

TEST EQUIPMENT

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PRÜFGERÄTE

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From Idea to Machine Engineering and Production

More Than 40 Years of One-Stop-Shop Solutions

In addition to technical research and development, our service spectrum also includes chemical, physical and microbiological material and product testing. Thanks to this unique combination of engineering, production and material testing under one roof, all testing requirements can be implemented out quickly and competently.

All-Round Technology

Our Engineering department possesses the necessary expertise and the technical resources to provide our clients with individual problem solutions. Whether mechanical engineering, electrical engineering or information technology, or whether a new testing procedure is to be introduced or a new production unit installed – we offer research, development and construction services according to your specifications. We accompany you throughout the entire development process, constantly contributing innovative input. We thus provide the right kind of support needed to transform your ideas into reality.

Our team of engineers and technicians specialised in mechanical engineering, electrical engineering, information technology and footwear production has access to the latest resources in the following areas:

- Research in testing and manufacturing technology
- Development, engineering and construction of plants, machines, devices and control systems
- Engineering and sales of test equipment
- Electrical circuitry design
- Software development
- Pilot scale facility

Further activities are:

- Mechatronic engineer training
- Supervision of degree theses and student research projects
- Collaboration in standards committee

Support in Assistance Programmes

You are planning a development, which – particularly for a medium-sized company – comes with inherent technical and financial risks. Public assistance programmes can reduce such risks. We can advise you on assistance possibilities and applications and help to you to carry out the project.

Custom-Made Developments

If you are looking for a certain piece of test equipment, but cannot find it in our catalogue, then please contact us. We will develop and build customer-specific testing devices, testing rigs and testing automation facilities in small lots.

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APM 2000, 3053/1 Abrasion Testing Machine



PFI Abrasion Testing Machine

For determining abrasion resistance of footwear soling materials conforming to PFI standards

Equipped with an automatic ejector and a suction head to remove abrasion dust. Bench-mounted instrument..

Accessories (available as optional extras)

- Punching Knife 3027/10 for sample cutting
- 60-grit sandpaper (for tests according to DIN 53516)

Technical Data

Dimensions: 670 × 330 × 350 mm; separate control unit 300 × 200 × 100 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Power consumption: approx. 120 W

Reference N° **APM 2000, 3053/1**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

APM-T, 3052/2 Thermoabrasion-Testmaschine



Thermoabrasion-Testmaschine

With this test the chalking of outsole materials can be determined.

During the test a specimen which is taken out of the outsole is put on a rotating light-coloured PVC-standard flooring (e.g. "Royal", colour: 420-54, manufacturer: DLW) with a defined force. The staining of the flooring is determined according to the grey scale DIN EN 20105/A03.

Technical Data

Footprint: T/B/H 600 mm / 900 mm (+ Controlunit) / 500 mm

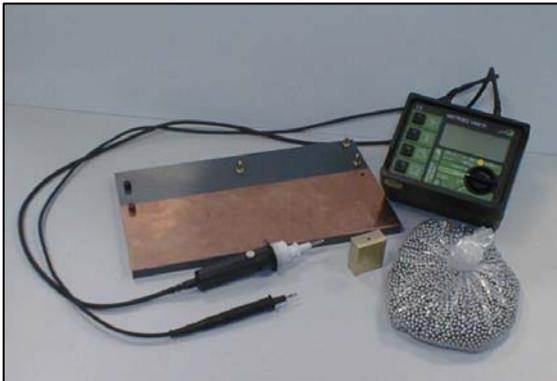
Supply voltage: 200 - 230 V

Supply frequency: 50 - 60 Hz

Airpressure: 6bar

Bestell-Nr.: **APM-T, 3052/2**, Tel.: 06331/2490505, E-Mail: peter.schultheis@pfi-germany.de

AM, 3077 Anti Static Measuring Unit



Anti Static Measuring Unit

This device allows tests conforming to DIN EN ISO 20344, DIN EN 100015 (partially replaced by DIN EN 61340-5-1).

Conforming to the standard, an ohmmeter measures the electric resistance (accuracy: 5 %). The inner electrode consists of steel balls (diameter: 5 mm) and weighs 4 kg. The outer electrode is a copper plate. To measure the electrical resistance, the shoe bottom is coated with a conductive silver film.

Reference N° **AM, 3077**

Phone: 0049 (0) 63 31 24 90 505 E-Mail: peter.schultheis@pfi-germany.de

DAT, 3080/1 DIN Abrasion Tester



DIN Abrasion Tester

For abrasion and abrasion resistance testing of cylindrical samples conforming to DIN 53516, ISO 4649, EN 12770, EN ISO 20344 standards.

Fitted with an automatic ejector and a suction head to remove abrasion dust.

Accessories (available as optional extras)

- Drilling device for sampling (AP 3080/2) consisting of pillar drill and sample cutter
- 60-grit sandpaper (coarse) for testing according to DIN 53516
- Reference rubber conforming to DIN 53516
- Standard vacuum cleaner

Technical Data

Footprint: 500 × 900 mm

Supply voltage: 230 V

Supply frequency: 50 - 60 Hz

Compressed air supply: 5 bar, consumption approx. 15 L/min

Reference N° **DAT, 3080/1**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

AP, 3080/2/3/4

Pillar Drill with Device for Sample Cutting



Pillar Drill with Device for Sample Cutting

Accessory for DIN-Abrasion Testing Machine for cutting cylindrical samples with a diameter of 16 mm.

The drilling device without a pillar drill you can order under [3080/3](#).

Substitute knives for the sample cutting device are available under [3080/4](#)

Reference N° [AP 3080/2](#)

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

BS, 3105 PFI Ball Shooter



Ball Shooter

The PFI Ball Shooting machine tests the permanent load behaviour of soccer balls by constantly shooting them against a deflection plate according to FIFA standard.

The machine can test up to three balls simultaneously and offers a wide variety of test control settings. The ball velocity, wheel distance, number of cycles and test duration can be determined by the user.

The ball shooter is controlled by a PC System which is part of the scope of delivery

Technische Daten

Footprint: T/B/H 3000 mm / 1000 mm / 1800 mm (2700 after installation)

Supply voltage: 230 V

Supply frequency: 50-60 Hz

Weight: 900kg

Bestell-Nr. **BS, 3105**, Tel.: 06331/2490505, E-Mail: peter.schultheis@pfi-germany.de

BBP, 3116 Belt Flex Tester



Belt Flex Tester

Resistance to crack initiation and growth

This machine determines the resistance of components mainly outsoles of footwear, by repeated flexing the test specimen over exchangeable rollers.

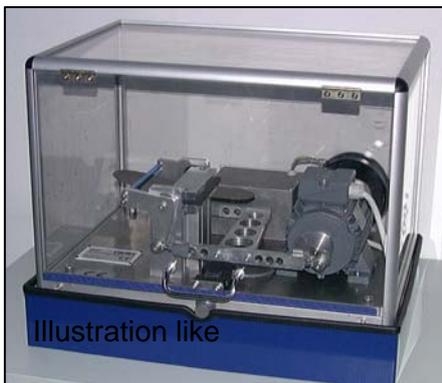
Technical Data

Footprint: 600 × 1100 mm
Supply voltage: 230 V
Supply frequency: 50 - 60 Hz
Compressed air supply: 6 bar,

Reference N° **BBP,3116** Phone: 0049 (0)6331/2490505, E-Mail: peter.schultheis@pfi-germany.de

BDE, 3090/2

Flexing Test Machine for Penetration Resistant



Flexing Test Machine for Penetration Resistant Inserts double station

For determining flexing properties of penetration-resistant steel inserts / midsoles (as used in safety footwear) according to DIN EN ISO 20344.

One end of the insert is clamped tight, the other end is flexed at a predefined speed and over a predefined distance. The machine is able to carry out up to one million flex cycles per test.

Technical Data

Footprint: 500 x 700 mm

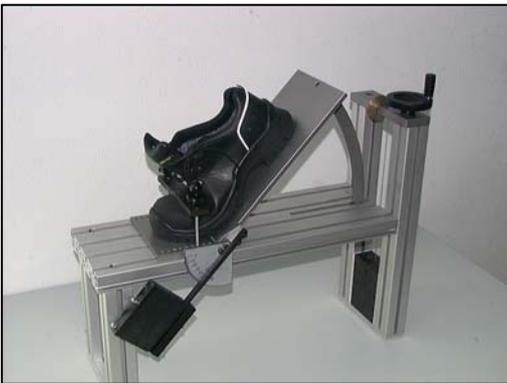
Supply voltage: 230 V

Supply frequency: 50 - 60 Hz

Reference N° **BDE, 3090**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

BVL, 3022 Outsole Bending Device



Bending Device

Allows assessment of outsole bending according to EN ISO 20344.

With this manually operated device bending of single outsoles and complete shoes can be tested.

Technical Data

Footprint: approx. 200 × 600 mm

Reference N° **BVL, 3022**,

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

BBT, 3064 Insole Break Tester



Insole Break Tester

This machine determines the flexing angle at which the sample will break.

Technical Data

Footprint: 350 x 350 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Power consumption: approx. 200 W

Reference N° **BBT, 3064**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

BFM, 3029

Insole Flexometer



Insole Flexometer

Designed for determining durability of insole materials under repeated flexing according to BS 5131.

When the sample breaks, the machine will automatically stop.

Technical Data

Footprint: 900 x 350 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Power consumption: approx. 200 W

Reference N° **BFM, 3029**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

A66,V2, 3010 Comfort-Tester



Comfort-Tester

Measuring device for assessing climate comfort of footwear according to PFI standards.

The comfort tester permits variation of the input parameters temperature, humidity and ventilation and is thus able to simulate different climate conditions during wearing of the shoe. Sensors record heat and humidity values at six measuring points distributed over an artificial foot. The comfort tester comes with a control PC which is equipped with specific software developed by PFI. This software logs all temperature and humidity data and can later on create graphs to visualise the test procedure.

Technical Data

Dimensions: 840 × 350 × 900 mm

Supply voltage: 230 V / 100 VA

Supply frequency: 50 Hz

Reference N° [A66,V2, 3010](#)

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

CM, 3026 Crockmeter



Crockmeter

Allows assessment of the colour fastness of textiles to rubbing. Suitable for testing according to EN ISO standards 105-X12.

Accessories (available as optional extras)

- Cotton cloth according to DIN EN ISO/DIS 105-F09.

Technical Data

Footprint: 400 x 400 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° **CM, 3026**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

BPM, 3054 Outsole Flex Testing Machine



Outsole Flex Testing Machine

This machine is suitable for testing outsoles and outsole materials according to **DIN 53543**, (pr. **EN 17707**) and **EN ISO 20344** standards.

In order to assess the wear properties of outsoles, the material's behaviour under repeated flexing is of utmost importance: Outsole cracking will always lead to justified complaints!

This machine permits testing of soling materials (sheets) and shoe soles. The thicker the material, the greater the elongation stress on the outer side of the sole when flexed. The elongation can be predefined by flexing the sample over a cylinder.

Accessories (available as optional extras)

3054/1 Additional clamp for checking child soles.

Technical Data

Dimensions: 800 × 800 × 700 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Power consumption: approx. 180 W

Reference N° **BPM, 3054**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

RF, 3005 Ross Flexing Machine



Ross Flexing Machine

This machine measures the resistance of non-leather outsole materials to cracking during wearing. It is suitable for carrying out tests conforming to EN 20344, ISO 5423 standards (especially after exposure to hydrolysis).

Initially, the out sole or out sole material is slit in a defined manner, and then continually flexed over a mandrel at an angle of 90°. The cut growth is an indication of the material's tendency to break. 10 digits.

Technical Data

Dimensions: 450 x 350 x 450 mm

Supply voltage: 230 V

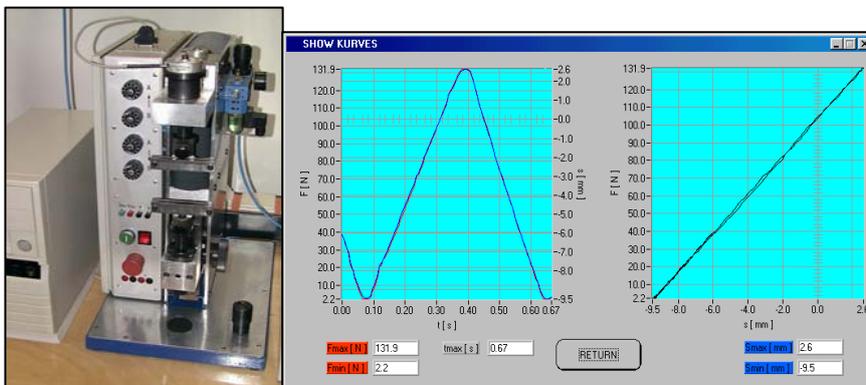
Supply frequency: 50 Hz

Reference N° **RF, 3005**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

DBPM, 3063

Dynamic Tension and Compression Testing Machine



Dynamic Tension and Compression Testing Machine

For dynamic testing of stiff leathers according to DIN 53340 as well as for other materials according to PFI standards.

