



DL1000

DURABILITY & LUBRICITY TEST SYSTEM

OakRiver Technology's DL1000 provides accurate, reliable measurement of the durability and lubricity of hydrophilic coatings on catheters and guidewires. Engineered with robust components and controls, the DL1000 maximizes productivity and provides flexible, easy to use features for lab and production applications. The software makes recipe setup and system calibration convenient, and is CFR 21 Part 11 compliant to aid in validation activities.

DL1000 OPERATION

- The test device is manually fixtured to the DL1000 in a vertical orientation and a pre-developed recipe is selected
- Grippers automatically close onto the device and exert a recipe-specified horizontal force onto the device, typically within a liquid test media
- The device is pulled and/or pushed through the grippers at the **recipe-specified** speed(s), distance(s) and number of cycles
- The DL1000's 'active' gripper design verifies and **actively maintains a constant gripper force** using closed-loop control; this minimizes the potential effect that changes in device geometry may have on the test results
- The resulting tension/compression force values are **plotted real-time** for a quick comparison tool
- The raw data is stored and used to auto-generate a comprehensive test report with **overall pass/fail indication** to assist in the durability and lubricity evaluation of the device



USER-FRIENDLY

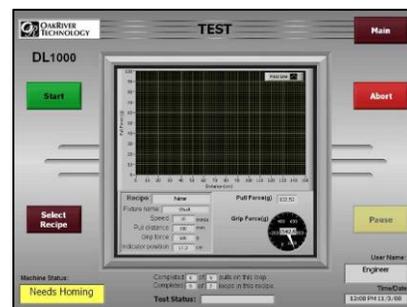
- Tool-less calibration and fixture change-out
- PC-based controls & touch-screen interface
- Intended for Production and R&D environments with 3 access levels
- Access to historical data, with the ability to create, view, print and save test reports

FLEXIBILITY

- Customizable and interchangeable gripper pad cassettes
- 6 interchangeable fixtures included for optimal device holding
- Removable base plate - allows for optional extended tank, heated baths, torturous path fixturing and other customizations

SOFTWARE

- **Advanced controls** – rapid set-up and simple data export for offline data analysis
- **Intuitive software** – provides maximum flexibility for R&D settings, as well as consistent, routine testing in production applications
- **Fast calibration** – easy software-driven calibration of load cells in less than 10 minutes with automatic notification and history tracking



SOFTWARE (CONTINUED)

- **Maintenance** – Built-in maintenance schedule and step-by-step guide for routine PM activities
- **Testing** – live graphing of results and progress
- **Recipes** – Highly configurable recipe setup with 'teach' functionality for position capture



- **Data Collection** – raw data archiving, with network interface capability for data storage
- **Reporting** – configurable test reports along with Excel compatible files (.csv) containing raw data
- **Alarm Handling** – Detailed error messages to guide user in troubleshooting and diagnostics

CONFIGURATIONS

The following DL1000 configurations are optional. Additional configurations available upon request.

Rotational Clamp



- This fixture allows the user to manually rotate the test device every 45 degrees providing the capability to test multiple sides without re-clamping the device.

Cart & Extended Tank



- This option includes a cart on casters with the top plate for mounting the DL1000. The setup allows for the use of the extended tank for elongated parts and/or extended test lengths. The transparent tank has built-in ports for the capability of adding heated water bath circulation (not included). The cart can be used with the extended tank or the originally supplied beaker.

ACCESSORIES

The DL1000 includes the following accessories. Additional accessories available upon request.

Pin Vise Set



- Capable of device diameters of 0.000 - 0.187" (0.00 - 4.8mm)

Hand-Tightened Chuck



- Tool-less operation
- Capable of device diameters of 0.063 - 0.5" (1.5 – 12.7mm)

Alligator Clip



- 5/16" Jaw opening

Gripper Pad Cassettes (2)



- 0.5" (12.7mm) gripper pad height (other heights available upon request)
- 60 (Shore A) durometer silicone rubber pads

