

## Product Information

### Mflow Extrusion Plastometer



#### Applicational range

The Mflow is a modular, expandable device with which you can determine the melt mass and melt volume flow rate. Affordable to setup and gradually expand at any time.

You can optionally expand the Mflow with, for example, the pneumatic weight lifting unit or the weight pegging unit. The extrusion plastometers are equipped with heating elements that are specially adapted to the thermal conditions of extrusion barrel and device covers. This achieves a very good distribution of temperature over space and time.

Operation of the Mflow via a PC offers all the advantages of testXpert III: up to six devices per PC can be operated.

#### Advantages

- The automatic parameter control (APC) minimizes the measurement errors and optimizes the test parameters
- The weight selector allows you to change the test weights quickly and easily. The piston is also held in any pre-heating position required
- A travel transducer is available for determination of the MVR

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#### Basic Instruments

Description	Item number
Mflow Extrusion Plastometer, supply-voltage 220 to 240 V, 50/60 Hz	<b>086973</b>
Mflow Extrusion Plastometer, supply-voltage 100 to 127 V, 50/60 Hz	<b>087023</b>

#### Technical data for Mflow Extrusion Plastometer

The Mflow Extrusion Plastometer in its basic version is equipped for MFR testing to Method A and can be expanded for MVR testing to Method B. Tests according to the following Standards are possible: Methods A and B to ISO 1133, ASTM D 1238, ASTM D 3364, JIS K 7210.

Technical data of the instruments	
<b>General</b>	
Power consumption	500 W
Compressed air, oiled, dry	6 - 10 bar (Option for pneumatic weight lifting unit)
Weight	70.6 kg (all equipment included)
Dimensions Mflow with weight lifting unit and all weights	930 x 360 x 520 mm (Height x Width x Depth)
Dimensions Mflow with weight selector	1078 x 360 x 597 mm (Height x Width x Depth)
Keypad	Pressure point – plastic foil keypad
Display	LCD-Graphic display, back-lit
Number of parameter sets storable	35
Interfaces	<ul style="list-style-type: none"> <li>• USB for connecting PC</li> <li>• RS 232-interface for raw data export, data output: serial number, specimen number, number of cuttings, density (operator input), density at test temperature, total weight of extrudate, MFR median value, MVR median value, MFR and MVR individual values</li> <li>• RS 232-interface to connect a analysis scale from the Zwick product range</li> </ul>
<b>Operational ranges</b>	
Test loads	0.325 up to 21.6 kg
Temperature range	+50 up to +450 °C
<b>Error limits</b>	
Temperature accuracy in the area of 0 to 75 mm over the orifice in the temperature range of 50°C to 450°C	< 0.3 °C with distance and with time, acc. to ISO 1132-2
Temperature display resolution	0.1 °C
Error limit of time measurement (Method A)	±0.02 s using automatic extrudate cutter
Error limit of time measurement (Method B)	±0.001 s
Error limit of travel measurement (Method B)	±0.02 mm (ISO 1133) or ±0.4 % of 6.25 mm (ASTM D 1238)
Resolution of the travel measurement (Method B)	< 0.005 mm
<b>Multiple instrument operation on one PC</b>	
Available minimum RAM	1.54 GB
Processor	3 GHz
Up to 6 Mflow Extrusion Plastometers can be connected to one PC.	

In the **scope of supply** of the Mflow Extrusion Plastometers are USB-cable, test weights (325 g and 2.16 kg), measuring spoon and funnel, cleaning accessories (cleaning rod, cleaning brush, cleaning pads, orifice cleaning drill dia. 2.095 mm) for barrel and orifice, test granulate and a filling channel for the granulate.

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#### Extrusion barrels

An extrusion barrel must be selected depending on the material that is to be tested. Cleaning pads and a cleaning piston are supplied to clean the extrusion barrel.

Description	Item number
Extrusion barrel for fluorine-free plastics, inner dia. 9.55 mm, accurately machined hole, wear-resistant	<b>087025</b>
Extrusion barrel for fluorine-containing plastics, inner dia. 9.55 mm, accurately machined hole	<b>087028</b>

#### Cooling unit

Description	Item number
Cooling unit for a fast cooling of the extrusion barrel with compressed air	<b>090173</b>

#### Pistons

At least one piston must be selected depending on the materials that are to be tested.

If testing should be performed to ISO 1133-1997, a piston with non-rounded edge (sharp-edge) is required:

Description	Item number
Piston for fluorine-free plastics, according to ISO 1133, weight 0.325 kg, wear-resistant	<b>001336</b>
Piston for fluorine-containing plastics, according to ISO 1133, weight 0.325 kg	<b>001340</b>
Piston for fluorine-free plastics, sharp-edge, according to ISO 1133-1997, wear-resistant	<b>001350</b>
Piston for fluorine-free plastics, according to ASTM D 1238, wear-resistant	<b>1007541</b>

#### Orifices

At least one pair of orifices (2 pieces) must be selected depending on the materials that are to be tested.

