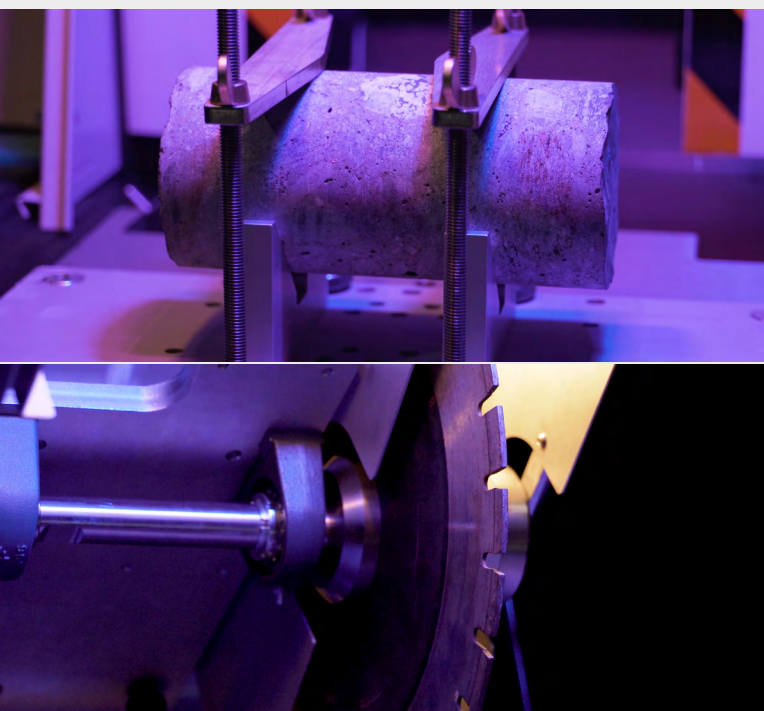
### Saws

#### Automatic sample cutting machine

Floor mounted rigid steel frame with hinged lid and viewing window protected by a safety switch. The movable sample stage is equipped with a motor and variable speed. After fixing the samples, the entire process is controlled from an external control cabinet. The cutting head is height-adjustable and allows the use of one or two saw blades at a variable distance of 25 to 60 mm. The sample table is roller-guided and prepared for mounting various sample holders, e.g. B. for the preparation of prismatic samples. Supplied with cooling water installation for connection to the municipal water supply. Without diamond saw blades and without specimen holders.

#### Advantages:

- ▶ Automatic operation
- ▶ Sawing operation PID-controlled



### Sample sawing machine 450 mm Auto

#### Technical specifications

|                 |                             |
|-----------------|-----------------------------|
| Dimensions      | 1515x1790x1790mm            |
| Weight          | 515.00 kg                   |
| Electrical data | 400V, 50/60Hz, 3P+N+PE, 5kW |

60-1203

### Sample sawing machine 650 mm Auto

#### Technical specifications

|                 |                             |
|-----------------|-----------------------------|
| Dimensions      | 1515x1790x1790mm            |
| Weight          | 900.00 kg                   |
| Electrical data | 400V, 50/60Hz, 3P+N+PE, 5kW |

60-1204

### Parallel grinding machine

With two electric motors, equipped with diamond grinding heads for simultaneous plane-parallel grinding of samples. Both grinding units can be fine-tuned to achieve parallel sample surfaces. The samples are fixed on an electrically driven, movable carriage with a variable speed range. The diamond grinding heads are equipped with a cooling water connection for the city water installation. Supplied with protective hood and clamping device for cubes 100 to 150 mm and cylindrical samples 100 to 150 mm Ø.

Clamping devices for 50 mm cubes, 200 mm cubes and Ø 50 mm cylindrical specimens are available as an option. Two diamond grinding heads 210 mm Ø. 60-12200 for bituminous mix or 60-12210 for concrete must be ordered separately.

#### Technical specifications

|                    |                                                                      |
|--------------------|----------------------------------------------------------------------|
| Dimensions         | 1850x2150x1500 mm<br>(height = 2200 mm when safety cover is open)    |
| Weight             | 850.00 kg                                                            |
| Electrical data    | 400V, 50Hz, 2x3kW, 16A<br>2 x 3 kW for grinding, 4 kW for sawing     |
| Clamping device    | for cubes 100 to 150 & cylindrical samples 100 up to 150 mm diameter |
| Sample length min. | 50mm                                                                 |

60-1205

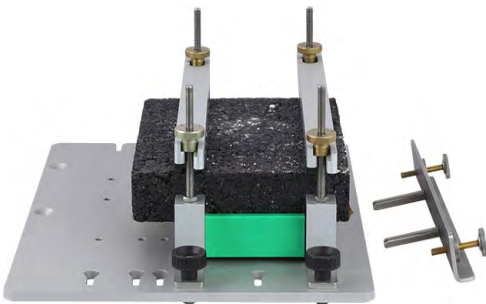


AREA 60 DRILLING & CUTTING EQUIPMENT

Saws

ACCESSORIES

for Saws



Base plate clamping device

Wrench 60-12515E20...required additionally.