For the assessment of many materials and components used in footwear manufacture, it does not suffice to determine static properties such as breaking strength or extension at break. In many cases, dynamic testing, cycled at low load rates, will produce more meaningful results than static testing.

Application Areas:

- Dynamic compression tests on shock absorbing materials, foam inlay soles, heels made of elastomer compounds, toe caps, heel counters
- Dynamic bending tests on shank parts, steel shanks, heels, heel attachments
- Dynamic tensile tests on seams, textile upper materials (seam slippage), elastics, shoe fastenings

Technical Data

- Force measurement by means of exchangeable strain gauge sensors; Fmax = 2000 N (alternatively 200/1000 N)
- Inductive displacement measurement
- Computer-based data interpretation and system control (WIN 95/98, Pentium II)
- Testing frequency: 0.3 to 4 Hz
- Supply voltage: 230 V 50-60 Hz
- Supply frequency: - Power consumption: approx. 200 W
- Compressed air supply: 5 bar, approx. 15 L/min

Reference N° **3063**, Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

KPM, 3083 Flex Cracking Test Machine



Flex Cracking Test Machine

For testing synthetic leather according to DIN 53359.

This machine is designed to assess resistance to creasing and cracking of all thin sheet materials.

It is primarily used for testing synthetic leather according to DIN 53359 standards. The machine allows for simultaneous testing of a maximum number of 9 samples. Both ends of the samples are clamped tight. During testing, the clamps move towards each other and back, simulating real wear conditions. The number of cycles can be preset.

Technical Data

Footprint: 400 x 400 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° **KPM, 3083**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

KPM-G, 3123

PFI - Flex Cracking Test Machine for Rubber Boots



Flex Cracking Test Machine for Rubber Boots

The **Flex Cracking Test Machine for Rubber Boots KPM-G** serves for measuring the flex resistance according to **ISO 2023**.

The controlling parts of the **Flex Cracking Test Machine KPM-G** are located in a separate case. It is primarily used for testing synthetic leather according to DIN 53359 standards. The machine allows for simultaneous testing of a maximum number of 6 samples. Both ends of the samples are clamped tight. During testing, the clamps move towards each other and back, simulating real wear conditions. The number of cycles can be preset.

Technical Data

Footprint machine: ca. 580 × 350 mm

Footprint Control unit: ca. 220 × 350 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Bestell-Nr.: **KPM-G, 3123**, Tel.: 06331/2490505, E-Mail: peter.schultheis@pfi-germany.de

DSPM, 3035

Shock Absorption Testing Machine



Shock Absorption Testing Machine

PC-controlled measuring device for dynamic tensile and shock absorption testing of shoe materials and components on the basis of ASTM 1976 F.

Application areas

- Dynamic shock absorption testing of heel cushioning materials and guards supplied with a control software being able to plot force/time, displacement/time and force/displacement diagrams
- Dynamic compression tests on shock absorbing materials, foam inlay soles, elastomeric heels
- Dynamic bending tests on shank parts, steel shanks, heel attachments, heels
- Dynamic tensile tests on seams, textile upper materials (seam slippage), elastics and shoe fastenings

Technical Data

Footprint: approx. 600 × 600 mm

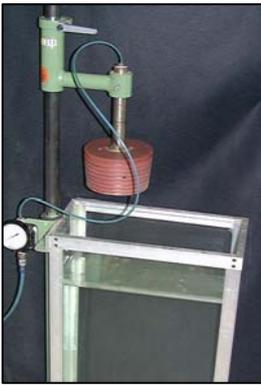
Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° **DSPM, 3035**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

DG, 3002 Impermeability Tester



Impermeability Tester

For impermeability testing of safety shoes (rubber boots made of PU, PVC) according to DIN EN ISO 20344.

The sample is sealed (except for a small tube for feeding in compressed air) and plunged into a water tank. Then the sample is exposed to constant inner pressure for a duration of 30 s. The test engineer will check for air bubbles indicating a leak.

Reference N° **DG, 3002**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

DOM, 3073 Domplastometer



Domplastometer

The dome plastimeter is used to assess permanent elongation of upper materials conforming to IUP 21.

It measures the shape retention/setting properties of upper materials after a simulated lasting/heat setting process. For this test, a predefined strain is applied to the sample, and then – still under strain – the sample is passed under a radiant heater. The test conditions can be modified in order to simulate manufacturing conditions as closely as possible. After cooling down, the strain is released and the area increase (permanent elongation) is determined. Thanks to its small size, the dome plastimeter can also be passed through a heat setting machine in order to assess its efficiency.

Reference N° **DOM, 3073**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

MS-M, 3071

Device for Measuring Ball Diameter



Device for Measuring Ball Diameter

For diameter determination of footballs according to International Matchball Standards. The diameter is measured at predefined points by means of a depth gauge. The result is the arithmetical average of all measurements. The digital measuring gauge gives results with a precision of 0.01 mm. The measuring device is equipped with a fine-reading manometer.

Technical Data

Footprint: approx. 400 × 300 mm

Reference N° **MS-M, 3071**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

FH, 3057 Fallhammer



Fall Hammer

For impact testing of steel toe caps according to DIN EN 12568 standards.

Automatic control of the test cycle, two preset fall heights (1000 or 500 mm).

Accessories (available as optional extras)

- Plasticine press (KP3057/4) for preforming of plasticine cylinders
- Thickness gauge for measuring deformation of the plasticine cylinder

Technical Data

Footprint: approx. 1000 × 800 mm; weight: approx. 200 kg

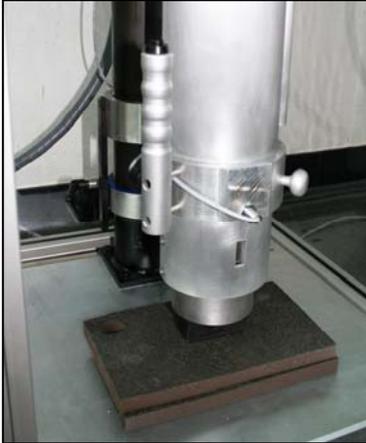
Supply voltage: 230 V ; Supply frequency: 50 Hz

Baseplate: Must endure loads conforming to EN 344 standard

Reference N° **FH, 3057**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

TI, 3128 Tube Impactor



Tube Impactor

The fall hammer „Tube Impactor“ is an equipment intended for testing of various test specimen, e.g. protectors, by means of a free falling mass dropping onto the test specimen. The weight of the fall test can be changed and the falling height is infinitely adjustable.

The falling masses weight might be up to 5 kilograms and the maximum falling height is approximately 2.1metres. Forces during the impact and impact velocity can be recorded.

The machine consists of a ground plate, a fall pipe which is mechanically coupled to the ground plate and a fall mechanism with a drag rope for positioning the fall mass to the determined height. The falling mass can be positioned and released automatically.

Technical Data

Footprint: approx. 1000 × 800 mm; weight: approx. 200 kg

Supply voltage: 230 V ; Supply frequency: 50 Hz

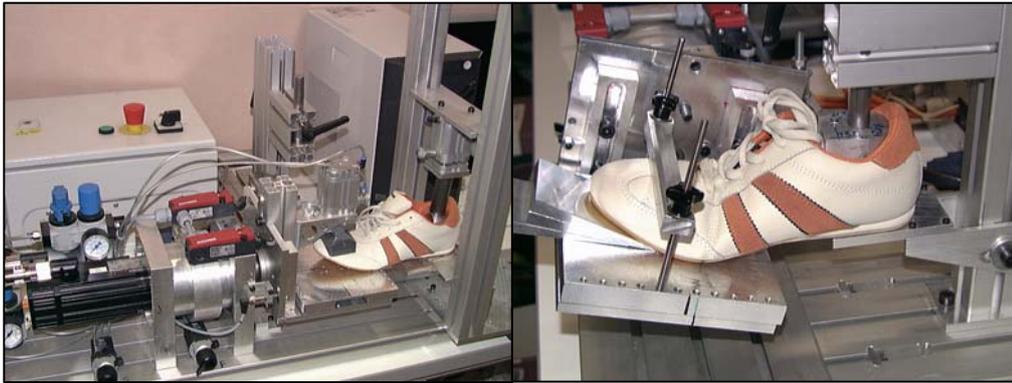
Baseplate: Must endure loads conforming to EN 344 standard

Reference N° TI, **3128**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

DFM, 3125

Dynamic and static Flexibility Measurement - device



Machine for measurement of Dynamical and static Flexibility

This PC controlled device is used to determine the flexibility behaviour of shoes.

A shoe is placed into the device and clamped with the aid of a heel and toe –piece. The shoe will be twisted back and forth longitudinally or along the shoes bending axis under controlled of special PC software. During the bending cycles forces and angles are constantly recorded and transformed into stiffness values.

Major values are constantly displayed on the computer screen and in curves. Velocity, number of bending cycles and force or angle limits, when the twisting direction will be changed, can freely be varied in the software. According to user settings either all recorded values or just results are stored in files that can be read by spreadsheet programs.

PC and software are included in scope of delivery.

Technical Data

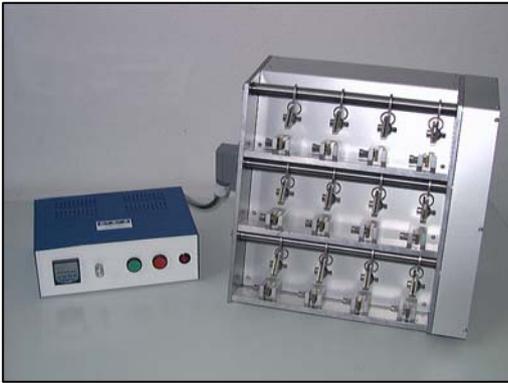
Area: approximately 800 × 1200 mm

Power Supply: 230V AC /50-60Hz

Compressed air: 4-6bar

Order-Nr. **DFM, 3125**, Tel.: 06331/2490505, Email: peter.schultheis@pfi-germany.de

FM, 3006 Flexometer



Flexometer

For repeated flex testing of leather and patent leather according to DIN EN ISO 5204, for testing of synthetics according to DIN 53351 and of textiles following DIN 53351.

Allows assessment of the materials' properties in terms of cracking and breaking as a result of repeated flexing stress. Simultaneous testing of up to 12 samples. The control unit is fitted with a counter and a frequency converter for continuously variable speed control. Also suitable for carrying out testing in a freezer cabinet down to -25°C.

Accessories (available as optional extras)

- Punching Knife 3027/12 for sample cutting (to be ordered separately).

Technical Data

Footprint: 500 × 300 mm

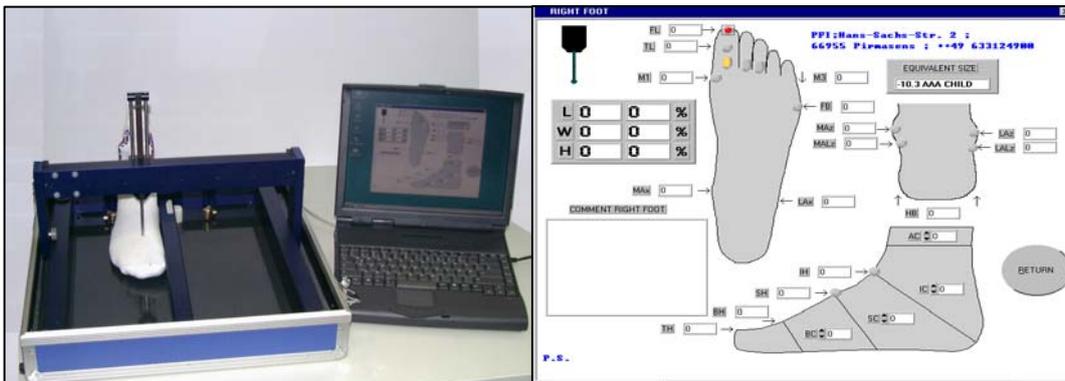
Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° **FM, 3006**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

EFMG 3D, 3052 3D Foot Measuring Device



3D Foot Measuring Device

The PFI 3D foot measuring device has been designed for 3D digitisation of predefined measuring points.

The procedure is very straight-forward:

1. The test person steps on the device (both feet).
2. The first measurement taken is the heel seat width of each foot.
3. With a calliper, the operator scans each reading point, following a pattern which is displayed on the screen. By mouse-click, the x-, y-, and z-coordinates of each point are read in.
4. Additional data such as name, age, weight can also be fed in.

The measuring device comes in a mobile case which can accommodate a laptop (not provided).

All x- and y-coordinates are displayed as absolute values in mm and also as a percentage relative to the overall foot length and width. Position and number of the reading points can be modified according to customer specifications. All read-in 3D data are saved in a folder and are ready for further processing in this format, e.g. for entry in a database.

Reference N° **EFMG 3D, 3052**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

FMG, 3051/1/5 Foot Measuring Device



Foot Measuring Device

The PFI foot measuring device is easy to use and very accurate for determining both foot length and width.

Measurement is as simple as pressing the start button. Callipers scan both feet and read in the data. A microcomputer then converts the measurements and displays the corresponding shoe size in the selected sizing system (Mondopoint, Stanag, Paris stitch, English sizes, millimetres). This PFI device was originally designed for measuring children's feet. In its modified version it is also in use for measuring adults' feet.

