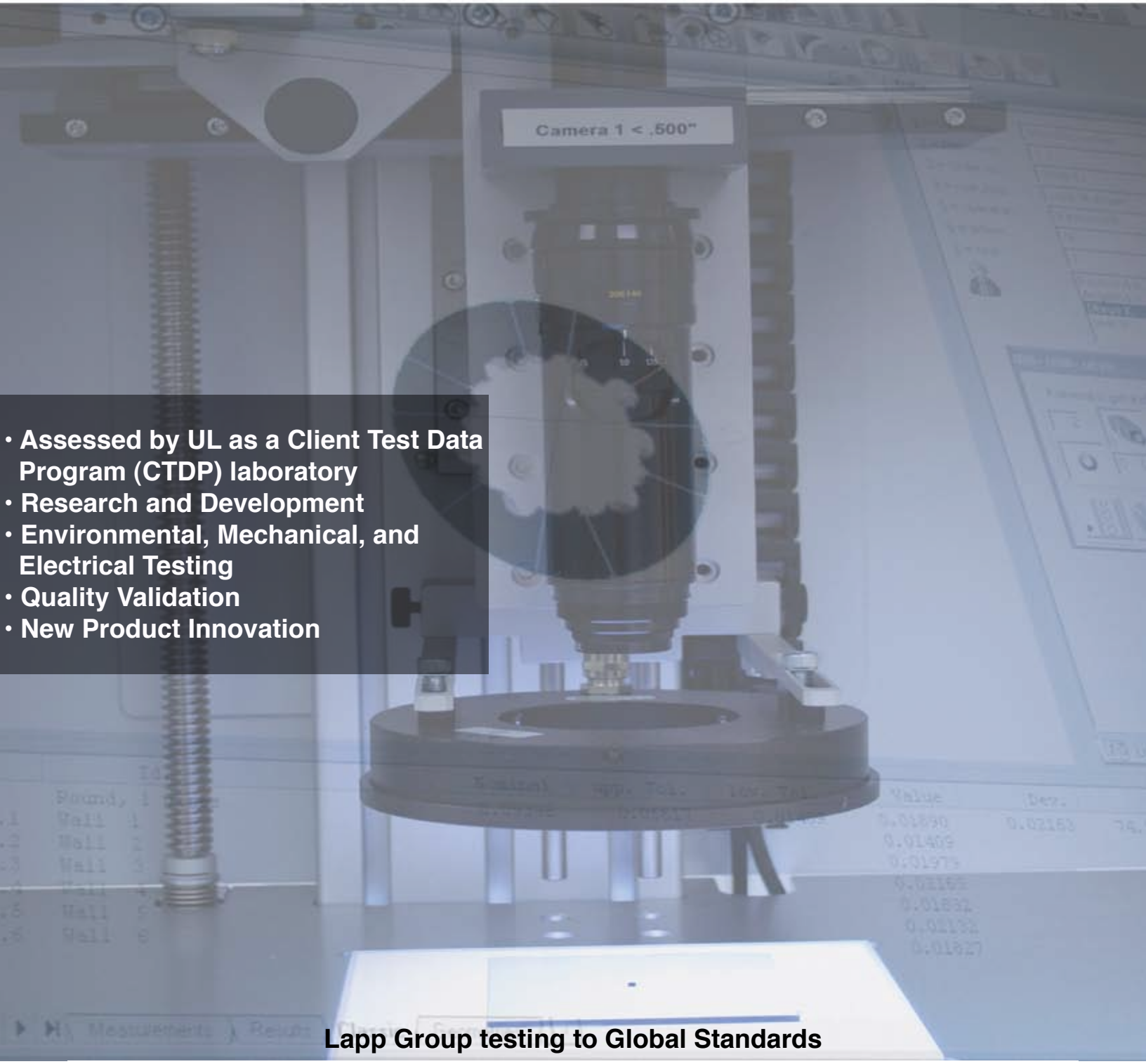
LAPP GROUP

NORTH AMERICAN LABORATORY
CENTER FOR COMPETENCE AND INNOVATION

"Innovation Creates our Future"



- Assessed by UL as a Client Test Data Program (CTDP) laboratory
- Research and Development
- Environmental, Mechanical, and Electrical Testing
- Quality Validation
- New Product Innovation

Lapp Group testing to Global Standards

800-774-3539
www.lappusa.com

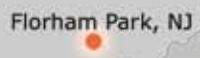
LAPP GROUP

Mission Statement:

The Lapp Group's Center for Competence and Innovation develops industry leading and innovative solutions for our customers. We validate designs of high-performance Industrial Cables, Connectors, and Cable Accessories through continuous testing in Lapp laboratories.

