ELASTOMER TESTING
MOONEY-VISKOSIMETER 91.11

016.03.2

GÖTTFERT

Contents

Introduction

The test device is a shearing disk viscosimeter with a closed chamber and a rotor.
It is used to determine the Mooney Viscosity and the scorch characteristics recorded over time.
Test materials are unvulcanised rubber compounds and samples of pure natural or synthetic rubber.

The technical highlights

- Table top instrument with latest control electronic for raw value recording and test data processing
- Universal handling with one multi function button
- Internal microprocessor for test data recording and controlling
- High sensible and precise torque transducer up to 200 MU
- High measuring accuracy via optimal tempering of test chamber und rotor
- Standard rotor speed 2 min^{-1}
- Measure procedures: Mooney Viscosity, Mooney Scorch, Mooney Relaxation, Delta Mooney

Additional features of the test device:

- Database software for parameter setting and online monitoring via Ethernet, as well as free definable test evaluation
- Compact and service friendly design with easily accessible components and complete integrated electronics
- Build-in Ethernet interface for data transfer to a PC
- Temperature range up to 200°C, temperature control algorithm
- 5 temperature calibration data sets each with separate control parameters for optimal adaptation over the full temperature range
- Pneumatic rotor ejection

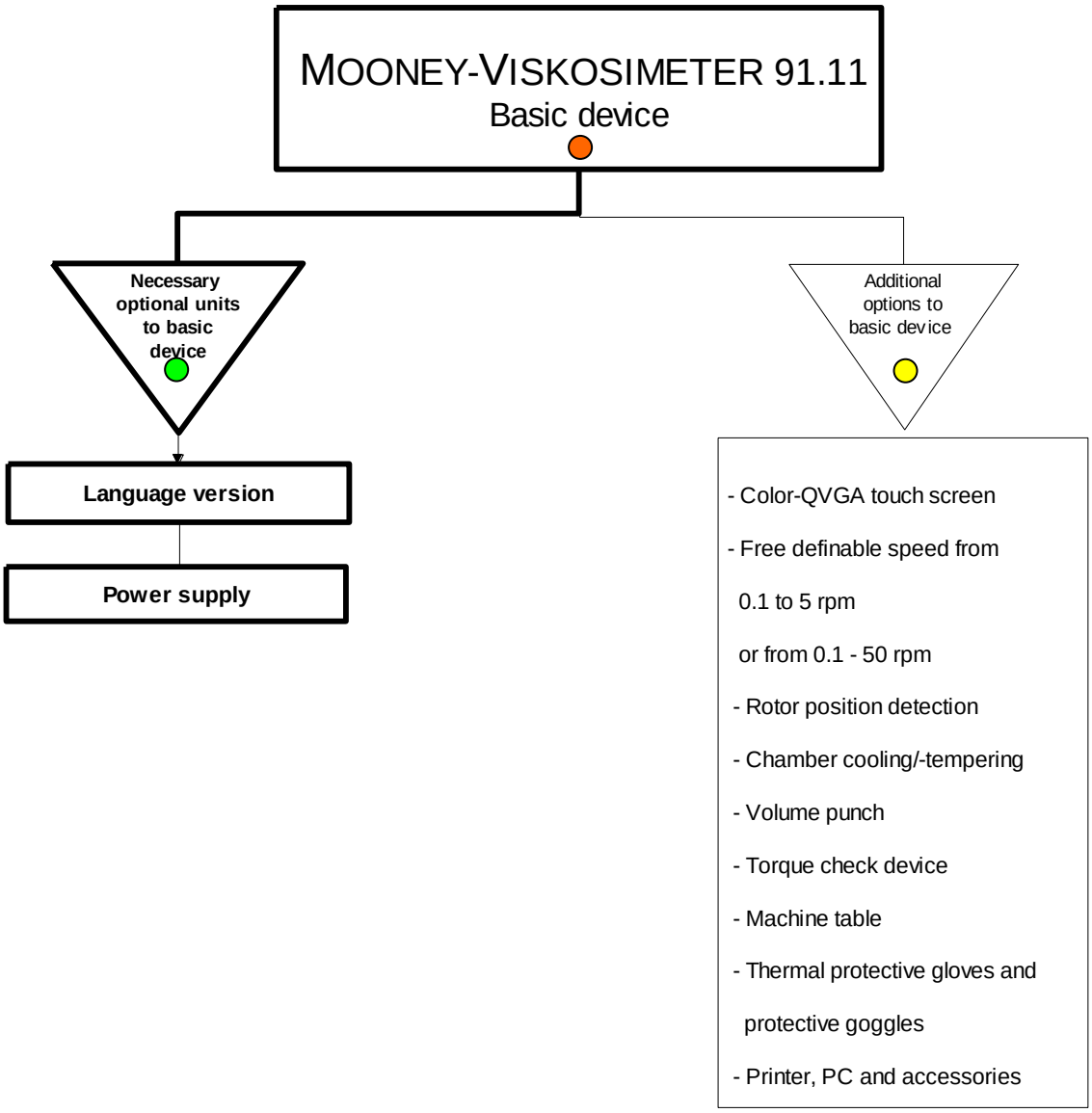
Application

The sample consists of two round blanks. One has a bore hole in the centre, so that the rotor can pass through.

Inside the rotor drive a torque transducer is placed.
After the test chamber is closed the sample is being sheared by a constant turning rotor.
During this procedure the resulting torque is recorded while pressure, temperature and speed are constant.
The evaluation of the data is performed with the PC program "RubberView"

The test device is designed for only be used to determine the Mooney Viscosity of rubber (intended use).

Concept



Legend:

●	Basic device	
●	Necessary options:	These units are necessary
●	Optional units:	Choice of measurement enhancing additional sub systems

Necessary options

The basic test device is no functioning instrument without adding the following necessary units:

- English Version or German Version
- Power supply 230 V or 115 V

Optional units

- Color-QVGA touch-screen for test data display directly at the device
- Free definable speed from 0.1 to 5 min^{-1}
