

# Polymer Melt Rheometer

SmartMelt Series



# The New Standard in Polymer Melt Rheology



The SmartMelt series empowers users to obtain full shear-rheological profiles, including flow curves, oscillation, creep, and relaxation tests – far beyond one-point methods such as Melt Flow Index (MFI). Compliant with ASTM D4440, SmartMelt delivers top-quality measurements that position you at the forefront of your industry.



## SmartMelt 73

SmartMelt 73 is a polymer melt rheometer for routine measurements. It offers the smallest footprint and the most sustainable, energy-efficient operation.



## What sets SmartMelt apart?

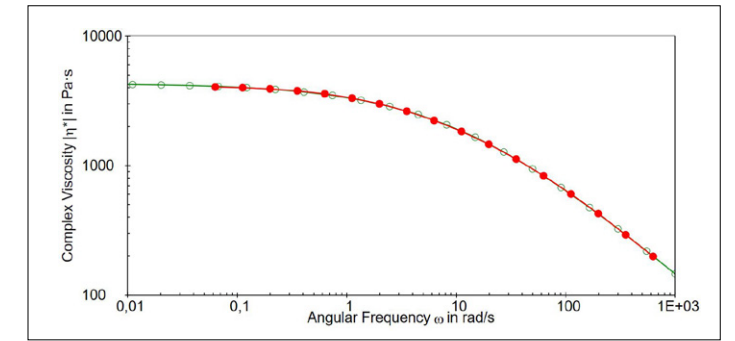
- Best-in-class temperature control – the most budget-friendly and best-performing electrical temperature oven on the market, with a temperature gradient of almost zero within the sample
- Fast, user-friendly operation – automatic recognition of accessories and one-handed coupling ensure rapid setup in seconds, effortless measurement, and consistent results
- Sustainable and efficient – benefit from low compressed gas and energy consumption, as well as quiet operation
- Special SmartMelt oven design – continuous lower plate heating, even during preparation and trimming, ensures efficient sample heating, while inert gas purging throughout the process prevents degradation

## SmartMelt 303

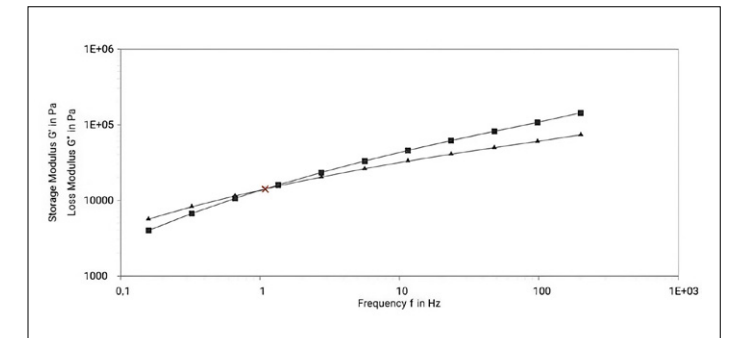
SmartMelt 303 is an advanced polymer melt rheometer with all the convenience and flexibility you're used to from the Anton Paar MCR series. It's also suitable for the measurement of thermoplastics with high viscosity and high filler content.

# Accelerate Your Analysis

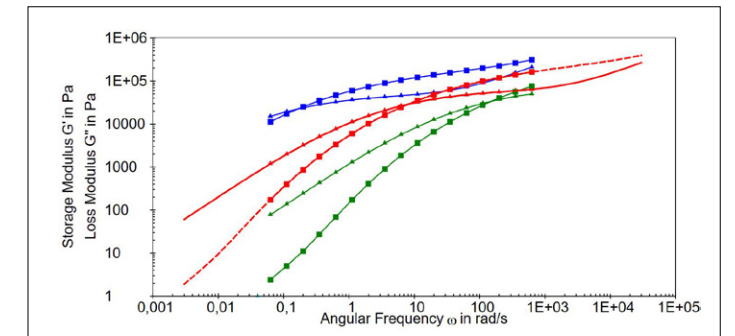
Our tools ensure that operators are trained in no time, optimize time-to-measurement, and deliver reliable polymer melt rheology results.



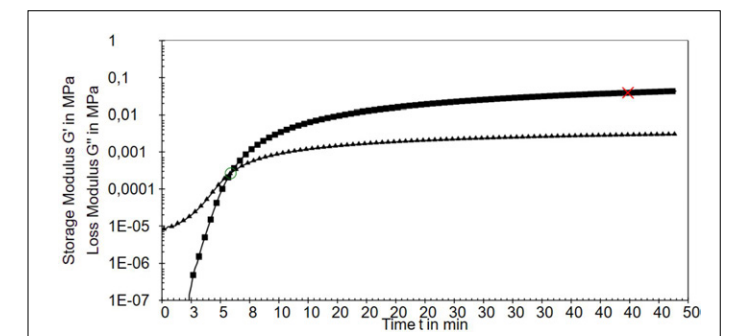
**Complex viscosity:** Complex viscosity of polystyrene at 230 °C; automatic analysis of zero-shear viscosity based on the Carreau-Yasuda model. (green = regression; red = frequency sweep)



**Frequency sweep:** Frequency sweep of polyethylene at 180 °C; automatic analysis of the cross-over point.



**Time-temperature superposition (TTS):** Frequency sweeps of polystyrene at 160 °C (blue), 200 °C (red), 260 °C (green), and the corresponding master curve at a reference temperature of 200 °C.



