

# Dynisco Laboratory Capillary Rheometer (LCR)

## LCR7000/7001/7002 Series

Offering Sophisticated  
Materials Characterization



### VERSATILE

The new LCR7000 Series Capillary Rheometers offer many new features and will meet the demands of a 24-hour-a-day shop floor operation while maintaining the highest possible level of accuracy, repeatability and sensitivity. The LCR series rheometers are versatile and easy to use yet they offer the most sophisticated materials characterization, data analysis, and reporting capabilities. The LCR series can be used with a standard load cell and a barrel mounted pressure transducer.

### SOPHISTICATED SOFTWARE

LAB KARS ("Kayeness Advanced Rheology Software") is the most powerful and easy to use rheological Windows™-based software package available. Just a few of its easily usable features include: Bagley and Rabinowitsch Corrections plus power law, Carreau, Modified Cross and polynomial viscosity models. With this software users can merge multiple data files from shear stress, shear rate, or thermal stability tests. The resident KARS SQC module can be used to quickly identify viscosity variations in different lots of material. A program for the correlation of melt viscosity to intrinsic viscosity, for PET and Nylon, is also included.

### REAL-TIME DISPLAY

In addition to all of its other powerful features LAB KARS for Windows™ provides a real time display of force or pressure versus time as a test progresses. This feature allows the operator to identify the steady state flow condition for the material. In addition, the presence of contamination, unmelted resin, or bubbles in the material may be identified from spikes in the force versus time curve.

## Features

- All digital calibration
- Increased speed and force range
- Advanced electronics and software enable up to 45 shear stress or shear rate data points per test
- Unique algorithms for polymer melt stability
- Bi-directional communications enable test parameters to be downloaded from the PC
- Multiple barrel heating zones and adaptive PID temperature control algorithm provide precise and uniform heat up to 430C (500C optional for Model 7000 and 7001 only)
- Precision servo-drive motor and transducers enable tight control of stress and rate mode tests
- Tungsten carbide dies and a hardened and honed tool steel barrel ensure long years of service
- LAB KARS, advanced rheology software

## LAB KARS Features

- Bagley and Rabinowitsch Corrections
- Carreau, Modified Cross, Power Law and Polynomial curve fits
- Arrhenius temperature fit
- Statistical error estimation
- Shear rate dependence
- Time at temperature relationship
- Critical shear stress
- Zero shear viscosity
- Intrinsic viscosity correlation

Specifications		
Model	Description:	Options for Special Requirements A comprehensive list of optional features provides for the testing of a wide range of materials. These include:
LCR7000	LCR7000 capillary rheometer with load cell, with cleaning and operating tools and one tungsten carbide orifice.	<p><b>Corrosion resistant alloy barrel</b> for testing corrosive materials such as PVC</p> <p><b>Tungsten carbide dies</b> with a broad range of diameters and L./D ratios provide a wide range of measurement capability</p> <p><b>Laser micrometer</b> for accurate measurements of die swell as the extrudate exits the die</p>
LCR7001	LCR7001 capillary rheometer with load cell, barrel mounted pressure transducer and long barrel, includes cleaning and operating tools and three tungsten carbide orifices.	<p><b>Corrosion resistant alloy barrel</b> for testing corrosive materials such as PVC</p> <p><b>Tungsten carbide dies</b> with a broad range of diameters and L./D ratios provide a wide range of measurement capability</p> <p><b>Melt pressure transducer</b> mounted just above the die, eliminates frictional and barrel pressure effects</p> <p><b>Laser micrometer</b> for accurate measurements of die swell as the extrudate exits the die</p>
LCR7002	LCR7002 dual bore capillary rheometer with barrel mounted pressure transducers, cleaning and operating tools and four tungsten carbide dies	

<b>Physical Specifications (LCR7000)</b>	
<b>Standards:</b>	DIN ISO 11433, DIN 53014, DIN 54811, ASTM D3835
<b>Barrel:</b>	l = 7.0" (162mm) $\phi = 0.376" \pm 0.0002"$ (9.55mm $\pm$ 0.005mm)
<b>Drive System:</b>	DC Servomotor
<b>Piston Speed:</b>	0.03 to 600mm/min
<b>Dynamic Range:</b>	20,000:1
<b>Testing Force:</b>	10 kN standard (resolution 0.2N), 15 kN (optional)
<b>Force Measurement:</b>	Load cell, barrel mounted pressure transducer (optional)
<b>Dies:</b>	Tungsten carbide capillary, many L/D ratios available
<b>Die Swell Measurement:</b>	Laser-Micrometer (optional)
<b>Temperature Range:</b>	up to 430°C Standard
<b>Temperature Control:</b>	4-zone electric heater
<b>Temperature Sensor:</b>	4-wire Platinum RTD
<b>Temperature Control:</b>	Adaptive PID-temperature-control-algorithm with 0.1°C resolution
<b>Temperature Accuracy:</b>	$\pm 0.2^\circ\text{C}$ at 0.50" (13mm)
<b>Ambient Temperature:</b>	20 to 30°C
<b>Relative Humidity:</b>	20% to 80%
<b>Voltage:</b>	10% of Nominal Voltage
<b>Power Supply:</b>	115/230Vac, 50/60Hz
<b>Power Consumption:</b>	750W max, 200W typical
<b>Data Processing System:</b>	PC-based
<b>System Software:</b>	LAB KARS for Windows™ (Kayeness Advanced Rheology Software)
<b>Options and Accessories</b>	
<b>D7052DS2</b>	Laser micrometer die swell measuring system
<b>GP8000C</b>	Personal computer with LAB KARS for Windows software installed
<b>GP7984C</b>	Color Printer
<b>8052-97K</b>	Barrel cleaning kit – 110V
<b>8052-97KE</b>	Barrel cleaning kit – 230V
<b>GRAN</b>	High speed mini granulator
<b>BTP1000A</b>	Barrel temperature calibration kit – 110V
<b>BTP100AHV</b>	Barrel temperature calibration kit - 230V
<b>8052-65BG</b>	Barrel bore verification kit
<b>D7992</b>	Electronic load cell calibration kit