Technical Data

Maximum foot length: 315 mm, maximum width: 120 mm

Footprint: approx. 450 x 600 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Power consumption: 15 W

Reference N° **FMG, 3051/1/5**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

FMG/M, 3051/10

Foot Measurement Device Magnet



Foot Measurement Device Magnet

This device electronically measures length and width of right and left foot and displays the values on the screen of a PC Monitor.

The device is connected to the PC via serial cable which is included in the scope of delivery.

Size systems displayed are WMS, Mondopoint, Stanag, French size, UK size and millimetres.

In two illuminated display windows custom specific logos can be displayed.

A robust aluminium case is available also.

Technical Data

Area: ca. 200 x 600 mm

In almost all colours available

Reference N° **3051/10**, Phone: 0049 (0) 63 31 24 90 505, E-Mail: peter.schultheis@pfi-germany.de

FMG/M, 3051/12

Operator console with touch panel and PC



The control console includes a fully operational pc with an integrated touch-screen. The device can optionally include a printer which allows an individual output of the measured sizes. In this Console you can place the Foot Measurement Device Magnet [3051/10](#) (not included).

The Operator console you can order in the same colour as the Foot Measurement Device Magnet 3051/10.

Technical Data

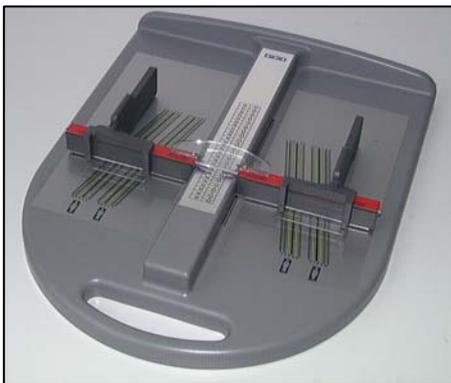
Area: ap. 480 × 700 mm

Height: ap. 1200 mm

Power supply: 230V / 50Hz

Bestell-Nr. [FMG/M, 3051/12](#) Tel.: 06331/2490505, E-Mail: peter.schultheis@pfi-germany.de

MFMG, 3048/1 Mechanical Foot Measuring Device



Mechanical Foot Measuring Device

for manually feet measuring.

For measuring of foot lengths of 133 to 300 mm. The maximum width is to 120 mm.
The size can be read in franz. Stich and engl. size .

Technical Data

Footprint: approx. 400 x 500 mm

Reference N° **MFMG, 3048/1**,

Phone: 0049 (0) 63 31 24 90 505, E-Mail: peter.schultheis@pfi-germany.de

GS-2, 3060/1 Walking Simulator Impermeability Tester



Walking Simulator Impermeability Tester

This two-station walking simulator (GS-2 3060/1) has been designed to assess water impermeability of completed footwear.

The shoes are flexed in a water tank. The carrier is inserted in the shoe in such a way that only the forepart can be flexed in the joint area (flexing angle: 30°; flexing frequency: 35 +/- 2 flexes per minute). During flexing, water penetration can be detected either by means of an endoscope or by measuring the electric resistance (resistance meter to be ordered separately). Appropriate carriers are required for operating this machine (see accessories).

Accessories

- Clamping device with self-resetting joint – large (3060/3)
- Clamping device with self-resetting joint – small (3060/5)
- Heel support (3060/4)

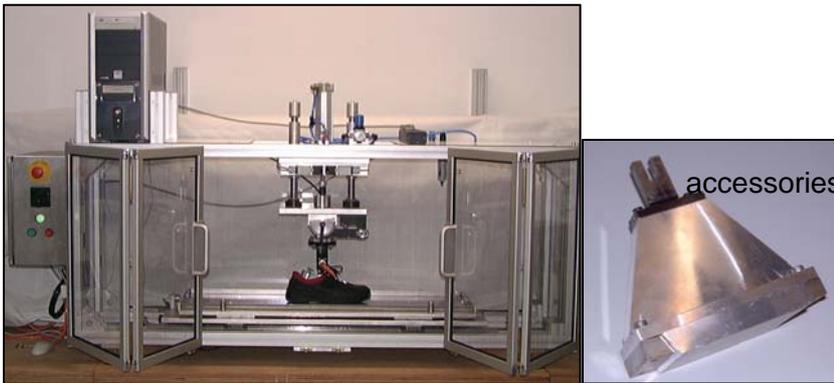
Technical Data

Footprint: approx. 500 x 700 mm
Electric supply: 230 V/50Hz

Reference N° **GS-2, 3060-1**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

GSP, 3034 Slip Resistance Testing Machine



Slip Resistance Testing Machine

For measuring the frictional force and the dynamic friction coefficient of completed footwear conforming to EN 13287.

The sample is placed on the bottom surface and a vertical force is applied. Then the shoe is moved in a horizontal direction. The machine is entirely PC-controlled (PC included).

Accessories

- Test resources holder complete with strap plate 3034/5
- Strap plate 3034/6

Technical Data

Footprint: approx. 2000 x 600 mm

Supply voltage: 230 V

Supply frequency: 50 Hz, approx. 1000 W

Compressed air supply: 6 bar

Reference N° **GSP, 3034**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

HPM, 3084 Hand Lastometer



Hand Lastometer

For grain crack testing of leather according to DIN 53325, IUP 9.

The device determines the elongation of leather. With this manually operated device, a ball is pushed into the sample. Elongation is continued until the grain cracks. For heat resistance testing of patent leather, the sample is stretched first, then heated and examined for coating cracks. Elongation at break can be read off a scale.

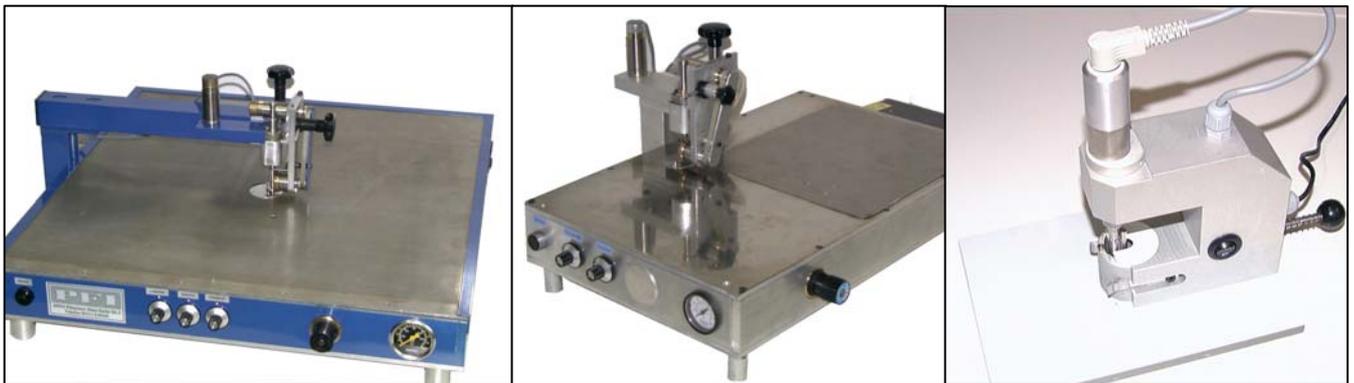
Accessories (available as optional extras)

- Punching Knife 3027/14 for sample cutting.

Reference N° **HPM, 3084**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

KFM 3089/01/02/05 Edge Dyeing Machine



Edge Dyeing Machine

For fast application of all commercially available edge inks on leather cuttings in all imaginable shapes (inner edges included).

Technical Data

Footprint KFM01, 3089/1: 650 × 650 mm

Footprint KFM02, 3089/2: 650 × 350 mm

Footprint KFM03, 3089/5: 250 × 200 mm

Supply voltage: 230 V; supply frequency: 50 Hz; Power consumption: approx. 200 W

Compressed air supply: 5 bar, approx. 150 L/min

Reference N° **KFM01, 3089/1**; **KFM02, 3089/2**; **KFM03, 3089/5**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

KVP, 3099 Velcro Fastening Tester



Velcro Fastening Tester

For testing Velcro fastenings according to DIN EN 1414.

Continuous opening and closing of Velcro fastenings simulates wear conditions. After a defined number of cycles, other physical tests assess the remaining mechanical resistance.

Technical Data

Footprint: 500 x 700 mm

Supply voltage: 230 V

Supply frequency: 50 Hz, 1.5 A, 300

Reference N° **KVT, 3099**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

KGP, 3047

Suitcase Handle Test & Fall machine



Suitcase Handle Test & Fall machine

With this machine dynamic durability tests of handle and telescope handle of suitcases can be performed as well as fall tests of 1m height. The hitting corner of suitcase can be set.

Technical Data

Footprint: approx. 1200 x 1200 mm height 2900mm

Supply voltage: 230 V

Supply frequency: 50 - 60 Hz

Reference N° **KGP, 3047**, Phone: 0049 (0) 63 31 24 90 505, E-Mail: peter.schultheis@pfi-germany.de

KRP, 3046 Suitcase roller testing machine



Suitcase roller testing machine

With this machine the durability of suitcase wheels/rollers or Trolli are checked. The speed can be adjusted individually. The flooring elements can be exchanged.

Technical Data

Footprint: approx. 1200 × 1200 mm

Supply voltage: 230 V

Supply frequency: 50 - 60 Hz

Reference N° **KRP, 3046**, Phone: 0049 (0) 63 31 24 90 505, E-Mail: peter.schultheis@pfi-germany.de

KOW, 3003

Contact Heat



Contact Heat

For testing resistance of shoe components to contact heat according to EN ISO 20344.

The sample is placed on a tray and covered with foil. The testing head is heated up to a defined temperature and is placed onto the sample for a defined time. Afterwards the degree of damage is assessed. (e.g. melting, burning, breaking, cracking).

Technical Data

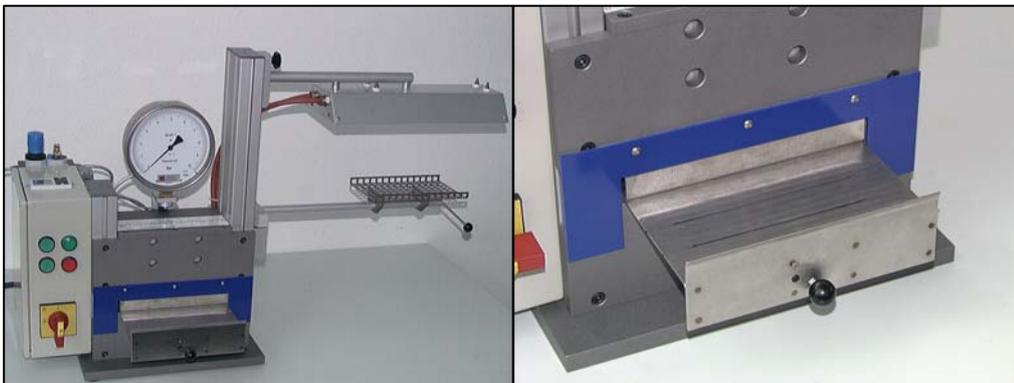
Footprint: 200 × 350 mm
Supply voltage: 230 V
Supply frequency: 50 - 60 Hz

Reference N° **KOW, 3003**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

LPA, 3100/1

Laboratory Scale Activating Press



Laboratory Scale Activating Press

This pneumatic desktop device allows activation and pressing of parts which are to be cemented together.

The size of the slideable pressing area is 80 × 160 mm. Four predefined activation times are available. Pressing and activation times are continuously adjustable.

Technical Data

Compressed air supply: 6 bar

Supply voltage: 230 V

Supply frequency: 50 Hz

Power consumption: approx. 3100 W

Reference N° **LPA, 3100/1**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

LST-5, 3075 Laboratory-Scale Cutting Press



Laboratory-Scale Cutting Press

This pneumatic cutting press is a desktop device for sample cutting under laboratory conditions.

Technical Data

Cutting force: 50 kN

Cutting area: 300 x 300 mm

Sliding table with twin-hand-safety switch

Dimensions: 560 x 350 x 490 mm

Weight: 110 kg

Compressed air supply: 6 bar, approx. 15 L/min

Reference N° **LST-5, 3075**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

LLT, 3007 Patent Leather Tester



Patent Leather Tester

Designed to assess the heat resistance of patent leather according to DIN 13540 standard.

The sample is first perforated (according to a predefined pattern) and then clamped tight. The machine will pneumatically push a ball (diameter 21 mm) 7.7 mm deep into the sample (equal to 20% linear elongation). Subsequently, the sample is exposed to heat (3 min at 100°C) and then examined for coating cracks.

Accessories (available as optional extras)

- Punching Knife 3027/14 for sample cutting

Technical Data

Bench space: 850 × 440 × 500 mm

Supply voltage: 230 V, supply frequency: 50 Hz

Power consumption: approx. 2000 W

Reference N° **LLT, 3007**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

LP, 3092 Latex Spray Pistol



Latex Spray Pistol

Handy spray gun for the application of latex and many other water-based adhesives, coatings and finishes.

