Melt Flow Indexer

The reliable solution for precise **MFR** and **MVR** measurements

- **Melt Density**
- **Die Swell Measurement**
- **Viscosity**
- **Elongation**

GÖTTFERT

THIS IS RHEOLOGY

mi1

Highest precision - minimal automation

HIGHLIGHTS

- High-resolution displacement transducer 0.003 mm/impulse
- Operation of the measurement via a single multifunction button
- Integrated panel for parameter input and result display (optional)
- Display of parameter menu and measurement results via VNC on various PCs
- Stand-alone device or with PC
- Easy installation (Plug & Play)
- Self-commissioning possible without on-site service

Learn more **goettfert.com/mi1**

mi1

The mi1 is a **very compact** and **reliable Melt Flow Indexer**. The plastometer delivers **highest measuring accuracy** by using premium, measurement-relevant components.

The space-saving design enables cost-effective and efficient incoming goods inspection and quality control of plastics according to ISO 1133 and ASTM D1238, making it ideal for standardized melt flow index measurements.

MFR | MVR

The determination of the melt flow index is essential for assessing the processability of plastics.

Especially in incoming goods inspection and quality control, fast, standardized and reproducible measurements are crucial.

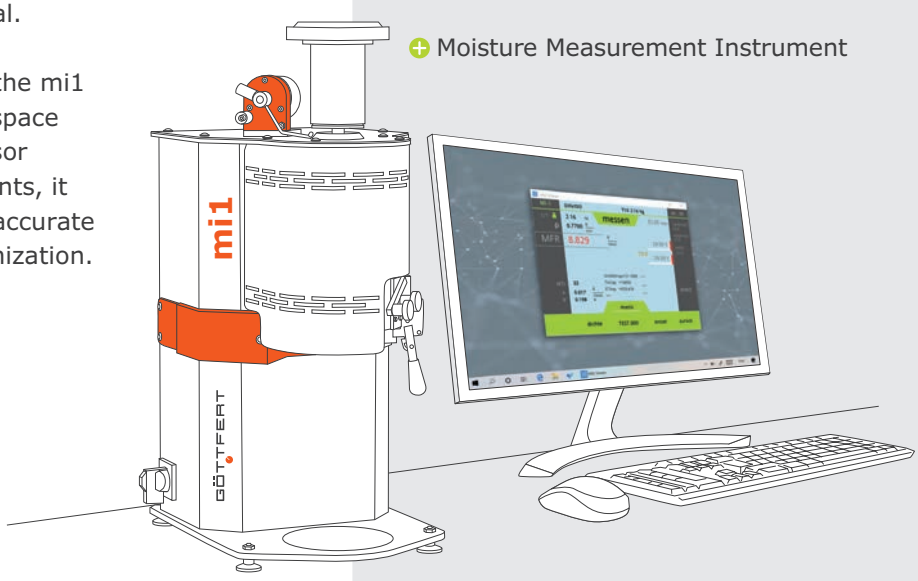
A compact testing istrument such as the mi1 enables precise results with minimal space requirements. Thanks to modern sensor technology and high-quality components, it provides reliable values that support accurate material evaluation and process optimization.

OPTIONS

- Manual die plug (heatable for polymers with high melting temperature)
- Automated die plug
- Manual or automated melt cutting unit (also for sticky polymers)
- Nitrogen purge for hygroscopic polymers
- Test barrel in corrosion-resistant or wear-resistant design
- Data backup of all parameters and measurement values via UPS in case of power failure
- Pre-compression and extrusion with higher weight loads
- Battery-powered cleaning device
- Pneumatic ejection unit (up to 50 kg / 100 kg)
- Air exhaust unit at the test barrel
- Final inspection according to ISO 17025

ADD-ON

- ⊕ miCONNECT
- ⊕ Melt density
- ⊕ Moisture Measurement Instrument



mi2

Flexible, compatible, systematic

HIGHLIGHTS

- Convenient operation and display of measurement results via panel
- Easy determination of MFR (Melt Flow Rate) and MVR (Melt Volume Rate)
- Modular design
- Stand-alone instrument or with PC (miCONNECT)

Learn more **goettfert.com/mi2**

mi2

With its **automated weight lifting system** and the optional pre-compaction of the material, the mi2 significantly reduces operator influence and ensures high reproducibility even in demanding applications.

This allows the measurement to start automatically after the melting time, and the weights can be raised and conveniently returned to the starting position at the push of a button.