800-774-3539
www.lappusa.com

Catalog of Testing and Engineering Competency



The Lapp Group recently created a state-of-the-art laboratory at our North American (NA) headquarters in Florham Park, NJ. This facility is a key asset for Lapp's development, testing, and validation of products. We also simulate specific customer applications and environments to confirm our products' performance. We welcome Lapp customers to our lab to witness product testing that is specific to their applications.

UL completed assessment of this facility for the UL Data Acceptance Program (DAP) as a UL Client Test Data Program (CTDP) laboratory. This means the equipment and test methods have been certified to precisely meet the same requirements as at UL test facilities.

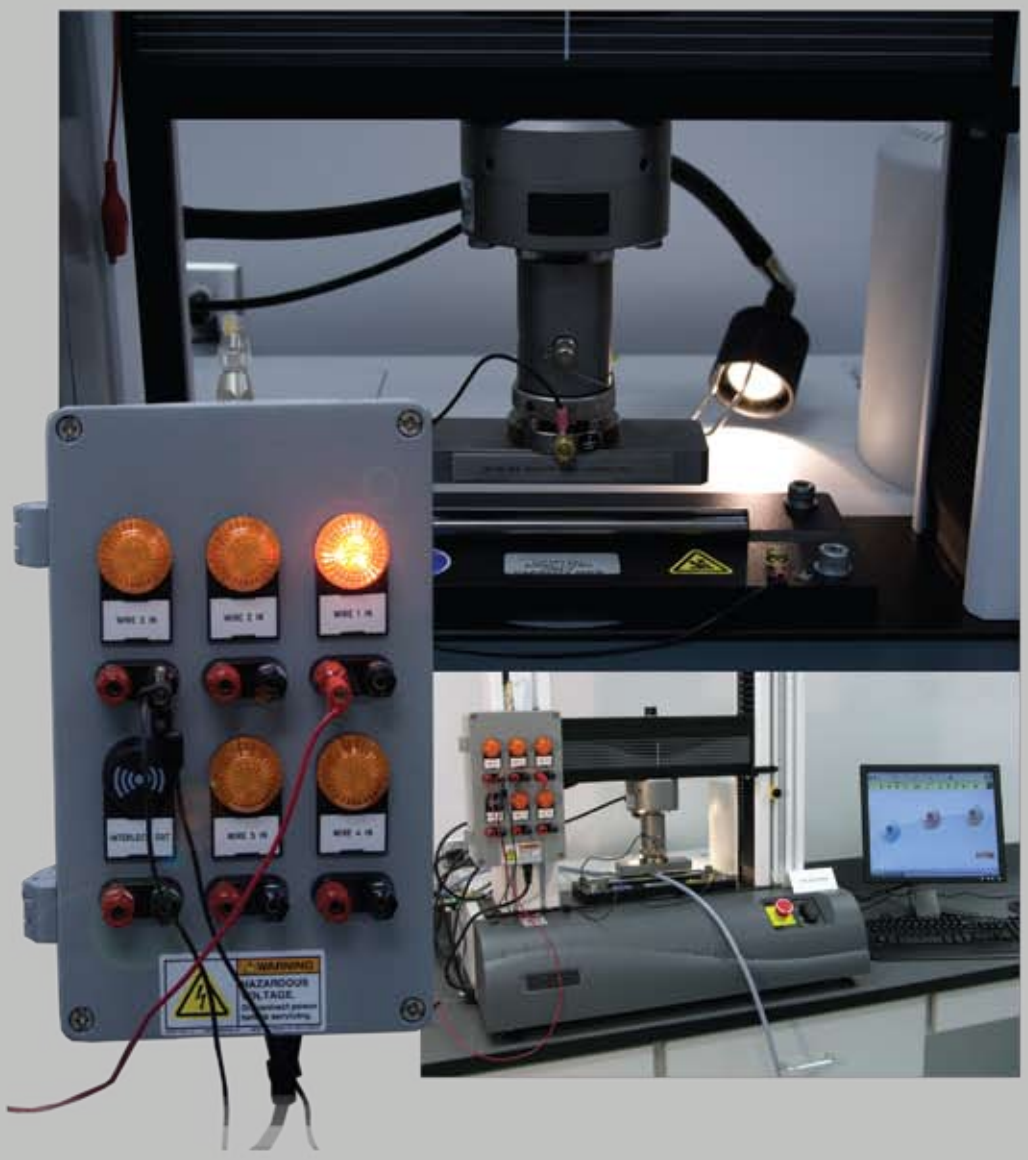
1.1 Tensile and Elongation

Scope:
The quality of polymers used in Lapp products is essential to their performance. This machine determines mechanical properties of polymers.

Technical Detail:
This machine measures properties called “tensile strength” and “ultimate elongation”. Tubular or “dumbbell” samples are stretched on a motor-driven machine, while force and elongation are constantly measured.