- Free definable speed from 0.1 to 50 min^{-1}
- Rotor detection
- Chamber cooling/-tempering
- Volume punch
- Torque check device
- Machine table
- Thermal protective gloves and protective goggles
- Printer, PC and accessories

Set-Up

Overall view MOONEY-VISKOSIMETER

Picture: MOONEY-VISKOSIMETER 91.11

The test device consists of the following components:

Test chamber
according to ASTM D1646, DIN 53523 part 1-4, ISO 289 part 1-4.
The test chamber has an inside diameter of 50.9 mm and a height of 10.59 mm.
The basic and covering surface of the test chamber are profiled, the wall surfaces are equipped with grooves to avoid a slippage of the sample at the wall surfaces of the test chamber as far as possible.

Rotor
with a shearing disk of 38.1 mm in diameter and a rotor with a shearing disk of 30.48 mm in diameter are contained in the basic equipment.
Both rotor shearing disks have a thickness of 5.54 mm, whereas their upper and lower surface as well as the corresponding cylinder are profiled.

Rotor drive
The rotor is driven by a 3-phase stepper motor which operates at a constant speed of 2 min^{-1} per norm (optional: free definable constant speed from 0.1 to 5 min^{-1} or from 0.1 to 50 min^{-1}). The rotor is fixed to the torque shaft and is driven via its square end.
The rotor is ejected with pneumatic help without effort from the lower test chamber half.

Test chamber clamping unit
Pneumatic clamping mechanism with maintenance unit with which the clamping pressure is adjusted and kept constant (clamping distance approx. 110 mm, clamping force adjustable max. 12.7 kN).

Test chamber heating
In order to achieve high measuring accuracy, an optimal tempering of test chamber and rotor is necessary. This is ensured by a special temperature control algorithm. The resolution of the set temperatures is 0.1 °C.

Torque measurement
The rotor drive is fitted with a DMS torque transducer. Further processing and evaluation is carried out digitally. Measuring range is 200 MU. The test time is freely adjustable.

Controlling
An integrated industrial PC with real time processing controls the device. The connection to the operating PC is made via Ethernet.

Safety system

- Comprising of a plastic protective hood (transparent) around the test chamber according to VGB 4. The hood closes automatically before standby and measuring operation. The chamber closes not until the hood is closed.
- Overload detection via torque monitoring.

