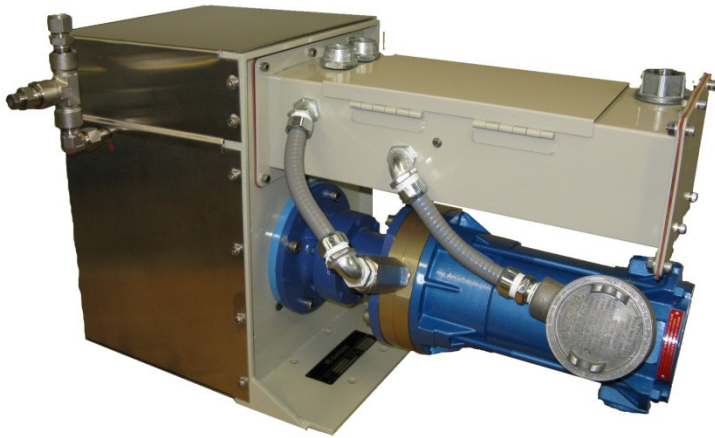


# FCR Series

## Flow Characterization Rheometer



### Features

- Unique dual capillary design
- On-line melt flow rate at two load conditions correlates to ASTM D1238
- Ideal for flow ratio measurements
- On-line apparent viscosities over a broad shear rate range
- On-line measurements of polymer extensional properties
- Customer specified solutions
- Systems for hazardous locations
- Compact measuring head for close extruder connection
- Data exchange by analog and digital input/outputs
- A range of metering pump sizes for specific applications
- Simple “in the field” calibration
- Rugged industrial design

### Description

Specifically designed for the thermoplastics resin industry, the Dynisco FCR series can be configured to measure dual melt flow rate, simultaneous melt flow rate and apparent viscosities, a range of apparent shear viscosities and extensional viscosities using the Cogswell Equations.

The FCR system consists of two parts: a rheometer head and a rheometer control unit (RCU). The rheometer head is connected directly to the process which samples, conditions, and measures the melt flow of the molten resin through two separate dies. The RCU controls the rheometer test parameters (temperature, pressure and rate) and takes in data from the measurement head as well as provides outputs of computed results.

[www.dynisco.com](http://www.dynisco.com)

## The Flow Characterization Rheometer

The measurement head samples molten polymer from the process through a heated transfer line. A three gear metering pump then drives the polymer melt through two separate capillary dies at a precisely controlled rate.

When the system is run at constant pressure (stress) and the flow rate is determined, continuous measurements of the MFR or MFR/ viscosity may be obtained. When it is run at constant rate the simultaneous calculation of apparent viscosities at different shear rates are possible. Extensional viscosities can be obtained when a "zero length" die is used as one of the capillaries.

## Specifications

### Performance Characteristics

<b>Melt Flow Index</b>	0.02 – 5000 g/10 min.
<b>Viscosity Range</b>	10 – 10 <sup>5</sup> Pas
<b>Shear Stress</b>	150 – 1.5 x10 <sup>5</sup> Pa
<b>Shear Rate</b>	1 – 5000 s <sup>-1</sup> (standard die) max. 50,000 s <sup>-1</sup> (special die)
<b>Dies</b>	
Viscosity:	1 – 5mm, 10 to 30:1 L/D
Melt Flow Index:	3.8182:1 L/D
Special Dies:	Upon request
<b>Temp. Range</b>	40 – 350°C
<b>Pressure Range</b>	3 x 10 <sup>5</sup> – 3.5 x 10 <sup>7</sup> Pa
<b>Metering Pump</b>	0.30 cm <sup>3</sup> / RPM (standard) Optional pumps available
<b>Pump Speed</b>	2 – 40 RPM
<b>Polymer Flow</b>	680 g/hour (average)

### Measurement and Control Functions

#### Test Modes

##### Shear Stress Mode:

Set point:	Pressure
Measurement:	Melt Flow Index

##### Shear Rate Mode:

Set point:	Pump Speed
Measurement:	Apparent Viscosity

##### Measurement of extensional Viscosity (Cogswell)

<b>Temperature control:</b>	3 Heating Zones
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## Rheometer Control Unit

The Rheometer Control Unit is contained in a NEMA 4 (IP 54) box that may be located in the control room or on the process floor. Programming of the control functions and output displays are achieved via a local color display with a touch screen interface. The RCU can communicate with a DCS through its analog and serial outputs. The RCU operates independently and will continue its control and analysis functions in the event of a DCS failure.

### Options

- Various capillaries
- Process Isolation Valve
- Standing Console or Wall mount for RCU
- Modbus, TCP or RS585
- Heated transfer section
- Hazardous location
- Additional I/O
- NEMA 4X

### RCU Specifications

<b>Electrical Cabinet</b>	NEMA 4 (IP 54)
<b>CPU</b>	S7-300
<b>Operator Interface</b>	Touch screen display

### Analog Outputs: (4 – 20 mA Standard)

Melt Flow Index
Apparent Viscosity
Melt temperature (2)
Melt pressure (2)
Pump speed
Temp. pump zone
Temp. die zone

### Digital Inputs: (NO/NC dry contacts)

Test ON / OFF (Motor Start / Stop)

### Digital Outputs: (NO/NC)

<b>Fault Alarm</b>	Shuts down analyzer and requires manual restart
<b>Warning Alarm</b>	Information / Deviation alarms, analyzer continues operation

### Electrical Specification

<b>System Voltage</b>	220-240V Single Phase 50/60 Hz
<b>Power</b>	2000 W (max)