OPTIONEN

- Die plug and melt cutting unit
- Measurement according to ISO 1133 method A and ASTM D1238 procedure A possible
- Special capillary (measurements according to ASTM D1238 procedure C “half die” or ASTM D3364 possible)
- Nitrogen purge unit
- Die Swell Measurement unit
- Test barrel in corrosion-resistant or wear-resistant design
- Data backup of all parameter and measurement values in case of power failure via UPS
- Pre-compression and extrusion with higher weight
- Battery-powered cleaning instrument
- Exhaust unit at the test barrel
- Final acceptance according to ISO 17025

ADD-ON

- miCONNECT
- Melt density
- Moisture Measurement Instrument

mi3

Semi-automated Melt Flow Indexer

with permanently integrated test weights for highest demands

Acc. to Standards:

ISO 1133
ASTM D1238
ASTM D3364

HIGHLIGHTS

- Weight magazine with manual weight selection
- High resolution displacement measurement (0.006 mm/pulse) with automatic resolution detection
- Automated pre-compression of the sample
- Weight-guided test piston
- Individually selectable basic weights (standard: 1.2 kg)
- Integrated test weights from 2.16 kg to 21.6 kg (max. 8 weights)
- Individually configurable test weights
- Electronic weight lifting unit
- Stand-alone instrument or PC operation (miCONNECT)

Learn more **goettfert.com/mi3**

mi3

The Melt Flow Indexer mi3 is equipped with a weight magazine that allows the operator to **manually select the required test weight.**

The instrument enables operators in quality control and incoming goods inspection to perform single-weight measurements according to ISO 1133 and ASTM D1238 (Procedure A-B-C).

With its high-resolution displacement measurement and automatic resolution detection, the mi3 ensures **repeatable and reliable testing of plastics.**

In addition to the standardized MFR and MVR measurements according to ASTM D1238 and ISO 1133, GÖTTFERT Melt Flow Indexers offer various Add-Ons that provide additional value in materials testing.

On request, the instrument can also be operated via PC using our measurement software **miCONNECT.** Especially for frequent material changes, a high number of tests, or in-depth result analysis, the software offers significant advantages.

OPTIONEN

- Manual die plug (also heatable for polymers with high test temperature)
- Automatic die plug
- Automatic melt cutting unit (also for highly adhesive materials)
- Nitrogen purge unit for hygroscopic polymers
- Test barrel and piston in corrosion-resistant or wear-resistant design
- Data backup of all parameter and measurement values in case of power failure via UPS
- Optimized piston fixing
- Battery-powered cleaning instrument
- Exhaust unit at the test barrel
- Final acceptance according to ISO 17025

ADD-ON

- ⊕ miCONNECT
- ⊕ Melt density
- ⊕ Moisture Measurement Instrument

mi40

Semi-automated measurements with highest accuracy

Acc. to Standards:
ISO 1133
ASTM D1238
ASTM D3364

HIGHLIGHTS

- Force-controlled pre-loading/ ejection via drive and automatic test weight selection
- Multi-load measurements with up to eight different weights, ascending, descending or freely selectable
- Time measurement accuracy better than 0.001 s
- Temperature control algorithm, resolution 0 to 320 °C: 0.01 °C, 320 to 500 °C: 0.1 °C
- High precision digital displacement transducer for volume throughput measurement with automatic resolution detection (0.006 mm/ pulse)
- Automatic weight selection

Learn more **goettfert.com/mi40**

mi40

The new generation of melt flow index testing is embodied by the mi40 from GÖTTFERT. Operators in incoming goods inspection and quality control (QC) benefit from **automated and more precise determination** of MFR (Melt Flow Rate) and MVR (Melt Volume Rate) according to ASTM D1238 and ISO 1133 (Procedures A-B-C-D).

With force-controlled compression of up to 80 kg, the **comparability of melt flow index measurements is significantly improved.** In addition, the mi40 enables **multi-load tests** with up to eight different weights, which can be applied in ascending, descending or freely selectable sequences.

An **automated operating point detection** further optimizes the measuring process. This makes the mi40 a weight-step testing instrument comparable to a rheometer.

Cleaning of the test barrel is simplified by a freely accessible, swiveling barrel and a side-mounted, semi-automated cleaning module.