Technical specifications

Weight 5.00 kg

60-12515E10

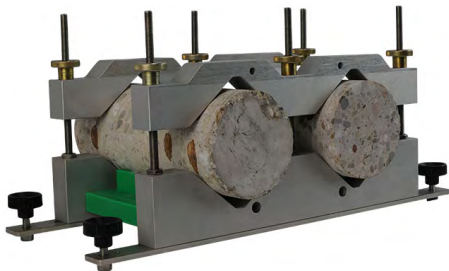
Clamping device for 60-12515E10

For grinding and sawing up to 2 samples Ø 75 - 100 mm.

Technical specifications

Weight 5.00 kg

60-12515E21



Clamping device for 60-12515E10

For grinding and sawing up to 4 samples Ø 40 - 75 mm.

Technical specifications

Weight 5.00 kg

60-12515E20

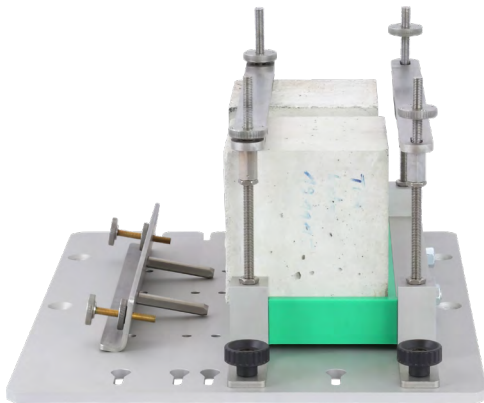
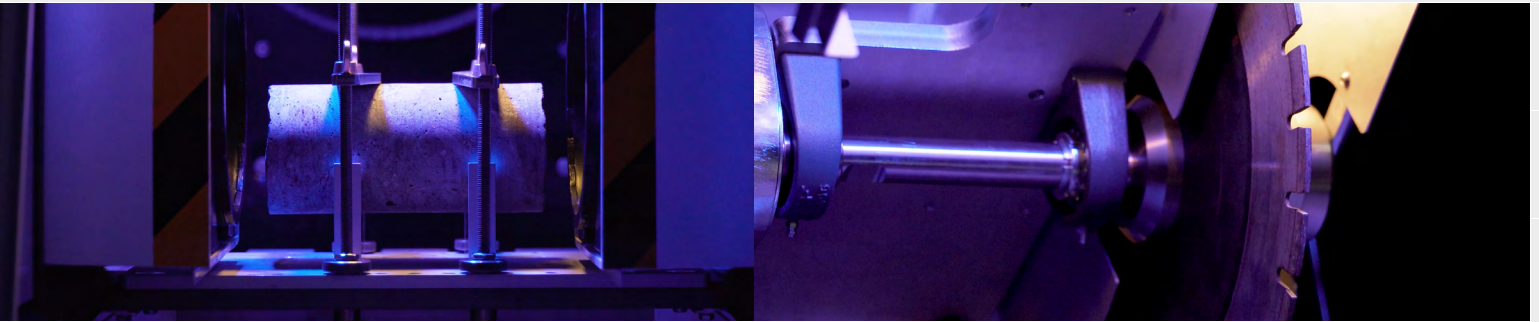
Clamping device for 60-12515E10

For grinding and sawing up to 2 samples Ø 100 - 150 mm (for 60-1202).

Technical specifications

Weight 5.00 kg

60-12515E22



### Clamping device for 60-12515E10

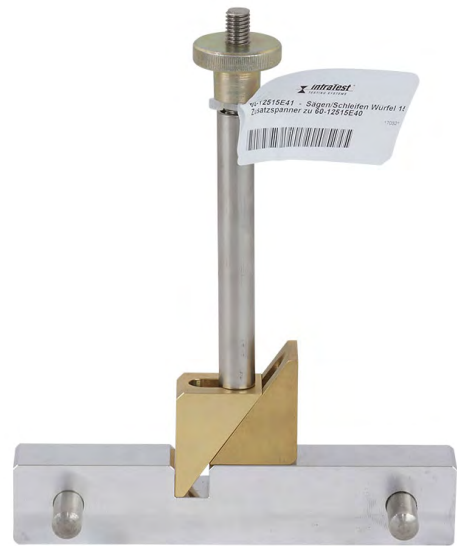
For grinding and sawing for cubes/plates 30 - 100 mm (up to 60-1200).

Incl. extensions for grinding cubes 200 mm (up to 60-1202).

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 5.00 kg |
|--------|---------|

60-12515E30



### Additional tensioner for 60-12515E40

For grinding and sawing for 150 mm cubes.

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 5.00 kg |
|--------|---------|

60-12515E41

### Clamping device for 60-12515E10

For grinding and sawing for cubes/plates 30 - 200 mm (up to 60-1202).

