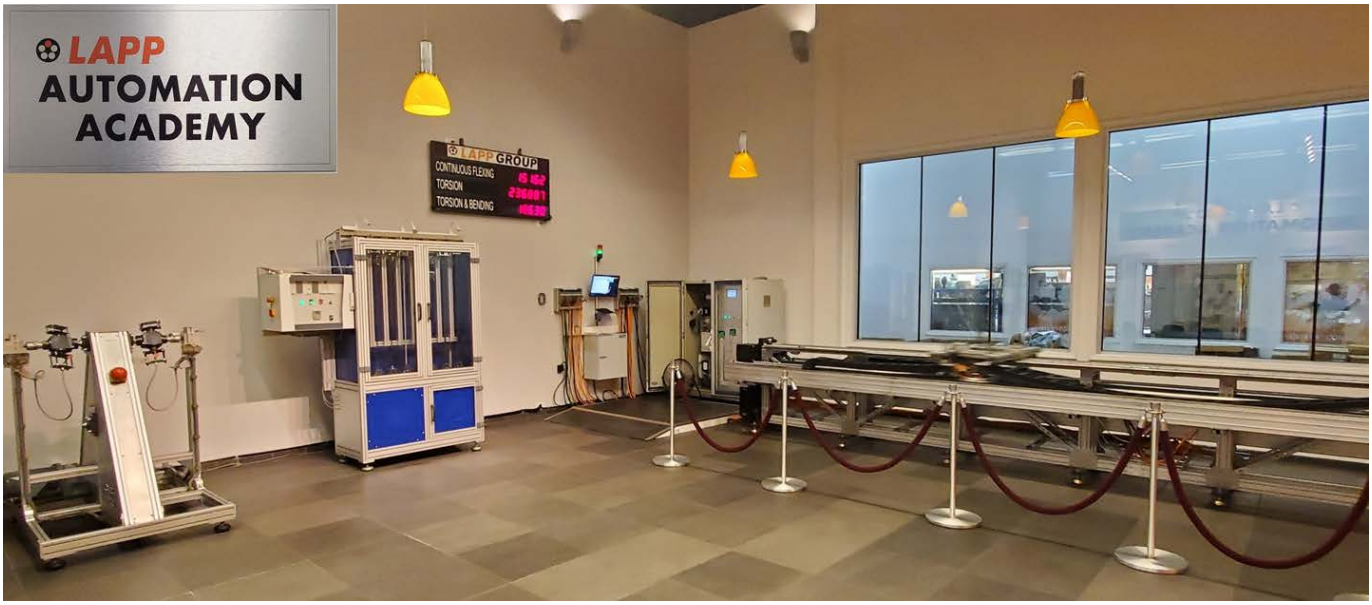
LAPP NORTH AMERICA EARNS UL VERIFICATION FOR CONTINUOUS FLEX TEST METHOD

LAPP's CONTINUOUS FLEXING HISTORY

LAPP North America was first established in New Jersey in 1976. Our newly renovated 130,000 square foot facility in Florham Park, which houses a modern manufacturing plant, has LAPP NA's State of the Art Research and Development test laboratory that is an active participant in the UL Client Test Data Program (CTDP) and CSA Supervised Manufacturer's Testing for Certification (SMTC) Program.

LAPP is a pioneer in products designed for dynamic applications – including Continuous Flexing, Torsional, and Robotic – and we have over 55 years of product development experience with this methodology and technology.



LAPP's CONTINUOUS FLEXING HISTORY (cont.)

The need to perform Continuous Flexing (FD) testing is driven by ever evolving industry and real-world applications that require increased levels of movement in manufacturing automation. To offer products that meet and exceed customer applications requirements, LAPP's test methods and parameters have been carefully developed using years of industry experience and customer feedback.

Rather than use generic statements that our cables were simply "extremely flexible," LAPP's innovative principles drove us to create continuous flexing cable performance guidelines. LAPP's Motion type attributes have become the standard to follow in the continuous flexing cable industry and are used by contractors, designers, equipment manufacturers, and end-users. At LAPP we test our products in a controlled environment to emulate end-use applications in order to evaluate and determine a product's continuous flexing characteristics and performance.