OPTIONS

- Integrated, electrically operated cleaning module
- Manual die plug (also heatable for polymers with high test temperatures)
- Automated die plug
- Special capillary (measurements according to ASTM D1238 Procedure C “half die” or ASTM D3364 possible)
- Automated melt cutting unit (also for highly adhesive materials)
- Nitrogen purge for hygroscopic polymers
- Inlet version
- Barrel and piston in corrosion-resistant or wear-resistant design
- Automatic backup of all parameters and measurement values in the event of power failure via UPS
- Optimized test piston fixing
- Air exhaust unit at the test barrel
- Final acceptance according to ISO 17025

ADD-ON

- miCONNECT
- Melt density
- Moisture Measurement Instrument

mi40 visco

Add-on “visco” for advanced viscosity measurements

HIGHLIGHTS

- Force-controlled pre-compression/ ejection via drive and automatic selection of test weights
- Multi-load measurements with up to eight different weights, ascending, descending or freely selectable
- Timing accuracy better than 0.001 s
- Temperature control algorithm, resolution: 0 to 320 °C = 0.01 °C, 320 to 500 °C = 0.1 °C
- High-precision digital displacement transducer for volume throughput measurement with automatic determination of resolution
- Automatic weight selection

Learn more **goettfert.com/mi40-visco**

mi40 visco

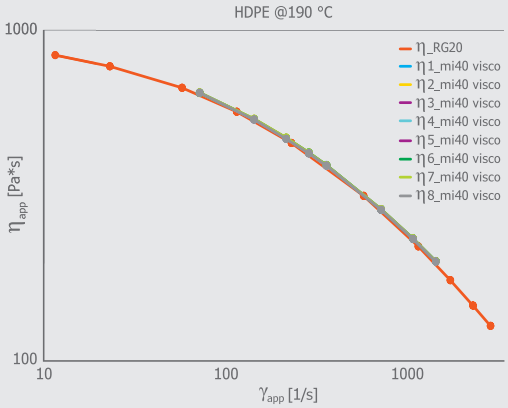
Melt Flow Index Testers (Plastometers) are commonly used to determine the Melt Flow Rate (MFR) or the Melt Volume Rate (MVR) of plastic pellets, powders and granules. These instruments are designed in compliance with the relevant standards ISO 1133 and ASTM D1238.

Until now, viscosity measurements according to ISO 11443 required the use of a Capillary Rheometer. Compared to a plastometer, a Capillary Rheometer is more time consuming and more demanding in terms of operation.

With the Add-On “visco” for the melt flow index tester mi40, **viscosity measurements** can now also be carried out **with a plastometer.** In contrast to standard MFR measurements, significantly higher shear rates can be achieved – a decisive factor for simulating actual processing conditions.

Thus, viscosity testing with this GÖTTFERT plastometer is closer to **processability control** than to a conventional melt flow index test.

VISCOSITY MEASUREMENT



mi40 visco vs. Capillary Rheometer RG20 with HDPE, MFR (190 °C/2,16 kg) = 9 g/10min

ADD-ON

- miCONNECT
- Melt density
- Moisture Measurement Instrument

IV TESTER

Determination of the Intrinsic Viscosity

USED FOR **POLYMER RECYCLING**

HIGHLIGHTS

- Determination of intrinsic viscosity without chemical substances
- Easy and fast measuring method
- Characterization of the average molecular weight of PET/PA/PP
- Stand-alone instrument or with PC

Learn more **goettfert.com/iv-tester**

IV TESTER

The IV Tester enables the determination of **intrinsic viscosity,** also referred to as solvent viscosity or limiting viscosity.

No chemical solvents are required for the measurement. This method is particularly used for quality control of polyester (PET) or polyamide (PA). The instrument can be operated as a stand-alone unit and does not require a PC.

OPTIONEN

- Die plug (also heatable for polymers with high test temperature)
- Nitrogen purge for hygroscopic polymers
- Test barrel and piston in corrosion-resistant or wear-resistant design
- Backup of all parameters and measurement values in the event of a power failure via UPS
- Battery-powered cleaning instrument
- Final acceptance according to ISO 17025