#### Technical specifications

|        |         |
|--------|---------|
| Weight | 5.00 kg |
|--------|---------|

60-12515E40

## RANGE 60 DRILLING & CUTTING EQUIPMENT

### Laboratory Core Device

#### Electrical Laboratory Core Device

For manual and automatic drilling of drill cores in asphalt and concrete. Sample dimensions approx. 600 x 400 x 300 mm. Core diameter 50 - 150 mm. Drilling speed adjustable in steps from approx. 300-1370rpm

- ▶ Drilling feed adjustable from 0-0.2 m/min
- ▶ Water flush with adjustable amount of water
- ▶ Sample plate can be moved and fixed on the drill table
- ▶ Collection tray for flushing water with overflow for clear water, easily removable for emptying
- ▶ Control unit on the machine
- ▶ Easy-to-open splash guard, drip edge in the drip tray
- ▶ Adjustable stop
- ▶ Optional roller floor for easy moving or plastic strip, eg PTFE
- ▶ Adjustable drill table for drilling perpendicular to the panel surface, or drill unit oriented perpendicular to the drill table
- ▶ Height of the drilling table for easy transfer of the panels from the transport trolley to the drilling table
- ▶ Adjustable center piece to guide the drill

#### Technical specifications

|                 |                      |
|-----------------|----------------------|
| Dimensions      | 1400x1200x1943 mm    |
| Weight          | 400.00 kg            |
| Electrical data | 230 V, 50 Hz. 3.7 kW |

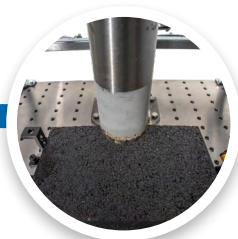
60-0220

#### Advantages:

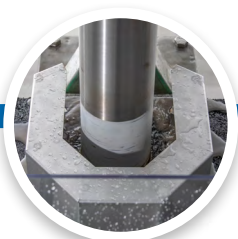
- ▶ Robust tool table
- ▶ Diverse clamping options
- ▶ Automatic drill feed with stop function







**Before drilling**



**During drilling**



**After drilling**



**Drill bit**



**Control unit**



**Clamping system**



**Clamping system screws**



**Nubs of the clamping system**



**Dismantled clamping system**

# ASPHALT & BITUMEN

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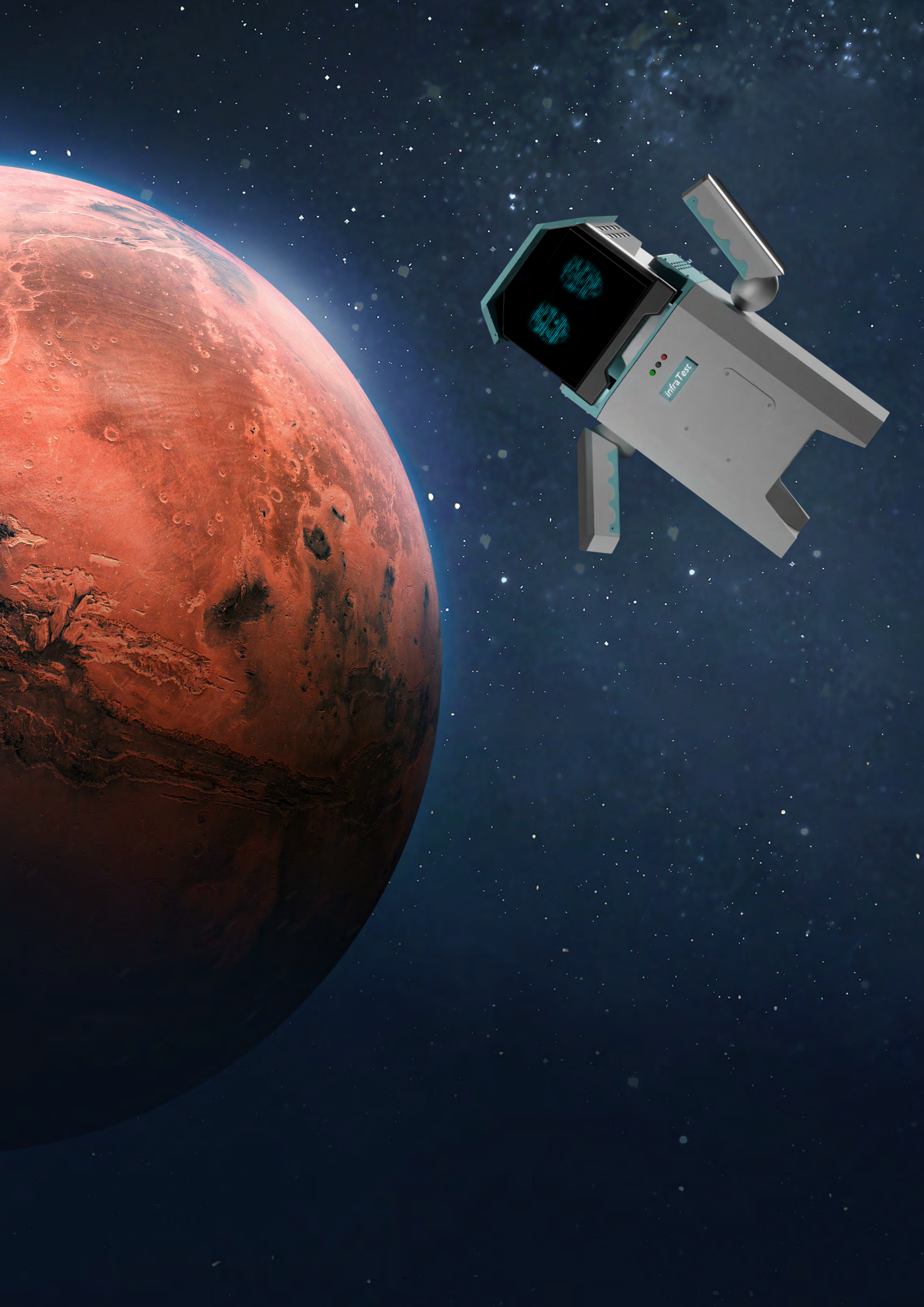