Standards:
UL1581, ASTM D-412, CSA 22.2 No. 0.3

1.2 Direct Burial and Crush

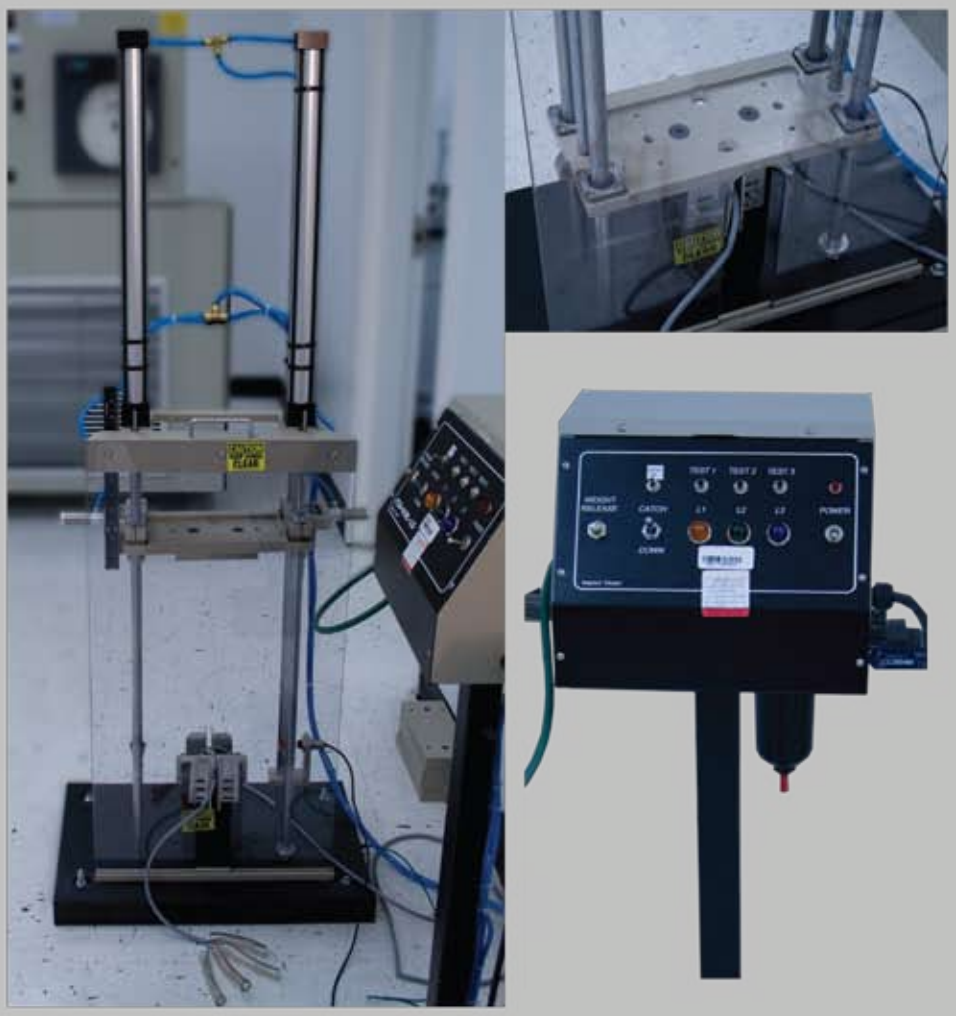


Scope:
While in service, Lapp cables can be inadvertently subjected to crushing forces. This equipment tests the ability of a cable to resist crushing.

Technical Detail:
The cable must resist force from a precisely-defined steel head crushing the cable at a specified rate. The minimum force must be sustained without electrical contact between conductors.

Standards:
UL 1277

1.3 Exposed Run Impact



Scope:
While in service, Lapp cables can be inadvertently subjected to impacts. This equipment tests the ability of a cable to withstand impact.

Technical Detail:
The cable must resist impact from a precisely-defined steel weight that is dropped from a specified height onto the product. The impact must be sustained without electrical contact between conductors.

Standards:
UL 1277

2.1 Air-Oven Aging and Oil Resistance

Scope:
Lapp cables are known for their ability to perform well in difficult environments. This equipment stresses polymers to assure they do not degrade during severe duty. Common stresses applied to cables are heat-aging and oil immersion.

Technical Detail:
Cable materials must retain a specified percentage of their original property values after exposure to environmental conditioning.

Standards:
UL 62, UL 1581, CSA 22.2 No. 49, No. 230, No. 210.2

3.1 Cold Impact

Scope:
Lapp offers cables that do not become brittle at low temperatures. This equipment tests the ability of a product to withstand impact at very low temperatures.

Technical Detail:
Products are placed in a chamber typically at -25°C or -40°C for extended periods of time. Immediately upon removal from the cold chamber, the cable must resist impact from a precisely-defined steel weight that is dropped from a specified height onto the product sample. Impact must be sustained without damage to the cable jacket or conductor insulation.

Standards:
UL 1581, CSA 22.2 No. 75

3.2 Cold Bend Test

Scope:
Lapp offers cables that do not become brittle at low temperatures. This equipment tests the ability of a cable to resist damage when bent at very low temperatures.

Technical Detail:
Immediately upon removal from the cold chamber, the cable is bent around a mandrel of specified diameter at a specified rate. The cable must coil around the mandrel without damage to the cable jacket or conductor insulation.

Standards:
UL 444, UL 1581, CSA 22.2 No. 0.3, CSA 22.2 No. 75

800-774-3539
www.lappusa.com

4.1 Insulation Resistance

Scope:
Lapp cables provide excellent electrical insulation in severe-duty applications. This equipment measures the ability of an insulating material to resist voltage.

Technical Detail:
Insulation Resistance testing is used to validate materials, designs, manufacturing processes, and quality. It can also be used to assess a change in properties after environmental conditioning.

Standards:
UL 83, UL 1581

4.2 DC Resistance Bridge

Scope:
Electrical conductors in Lapp cables must be an efficient path for electrical current. This equipment tests the electrical resistance of conductors.

Technical Detail:
Specified sizes of conductors must have a maximum resistance over a specified length. This equipment precisely measures conductor resistance over a precise distance.