ADD-ON

- miCONNECT
- Moisture Measurement Instrument

MI-ROBO

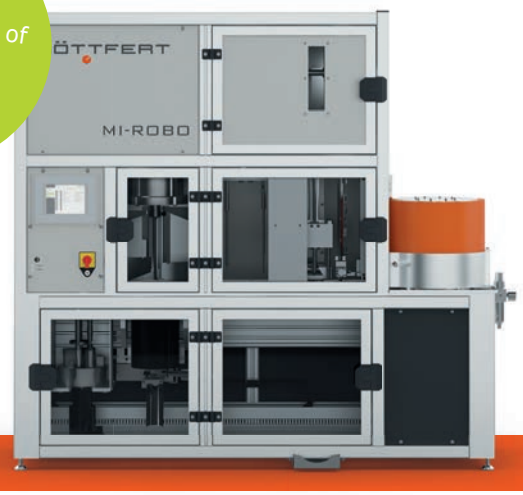
Fully automated Melt Flow Indexer

HIGHLIGHTS

- Fully automated melt index measurements according to Method A and B
  - ▶ Automated sample preparation
  - ▶ Automated measurements
  - ▶ Automated cleaning of test piston, test barrel and die
- Integrated sample magazine for 30 single tests, fillable with granules, powder and similar material profiles
- Temperature control algorithm, Resolution 0 to 320 °C: 0.01 °C, 320 to 500 °C: 0.1 °C
- Precise displacement transducer for exact volume determination
- High precision timer with a resolution better than 0.001 s (for determination of melt density)

Learn more **goettfert.com/mi-robo**

NEW!
Determination of melt density according to Method A



MI-ROBO

The MI-ROBO from GÖTTFERT offers the possibility to perform **fully automated** melt index measurements for granules and powder materials.

This includes fully automated filling of the test barrel, automatic execution of the measurement, automatic cleaning of the test barrel and die, as well as die change. With automated filling, an **unlimited number of consecutive tests** can be carried out without operator intervention.

The MI-ROBO can be individually configured for the respective polymer through various optional features.

Determination of melt density (Method A)
The MI-ROBO optionally enables the automatic determination of melt density according to Method A in accordance with ISO 1133. The melt volume is recorded in relation to the melt index, and the density of the material is calculated automatically.

This procedure **increases reproducibility** and **minimizes operator errors** – ideal for precise material analysis and quality assurance.

OPTIONS

- Sample magazine in standard or inlet design for sticky materials
- Additional integrated weights with automatic weight selection for pre-load and measurement
- Magazine heating
- Nitrogen purge
- Automatic material feeding
- Test barrel and piston in corrosion-resistant or abrasion-resistant design
- MFR measurements according to Method A (determination of melt density)

SPECIFICATIONS

- Aligned cleaning tools for optimized results
- Individual filling and cleaning procedures, specific to each material
- Automatic melt cutting unit
- Electrically heated test barrel with easily exchangeable design
- 5 temperature calibration data sets with separate control parameters for optimal adaptation

Software and Options

mi2, mi3 und mi40

SOFTWARE miCONNECT

- Uniform and user-friendly operating concept
- Browser-based testing software
- Easy setup, management and analysis of test plans
- Support for Microsoft® Access and Microsoft® SQL databases
- Flexible search filter (test plans / test results)
- OPC/UA interface
- Easy installation

Optional versions for individual requirements

Our Melt Flow Indexers can be specifically adapted to **special material properties** and testing requirements through **various optional features**.

From automatic cutting units to corrosion-resistant designs – for **greater efficiency, precision and durability** in daily operation.

- Automatic melt cutting unit (also for highly adhesive materials) (Fig. 1)
- Time-saving: pre-compression and extrusion for viscous test materials (mi3)
- Nitrogen purge for hygroscopic polymers
- Barrel and piston in corrosion-resistant or wear-resistant design
- Die plug (Fig. 2)

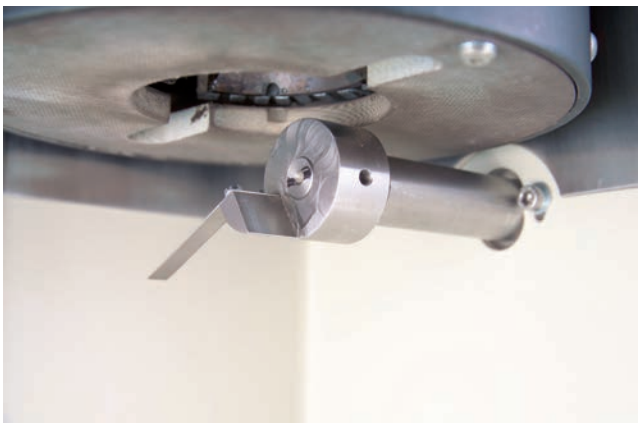


Fig. 1

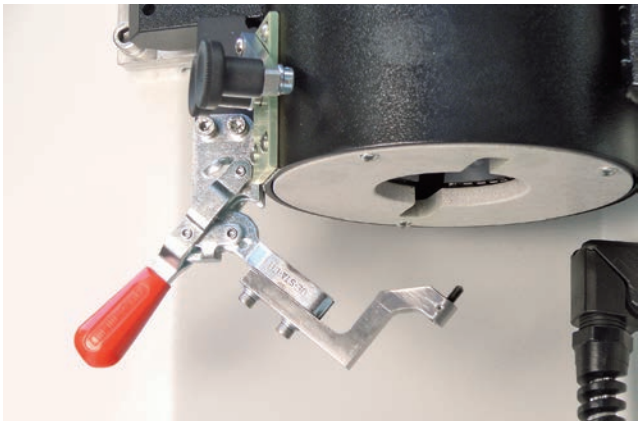


Fig. 2

Add-On

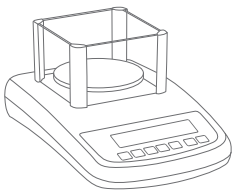
Additional extension of our standardized Melt Flow Indexers mi2, mi3 and mi40