Reference N° **LP, 3092**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

LMG, 3091 Last Marking Device



Last Marking Device

For easy marking of the joint measuring points and other predefined measuring points on the last.

Last-specific measurements such as joint measuring points, centre line, instep point, overall last length, heel curve etc. can be easily determined.

Reference N° **LMG, 3091**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

MAR, 3016/2 Martindale



Martindale

For assessing rub fastness of textiles in conformity with DIN EN ISO 12947-1.

The round sample is rubbed against a standard cloth under a defined load following a predefined pattern (Lissajous curve). The rub fastness is then determined against the time interval when the textile sample is destroyed. Each workstation of this ten-station machine can be individually set up for testing. Operation by touch screen.

Technical Data

Footprint: 1000 x 800 mm
Supply voltage: 230 V
Supply frequency: 50 Hz
Power consumption: approx. 800 W
Compressed air supply: 6 bar

Reference N° **MAR, 3016/2**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

WNP, 3114 Grain Crack Tester



Grain Crack Tester

Allows assessment of resistance to grain cracking according to EN ISO 3378.

With this manually operated device leather resistance to grain cracking can be tested.

Technical Data

Footprint: approx. 300 x 300 mm

Reference N° **WNP, 3114**, Tel.: 06331/2490505, E-Mail: peter.schultheis@pfi-germany.de

NLP V.2, 3122/10

Nickel release Testing machine two-digit



Nickel release testing machine two-digit

Method for the simulation of wear and corrosion for the detection of nickel release from coated items
DIN EN 12472:2005. The machine is expandable except for 3 times 2 places

Accessories (available as optional extras)

- abrasive granules and abrasive paste

Technical Data

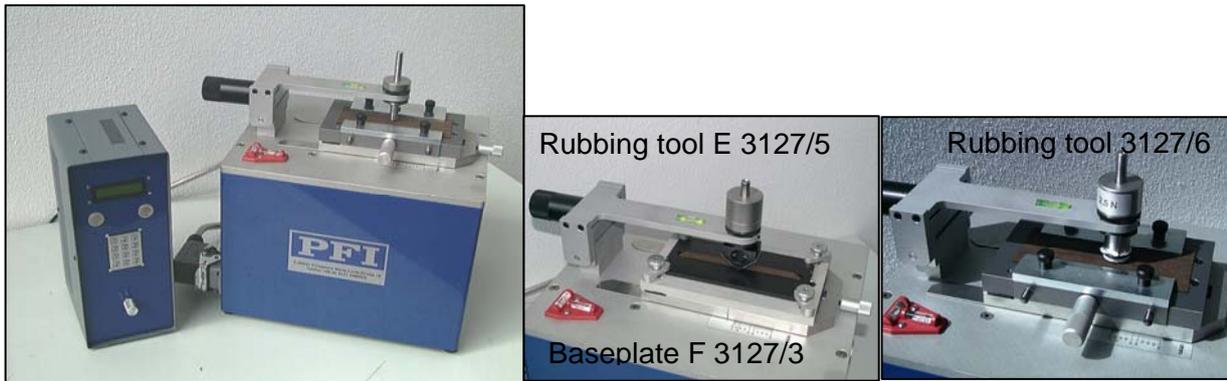
Footprint: 510 x 460 mm

Supply voltage: 230 V

Supply frequency: 50 - 60 Hz

Bestell-Nr. **NLP V.2, 3122/10** Tel.: 06331/2490505, E-Mail: peter.schultheis@pfi-germany.de

GM, 3127 Abrasion Tester



Abrasion Tester

Device for determination of the durability (abrasion resistance) of surface materials according **GMW 14125** . A wide variety of tests can be performed by user. Exchangeable clamping plates and rubbing tools. Test speed, strokelength and number of strokes can be set by the user. In standard configuration tools 3127/1, 3127/3, 3127/5 and weights X0-X9 belong to scope of delivering. Different clamping plates and rubbing tools are available.

Accessories (available as optional extras)

- Sandpaper silicon carbide K 220 (Supplier: Carborundum)

Technical Data

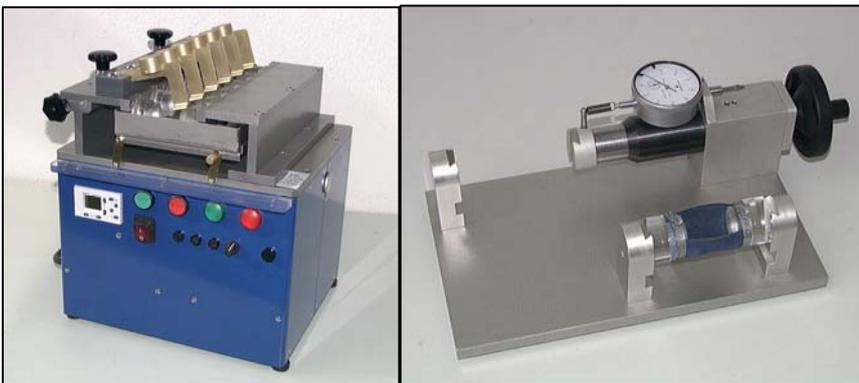
Footprint: 350 × 350 mm
Supply voltage: 230 V,
Supply frequency: 50 Hz
Power consumption: approx. 300 W

Reference N° **OST, 3127**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

PEN, 3023

Penetrometer



Penetrometer

Determines water penetration of flexible leathers under dynamic load conforming to DIN EN ISO 5403, EN ISO 20344.

The sample is compressed while partly immersed in water. During testing, the time that elapses until the water penetrates the sample is measured. The procedure also permits determination of the mass percentage of absorbed water as well as the exact amount of water which has penetrated the sample. (replaces DIN 53338). Supplied with an auxiliary device for determining the test amplitude.

Accessories (available as optional extras)

- Punching Knife 3027/15 for sample cutting
- Copper wool (skein)
- Cotton material for tamponing
- 1000-gram-weight (for certain tests)
- Sandpaper P180
- Rough device

Technical Data

Footprint: approx. 350 × 350 mm
Supply voltage: 400 V (three-phase AC)
Supply frequency: 50 Hz
Power consumption: approx. 300 W

Reference N° **PEN, 3023**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

PMM, 3024 Permeometer



Permeometer

The permeometer assesses the impermeability of leather outsoles, midsoles and insoles according to DIN EN ISO 5404, EN ISO 20344.

One side of the sample sole is constantly in contact with water and at the same time flexed and compressed (simulating the gait movement). This way, various time-related aspects of impermeability can be assessed. (replaces DIN 53338).

Technical Data

Footprint: 800 × 300 × 500 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° **PMM, 3024**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

MS-R, 3070 Rebound Tester



Rebound Tester

For determining rebound height of footballs according to International Matchball Standards.

According to International Matchball Standards, a football (size 5) has to rebound at least 1.10 m after a free fall from 2 m. Correspondingly, a ball of size 4 should rebound at least 1 m after a free fall from 2 m. The test machine simulates a free fall after which the ball hits a flat steel surface. The rebound height is determined by means of a video camera.

Reference N° **MS-R, 3070**,

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

PDE, 3000 Steel inlays detector



Steel inlays detector

This testing device indicates whether a safety shoe has been fitted with a nail-penetration-safe bottom (in conformity with EN ISO 20344-347).

The device works in the manner of a metal detector. It can also be used to verify whether a shoe has steel joints.

Reference N° **PDE, 3000**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

RET, 3059/2 Rub Fastness Tester



Rub Fastness Tester

Allows assessment of the colour and finish fastness of leather to rubbing on the surface according to DIN EN ISO 11640, of textiles according to DIN EN ISO 105-X12, and of synthetics according to DIN EN ISO 105-X12.

Especially important for testing the rub fastness of footwear lining materials and back side of upper leathers in unlined shoes. Available with one or two workstations.

Accessories (available as optional extras)

- Punching Knife 3027/22 for sample cutting
- Cotton cloth according to DIN EN ISO/DIS 105-F09
- Testfelt Empa colour white a. black

Technical Data

Footprint: 600 × 400 mm

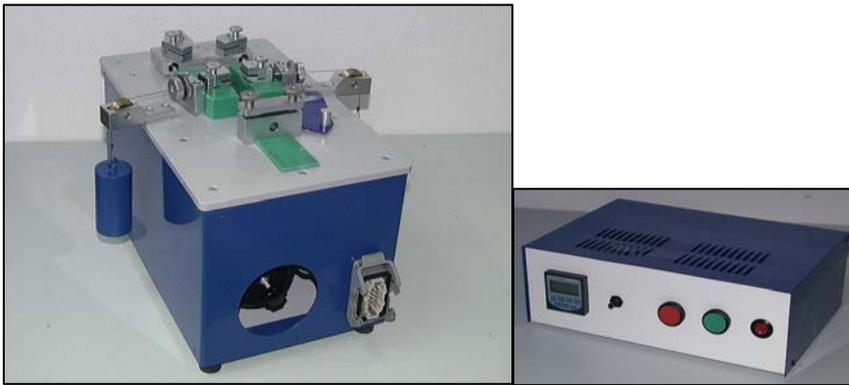
Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° **RET 3059/2**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

RVT, 3030 Zipper Tester



Zipper Tester

Designed to assess durability of zip fasteners according to DIN 3490.

The zipper chain is opened and closed under transversal and longitudinal strain. Afterwards, the loss of mechanical strength is assessed by examining the cross-lateral strength. The machine is suitable for testing all commercially available zip fasteners. The machine comes with 18 weights to carry out different tests.

Technical Data

Footprint: 600 x 500 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° **RVT, 3030**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

SB, 3004 Sand Bath



Sand Bath

Allows assessment of thermal insulation properties of footwear conforming to EN ISO 20344 (pr. EN 15090).

For this test, heat sensors are attached on the sample shoe, which is then filled up with stainless steel balls. The sand bath is heated and the sample is put in place. During this test, the temperature increase over time is measured. After the test, the sample is inspected for possible damage.

Accessories

- 5 kg of glass sand

Accessories (available as optional extras)

- 4 kg of stainless steel balls (Ø 5 mm)

Technical Data

Footprint: approx. 630 x 400 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° **SB, 3004**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

SF, 3072 PFI Sand Abrasion Tester



PFI Sand Abrasion Tester

This machine is used to carry out wear tests of coated surfaces conforming to PFI standards.

It is designed to determine the abrasion of a coated surface or finish after it has been impacted by 5, 10 or 15 kg of free-falling sand with a falling height of 80 cm.

Technical Data

Footprint: approx. 500 × 500 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° **SF, 3072**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

SE, 3065/1/2 Ramp Tester



Ramp Tester

For assessing slip resistance of footwear and flooring materials conforming to DIN 4838 T 100, DIN 51097, DIN 51098 and DIN 51130.

For prototype testing of safety, protective and occupational footwear, determination of anti-slip properties (DIN 4843-100) is mandatory. A test person wearing the prototypes walks on a ramp of adjustable inclination, which can be fitted with different floor coverings. To prevent injuries, the test person wears safety belts.

Technical Data

Footprint: approx. 1500 x 2500 mm
Supply voltage : 400 V (three-phase AC)
Supply frequency: 50 Hz

Reference N° **SE, 3065/1/2**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

SEK, 3065/3 Ramp Tester small



Ramp Tester small

For assessing slip resistance of footwear and flooring materials conforming to DIN 4838 T 100, DIN 51097, DIN 51098 and DIN 51130.

For prototype testing of safety, protective and occupational footwear, determination of antislip properties (DIN 4843-100) is mandatory. A test person wearing the prototypes walks on a ramp of adjustable inclination, which can be fitted with different floor coverings. To prevent injuries, the test person wears safety belts.

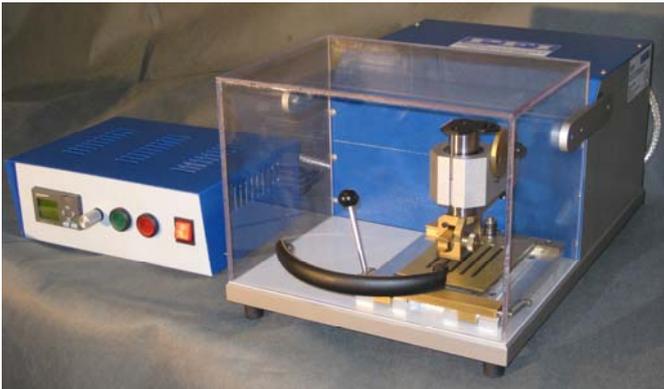
Technical Data

Footprint: approx. 3000 x 1200 mm, Height approx. 3300 mm

- Supply Voltage: 230 V/50 Hz
- Size of the test surface: 50 x 1500 mm

Reference N° **SEK, 3065/3** Phone: 0049 (0) 63 31 2490505
E-Mail: peter.schultheis@pfi-germany.de

SFH, 3136 Blade cut resistance tester



Blade cut resistance tester

The PFI-blade cut resistance tester serves the determination of cut resistance of protective gloves according to DIN EN 388:2003.

Test samples are cut by rotating circular blade which moves linearly with an applied fixed load of $5 \pm 0,05$ N. The blade moves back and forth on the test sample and rotates in the opposite direction with a rotational frequency of max. 10 cm/s.