Motion type

Level	Description	Definition	Cycle life range
FL-00	very stiff (static)	low strand count and difficult to work with, used in static applications	–
FL-01	flexible	can be easily installed in machines, conduit, and cable tray when applicable	–
FL-02	highly flexible	high flexibility with continuous flexing design attributes	–
WT-01	wind turbine torsion -20°C	designed for basic wind torsion to an angle of ± 150°/m application temperature: -20°C	up to 2,000 cycles
WT-02	wind turbine torsion -40°C	designed for basic wind torsion to an angle of ± 150°/m application temperature: -40°C	up to 2,000 cycles
WT-03	wind turbine torsion -50°C	designed for basic wind torsion to an angle of ± 150°/m application temperature: -50°C	up to 2,000 cycles
CF-01*	continuous flexing: basic	designed for basic continuous flexing and cable track applications distance: chain length up to 15 feet	1 - 2 million cycles
CF-02*	continuous flexing: moderate	designed for continuous flexing and cable track applications distance: chain length up to 30 feet	2 - 8 million cycles
CF-03*	continuous flexing: high	designed for high cycle continuous flexing and cable track applications distance: chain length up to 30 feet	8 - 20 million cycles
CF-04*	continuous flexing: high-extended	designed for high cycle continuous flexing and long cable track applications distance: chain length up to 300 feet	8 - 20 million cycles
CF-04A*	continuous flexing: high- extended high-acceleration	designed for high-cycle continuous flexing and long cable track applications distance: chain length up to 300 feet acceleration: up to 50 m/s² for chain length up to 15 feet	8 - 20 million cycles
T-01	torsion	designed to withstand torsion applications	2 million cycles
TCF-01	torsion & continuous flex	designed for high cycle continuous flexing and torsion applications	10 million cycles

* When comparing cycle life data between cables, the following critical variables must be evaluated: bend radius, distance, acceleration, speed & weight

Test Conditions	LAPP Capabilities
Minimum Bending Radius Factor Range for LAPP products	5 to 15 x Cable OD
Bending Radius Range during Testing	4 to 12 x Cable OD
Travel distance range under test conditions	15 – 300 feet (5 – 100 Meters)
Acceleration under test conditions	Up to 160 ft / s^2 (Up to 50 m/s^2)
Temperature range under test conditions	-10°C to +22°C
Speed of travel during testing	Up to 5 m/s

UL VERIFICATION

Verification is an objective, science-based assessment that confirms the accuracy of marketing claims. Their independent assessment process scrutinizes the validity of specific advertising or promotional statements, giving consumers a way to separate fact from fiction.

For more information visit: verify.ul.com

LAPP's CONTINUOUS FLEX TEST METHOD VERIFICATION

LAPP's Continuous Flex Test Method Verification helps designers, contractors, and other customers determine a product's point of degradation with regards to electrical and mechanical parameters based on the number of continuous flexing cycles it has undergone. This method also allows end users to estimate a preventative maintenance program based on the product's life cycle performance.

UL has performed a detailed audit surveillance of LAPP's Continuous flex testing methodology claims (Motion Type attributes: CF-01, CF-02, and CF-03)

- This audit required LAPP to have specialty equipment that had been calibrated and functioned as per the described claim. The auditor witnessed and observed the flex testing process
- The laboratory staff must be well trained in equipment operation and test procedures
- This assessment also included an audit of the laboratory test database and record keeping procedures used to validate these claims
- All documentation must be controlled and maintained in compliance with ISO 17025 requirements

The Continuous Flex Test Method Verification by UL further substantiates LAPP's credibility as an established industry leading manufacturer of flexing cables with a commitment to quality and our dedication to innovation.

SOPHISTICATED COMPUTERIZED EQUIPMENT + LAPP FD EXPERTISE + VERIFIED TEST METHODS
= LAPP's MOTION TYPE ATTRIBUTES

BENEFITS OF USING LAPP FD PRODUCTS

LAPP USA differentiates itself from the competition by monitoring both mechanical and electrical performance characteristics

By monitoring changes in the electrical performance of a cable, it is possible for LAPP to identify a point of electrical degradation before any signs of mechanical (visual) fatigue – “capability to predict failures before total loss of continuity”

Evaluating a product’s mechanical and electrical performance characteristics provides the ability to categorize LAPP USA motion type attributes (CF-01, CF-02, and CF-03 ratings) more precisely and accurately

Knowing a product’s electrical behavior under flexing conditions enables LAPP customers to create a preventative maintenance schedule for reducing downtimes and increasing equipment reliability

To learn more about LAPP’s UL verification of Continuous Flexing Test Method, please visit verify.ul.com.