**Curing:** Curing reaction of a silicone at 90 °C; automatic analysis of the cross-over time (o) and degree of cure (DOC) of 90 % (x).



1. **Toolmaster:** Automatic recognition of measuring geometry and cell
2. **QuickConnect:** One-handed coupling of the measuring geometry in seconds
3. **Gas purging of sample:** Gas purge for samples requiring an inert environment
4. **RheCompass templates:** Pre-prepared measuring workflows
5. **RheCompass analysis:** Various regression models, curve analysis, master curves based on time-temperature superposition (TTS), and much more
6. **Automatic data exchange:** With a lab information management system (LIMS) and report export
7. **Sample preparation and cleaning tools**
8. **Touchscreen:** Full sample preparation and guided testing directly at the instrument

	SmartMelt 73	SmartMelt 303
<b>Specifications</b>		
<b>Bearing design</b>	Air, fine-pored carbon	
<b>Motor design</b>	Electronically commutated (EC) – permanent magnet synchronous motor	
<b>Displacement transducer</b>	High-resolution optical encoder	
<b>Minimum torque (rotation)</b>	100 nNm	5 nNm
<b>Minimum torque (oscillation)</b>	100 nNm	1 nNm
<b>Maximum torque</b>	160 mNm	230 mNm
<b>Angular deflection resolution</b>	8 nrad	3 nrad
<b>Maximum speed</b>	2,500 rpm	3,000 rpm
<b>Minimum angular frequency<sup>1)</sup></b>	2x 10 <sup>-5</sup> Hz	2x 10 <sup>-8</sup> Hz
<b>Maximum angular frequency</b>	100 Hz	250 Hz
<b>Normal force measurement design</b>	×	360° capacitive sensor, non-contacting, fully integrated in bearing
<b>Normal force range</b>	×	0.001 N to 50 N
<b>Temperature device</b>		
<b>Temperature oven design</b>	Electrical temperature oven	
<b>Recommended measuring geometry</b>	Plate-plate, disposables	Plate-plate, cone-plate, disposables
<b>Temperature range</b>	-150 °C to +400 °C	
<b>Maximum heating rate</b>	50 °C/min	
<b>Maximum cooling rate</b>	Up to 100 °C/min <sup>2)</sup>	
<b>Fully automatic temperature calibration</b>	✓	✓
<b>Features</b>		
<b>Ready for extensional, pressure, and powder rheology, tribology, rheo-optics, and more</b>	×	✓
<b>TruStrain – sample-adaptive controller / TruChirp</b>	×	✓
<b>QuickConnect</b>	✓	✓
<b>Toolmaster</b>	✓	✓
<b>Master curve software analysis module</b>	✓	✓
<b>Automatic gap control / setting, AGC / AGS</b>	✓	✓
<b>Dimensions of rheometer</b>		
<b>Dimensions (W x H x D)</b>	442 mm x 725 mm x 596 mm	453 mm x 725 mm x 673 mm
<b>Weight</b>	45 kg	48 kg

Trademarks Toolmaster (3623873), TruStrain (9176918), RheoCompass (9177015)

✓ Included × Not included

1) Set frequencies below 10<sup>-4</sup> rad/s are of no practical relevance due to the measuring point duration >1 day.

2) Maximum cooling rate depends on the coolant media used: 100 °C/min with fluid, 70 °C/min with liquid N<sub>2</sub>, 10 °C/min with air.

# The Rheo Academy



Find out more

## Sign up for our rheology courses and webinars

We regularly offer courses at our global subsidiaries and also organize online or exclusive group courses for customers on request.

Learn the basics of rheology, optimize your work with the RheoCompass software, and gain application-specific knowledge. You can also learn more about specialist subjects and meet our experts for discussions online by taking part in one of our free webinars.

## Enjoy access to an extensive database of knowledge

As a customer, enjoy access to a large database of useful application reports, product documentation, and tutorial videos. Benefit from our comprehensive background knowledge on rheological theory (e.g., through our wiki and the book *Applied Rheology* by renowned expert Thomas Mezger).

## Get in touch with our experts

We provide excellent service and support. With Anton Paar subsidiaries and numerous partners worldwide, a rheological expert is nearby and happy to help. Call us for advice on test definitions or to discuss the rheological challenges you're facing.



## Reliable. Compliant. Qualified.



**Our well-trained and certified technicians are ready to keep your instrument running smoothly.**

Maximum uptime | Warranty program | Short response times | Global service network