Accessories:

Spare Blades [3136/1](#)

Punching Knife for test samples [3027/53](#)

Technical Data

Footprint: approx. ca. 500 mm x 320 mm

Supply voltage: 230 V

Supply frequency: 50 Hz

Reference N° [SFH, 3136](#) Phone: 0049 (0) 63 31 2490505

E-Mail: peter.schultheis@pfi-germany.de

SPM, 3058 Lace Abrasion Tester



Lace Abrasion Tester

For determining abrasion resistance of shoe laces and yarn threads conforming to DIN EN ISO 18691 (draft).

Two shoe laces per test station are required. Both ends of one lace are clamped in the carrier provided to form a loop. The other lace is threaded through this loop. Again, one end of the second lace is clamped tight, while a movable weight of 250 g is attached to its other end. With the weight moving, the two laces abrade each other. After 15,000 cycles, the samples are assessed visually. The device is equipped with a counter to preset the number of cycles.

Technical Data

Footprint: approx. 350 × 350 mm

Supply voltage: 230 V

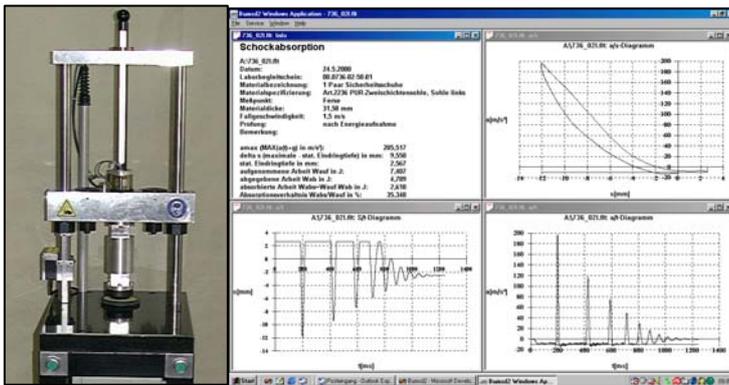
Supply frequency: 50 Hz

Power consumption: approx. 200 W

Reference N° **SPM, 3058**,

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

SAPE, 3098 Shock Absorption Tester



Shock Absorption Tester for Cushioning Materials

PC-controlled testing machine for assessment of shock absorption properties of heel cushioning materials and protectors following ASTM 1976 F.

Supplied with control software; output of force/time, displacement/time and force/displacement diagrams.

Technical Data

Footprint: 500 × 500 mm

Supply voltage: 230 V

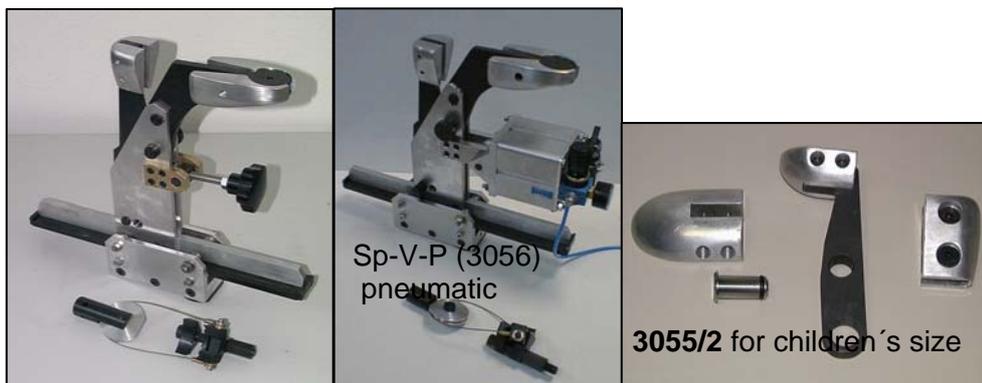
Supply frequency: 50 Hz

Reference N° **SAPE, 3098**

Phone: 0049 (0) 63 31 2490505

E-Mail: peter.schultheis@pfi-germany.de

Sp-V-H, 3055/1/2 Sp-V-P, 3056 Clamping Device for Sole Adhesion Testing



Clamping Device for Sole Adhesion Testing

Peel strength testing of bottom constructions of completed footwear represents a simple and meaningful tool in quality control. Secure clamping-in of the shoe in the tension testing machine is the key to obtaining valid results: The PFI has developed an extremely reliable clamping-in mechanism which has been proven over many years. The sliding carriage with ball bearings ensures a constant peeling angle over the entire tension length and therefore guarantees reproducible results.

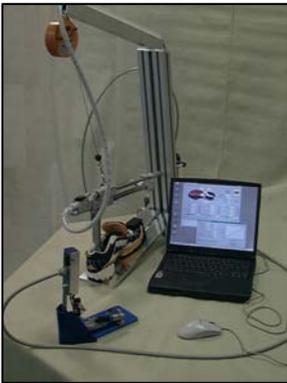
Clamping-in of the shoe is effected either manually by means of a screw-type clamp (Sp-V-H), or pneumatically (Sp-V-P).

Clamp adjustable for shoe sizes 38 to 48 (Paris stitch). Different clamps for sizes 30 to 37 (Paris stitch). The clamp, reliably holds even shell-shaped or dished soles at the toe.

Reference N° **Sp-V-H 3055/1 und 3055/2, Sp-V-P, 3056**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

ESMG, 3019 Electronic In-Shoe Measuring Device



Electronic In-Shoe Measuring Device

This semi-automatic measuring device provides a means of taking in-shoe measurements such as insole length and shoe width.

Specifically engineered software displays the data on your PC or notebook screen (computer not included).

Technical Data

Measuring range insole length: 190 – 390 mm

Measuring range shoe width: 188 – 273 mm (joint girth)

Supply voltage: 230 V

Supply frequency: 50 Hz

Compressed air supply: 6 bar

Reference N° **ESMG, 3019**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

SWM, 3079/1/2

In-Shoe Width Measuring Device



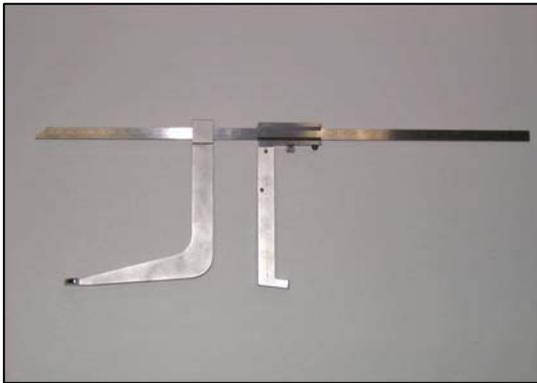
In-Shoe Width Measuring Device

This hand-held device determines joint width and joint girth of completed footwear (right shoe).

Reference N° **SWM 3079/1 = adults** **SWM 3079/2 = children**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

LM, 3079/1/2/3/4 In-Shoe Length Measuring Device



In-Shoe Length Measuring Device

This hand-held device determines the in-shoe length and hence the insole length of shoes with different heel and toe spring values.

Accessories

Conversion table for toe and heel spring values.

3074/1 Gr.31 – 50

3074/2 Gr.22 – 35

3074/3 Gr.17 - 30

3074/4 Boots

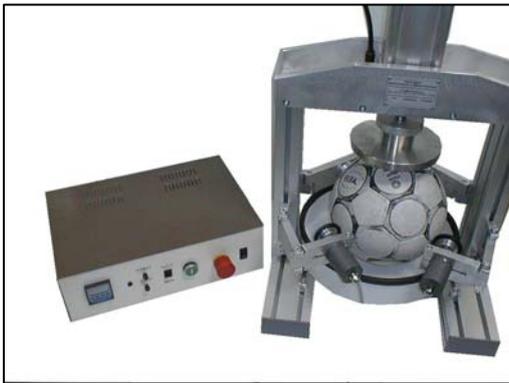
Reference N° **LM 3074/1/2/3**

Phone: 0049 (0) 63 31 2490505

E-Mail: peter.schultheis@pfi-germany.de

MS-W, 3069

Water Absorption of Footballs



Water Absorption of Footballs

For determining water absorption of footballs according to International Matchball Standards.

In conformity with International Matchball Standards, a football may absorb only a certain amount of water. In order to determine this amount, a football conditioned according to International Matchball Standards is weighed and then compressed in a water bath to a defined extent by a defined number of cycles. Compression is effected by an adjusting measure which can be calibrated by means of a supplied gauge. In-between two compression cycles, the ball is automatically turned so that its complete surface comes into contact with water during the test.

Technical Data

Footprint: approx. 500 × 500 mm

Supply voltage: 230 V

Supply frequency: 50 Hz, approx. 200 W

Compressed air supply: 6 bar, 100 L/min

Reference N° **MS-W, 3069**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

WDA, 3020

Water Vapour Absorption



Water Vapour Absorption

Container for measuring the absorption of water vapour by sheet materials (leather, compounds, textiles, synthetics) according to DIN EN ISO 17229, EN ISO 20344.

Reference N° **WDA, 3020**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

WDD, 3068

Water Vapour Permeability



Water Vapour Permeability

Testing device for determining water vapour permeability of leather (thickness < 3 mm), textiles, synthetics and membrane materials according to DIN EN ISO 14268 and EN ISO 20344.

When testing according to EN ISO 20344, the measure for water vapour permeability of a material is the weight increase of a desiccant, which absorbs the water vapour diffusing through the sample (two-times-six station device).

Accessories (available as optional extras)

- Punching Knife 3027/13 for sample cutting

Technical Data

Footprint: 900 × 400 mm

Supply voltage: 400 V (three-phase AC)

Supply frequency: 50 Hz

Reference N° **WDD, 3068**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

BUM, 3042/2/3

Joint Girth Gauge



Joint Girth Gauge for Lasts

This device determines the exact joint girth of shoe lasts.

3042/2

Measuring accuracy: ± 1 mm.

Measuring range from 80 to 230 mm.

Vernier calliper included.

3042/3

Measuring accuracy: ± 1 mm.

Measuring range from 150 to 300 mm.

Vernier calliper included.

Reference N° **BUM, 3042/3**

Phone: 0049 (0) 63 31 2490505 E-Mail: peter.schultheis@pfi-germany.de

GVS, 3042/4 Size Converter



Size Converter

Allows comparison and conversion of different sizing systems for shoe length determination.

Reference N° **GVS, 3042/4**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

BMB, 3042/5

Joint Girth Measuring Tape



Joint Girth Measuring Tape

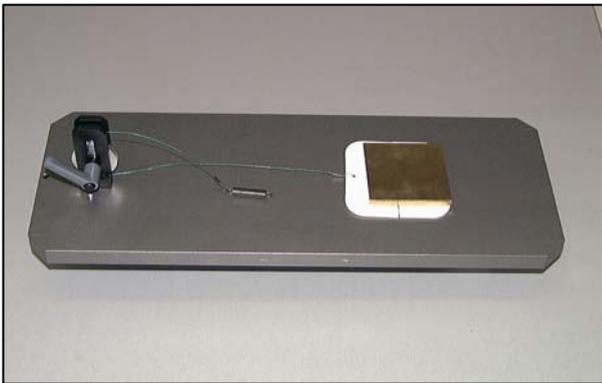
Determines joint girth of the foot.

Reference N° **BMB, 3042/5**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

RBV, 3037

Friction Coefficient of Plastic Foils



Friction Coefficient of Plastic Foils

This accessory device determines the friction coefficient of plastic foils according to DIN 53375.

For use in all tensile testing machines. Adaptation to location bolts according to customer specifications.

Reference N° **RBV, 3037**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

EA, 3067/1/7 Energy Absorption



Energy Absorption for Heels

Six heel thrust pads (3067/1) for determining energy absorption in the heel area conforming to EN ISO 20344, DIN EN 12743 standards.

Piston with ball levelling piece(3067/7) for energy absorption in the heel area according to.

For use in a tensile testing machine. Adaptation to location bolts according to customer specifications.

Reference N° **EA, 3067/1 or 3067/7** ,
Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

DT, 3067/12 Steel Pressure Plate



Pressure Plate

Universal pressure plate made of steel.

For use in a tensile testing machine. Adaptation to location bolts according to customer specifications.

Reference N° **DT, 3067/12**, Phone: 06331/2490505 E-Mail: peter.schultheis@pfi-germany.de

HZ, 3067/2

Holding Device for Toe Protection Cap



Holding Device for Toe Protection Caps

Holder for toe caps (3067/2) for compression testing according to DIN 12568.

Two pressure plates required. For use in a tensile testing machine.

Reference N° **HZ, 3067/2**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

MZ, 3067/3

Measuring Device for Toe Protection Caps



Measuring Device for Toe Protection Caps

Device for measuring inner length of toe caps according to EN 12568, EN ISO 20344.

Reference N° **MZ, 3067/3**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

NDST, 3067/4b

Nail Penetration Testing of Complete Shoes



Jig for Nail Penetration Testing of Complete Shoes

For assessment of nail penetration resistance of shoes conforming to EN ISO 20344 (with accessories: EN 388).

For use in a tensile testing machine. Adaptation to location bolts according to customer specifications.