More than just MFR and MVR

With our modular Add-Ons, GÖTTFERT Melt Flow Indexers can be flexibly expanded. This way, a classical plastometer becomes a versatile system for comprehensive material characterization.

Depending on the application, **additional functions** can be integrated. This makes our instruments suitable not only for standard testing, but also **for demanding tasks in quality assurance**, development and process optimization.

MELT DENSITY

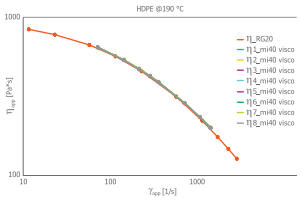


When determining the Melt Volume Rate (MVR) according to Method B, the extruded volume per unit of time is measured via the piston speed in cm³/10 min.

The melt density can be **measured directly** and used for converting between MVR and MFR.

This Add-On requires a laboratory balance as well as the optional melt cutting unit.

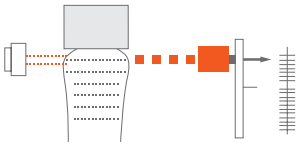
VISCOSITY



With the **"Viscosity Measurement"** Add-On, the mi40 becomes the mi40 visco. This enables the plastometer to perform viscosity measurements in accordance with the Capillary Rheometer standard **ISO 11443.**

The intuitive handling of the plastometer is combined with the extended material characterization capabilities of a Capillary Rheometer. This option allows viscosity to be measured quickly and easily, making it suitable as a QC criterion, for example in incoming goods inspection.

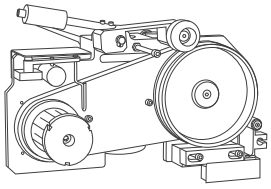
DIE SWELL MEASUREMENT



The Die Swell Measurement is an Add-On from the series of GÖTTFERT Capillary Rheometers.
With the help of a laser measuring head, which can be adjusted in height, it is possible to measure the material-dependent swelling of the extruded polymer strand.

This Add-On is particularly important for process optimization and quality control in companies processing elastomers (HDPE, PVC).

ELONGATION



The **D-MELT** consists of a GÖTTFERT Melt Flow Indexer (Plastometer) mi40 and an integrated **HAUL-OFF** system.

The specially developed D-MELT measuring method makes it possible to determine both the melt flow rate (MFR) and the melt elasticity (ME) with only one filling of the test barrel.

The HAUL-OFF system, which measures the melt elasticity, is fed directly by the Melt Flow Indexer, also called plastometer.

Applications

mi2, mi3 and mi40

Automatic resolution determination

The position transducer in the instrument has a path resolution of 0.006 mm per pulse. For optimal measuring results, this resolution can be selected in three levels (high, normal and low) depending on the MVR value.

For **optimal determination** of the piston path resolution (mm per measuring point), this value can also be set to be determined automatically.

This is particularly advantageous when working with unknown materials.

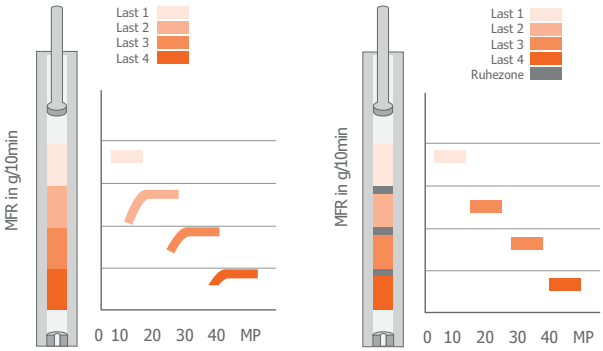
REDESIGN: mi3 & mi40

Multi-load measurement

With relaxation phase for higher precision

In conventional multi-weight measurements, the relaxation phase is missing, which results in higher scatter.