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## AASHTO

Asphalt Analyzer PURE basic module

- 20-11600 **72**

Asphalt Analyzer YOU! PG

- 20-11340 **63**
- 20-11340-60 **63**

Asphalt Analyzer YOU! Touch

- 20-11320 **62**
- 20-11320-60 **62**

Dynamic compact testing system 30 kN / 25 Hz

- 20-60550 **155**

Dynamic compact testing system 50 kN / 60 Hz

- 20-60500 **155**

MODA module - Washing Device

- 20-11600E10 **74**

## AASHTO R 28

Pressure Ageing Vessel - PAV

- 20-44000 **44**

PAV – Pressure Ageing Vessel with Vacuum Unit

- 20-44150 **45**

RVDV2T "EXTRA" Viscometer

- 20-2480 **37**

## AASHTO T 40

Scuba tank

- 20-2010 **8**

## AASHTO T 47

Loss-on Heating Oven TFOT

- 20-25700 **40**

Test vessel for PAV Ø 140 x 9,5 mm

- 20-2575 **40-45**

## AASHTO T 49

Penetrometer automatic

- 20-20670 **17**

Penetrometer digital

- 20-20665 **14**

Penetrometer with control unit

- 20-2060 **13**

## AASHTO T 49-07

Penetration needle 2.5 g / 3.2 mm magnet

- 20-20711 **18**

## AASHTO T 51

Ductilometer 400 mm

- 20-2331 **30**

Ductilometer 400 mm digital

- 20-2336 **30**

Ductilometer 1000 mm

- 20-2341 **31**

Ductilometer 1000 mm digital

- 20-2346 **31**

Ductilometer 1500 mm

- 20-2351 **33**

Ductilometer 1500 mm digital

- 20-2356 **32**

Ductilometer mould

- 20-2360 **34**

## AASHTO T 53

Test ball Ø 9,5 mm

- 20-2135 **22**

Test ring with step

- 20-2125 **22**

Ring and ball machine

- 20-22000 **20**

Ring and ball insert frame

- 20-2120 **22**

Ring and ball insert frame for 20-2200

- 20-2215 **22**

Ring and ball insert frame for 20-22000

- 20-22150 **22**

## AASHTO T 54

Engler viscometer 1-fold DIN

- 20-2560 **39**

## AASHTO T 72

Sayboldt viscometer

- 20-2530 **38**

Sayboldt viscometer 2-fold

- 20-2540 **38**



**AASHTO T 164**

Filter-extraction centrifuge 1500/3000 g

- 20-12000 [86](#)

Filter-extraction centrifuge 1500 g - 60 Hz

- 20-1200-60 [86](#)

**AASHTO T 179**

Loss-on Heating Oven TFOT

- 20-25700 [40](#)

Test vessel for PAV Ø 140 x 9,5 mm

- 20-2575 [40-45](#)

**AASHTO T 209**

Stainless steel vacuum container

- 20-1435 [92](#)

**AASHTO T 245**

Automatic Marshall Compressor

- 20-1471 [95](#)

Marshall Compression Testing Machine 30 kN

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**AASHTO T 313**

Bending Beam Rheometer (BBR)

- 20-44220 [54](#)

**AASHTO T 315**

Kinexus DSR-III rheometer platform incl. rSpace software

- 20-44405 [48](#)

**AASHTO T 315-12**

Lower measuring plate stainless steel Ø 25 mm

- 20-4453 [53](#)

**AASHTO TP 31**

Used for splitting-swelling test

- 20-60199E260 [172](#)

**AASHTO TP 70**

Kinexus DSR-III rheometer platform incl. rSpace software

- 20-44405 [48](#)

**AASHTO TP 79**

Pressure swelling test EN12697-25B +

- 20-60599E241 [174](#)

**ASTM**

Dynamic compact testing system 30 kN / 25 Hz

- 20-60550 [155](#)

Dynamic compact testing system 50 kN / 60 Hz

- 20-60500 [155](#)

**ASTM 88**

Sayboldt viscometer

- 20-2530 [38](#)

**ASTM 6084-04**

Ductilometer 400 mm

- 20-2331 [30](#)

Ductilometer 1000 mm

- 20-2341 [31](#)

**ASTM 6521**

RVDV2T "EXTRA" Viscosimeter

- 20-2480 [37](#)

**ASTM 6925-15**

Gyrator iT (centrifugal compressor)

- 20-42000 [146](#)

### ASTM 7515-10

Gyrator iT (centrifugal compressor)