Reference N° **NDST, 3067/4b**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

NDE, 3067/5

Nail Penetration Testing for Inlay Soles



Jig for Nail Penetration Testing of Inlay Soles

For assessment of nail penetration resistance of inlay soles conforming to EN 12568 standard.

For use in a tensile testing machine. Adaptation to location bolts according to customer specifications.

Reference N° **NDE, 3067/5**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

DSH, 3139

Nail Penetration Testing of Gloves



Nail Penetration Testing of Gloves

For assessment of nail penetration resistance of gloves conforming to DIN EN 388

For use in a tensile testing machine. Adaptation to location bolts according to customer specifications.

Reference N°**DSH, 3139**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

ESM, 3028 Electrical Cutting Tool



Electrical Cutting tool

Electrical Cutting tool for separating upper leather from the sole of a shoe

Technical Data

Supply voltage: 230 V

Supply frequency: 50 Hz, approx. 200 W

Reference N° **MS-W, 3069**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

STAF, 3067/6 Stitch Tear Resistance



Stitch Tear Resistance

Determines stitch tear resistance of leather, elastomers and rubber according to DIN 53331, DIN 53506, DIN 54301 standards.

For use in a tensile testing machine. Adaptation to location bolts according to customer specifications.

Reference N° **STAF, 3067/6**

Phone: 0049 (0) 63 31 2490505E-Mail: peter.schultheis@pfi-germany.de

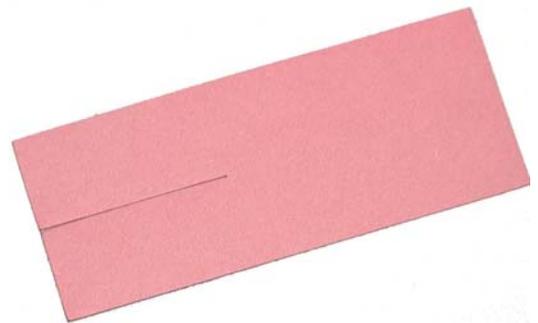
SM, 3027/1 bis 50 Punching Knives

Illustrations are not in scale

Punching Knife

Full built, height = 40 mm

Used for:
Tear strength testing of textiles
according to DIN EN ISO 13937-2.

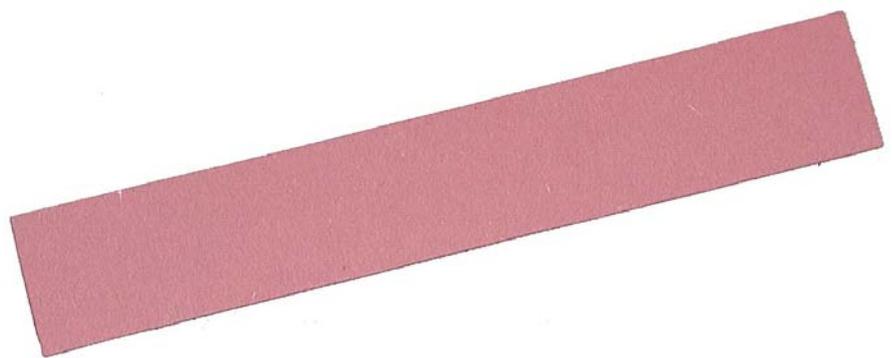


Reference N° 3027/1

Punching Knife

Full built, height = 40 mm

Used for:
Shrinkage testing
(hydrolysis testing)
according to EN 12772 and
EN ISO 20344.

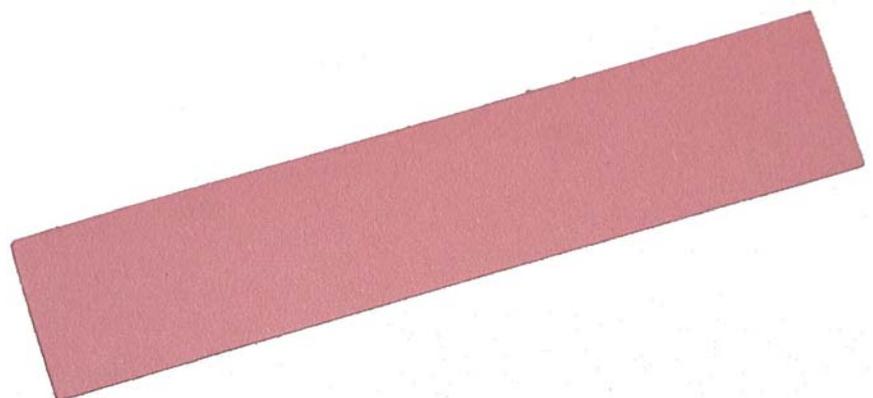


Reference N° 3027/3

Punching Knife

Full built, height = 40 mm

Used for:
Bond testing
according to EN 1392.



Reference N° 3027/4

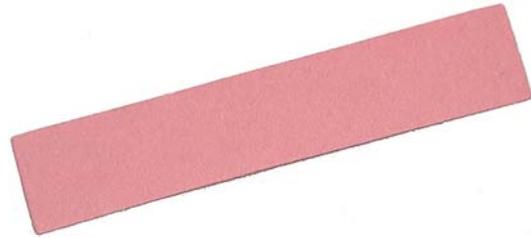
Punching Knife

Full built, height = 40 mm

Used for:

- Needle tear strength testing (small) according to DIN 53506, EN 12773 Rubber and elastomers.

Reference N° **3027/5**



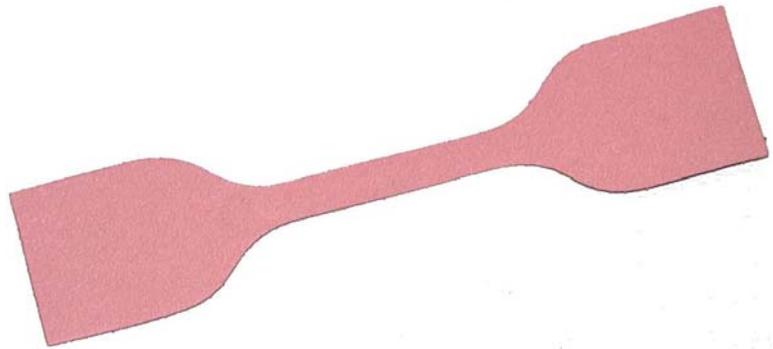
Punching Knife

Full built, height = 40 mm

Used for:

Tensile strength testing according to DIN 53504 norm scale S1) EN 12.

Reference N° **3027/6**



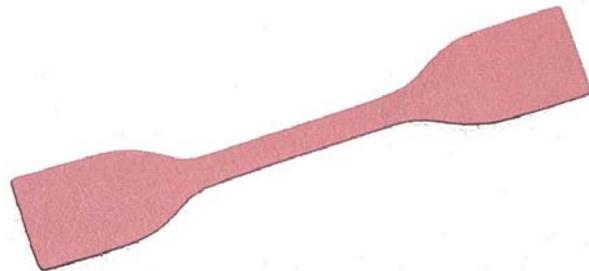
Punching Knife

Full built, height = 40 mm

Used for:

Tensile strength testing (small) according to DIN 53504 (norm scale S2) EN 12.

Reference N° **3027/7**



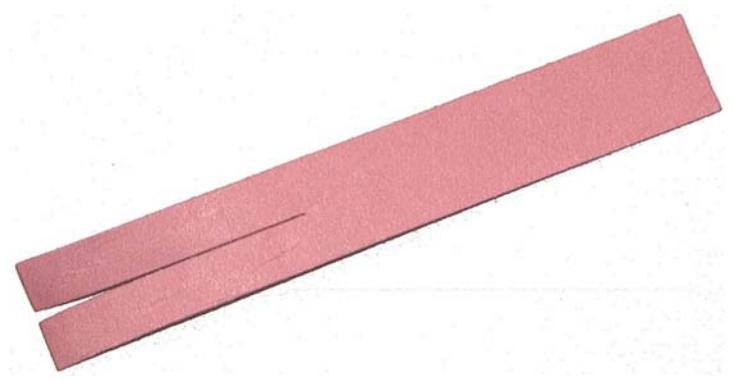
Punching Knife

Full built, height = 40 mm

Used for:

Tear strength testing according to EN ISO 20344 and EN 12771.

Reference N° **3027/9**



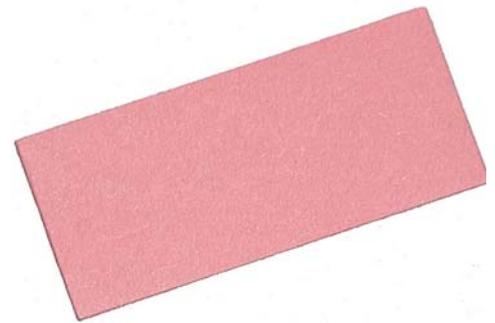
Punching Knife

Full built, height = 40 mm

Used for:

• PFI abrasion testing (special abrasion).

Reference N° **3027/10**



Punching Knife

Full built, height = 40 mm

Used for:

Rub fastness testing of finishes according to DIN EN ISO 11644.

Reference N° **3027/11**



Punching Knife

Full built, height = 40 mm

Used for:

- Flexometer testing of leather according to DIN EN ISO 4502
- Flexometer testing of synthetics according to DIN 53351



Reference N° **3027/12**

Punching Knife

Full built, height = 40 mm

Used for:

- Patent Leather Tester, Lastometer (PFI standard).



Reference N° **3027/14**

Punching Knife

Full built, height = 40 mm

Used for:

- Penetrometer testing according to DIN EN ISO 5403, EN ISO 20344



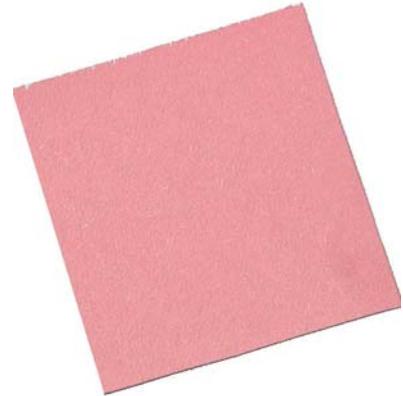
Reference N° **3027/15**

Punching Knife

Full built, height = 40 mm

Used for:
Shrinking test.

Reference N° **3027/17**



Punching Knife

Full built, height = 40 mm

Used for:
Martindale test small for textiles
according to DIN EN ISO 12947-1.

Reference N° **3027/18**



Punching Knife

Full built, height = 40 mm

Used for:
Martindale test big
for textiles
DIN EN ISO 12947-1.

Reference N° **3027/19**



Punching Knife

Full built, height = 40 mm

Used for:

- Tear strengt testing for leather. according to DIN EN ISO 3377-2.
- Tear strengt testing for syntetics DIN 53329.

Reference N° **3027/20**



Punching Knife

Full built, height = 40 mm

Used for:

Bending/Flex cracking according to ISO 2023.

Reference N° **3027/21**



Punching Knife

Full built, height = 40 mm

Used for:

Waterabsorbtion according to DIN EN ISO 20344 Permeometer.

- Rub fastness testing of leather according to DIN EN ISO 11640
- Rub fastness testing of textiles according to DIN EN ISO 105-X12
- Rub fastness testing of synthetics according to DIN EN ISO 105-X12.

Reference N° **3027/22**

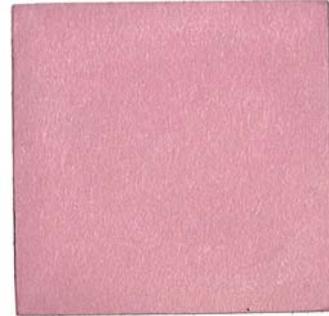


Punching Knife

Full built, height = 40 mm

Used for:
Water absorption
according to EN 344-1.

Reference N° **3027/23**



Punching Knife

Full built, height = 40 mm

Used for:
Water absorption
according to Freundlich PFI.

Reference N° **3027/24**



Punching Knife

Full built, height = 40 mm

Used for:
Seam strength static dynamic
according to EN ISO 13935.

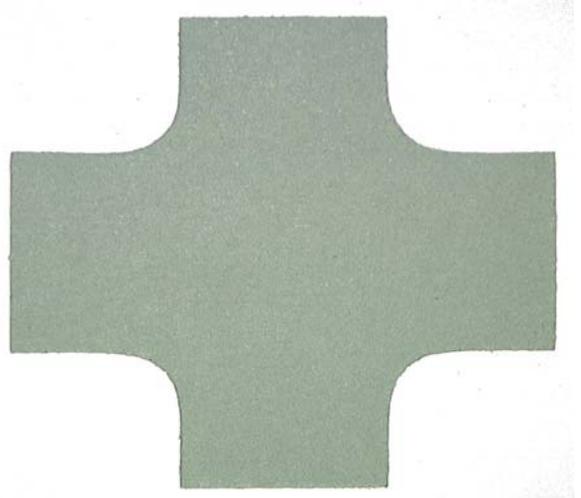
Reference N° **3027/25**



Punching Knife

Full built, height = 40 mm

Used for:
Seam strength
static dynamic
according to EN ISO 13935.