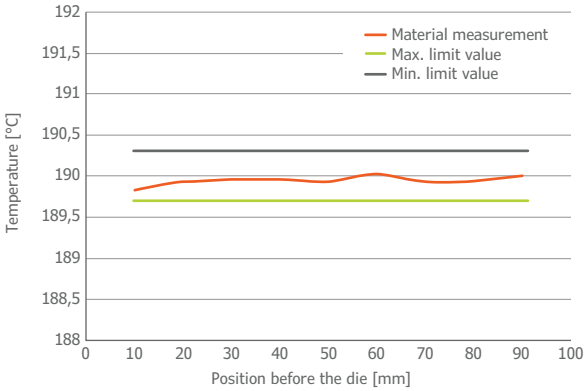
The multi-load function of the mi40 (up to 8 weights) gives the material targeted time to relax, reduces pre-shear effects and thus ensures measurement results that are much closer to single-weight measurements.



Temperature profile

More stable and precise than required by the standard

The current ISO 1133-2:2011 standard requires a temperature accuracy of ±0.3 °C up to 70 mm before the die. Our instruments exceed these requirements significantly, as shown in the diagrams. This also applies when measurements are performed according to Part 1 of the standard.

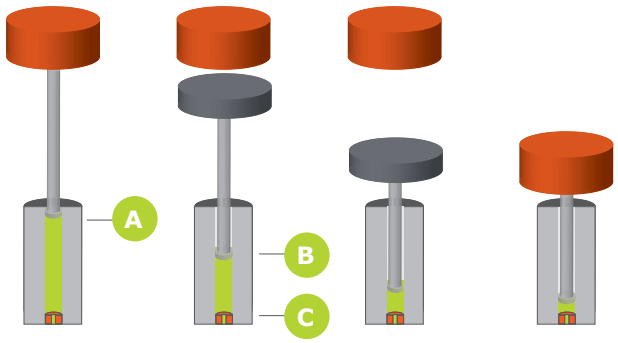


Compaction, measurement, extrusion – individually controllable

For many polymer melts, the type of filling and compaction has a decisive influence on measurement accuracy and reproducibility.

Our instruments offer various options for material compaction throughout the entire melting process. Either a fixed position in the test barrel can be approached, or a defined time/force window can be set.

With the mi3, weight selection is performed manually, while with the mi40 it can be conveniently controlled via software.



Pre-compaction
Automatic with selectable pre-compaction weight to a freely definable position A or adjustable time/force window.

Post-compaction
With test weight to a freely definable position B or 55 mm before the capillary C (5 mm before the ISO 1133 measuring section).

Measurement
Automatic, including the selection of up to eight freely combinable weight levels.

After the measurement
Automatic extrusion of residual material with adjustable maximum weight.

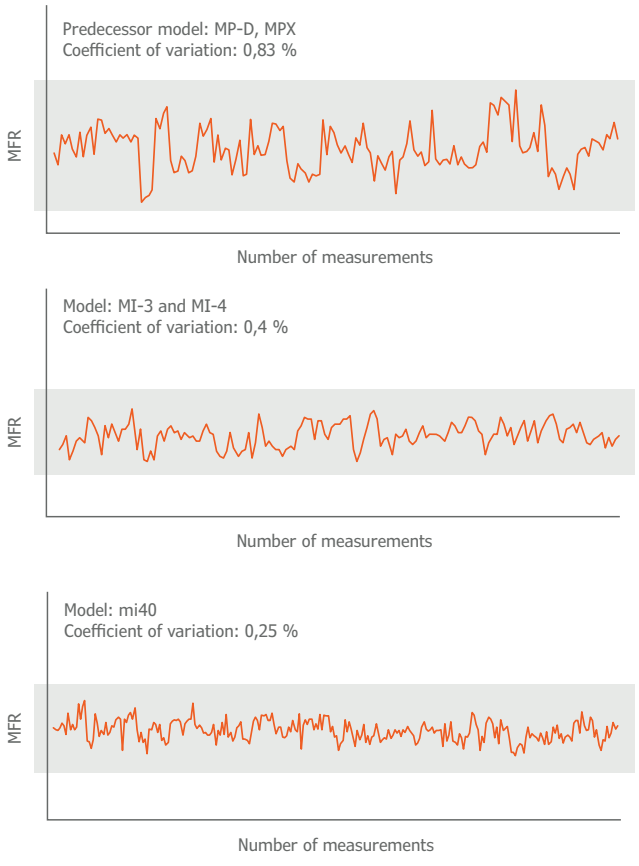
Variation halved – Accuracy doubled

What sounds simple is the result of consistent further development.