PC Software RubberView
With the PC program "RubberView" the setting of parameters, the performance of the measurements, as well as the evaluation of the raw data can be carried out by data bases.

Further details, as well as requirements of the PC you will find in the separate product description „RubberView"".

Required compressed air connection
For operation of the device a compressed air connection of approx. 5 to 10 bar is required. The compressed air should be free of oil and water (as far as possible). The unit is connected to the compressed air supply system by means of a quick connector coupling, which is included in the device accessories. The coupling must be fitted to an air hose (DN 9). The pressure regulator can be used to reduce excessive air pressure.

Technical Data

Standards	ISO 289 part 1-4; DIN 53523 part 1-4; ASTM D1646
Test procedures	Mooney Viscosity - Mooney Scorch – Mooney Relaxation - Delta Mooney
Operation	
Control (local)	With microprocessor
PC	With RubberView program
Heater	
Temperature range	Up to 200°C (392°F)
Temperature sensors	PT100 1/3 DIN
Heater circuits	2
Controller	Special algorithm
Variation over time in usable range	less ±0.2°C
Spatial temperature distribution in usable range	± 0.1 °C
Drive	
Motor	3 phase stepper motor
Speed	Standard speed 2 min^{-1} according to standards ISO 289 part 1-4; DIN 53523 part 1-4; ASTM D1646 (optional 0.1 – 5 min^{-1} or 0.1 – 50 min^{-1})
Test data recording	
Torque transducer	Direct torque measuring
Measuring range	Up to 200 MU
Auto zero	Yes, at standby operation
Test chamber	
Clamping force:	adjustable max. 12.7 kN
Clamping range:	110 mm
Air supply	
Connection:	5 - 10 bar, oil and water free
Air consumption:	approx. 16 liters/test
Power supply	
Voltage	1 x 230V AC 1 x 115V AC Other on request
Tolerance	±10%
Frequency	50-60 Hz
Protective earthing	Earth resistance less than 5 Ohm

Short time breaks	Less than 10 msec
Power consumption:	approx. 1 kW

Ambient conditions

Ambient temperature	+ 10°C up to + 40°C (50°F up to 104°F)
Air humidity	max. 90 % not condensing

Dimensions

Width	540 mm (21.26 inches)
Depth	410 mm (16.14 inches)
Height	980 mm (38.58 inches)
Finish:	Light grey RAL 7035 Anthracite grey RAL 7016 Pure orange RAL 2004
Weight:	Approx. 150 kg
Protection unit	Automatic protection hood

Note
Please pay attention to the fact that the device is equipped with microprocessors. In order to guarantee a trouble free operation, the power supply must be free of interferences. Should there occur any interference you have to connect line filters resp. mains stabilisers on line side.

Supplied accessories

MOONEY-VISKOSIMETER 91.11

- User information
- Cleaning tools
- Mirror
- Height gauge
- Spare sealing rings

Order information

MOONEY-VISKOSIMETER 91.11
Basic device
Order number 5.26.500

Necessary optional units to basic device:

Language version and user information

English Version
Marking and user information* (on CD) in English, operating manual on paper format.
Order number 5.26.506

German Version
Marking and user information* (on CD) in German, operating manual on paper format.
Order number 5.26.505

Additional user information* English, on paper format
Complete printed English user information* in single A4 ring binder.
One user information* on CD belongs to standard scope of the basic instrument.
Order number 5.26.508

Additional user information* German, on paper format
Complete printed German user information* in single A4 ring binder.
One user information* on CD belongs to standard scope of the basic instrument.
Order number 5.26.507

* The user information contains:
Operating manual, technical documentation, RubberView program documentation and calculation basis.

Power supply

Following power supplies are available:

Power supply 230V~, 50-60Hz, 1L+N+PE

Voltage:	1x 230V AC; (1L+N+PE)
Permissible voltage fluctuations:	+/- 10% (permissible range: 207V…253V)
Frequency:	50-60 Hz, +/- 1%
Power consumption:	ca. 1 kW

Order number 5.26.510

Power supply 115V~, 50-60Hz, 1L+N+PE

Voltage:	1x 115V AC; (1L+N+PE)
Permissible voltage fluctuations:	+/- 10% (permissible range: 103.5V…126.5V)
Frequency:	50-60 Hz, +/- 1%
Power consumption:	ca. 1 kW

Order number 5.26.511

Further voltages on request.