- 20-42000 [146](#)

### ASTM D 5

Penetration needle 2.5 g / 3.2 mm magnet

- 20-20711 [18](#)

Penetrometer

- 20-2050 [12](#)

Penetrometer automatic

- 20-20670 [17](#)

Penetrometer digital

- 20-20665 [14](#)

Penetrometer with control unit

- 20-2060 [13](#)

### ASTM D 6

Loss-on Heating Oven TFOT

- 20-25700 [40](#)

Test vessel for PAV Ø 140 x 9,5 mm

- 20-2575 [40](#)

### ASTM D 36

Test ball Ø 9,5 mm

- 20-2135 [22](#)

Test ring with step

- 20-2125 [22](#)

Ring and ball machine

- 20-22000 [20](#)

Ring and ball insert frame

- 20-2120 [22](#)

Ring and ball insert frame for 20-2200

- 20-2215 [22](#)

Ring and ball insert frame for 20-22000

- 20-22150 [22](#)

### ASTM D 88

Sayboldt viscometer 2-fach

- 20-2540 [38](#)

### ASTM D 92 / ISO 2592

Cleveland Flash Point Tester

- 20-2450 [37](#)

### ASTM D 93

Pensky-Martens flash point tester

- 20-2470 [37](#)

- 20-2475 [37](#)

### ASTM D 113

Ductilometer 400 mm

- 20-2331 [30](#)

Ductilometer 400 mm digital

- 20-2336 [30](#)

Ductilometer 1000 mm

- 20-2341 [31](#)

Ductilometer 1000 mm digital

- 20-2346 [31](#)

Ductilometer 1500 mm

- 20-2351 [33](#)

Ductilometer 1500 mm digital

- 20-2356 [32](#)

Ductilometer mould

- 20-2361 [34](#)

### ASTM D 140

Scuba tank

- 20-2010 [8](#)

### ASTM D 217

Penetration cone

- 20-20811 [19](#)

### ASTM D 402

Testing device cut-off bitumen

- 20-2430 [36](#)

### ASTM D 937

Penetration cone

- 20-20811 [19](#)

### ASTM D 940

Engler viscometer 1-fold DIN

- 20-2560 [39](#)

### ASTM D 1074-74

Steel cylinder shape Ø 101,6 mm

- 20-1813E10 [4](#)

**ASTM D 1559**

Automatic Marshall Compressor

- 20-1471 **95**

Lab mixer

- 20-0010 **122**
- 20-0020 **122**

Lab mixer 4-15 kg

- 20-0150 **126**

Marshall Compression Testing Machine 30 kN

- 20-1650 **106**

Marshall Compression Testing Machine 30 kN-PC

- 20-1672 **107**
- 20-1672-60 **107**

Marshall shear form

- 20-1710 **112**
- 20-1712 **112**

Marshall Compactor

- 20-1450 **94**

**ASTM D 1559-2166**

Universal testing machine 50 kN

- 35-5100 **108**

Universal testing machine 100 kN

- 35-5110 **109**

Universal testing machine 200 kN

- 35-5115 **110**

**ASTM D 1665**

Engler viscometer 1-fold DIN

- 20-2560 **39**

**ASTM D 1754**

Loss-on Heating Oven TFOT

- 20-25700 **40**

Test vessel for PAV Ø 140 x 9,5 mm

- 20-2575 **40-45**

**ASTM D 2041**

Stainless steel vacuum container

- 20-1435 **92**

**ASTM D 2172**

Filter-extraction centrifuge 1500/3000 g

- 20-12000 **86**

Filter-extraction centrifuge 1500 g - 60 Hz

- 20-1200-60 **86**

**ASTM D2872-12 (RTFOT)**

Rolling Thin Film Oven Test (RTFOT)

- 20-25720 **41**

**ASTM D 4123**

Used for splitting-swelling test

- 20-60199E260 **172**

Universal splitting device with transverse strain measuring device

- 20-1767 **114**

**ASTM D 4402**

Kinexus DSR-III rheometer platform incl. rSpace software

- 20-44405 **48**

**ASTM D 5581**

Marshall shear form 152,4 mm ASTM

- 20-1712ASTM **112**

Marshall Water Bath

- 20-16200 **102**
- 20-16205 **102**

**ASTM D 5581-07a**

Top piece Marshall 152,4 mm

- 20-1483 **99**

**ASTM D 5581-07a (2013)**

Base plate Marshall 152,4 mm

- 20-1481 **98**

Marshall forme cylinder Ø 152,4 mm

- 20-1487 **99**

**ASTM D 5881-09**

Impact compressor Marshall 101,2/152,4 GOST

- 20-1506 **97**

**ASTM D 6084-04**

Ductilometer mould

- 20-2364 **34**



## ASTM D 6521

Pressure Aging Vessel (PAV)

- 20-44000 **44**

PAV –Pressure Aging Vessel with Vacuum Unit

- 20-44150 **45**

## ASTM D 6648

Bending Beam Rheometer (BBR)