Through targeted optimizations in design, manufacturing, and quality control, our Melt Flow Indexers achieve **double the measurement accuracy** and an **even higher level** of instrument repeatability.

The results are based on internal QC tests that every instrument undergoes before delivery. As a reference, a standard PE with an MFR of 7.5 was used. Around 40 test protocols per model series were evaluated.

While the predecessor models MP-D and MPX already achieved excellent dispersion values below 1 % (Ø 0.83 %), the current generation of Melt Flow Indexers mi2, mi3, and mi40 now reach maximum variances of only **0.4 %.**



Maintenance and calibration

of our testing instruments ensuring long service life and minimal downtime

360° SERVICE

To ensure sustainably reproducible and reliable test results, periodic maintenance of dependable testing instruments is essential. The **globally operating and highly trained team** of our service engineers ensures consistently reliable and accurate rheological test results.

Our professionally trained service team and our certified quality management system (according to the international standard DIN EN ISO 9001) **guarantee fast and reliable worldwide service.**

Mehr erfahren unter
goettfert.com/maintenance

OUR MAINTENANCE PACKAGES

We offer a range of service packages to provide the solution that best meets your needs.

SERVICE BASIC+

- ✓ Maintenance of the testing instrument using traceable measuring equipment
- ✓ Upon successful completion, a maintenance checklist (test protocol) is provided
- ✓ The test protocol does not represent an accredited test report or calibration certificate

SERVICE ISO/IEC 17025

- ✓ Maintenance and calibration of the testing instrument using traceable measuring equipment
- ✓ Specification of the smallest measurement uncertainty determined directly on the testing instrument on site
- ✓ After successful calibration, a calibration certificate/result report is issued in accordance with the ISO/IEC 17025 requirements of the DAkkS

Enhanced safety

for Melt Flow Indexers and Capillary Rheometer

WELL ADVISED

Only **regular maintenance** ensures long-term reliability. We offer you a service contract tailored to your needs.

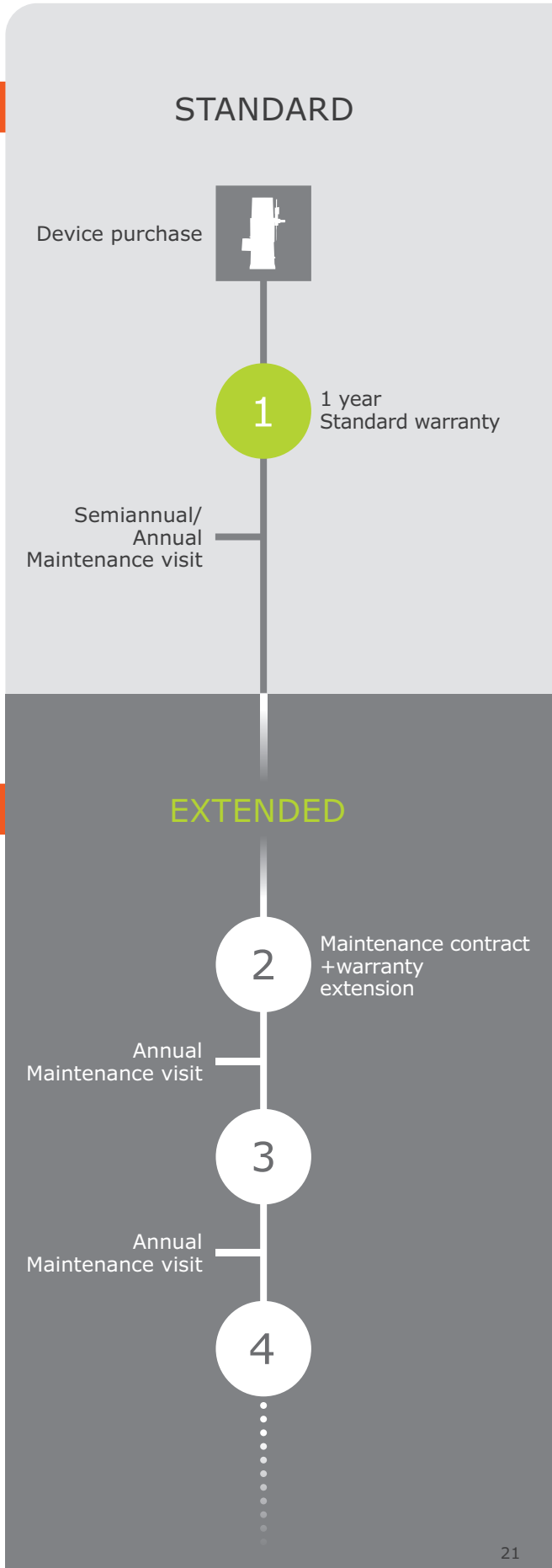
All GÖTTFERT testing instruments are delivered with a 1-year warranty. Enhanced safety extends the warranty for our manually operated Melt Flow Indexers and Capillary Rheometer **by another 12 months**, provided that a maintenance contract (duration 36 months from purchase and up to 12 months thereafter) is concluded. With semi-annual or annual maintenance visits, the reliability of the machine is ensured.