<b>Physical Specifications (LCR7001)</b>	
<b>Standards:</b>	DIN ISO 11433, DIN 53014, DIN 54811, ASTM D3835
<b>Barrel:</b>	l = 7.88" (200mm) $\phi = 0.376" \pm 0.0002"$ (9.55mm $\pm 0.005$ mm)
<b>Drive System:</b>	DC Servomotor
<b>Piston Speed:</b>	0.03 to 600mm/min
<b>Dynamic Range:</b>	20,000:1
<b>Testing Force:</b>	10 kN standard (resolution 0.2N) per bore
<b>Force Measurement:</b>	Barrel mounted pressure transducers (2)
<b>Dies:</b>	Tungsten carbide capillary, many L/D ratios available
<b>Temperature Range:</b>	up to 430°C Standard
<b>Temperature Control:</b>	4-zone electric heater
<b>Temperature Sensor:</b>	4-wire Platinum RTD
<b>Temperature Control:</b>	Adaptive PID-temperature-control-algorithm with 0.1°C resolution
<b>Temperature Accuracy:</b>	$\pm 0.2^\circ\text{C}$ at 0.50" (13mm)
<b>Ambient Temperature:</b>	20 to 30°C
<b>Relative Humidity:</b>	20% to 80%
<b>Voltage:</b>	10% of Nominal Voltage
<b>Power Supply:</b>	115/230Vac, 50/60Hz
<b>Power Consumption:</b>	750W max, 200W typical
<b>Data Processing System:</b>	PC-based
<b>System Software:</b>	LAB KARS for Windows™ (Kayeness Advanced Rheology Software)
<b>Options and Accessories</b>	
<b>D7052DS2</b>	Laser micrometer die swell measuring system
<b>GP8000C</b>	Personal computer with LAB KARS for Windows software installed
<b>GP7984C</b>	Color Printer
<b>8052-155</b>	Pressure transducer port cleaning kit
<b>8052-97K</b>	Barrel cleaning kit – 110V
<b>8052-97KE</b>	Barrel cleaning kit – 230V
<b>GRAN</b>	High speed mini granulator
<b>BTP1000A</b>	Barrel temperature calibration kit – 110V
<b>BTP100AHV</b>	Barrel temperature calibration kit - 230V
<b>8052-65BG</b>	Barrel bore verification kit
<b>D7992</b>	Electronic load cell calibration kit

Physical Specifications (LCR7002)	
Standards:	DIN ISO 11433, DIN 53014, DIN 54811, ASTM D3835
Barrel:	l = 7.88" (200mm) $\varnothing = 0.376" \pm 0.0002"$ (9.55mm $\pm 0.005$ mm)
Drive System:	DC Servomotor
Piston Speed:	0.03 to 600mm/min
Dynamic Range:	20,000:1
Testing Force:	10 kN standard (resolution 0.2N), 15 kN (optional)
Force Measurement:	Load cell, barrel mounted pressure transducer (optional)
Dies:	Tungsten carbide capillary, many L/D ratios available
Die Swell Measurement:	Laser-Micrometer (optional)
Temperature Range:	up to 430°C Standard
Temperature Control:	4-zone electric heater
Temperature Sensor:	4-wire Platinum RTD
Temperature Control:	Adaptive PID-temperature-control-algorithm with 0.1°C resolution
Temperature Accuracy:	$\pm 0.2^\circ\text{C}$ at 0.50" (13mm)
Ambient Temperature:	20 to 30°C
Relative Humidity:	20% to 80%
Voltage:	10% of Nominal Voltage
Power Supply:	115/230Vac, 50/60Hz
Power Consumption:	750W max, 200W typical
Data Processing System:	PC-based
System Software:	LAB KARS for Windows™ (Kayeness Advanced Rheology Software)
Options and Accessories	
GP8000C	Personal computer with LAB KARS for Windows software installed
GP7984C	Color Printer
8052-155	Pressure transducer port cleaning kit
8052-97K	Barrel cleaning kit – 110V
8052-97KE	Barrel cleaning kit – 230V
GRAN	High speed mini granulator
BTP1000A	Barrel temperature calibration kit – 110V
BTP100AHV	Barrel temperature calibration kit - 230V
8052-65BG	Barrel bore verification kit
D7992	Electronic load cell calibration kit