- 20-44220 **54**

## ASTM D 6926

Automatic Marshall Compressor

- 20-1471 **95**

## ASTM D 6926-10

Marshall Compactor

- 20-1450 **94**

## ASTM D 6926-2010

Form cylinder Marshall

- 20-1485 **99**

Base plate for 20-1471

- 20-14800 **98**

## ASTM D 6927

Marshall shear form 152,4 mm ASTM

- 20-1712ASTM **112**

Marshall Water Bath

- 20-16200 **102**

- 20-16205 **102**

## ASTM D 6931

Split pulling device 100 mm

- 20-1760 **112**

## ASTM D 7175

Kinexus DSR-III rheometer platform incl. rSpace software

- 20-44405 **48**

## ASTM D 7405

Kinexus DSR-III rheometer platform incl. rSpace software

- 20-44405 **48**

## ASTM D 8159-2018

Asphalt analyzer PURE basic module

- 20-11600 **72**

Asphalt Analyzer YOU! PG

- 20-11340 **63**

- 20-11340-60 **63**

Asphalt Analyzer YOU! Touch

- 20-11320 **62**

- 20-11320-60 **62**

Module washing device MODA

- 20-11600E10 **74**

## BS 598 P. 3

Lab mixer

- 20-0010 **122**

- 20-0020 **122**

## BS 2000

Engler viscometer 1-fold DIN

- 20-2560 **39**

Tar Viscometer

- 20-2400 **36**

## CNR 134-91

Universal splitting device with transverse strain measuring device

- 20-1767 **114**

## CRN N° 102

Engler viscometer 1-fold DIN

- 20-2560 **39**

## DIN 1996 P. 3

Lab mixer

- 20-0010 **122**

- 20-0020 **122**

## DIN 12576

Mohr cooler 250 mm

- 20-0249 **180**

## DIN 18136

Universal testing machine 50 kN

- 35-5100 **108**

Universal testing machine 100 kN

- 35-5110 **109**

Universal testing machine 200 kN

- 35-5115 **110**

**DIN 52010**

Perforated base plate

- 20-2078 [18](#)

**DIN 53019**

DIN outer cup for C25 cylinder system

- 20-44421 [52](#)

DIN inner cylinder for C25 cylinder system

- 20-44430 [52](#)

**DIN EN 932-1:1996-11**

Sampling shovel for asphalt and aggregate

- 20-9430 [181](#)

**DIN EN 12593**

Electric melting device

- 20-22800 [27](#)

**DIN EN 12593-09**

Fraass breaking point apparatus

- 20-22650 [25](#)

**DIN EN 14771**

Bending Beam Rheometer (BBR)

- 20-44220 [54](#)

**DIN EN ISO 2719**

Pensky-Martens flash point tester

- 20-2470 [37](#)

**EN 58**

Scuba tank

- 20-2010 [8](#)

**EN 1426**

Penetration needle 2.5 g / 3.2 mm magnet

- 20-20711 [18](#)

Penetrometer

- 20-2050 [12](#)

Penetrometer automatic

- 20-20670 [17](#)

Penetrometer digital

- 20-20665 [14](#)

Penetrometer with control unit

- 20-2060 [13](#)

**EN 1427**

Casting plate nickel plated

- 20-21420 [22](#)

Test ball Ø 9,5 mm

- 20-2135 [22](#)

Test ring with step

- 20-2125 [22](#)

Ring and ball machine

- 20-22000 [20](#)

Ring and ball insert frame

- 20-2120 [22](#)

Ring and ball insert frame for 20-2200

- 20-2215 [22](#)

Ring and ball insert frame for 20-22000

- 20-22150 [22](#)

**EN 1871**

Test device according to Wilhelmi

- 20-2160 [24](#)

**EN 12272-1**

Expansion Tester

- 20-9410 [181](#)

**EN 12272-3**

Vialit Adhesion Tester

- 20-9420 [181](#)

**EN 12593-09**

Fraass double breaking point apparatus

- 20-22610 [24](#)

**EN 12607-1**

Rolling Thin Film Oven Test (RTFOT)

- 20-25720 [41](#)

**EN 12607-2**

Loss-on Heating Oven TFOT

- 20-25700 [40](#)

Test vessel for PAV Ø 140 x 9,5 mm

- 20-2575 [40-45](#)