Optional units for the basic system:

Color-QVGA touch-screen

For display the Mooney Viscosity and the temperatures directly at the device.
The configuration settings can be edited without PC directly at the device.

Note: with this option, the device becomes no standalone unit. All measurements are always controlled via the PC software RubberView.

Because of constructionally reasons a subsequent installation of the touch-screen is not possible

Color-QVGA touch-screen
Order number 5.26.603

Speed 0.1 to 5 min^{-1}

Free definable speed from 0.1 to 5 min^{-1}
Order number 5.26.518

Speed 0.1 to 50 min^{-1}

Free definable speed from 0.1 to 50 min^{-1}
Order number 5.26.519

Rotor position detection

Rotor position detection
Photo sensor to detect the correct position of the rotor in the lower test chamber half. If the rotor is placed in a wrong way or not into the test chamber, the measurement can not be started.
Order number 5.26.513

Chamber cooling/-tempering

Air cooling
The test chamber is cooled down with compressed air.
Order number 5.26.514

Fluid tempering
The test chamber is tempered with a fluid by means of a thermostat.
Order number 5.26.515

Volume punch

Volume punch
For reproducible tests there are test samples with a constant volume absolutely required. The volume punch cuts out of a un-vulcanised rubber plate with different thickness a test sample at a constant volume.

Details and closer information you will find in the separate product descriptions for different volume punches.

Check device

Torque check device
for checking of the torque measuring system and the measuring amplifier.
With 6 test weights and idler pulley with mounting for the test ranges 33, 66, 100, 133, 166 and 200 MU.
Order number 5.26.516

Machine table

Machine table
For the reception of the device.
The machine table is made of anodized Aluminium beams.
Width: 1450 mm, depth: 600 mm, height: 670 mm.
Order number 5.26.517

Accessories

Thermal protective gloves and protective goggles

Thermal protective gloves
Material: Para-Aramid cotton, cat.III EN 388 (2541), EN 407 (4341), heat isolation up to 350° degree Celsius, high cut resistance.
Order number 1.44.214

Protective goggles
Very comfortable to wear, good adaptability by multi adjustability, glass made from high-impact polycarbonate, color yellow/black
Order number 1.40.131

PC, Printer and Accessory

For visualization and for the operation of GÖTTFERT testing devices personal computers (PC's), with the Microsoft Windows® operating system, are used.

Details and closer information you will find in the separate product description "PC Specifications for GÖTTFERT Systems".

Note

GÖTTFERT GmbH provides full warranty for the function of machines that have been supplied as complete system that means with PC and printer by GÖTTFERT. PC means generally the complete system comprising of PC, monitor, keyboard, interfaces, mouse and if applicable joysticks. Principally, we do not give a functioning guarantee for connecting externally supplied PCs and printers (non-GÖTTFERT supply).

If the customer provides the PC by himself, GÖTTFERT cannot guarantee the troublefree functioning of PC and GÖTTFERT unit. Service work, which will be essential due to appearing problems in regard to configuration, serial interfaces, connection cables, communication etc. do not belong to the warranty obligations and will therefore be invoiced on an actual expense basis.

Some GÖTTFERT devices require the application of PC extension cards. By default they are executed in full construction height, consequently the application of a mini Tower PC is necessary. If the customer provides a PC in „Small-Form-Factor" format by himself, then low profile extension cards have to be used.
Please refer with the order if a PC with low profiles extension slots shall be used! GÖTTFERT is checking if low profile cards are available for the requested application and will offer these extension cards. Please specify the brand and type of the used PC when placing the order!

Due to the various printer executions that are available on the market, we do not give any function guarantee for printers not supplied by GÖTTFERT. Support for possible adjustments will be charged on an actual expense basis.

Subject to change due to technical developments.

QUALITY COULD NOT BE PROVEN – IT HAS TO BE PRODUCED...

THIS IS RHEOLOGY

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