Reference N° [3027/26](#)

Punching Knife

Full built, height = 40 mm

Used for:
Tensile strength testing
according to DIN EN ISO 3376 und 20344.



Reference N° [3027/27](#)

Punching Knife

Full built, height = 40 mm

Used for:
Martindale
according to DIN EN ISO 105-X12.



Reference N° [3027/28](#)

Punching Knife

Full built, height = 40 mm

Used for:
Tear strength testing
DIN 53507 EN 12771 EN ISO 20344.

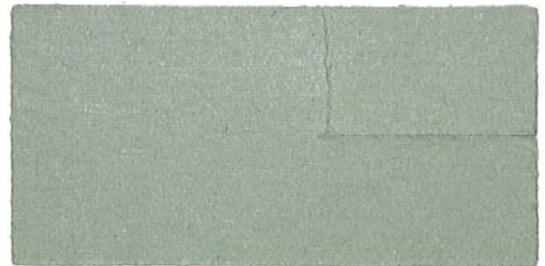


Reference N° **3027/30**

Punching Knife

Full built, height = 40 mm

Used for:
Tear strength testing
according to DIN EN ISO 20344.

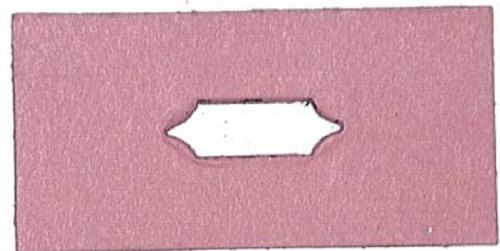


Reference N° **3027/32**

Punching Knife

Full built, height = 40 mm

Used for:
Tear strength testing
DIN EN ISO 20344 DIN EN ISO 53329 3377-1.

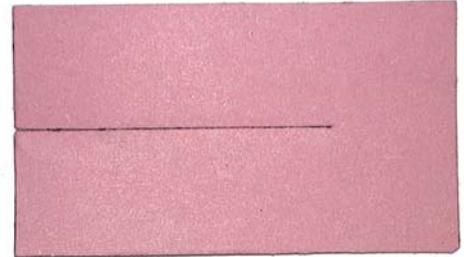


Reference N° **3027/33**

Punching Knife

Full built, height = 40 mm

Used for:
Tear strength testing
according to DIN EN ISO3377-1.



Reference N° **3027/34**

Punching Knife

Full built, height = 40 mm

Used for:
Tear strength testing
DIN 53515.



Reference N° **3027/35**

Punching Knife

Full built, height = 40 mm

Used for:
Leather and synthetic test
DIN 5331/53506/54301 EN 1392.



Reference N° **3027/36**

Punching Knife

Full built, height = 40 mm

Used for:

Colour fastness

DIN EN ISO 105-E01/E02/E04.



Reference N° **3027/38**

Punching Knife

Full built, height = 40 mm

Used for:

Hack-Test

according to DIN 53543



Reference N° **3027/39**

Punching Knife

Full built, height = 40 mm

Used for:

Varnish adhesion PFI



Reference N° **3027/40**

Punching Knife

Full built, height = 40 mm

Used for:
Pulsating Tensometer PFI
according to DIN 53323.

Reference N° **3027/41**



Punching Knife

Full built, height = 40 mm

Used for:
Taber
according to DIN 53109/53754/53799.

Reference N° **3027/42**



Punching Knife

Full built, height = 40 mm

Used for:
Rub fastness Frank Hauser
according to DIN 53863/53528.

Reference N° **3027/43**



Punching Knife

Full built, height = 40 mm

Used for:
Air permeability
DIN 53334 DIN EN ISO 9237

Reference N° **3027/44**,

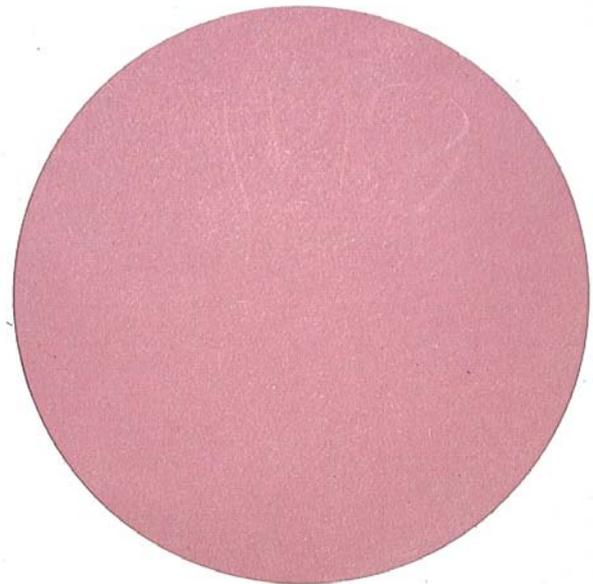


Punching Knife

Full built, height = 40 mm

Used for:
Special-Abasion PFI

Reference N° **3027/46**,



Punching Knife

Full built, height = 40 mm

Used for:
Breaking test of 2-layered substances.
Lether Breaking test
EN 344-1 DIN 53357

Reference N° **3027/47**,



Punching Knife

Full built, height = 40 mm

Used for:
EN 344-1 ISO 2023



Reference N° [3027/48](#),

Punching Knife

Full built, height = 40 mm

Used for:
DIN EN ISO 13934-1

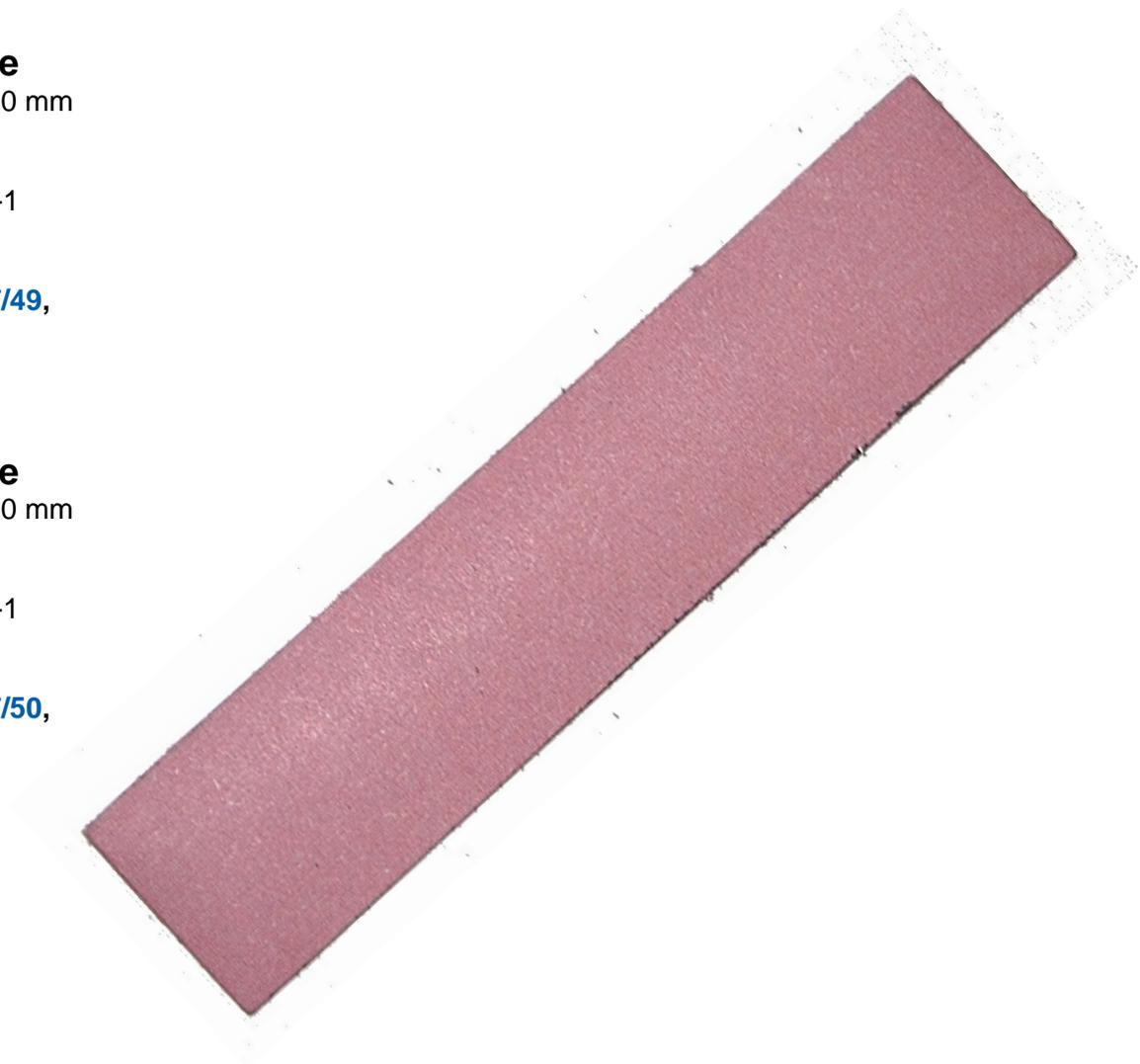
Reference N° [3027/49](#),

Punching Knife

Full built, height = 40 mm

Used for:
DIN EN ISO 13934-1

Reference N° [3027/50](#),

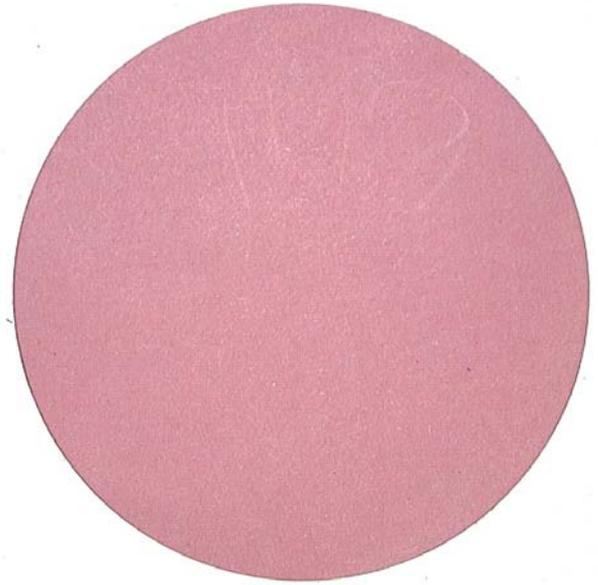


Punching Knife

Full built, height = 40 mm

Used for:
VDA 230-211

Reference N° **3027/51**,



Appendix

All Testing Machines and Devices and Respective Standards

Testing Machines and Devices (Reference N°)	Standards Applicable	Application Area	Objects / Materials Tested
PFI Abrasion Testing Machine (APM 2000, 3053/1)	PFI method	Abrasion testing	Soling materials
Anti Static Measuring Unit (AM, 3077)	DIN EN ISO 20344, DIN EN 100 015 (partially replaced by DIN EN 61340-5-1)	Electrostatic charge / conductivity of shoes	Complete shoes
DIN Abrasion Testing Machine (DAT, 3080/1)	DIN 53516, ISO 4649 EN 12770, EN ISO 20344	Abrasion and abrasion resistance of cylindrical samples	Shoes, soling materials
Drilling Device for Sample Cutting (AP, 3080/2)	For DIN Abrasion Testing Machine	Sample cutting	/
Midsole Flex Testing Machine (BDE, 3090)	DIN EN ISO 20344	Flexing properties	Penetration-resistant steel inserts / midsoles
Insole Break Tester (BBT, 3064)	/	Flexing angle at which the sample will break	Insoles
Insole Flexometer (BFM, 3029)	BS 5131	Durability under repeated flexing	Insoles, insole materials
Comfort-Tester (A66, 3010)	PFI method	Assessing the climate comfort (humidity and temperature)	Complete shoes
Crockmeter (CM, 3026)	EN ISO 105-X12	Assessment of colour fastness to rubbing	Textiles, textile floorings, pole fabrics
Outsole Flex Testing Machine (BPM, 3054)	DIN 53 543 EN 12 769 (pr. EN 1707), EN ISO 20344	Assessing the wear properties	Outsoles, outsole materials

<u>Ross Flexing Machine (RF, 3005)</u>	EN ISO 20344, ISO 5423	Measures the resistance of non-leather outsole materials to cracking in wear. This test is often carried out after hydrolysis storage of the material.	Outsoles, synthetic soling materials, PU boots
<u>Dynamic Tension and Compression Testing Machine (DBPM, 3063)</u>	DIN 53340	Dynamic testing of stiff leather	Shoes, shoe materials, shoe components
	PFI method	Dynamic testing of sample seams and materials	Dynamic seam strength
	PFI method	Dimensional stability	Toe and heel caps
<u>Flex Cracking Test Machine (KPM, 3083)</u>	DIN 53 359	Testing of synthetic leather	Upper materials, components, synthetic leather
<u>Shock Absorption Testing Machine (DSPM 3035)</u>	Following ASTM F 1976 F	Dynamic tensile and shock absorption testing of shoe materials and components	Shoe materials and components
<u>Impermeability Tester (DG, 3002)</u>	DIN EN ISO 20344	Impermeability testing	Safety shoes (rubber boots made of PU, PVC)
<u>Dome Plastimeter (DOM, 3073)</u>	IUP 21	Assessment of the permanent elongation of upper materials	Heel lining materials: leather
<u>Device for Measuring Ball Diameter (MS-M, 3071)</u>	International Matchball Standards	Diameter determination	Footballs
<u>Fall Hammer (FH, 3057)</u>	DIN EN 12568	Impact testing	Steel toe caps
<u>Plasticine Press (3057/4)</u>	Accessory to Falling Mass Shock Absorption Tester (FH, 3057)	Preforming of plasticine cylinders	/