Description	Item number
Sintered material orifices, inner dia. 2.095 mm, according to ISO 1133 and ASTM D 1238, length 8 mm, wear-resistant, for fluorine-containing and fluorine-free plastics	<b>312342</b>
Sintered material orifices, inner dia. 1.05 mm, according to ISO 1133 and ASTM D 1238 method C, length 4 mm, wear-resistant, for fluorine-containing and fluorine-free plastics	<b>325554</b>
Sintered material orifices, inner dia. 1.18 mm, according to BS 2782-7, method 720A-1997, length 8 mm, wear-resistant, for fluorine-containing and fluorine-free plastics	<b>001351</b>
Sintered material orifices, inner dia. 2.095 mm, according to ASTM D 3364, length 25.4 mm, for PVC tests	<b>092326</b>

#### Protective shields

For catching individual extrudates.

Description	Item number
Protective shield, automatically operated	<b>087036</b>
Protective shield, manually operated	<b>087039</b>

#### Extrudate cutters and orifice plug

For short cutting intervals the automatic extrudate cutter would be the right solution to get a precisely timed cut.

The orifice plug prevents the early flow of the plastic material when testing with high flow rates

(> 10 cm<sup>3</sup> / 10 min at a load of 0.375 kg). If the orifice plug is used, an extrudate cutter is also required in order for the orifice plug to be ejected automatically at the start of the test.

Description	Item number
Extrudate cutter, manually operated	<b>087032</b>
Extrudate cutter, automatically operated, automatic control of the time interval or manually by pushbutton	<b>087035</b>
Orifice plug for tests on high flow rate plastics, incl. ceramics cap	<b>087031</b>

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### Mflow Extrusion Plastometer

#### Travel measurement

Description	Item number
Piston travel transducer, for tests to ISO 1133-Method B and ASTM D 1238 Method B	<b>087698</b>
Control gages, for checking the piston travel transducer for 10, 30 and 50 mm	<b>001396</b>

#### Pneumatic weight lifting unit

The Mflow can be fitted with test weights depending on the type of plastics that is to be tested. For reduced workload, a pneumatic weight lifting unit can be added to lift and lower the weights without using muscle power. The weight-lifting unit allows the test weight to be raised automatically when the pre-heating position is reached, minimizing premature outflow of the plastic granulate during the pre-heating period. When using test weights with test loads e.g. 2.16 kg, 5 kg, 10 kg, and 21.6 kg in combination with the Mflow we recommend the pneumatic weight lifting unit or the weight selector.

Description	Item number
Pneumatic weight lifting unit, requires dry, oiled air	<b>001472</b>
Maintenance unit for weight lifting unit, for drying and oiling of non-conditioned compressed air	<b>004854</b>

#### Pneumatic Weight lifting unit with clean and purge option

Description	Item number
Pneumatic Weight lifting unit with clean and purge option	<b>1007859</b>
Piston for cleaning	<b>1007869</b>
Maintenance unit for weight lifting unit, for drying and oiling of non-conditioned compressed air	<b>004854</b>

#### Test weights

Test weights are required for both the pneumatic weight-lifting unit and the weight lifting unit with clean and purge option.

Description	Item number
Test weights for obtaining a test load of	
5 kg	<b>001380</b>
5 kg, 10 kg	<b>001381</b>
5 kg, 10 kg, 15 kg, 21.6 kg	<b>001443</b>
1 kg	<b>001385</b>
1.05 kg	<b>001386</b>
1.2 kg	<b>001387</b>
3.8 kg	<b>001459</b>
12.5 kg <sup>(1)</sup>	<b>001389</b>
20 kg <sup>(2)</sup> (ASTM D 3364)	<b>008077</b>

<sup>(1)</sup> Requires test weights with test load 5 kg and 10 kg (Item number 001381 or 001443).

<sup>(2)</sup> Requires test weights with test load 5, 10, 15 and 21.6 kg (Item number 001443).

#### Weight selector

The weight selector **contains** the pneumatic weight lifting unit and the test weights listed below. When test weights often change, we recommend the use of the weight selector. With the device for holding the piston in the preheat position (Item number 032419) the test piston can be held in a free adjustable position in the preheat phase.

Description	Item number
Weight selector, incl. test weights 1.2 kg, 2.16 kg, 3.8 kg, 5 kg, 8.7 kg, 10 kg, 12.5 kg, 20 kg, 21.6 kg, requires dry, oiled air,	<b>032418</b>
Test weight 1 kg, for weight selector	<b>032420</b>
Test weight 1.05 kg, for weight selector	<b>032449</b>
Device for holding the piston in the preheat position	<b>032419</b>
Maintenance unit for weight lifting unit, for drying and oiling of non-conditioned compressed air	<b>004854</b>