## EN 12697-1

Asphalt analyzer PURE basic module

- 20-11600 **72**

Asphalt Analyzer YOU! **60**

Asphalt Analyzer YOU! PG

- 20-11340 **63**
- 20-11340-60 **63**

Asphalt Analyzer YOU! Touch

- 20-11320 **62**
- 20-11320-60 **62**

Filter-extraction centrifuge 1500/3000 g

- 20-12000 **86**

## EN 12697-3

Module rotary evaporator ROTA

- 20-11600E20 **76**

Module washing device MODA

- 20-11600E10 **74**

Rotary evaporator set with vacuum unit

- 20-13050 **89**

Vacuum rotary evaporator

- 20-13000 **88**
- 20-13010 **88**
- 20-13030 **88**
- 20-13040 **88**

## EN 12697-5

Stainless steel vacuum container

- 20-1435 **92**
- 20-1436 **92**

Bottle rolling device

- 20-1352 **91**

Granulator

- 20-1440 **118**
- 20-1440-60 **118**

Pycnometer calibrated

- 20-1370 **91**
- 20-1375 **91**
- 20-1380 **91**

Vacuum control device

- 20-1437 **93**

## EN 12697-11

Bottle rolling device

- 20-1352 **91**

## EN 12697-12

Vacuum control device

- 20-1437 **93**

## EN 12697-14

Measuring tube 20 ml

- 20-0248 **180**

Water content test facility EN 12697-14

- 20-0230 **180**

## EN 12697-15

Separation apparatus

- 20-4300 **118**

## EN 12697-20

Penetration depth tester 1 way

- 20-1830 **6**

Penetration depth tester 2 ways

- 20-1840 **6**

## EN 12697-21

Penetration Test Plates

- 20-1875 **6**

## EN 12697-21 (D)

Sample cylinder with aluminum base plate Ø 150 x 25 mm

- 20-1852 **6**

## EN 12697-22

Track formation tester water / air

- 20-4000 **134**

## EN 12697-23

Marshall Water Bath

- 20-16200 **102**
- 20-16205 **102**

Split pulling device 100 mm

- 20-1760 **112**

Split pulling device 100 mm mit Querdehnungsmesseinrichtung

- 20-1762 **113**

Universal Split pulling device

- 20-1765 **113**



Universal splitting device with transverse strain measuring device

- 20-1767 **114**

#### **EN 12697-24..26**

Dynamic cold compaction testing system 10 kN / 10 Hz  
–20 to +60 °C

- 20-60100 **153**

Dynamic Cold Compaction Testing System 20 kN / 25 Hz

- 20-60210 **156**

Dynamic compact testing system 30 kN / 25 Hz

- 20-60550 **155**

Dynamic compact testing system 50 kN / 60 Hz

- 20-60500 **155**

Dynamic thermo-compaction testing system  
10 kN / 10 Hz

- 20-60000 **153**

#### **EN 12697-24 (D)**

Insert frame four-point bending test

- 20-60599E230 **173**

#### **EN 12697-24 (E) / 12697-26 (C)**

Used for splitting-swelling test

- 20-60199E260 **172**

#### **EN 12697-25 A2**

Stamp penetration test (D56,4) GA

- 20-60199E250 **172**

#### **EN 12697-25 B**

Pressure swelling test

- 20-60599E241 **174**

#### **EN 12697-26 (B)**

Insert frame four-point bending test

- 20-60599E230 **173**

#### **EN 12697-30 A**

Impact compressor Marshall

- 20-1500 **97**

Impact compressor Marshall 100/150

- 20-1505 **97**

#### **EN 12697-30 B**

Impact compressor

- 20-1475 **95**

#### **EN 12697-31**

Gyrator iT (centrifugal compressor)

- 20-42000 **146**

#### **EN 12697-33 Part. 5.2**

Roller sector compactor 30 kN

- 20-4030 **140**

Roller sector compactor 40 kN

- 20-4050 **143**

Roller sector compactor 820x260mm

- 20-4060 **144**

#### **EN 12697-34**

Marshall Compression Testing Machine 30 kN-PC

- 20-1672 **107**

- 20-1672-60 **107**

Marshall shear form

- 20-1710 **112**

- 20-1712 **112**

Marshall shear form 152,4 mm ASTM

- 20-1712ASTM **112**

Marshall Water Bath

- 20-16200 **102**

- 20-16205 **102**

Universal testing machine 50 kN

- 35-5100 **108**

Universal testing machine 100 kN

- 35-5110 **109**

Universal testing machine 200 kN

- 35-5115 **110**

#### **EN 12697-35**

Lab mixer 4-15 kg

- 20-0150 **126**

Lab mixer 30 l

- 20-0160 **124**

#### **EN-12697-35**

Lab mixer

- 20-0010 **122**

- 20-0020 **122**

#### **EN 12697-44**

Test frame SCB (semi-circular bending test)