<u>Flexometer (FM, 3006)</u>	DIN EN ISO 5402	Repeated flex testing	Leather and patent leather
	DIN 53351		Synthetics
	following DIN 53351		Textiles
<u>3D Foot Measuring Device (EFMG 3D, 3052)</u>	/	3D Digitisation	Feet
<u>Foot Measuring Device (FMG, 3051/5)</u>	/	Measuring	Feet
<u>Walking Simulator / Impermeability Tester (GS-2, 3060/1)</u>	/	Assess water impermeability	Completed Footwear
<u>Slip Resistance Testing Machine (GSP, 3034)</u>	EN 13287	Measuring the frictional force and the dynamic friction coefficient	Footwear
<u>Hand Lastometer (HPM, 3084)</u>	DIN 53 325; IUP 9	Grain crack testing	Leather
<u>Edge Inking Machine (KFM01, 3089/1; KFM02, 3089/2; KFM03, 3089/5)</u>	/	Fast application of all commercially available edge inks	/
<u>Velcro Fastening Tester (KVP, 3099)</u>	DIN EN 1414	Durability testing	Velcro fastenings
<u>Contact Heat (KOW, 3003)</u>	EN ISO 20344	Assesses the resistance to contact heat	Shoe components
<u>Laboratory Scale Activating Press (LPA, 3100/1)</u>	/	Desktop model for activating and pressing	Parts which are to be cemented
<u>Laboratory Scale Cutting Press (LST-5, 3075)</u>	/	Desk-top device for sample cutting in the materials testing laboratory	Sample cutting
<u>Patent Leather Tester (LLT, 3007)</u>	DIN 13540	Heat resistance testing	Patent leather
<u>Latex Spray Gun (LP, 3092)</u>	/	Easy application	Latex and many other water-based adhesives, coatings and finishes

<u>Last Marker (LMG, 3091)</u>	/	Last Marking	Lasts
<u>Martindale (MAR, 3016)</u>	DIN EN ISO 12947-1	Testing of rub fastness	Textiles
<u>Rub Fastness Tester – Surface (OST, 3038)</u>	GM 60368	Assessing fastness to rubbing on the surface	Upper material exposed to high strain
<u>Penetrometer (PEN, 3023)</u>	DIN EN ISO 5403, EN ISO 20344	Determines water penetration under dynamic load conforming	Flexible leathers, Membrane materials, textiles
<u>Permeometer (PMM, 3024)</u>	DIN EN ISO 5404, EN ISO 20344	Assesses the impermeability	Leather outsoles, midsoles, insoles, components, non woven materials
<u>Rebound Tester (MS-R, 3070)</u>	International Matchball Standards	Determines the rebound height of footballs	Footballs
<u>Nail Penetration Tester for Completed Footwear (PDE, 3000)</u>	EN ISO 20344-347	Works in the manner of a metal detector.	Completed footwear
<u>Rub Fastness Tester (RET, 3059/2)</u>	DIN EN ISO 11640	Assessment of colour and finish fastness to rubbing on the surface	Leather
	DIN EN ISO 105-X12		Textiles
	following DIN EN ISO 105-X12		Synthetics

<u>Zipper Tester (RVT, 3030)</u>	DIN 3419	Assesses the durability of zip fastenings	Zip fastenings
<u>Sand Bath (SB, 3004)</u>	EN ISO 20344 (pr. EN 15090)	Assessment of the thermal insulation properties	Footwear
<u>PFI Sand Abrasion Tester (SF, 3072)</u>	PFI method	Wear testing of coated surfaces	Coated surfaces
<u>Inclined Plane (SE, 3065/1/2)</u>	DIN 4843 T 100, DIN 51097, DIN 51098, DIN 51130	Assessment of the slip resistance	Footwear and flooring materials
<u>Shoe Lace Abrasion Tester (SPM, 3058)</u>	DIN EN ISO 18691 (draft)	Abrasion resistance	Shoe laces and yarn threads
<u>Shock Absorption Tester (SAPE, 3098)</u>	Following ASTM F 1976 F	Assessment of the shock absorption properties	Shoes, shoe bottoms, heel cushioning materials and protectors
<u>Clamping Device for Sole Adhesion Testing (Sp-V-H, 3055/1/2; Sp-V-P, 3056)</u>	/	Accessory	
<u>Electronic In-Shoe Measuring Device (ESMG, 3019)</u>	/	Semi-automatic taking of in-shoe measurements such as insole length and shoe width	Shoes
<u>In-Shoe Width Measuring Device (SWM 3079/1/2)</u>	/	Measuring joint width and joint girth	Shoes (right shoes)
<u>In-Shoe Length Measuring Device (LM 3074/1/2)</u>	/	Measures the insole length	Shoes
<u>Water Absorption of Footballs (MS-W, 3069)</u>	International Matchball Standards	Determines the water absorption	Footballs
<u>Water Vapour Absorption (WDA, 3020)</u>	DIN EN ISO 17229, EN ISO 20344	Absorption of water vapour of a sample is determined by measuring the weight increase of a desiccant	Leather, composites, textiles, synthetics
<u>Water Vapour Permeability (WDD, 3068)</u>	DIN EN ISO 14268, EN ISO 20344	Determination of the water vapour permeability	Leather (thickness < 3 mm), textiles, synthetics, membrane materials

<u>Joint Girth Gauge (BUM, 3042/3)</u>	/	Determines the exact joint girth	Shoe lasts
<u>Size Converter (GVS, 3024/4)</u>	/	Compares and converts different shoe sizing systems	/
<u>Joint Girth Measuring Tape (BMB, 3042/5)</u>	/	Determines the joint girth	Foot
<u>Software for Shoe Size Determination (PCS, 3042/6)</u>	/	Determines the shoe size	
<u>Friction Coefficient of Plastic Foils (RBV, 3037)</u>	DIN 53375	Determines the friction coefficient (accessory for tensile testing machine)	Plastic foils
<u>Energy Absorption (EA, 3067/1)</u>	EN ISO 20344, EN ISO 12743	Heel thrust pads for determining the energy absorption in the heel area (accessory for tensile testing machine)	/
<u>Energy Absorption (EA, 3067/7)</u>	EN ISO 20344, EN ISO 12744	Piston with ball levelling piece for the determination of the energy absorption in the heel area (accessory for tensile testing machine)	/
<u>Holding Device for Toe Protection Cap (HZ, 3067/2)</u>	DIN 12568	For compression testing (accessory for tensile testing machine)	Toe protection caps
<u>Measuring Device for Toe Protection Caps (MZ, 3067/3)</u>	DIN 12568, EN ISO 20344	For measuring the inner length of toe protection caps	Toe protection caps

<u>Nail Penetration Testing for Complete Shoes (NDS, 3067/4)</u>	EN ISO 20344, EN ISO 12568 with accessories: EN 388	Assessment of the penetration resistance (accessory for tensile testing machine)	Shoes, shoe bottoms
<u>Nail Penetration Testing for Inlay Soles (NDE, 3067/5)</u>	EN ISO 20344	Assessment of the penetration resistance (accessory for tensile testing machine)	Inlay soles, components
<u>Stitch Tear Resistance (STAF, 3067/6)</u>	DIN 53331, DIN 53506, DIN 54301 DIN 53506	Resistance testing (accessory for tensile testing machine) Needle tear strength testing	Leather, elastomers, rubber Rubber, elastomers
<u>Punching Knife (SM 3027/2)</u>	DIN 54301	Needle tear strength testing	Textiles
<u>Punching Knife (SM 3027/3)</u>	EN 12772, EN ISO 20344	Shrinkage testing (hydrolysis testing)	
<u>Punching Knife (SM 3027/4)</u>	EN 1392	Bond testing	
<u>Punching Knife (SM 3027/5)</u>	DIN 53506, EN 12773	Needle tear strength testing (small)	
<u>Punching Knife (SM 3027/6)</u>	DIN 53504	Tensile strength testing	Norm scale S1
<u>Punching Knife (SM 3027/7)</u>	DIN 53504	Tensile strength testing (small)	Norm scale S2
<u>Punching Knife (SM 3027/8)</u>		Bond testing (small)	
<u>Punching Knife (SM 3027/9)</u>	EN ISO 20344, EN 12771	Tear strength testing	Rubber
<u>Punching Knife (SM 3027/10)</u>	PFI method	PFI abrasion testing	Soling materials
<u>Punching Knife (SM 3027/11)</u>	DIN EN ISO 11644	Finish adhesion	
<u>Punching Knife (SM 3027/12)</u>	DIN EN ISO 4502	Flexometer	Leather
	DIN 53351	Flexometer	Synthetics
	DIN EN ISO 11640	Rub fastness	Leather
	DIN EN ISO 105-X12	Rub fastness	Textiles
	following DIN EN ISO 105-X12	Rub fastness	Synthetics
<u>Punching Knife (SM 3027/13)</u>	DIN EN ISO 17229, EN ISO 20344	Water vapour absorption	
<u>Punching Knife (SM 3027/14)</u>	PFI method	Patent leather tester, Lastometer	
<u>Punching Knife (SM 3027/15)</u>	DIN EN ISO 5403	Penetrometer	
<u>Punching Knife (SM 3027/16)</u>		Stitch tear resistance	

3027/16)		testing	
Punching Knife (SM 3027/17)		Shrinkage	
Punching Knife (SM 3027/18)	DIN EN ISO 12947-1	Martindale	Textiles
Punching Knife (SM 3027/19)	DIN EN ISO 12947-1	Martindale	Textiles
Punching Knife (SM 3027/20)	DIN EN ISO 3377-2	Tear strength testing	Leather
	DIN 53329		Synthetics based on non-wovens
Punching Knife (SM 3027/21)	DIN EN ISO 14268	Water vapour permeability	
Punching Knife (SM 3027/22)	DIN EN ISO 20344	Waterabsorbtion Permeometer	
Punching Knife (SM 3027/23)	EN 344-1	Waterabsorbtion	
Punching Knife (SM 3027/24)		Waterabsorbtion Freundlich PFI	
Punching Knife (SM 3027/25)	EN ISO 13935	Seam strength static dynamic	
Punching Knife (SM 3027/26)	EN ISO 13935	Seam strength statisch dynamisch	
Punching Knife (SM 3027/27)	DIN EN ISO 3376 und 20344	Tensile strength test	
Punching Knife (SM 3027/28)	DIN EN ISO 105-X12	Martindale	
Punching Knife (SM 3027/29)	DIN 53504	Tensile strength test	
Punching Knife (SM 3027/30)	DIN 53507	Further tearing resistance	
Punching Knife (SM 3027/32)	DIN EN ISO 20344	Further tearing resistance	
Punching Knife (SM 3027/33)	DIN EN ISO 20344 DIN EN ISO 53329 3377-1	Further tearing resistance	
Punching Knife (SM 3027/34)	DIN EN ISO 3377-1	Further tearing resistance	
Punching Knife (SM 3027/35)	DIN 53515	Further tearing resistance	
Punching Knife (SM 3027/36)	DIN 5331/53506/54301 EN 1392	Lether and synthetic test	
Punching Knife (SM 3027/38)	DIN EN ISO 105-E01/E02/E04	Colour fastness	
Punching Knife (SM 3027/39)	DIN 53543	Hack-Test	

<u>Punching Knife (SM 3027/40)</u>	Lackhaftung nach PFI	Varnish liability PFI	
<u>Punching Knife (SM 3027/41)</u>	DIN 53323	Pulsating Tensometer PFI	
<u>Punching Knife (SM 3027/42)</u>	DIN 53109/53754/53799	Taber	
<u>Punching Knife (SM 3027/43)</u>	DIN 53863/53528	Barn resistance Frank Hauser	
<u>Punching Knife (SM 3027/44)</u>	DIN 53334 DIN EN ISO 9237	Air permeability	
<u>Punching Knife (SM 3027/45)</u>	DIN EN ISO 12947-2	Martindale	
<u>Punching Knife (SM 3027/46)</u>	Spezial-Abrieb PFI	Special-Abasion PFI	
<u>Punching Knife (SM 3027/47)</u>	EN 344-1 DIN 53357	Breaking test of 2-layered substances. Lether Breaking test	
<u>Punching Knife (SM 3027/48)</u>	EN 344-1 ISO 2023		
<u>Punching Knife (SM 3027/49)</u>	DIN EN ISO 13934-1		
<u>Punching Knife (SM 3027/50)</u>	DIN EN ISO 13934-1		

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