Beaker



- 2L Pyrex beaker for test solution containment

Calibration Kit – Weights Traceable to NIST



- 1kg +/- 0.0001kg
- 500g +/- 0.07g
- 200g +/- 0.04g
- 50g +/- 0.01g

SPECIFICATIONS

Description	Specification
<i>Process Capabilities</i>	
Maximum Part Length	550mm (21.6") *Bottom plate can be removed to extend maximum part length
Maximum Push/Pull Length	330mm (13")
Maximum Part Diameter	19.1mm (0.75")
Minimum Part Diameter	0.9mm (0.035") **Smaller diameters may be possible with alternative grippers
Gripper Pad Material	60 (Shore A) Durometer Silicone Rubber (alternatives available upon request)
Max Distance Between Open Grippers	40mm (1.6") *Depends on specific cassettes and gripper pads
<i>Motion Control</i>	
Pull Speed Range	0.1cm/s - 5cm/s
Position Repeatability	+/- .02mm
Pull Force Capacity	1000g (standard), 500g and 2000g (optional)
	0.1%FS (±1g; Max pull force capacity:1000g - standard)
Grip Force Range	100 - 1000g
Grip Force Accuracy	0.2%FS (±2g)
Grip Force Stability	0.5%FS (±5g)
Gripper Height Adjustment	Manual with ruled reference in millimeters and inches
<i>Operation</i>	
Loading Ergonomics	Adjustable by recipe
HMI	15" Touch-screen monitor for all production functions Keyboard and mouse optional for developmentfunctions Compatible with barcode scanner
Monitor Height	8.5" off of table to center of screen
<i>Safety</i>	
E-Stops	1 (Front)
Electrical Enclosure	Main power disconnect & padlock functionality
<i>Calibration</i>	
Components	Pull force load cell and grip force load cell
Calibration Kit	Included; weights traceable to NIST certification
<i>Data Logging</i>	
Compliance	CFR 21 Part 11
Grip Force Monitoring	Actively read, regulated and recorded
Maximum Data Acquisition Rate	125 Hz
SQL Databasing	Test data and reports, access codes and logins, test recipes, errors and alarms
Hard Disk Space	500GB
<i>Materials/Construction</i>	
Process-Exposed Materials	316 Stainless Steel, Silicone Rubber, PSA
Compatibility with Test Media	DI water and saline (PBS)
Debris Generation Resistance	Stainless steel & coated aluminum parts; sealed bearings (no lubrication required)



SPECIFICATIONS (CONTINUED)

Description	Specification
<i>Dimensions</i>	
Height	94cm (37in)
Width	46cm (18in)
Depth	56cm (22in)
Working Height	94cm (37in)
Working Width	92cm (36in)
Working Depth	97cm (38in) (rear-mounted electrical enclosure door swing)
Reservoir Diameter	13cm (5.2in)
Reservoir Height	19cm (7.6in)
Reservoir Volume	2L
Weight	150lbs
<i>Electrical/Pneumatics</i>	
Voltage	120 VAC
Frequency	60 Hz
Phases	1
Wires	3
Full-Load Current	4 Amps
Largest Load	1.9 Amps
Short Circuit	5000 Amps
Electrical Enclosure Design	NEMA 12
Air Pressure	90 psi
<i>Controls</i>	
Computer	Industrial PC – 2.2GHz, 8GB RAM, 500Gb hard drive
Ethernet Ports	1
USB Ports	3
I/O Module	6212 DAQ
Software Platform	NI LabVIEW
Software Access Levels	3: Operator, Technician, Engineer

OAKRIVER MEDICAL DEVICE COATING

OakRiver Technology offers a growing portfolio of innovative medical device coating equipment to compliment the DL1000 Durability & Lubricity Test System. Our coating products are built on a foundation of medical device industry experience and unmatched equipment engineering and design capabilities.

OakRiver Technology's current portfolio of medical device coating products includes:



- DC10 · DC20 Medical Device Dip-Coating System
- DC100x Medical Device Dip-Coating System
- DC200 Medical Device Dip-Coating System
- DL1000 Durability and Lubricity Test System
- SC1000, HC1000 Specialty Coating Systems



Additional products are currently under development - contact OakRiver Technology to learn more.

FOR MORE INFORMATION

To learn more about OakRiver Technology's product lines, or our process automation and manufacturing services, please contact OakRiver today

