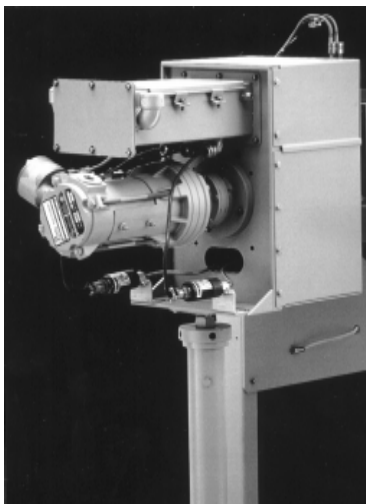


Online Rheometer FCR

Series
FCR

Multiple Possibilities

DYNISCO Polymer Test is a world leader in the field of on-line rheological measurements for the plastics industry. Specifically designed for the thermoplastics resin industry, the FCR (Flow Characterization Rheometer) provides continuous measurements of the melt flow or apparent viscosity directly on the manufacturing process. The FCR system consists of two parts: 1.) The Rheometer, connected directly to the process, which samples, conditions, and measures the flow of the molten resin through two separate dies, and 2.) The RCU (Rheometer Control Unit) that controls the rheometer test parameters, takes in data from the measurement head and provides outputs of computed results. It can provide communications to an external distributed control system. The FCR can be configured to measure dual melt flow rates, simultaneous MFR and apparent viscosity, a range of apparent shear viscosities, and extensional viscosities



using the Cogswell Equations.

The 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 a 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.

Rheometer Control Unit

The Rheometer Control Unit (RCU) 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 digital display with membrane keypad. In addition to its control and programming functions 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.

Features of the system

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

Option for special requirements

Several options complete the broad application range of the FCR Rheometer.

Different capillaries and zero-length dies allow the user to measure melt flow index, apparent viscosity or ex-

tensional viscosity.

The rheometer as well as the **RCU** is available as **general purpose** version and for **hazardous locations**.

A range of gear pump sizes are available for customizing the FCR for

unique applications.

The RCU control cabinet is available as **wall mounted** version or with **free standing console (option)**.

Specifications FCR with control unit RCU

Performance Specification:

Melt flow index	0.02 – 5000 g/10 min
Viscosity	10 – 10 ⁵ Pa s
Shear stress	150 – 15 x 10 ⁵ Pa
Shear rate	1 – 5000 s ⁻¹ (with standard dies) max. 50000 s ⁻¹ (with special die)
Capillary dies:	
Viscosity:	∅ 1 – 5 mm, 10:1 to 30:1 L/D
Melt Flow Index:	∅ per melt flow, 3.8182 L/D
Special dies upon request	
Temp. range	up to 350 °C
Pressure range	40-5000 psi (3 x 10 ⁵ – 3.5 x 10 ⁷ Pa)
Metering Pump	0.380 cm ³ /rev Optional sizes available
Pump Speed	2 – 40 rpm
Polymer Flow	1.5 lbs/hr (680 g/h) avg.

Measurement and Control Functions:

Test Modes

Shear Stress Mode: Setpoint:

 Pressure Measurement: Melt
 Flow Index

Shear Rate Mode:

 Set point: Pump speed

 Measurement: Apparent viscosity

Measurement of extensional viscosity (Cogswell)

Temp. control 3 Heating zones

Specification:

Electr. Cabinet	NEMA 4 (IP 54)
CPU 80188	E-PROM Embedded Applications Program
Operator Interface	LCD display
Analog Outputs: (4 - 20 mA standard)	
Standard	Melt Flow Index and/or apparent viscosity (2 outputs)
Optional	Melt temperature (2 outputs) Temperature pump zone Temperature die zone Melt pressure (2 outputs) Pump speed

Digital Inputs: (NO / NC dry contact)

Test ON/OFF (Motor Start / Stop)

Digital Outputs: (NO / NC)

Fault Alarm	Shuts down analyzer and requires manual restart
Warning Alarm	Information / Deviation Alarms Analyzer continues to operate

Serial Output: RS 232/485 standard

Electrical Specific.:

System voltage	115/230 VDC 50/60 Hz
Power consumt.	2000 W (max.)

Options

Stand for RCU

Process Isolation Valve Heated transfer section Hazardous location Additional I/O

NEMA 4X

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