- 20-1795 **116**

## EN 12697-46

TRAVIS Low-Temperature Compaction Testing System  
TSRST, 25 kN / 50 Hz

- 20-65200 **157**

Test procedure for TP-Asphalt StB Part 46B

- 20-60599E348 **176**

## EN 12697-50 B

Scuffing Device

- 20-40030 **138**

## EN 12846

Tar Viscometer

- 20-2400 **36**

## EN 13108

Filter-extraction centrifuge 1500/3000 g

- 20-12000 **86**

## EN 13302

Kinexus DSR-III rheometer platform incl. rSpace software

- 20-44405 **48**

## EN 13303

Loss-on Heating Oven TFOT

- 20-25700 **40**

Test vessel for PAV Ø 140 x 9,5 mm

- 20-2575 **40-45**

## EN-13357

Tar Viscometer

- 20-2400 **36**

## EN 13358

Testing device cut-off bitumen

- 20-2430 **36**

## EN 13398

Ductilometer 400 mm

- 20-2331 **30**

Ductilometer 400 mm digital

- 20-2336 **30**

Ductilometer 1000 mm

- 20-2341 **31**

Ductilometer 1000 mm digital

- 20-2346 **31**

Ductilometer 1500 mm

- 20-2351 **33**

Ductilometer 1500 mm digital

- 20-2356 **32**

## EN 13587

Ductilometer 400 mm digital

- 20-2336 **30**

Ductilometer 1000 mm digital

- 20-2346 **31**

## EN 13589

Ductilometer 400 mm digital

- 20-2336 **30**

Ductilometer 1000 mm digital

- 20-2346 **31**

Ductilometer 1500 mm digital

- 20-2356 **32**

Ductilometer mould

- 20-2362 **34**

## EN 13702

Kinexus DSR-III rheometer platform incl. rSpace software

- 20-44405 **48**

## EN 13880-2

Penetration cone

- 20-20811 **19**

Penetrometer automatic

- 20-20670 **17**

## EN 13880-3

Penetrometer automatic

- 20-20670 **17**

## EN 14769

Pressure Aging Vessel (PAV)

- 20-44000 **44**

PAV –Pressure Aging Vessel with Vacuum Unit

- 20-44150 **45**

RVDV2T “EXTRA” Viscosimeter

- 20-2480 **37**

**EN 14770**

Kinexus DSR-III rheometer platform incl. rSpace software

- 20-44405 [48](#)

Test vessel for PAV Ø 140 x 9,5 mm

- 20-2575 [45](#)

**EN 22592**

Cleveland Flash Point Tester

- 20-2450 [37](#)

**EN 22719**

Pensky-Martens flash point tester

- 20-2475 [37](#)

**GOST 110-2016**

Base plate for 20-1471

- 20-1485 [98](#)

Impact compressor Marshall 101,2/152,4 GOST

- 20-1506 [97](#)

**GOST 11501-78**

Penetrometer digital

- 20-20665 [14](#)

**GOST 11505-75**

Ductilometer 400 mm digital

- 20-2336 [30](#)

Ductilometer 1000 mm digital

- 20-2346 [31](#)

Ductilometer 1500 mm

- 20-2351 [33](#)

Ductilometer 1500 mm digital

- 20-2356 [32](#)

**GOST 11506-73**

Test ball Ø 9,5 mm

- 20-2135 [22](#)

Test ring with step

- 20-2125 [22](#)

Ring and ball machine

- 20-22000 [20](#)

Ring and ball insert frame for 20-2200

- 20-2215 [22](#)

Ring and ball insert frame for 20-22000

- 20-22150 [22](#)

**GOST 12801-98**

Marshall Compression Testing Machine 30 kN-PC

- 20-1672 [107](#)
- 20-1672-60 [107](#)

**GOST 33136-2014 -78**

Penetrometer

- 20-2050 [12](#)

**GOST 33140-2014**

Rolling Thin Film Oven Test (RTFOT)

- 20-25720 [41](#)

**GOST 58400.8-2019**

Bending Beam Rheometer (BBR)

- 20-44220 [54](#)

**GOST R 52519-2006**

Gyrator iT (centrifugal compressor)

- 20-42000 [146](#)

**NCHRP 9-19**

Pressure swelling test EN12697-25B +

- 20-60599E241 [174](#)

**NCHRP 9-29**

Pressure swelling test EN12697-25B +

- 20-60599E241 [174](#)

**NF P98 251-2**

Automatic Marshall Compressor

- 20-1471 [95](#)

**NF P98-251-4**

Duriez mold set 80 mm

- 20-1810 [4](#)

Duriez mold set 120 mm

- 20-1815 [4](#)

**NF T 66-004**

Penetrometer

- 20-2050 [12](#)

**NF T 66-005**

Tar Viscometer

- 20-2400 [36](#)

**NF T 66-020**

Engler viscometer 1-fold DIN

- 20-2560 [39](#)



### **NF T 66-062**

Bending Beam Rheometer (BBR)

- 20-44220 **54**

### **ÖNORM EN 12697-27**

Sampling shovel for asphalt and aggregate

- 20-9430 **181**

### **PNST 79-2016**

Bending Beam Rheometer (BBR)

- 20-44220 **54**

### **SN 670 461**

Shear jaws r=77,5 mm SN

- 20-1790E70 **115**

### **SN 671 961**

Shear jaws r=77,5 mm SN

- 20-1790E70 **115**

### **TP A 3-2007**

Roller sector compactor 40 kN

- 20-4050 **143**

### **TP A 33-2007**

Roller sector compactor 30 kN

- 20-4030 **140**

Roller sector compactor 820x260mm

- 20-4060 **144**

### **TP A-StB**

Shearing frame 100 mm

- 20-1780 **114**

Shearing frame 150 mm

- 20-1790 **114**

### **TPA StB 25-A1-SN**

Stamp penetration test (D56,4) GA

- 20-60199E250 **172**

### **TP A-StB 46**

TRAVIS Low-Temperature Compaction Testing System  
TSRST, 25 kN / 50 Hz

- 20-65200 **157**

### **TPA StB Teil 25 A2**

Shearing Stamp penetration test (D80)

- 20-60199E210 **172**

- 20-60199E230 **172**

### **UCTST**

Test procedure for TP-Asphalt StB Part 46B

- 20-60599E348 **176**



## NOTES











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