We are happy to prepare a customized offer for you, including further benefits such as SERVICE BASIC+ or SERVICE ISO 17025, **discounted spare parts**, or **prioritized processing of inquiries**. This makes budget and operating costs predictable.

YOUR BENEFITS

- Extension of warranty to 24 months
- Free updates
- 3% discount on spare parts
- 50% discount on in-house training
- Prioritized support on our service platform serviceCONNECT
- Periodic maintenance of your testing instrument
- Maintenance scheduling through service planning

Learn more
goettfert.com/service-contract



Remote Support

Fast, straightforward and targeted handling of service requests

Fast Response via remote access

Commissioning, repairs or maintenance of your GÖTTFERT testing instruments – we provide the right solution and support you regardless of location via remote access.

Our customer platform serviceCONNECT enables direct contact with our product managers.

- ✓ LOCATION-INDEPENDENT
- ✓ DIRECT CONTACT
- ✓ SHORT RESPONSE TIMES
- ✓ STRAIGHTFORWARD

Learn more
goettfert.com/serviceconnect

Specifications

Overview of main parameters




Model	mi1	mi2	mi3	mi40
Test procedure	Automated measurement with single load		Automated measurement with single load and manual weight selection	Automated measurement and software controlled weight selection, Multi load measurement
Test chamber	Two heater circuits, electrically heated, temperature sensor PT100 1/3 DIN Temperature difference over time: < ± 0.1 °C Temperature difference over distance (0 - 70 mm before the die) < ± 0.2 °C of set temperature (temperature range 60 °C to 400 °C) < ± 0.3 °C of set temperature (option: temperature range 400 °C to 500 °C)			
Load steps	0,325 - 21.6 kg			
Weight guidance	Piston guidance according to ISO/ASTM		Piston guidance according to ISO/ASTM and internally installed test weights	
Weight handling system	-	Yes	Yes	Yes
Pre-load and material purge function	Manually with weights (option)		Automated with manual weight selection	Fully automated with weights or force controlled
Multi-Load function	-			8 weight steps, selectable in any sequence
Actual temperature display	0 - 500°C on PC via VNC Viewer	0 - 500 °C on touch screen monitor		
Temperature acquisition	Via 16-bit converter, resolution 0 - 320 °C: 0,01 °C; resolution 320 - 500 °C: 0,1 °C			
Test barrel	9.555 (-0.01) mm diameter			
Touchscreen display	-	14.48 cm (5.7“) Color VGA touch screen monitor		
Test value acquisition	Electronically, resolution: 0,003 mm/Impuls	Electronically, resolution: 0.003 mm/impulse	Electronically, resolution: 0.006 mm/impulse	
Test data display	Numerical			
Die	2.095 (± 0.003) mm diameter, 8 (± 0.025) mm length 1.048 (± 0.005) mm diameter, 4 (± 0.025) mm length (option)			
Advanced evaluation 1	IV calculation to characterize polyester and polyamide based plastics			
Advanced evaluation 2: Add-On die swell measurement	-		Flow Rate Ratio (FRR) calculation for multi load tests	
Melt cutting unit	Option			
Die locking mechanism	Option			
Nitrogen purge	Option			
Corrosion resistant version	Option			
Abrasion resistant version	Option			
Pre-load function	Manual pre-loading (option)		Semi-automatic	Fully-automated
Data input	PC	Touch screen monitor		
Interfaces	Ethernet	Ethernet, serial, 1 or 2 x USB (printer, memory)		
Power supply	115 V or 230 V			
Ambient temperature	+10 - +40 °C			
Ambient humidity	max. 90 % not condensing			
Dimensions Width / Depth / Height (*with cleaning module)	W: 290 mm D: 380 mm H: 530 mm	W: 530 mm D: 380 mm H: 836 mm	W: 888 mm* D: 585 mm* H: 1317 mm*	W: 888 mm* D: 585 mm* H: 1317 mm*
Weight	approx. 37 kg	approx. 75 kg	approx. 170 kg	approx. 200 kg

Rev. I - 09/2025

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