Standards:
UL 1581

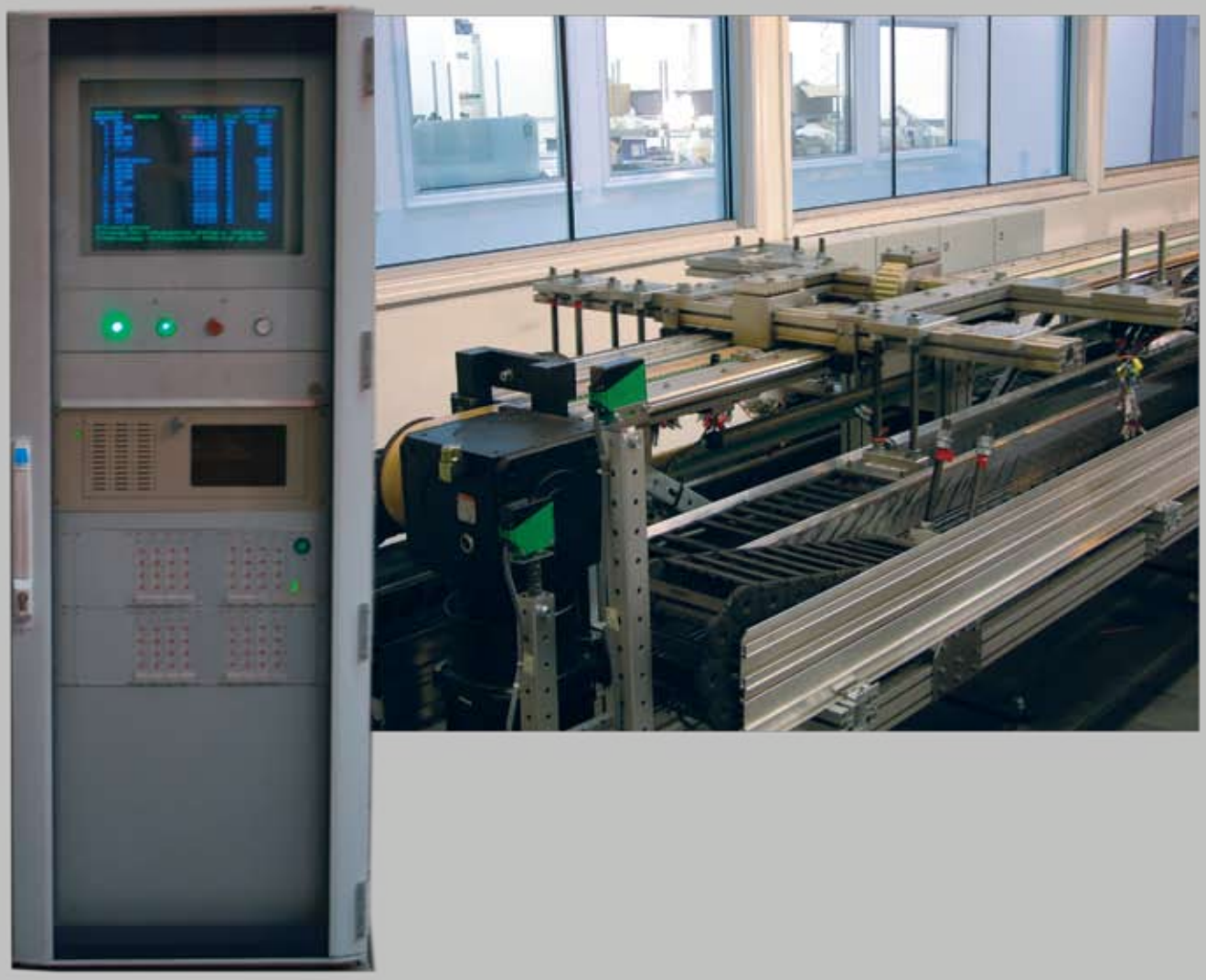
800-774-3539
www.lappusa.com

5.1 Torsion Test

Scope:
Lapp cables can be used in applications where they are subjected to constant movement. Poorly designed or improperly specified cables can experience failures when subjected to strenuous or repeated twisting. This equipment tests the ability of a cable to resist twisting.

Technical Detail:
Cable torsion requirements are normally set by specific applications. Cables on robots are often subjected to continuous, rapid, and large twisting motions. Cables in wind turbines experience twisting, but the rates and angles are much lower, as are the number of twisting cycles required.

5.2 Continuous Flex



Scope:
Lapp offers a wide range of cables for applications requiring cable movement. This equipment tests the ability of a cable to survive millions of bending cycles in a cable chain.

Technical Data:
Cable flexing requirements in a cable chain are normally set by specific applications. Variables that require higher-performing products include tight bend radii, long travel lengths, high speed movement, and a high number of bending cycles.

800-774-3539
www.lappusa.com

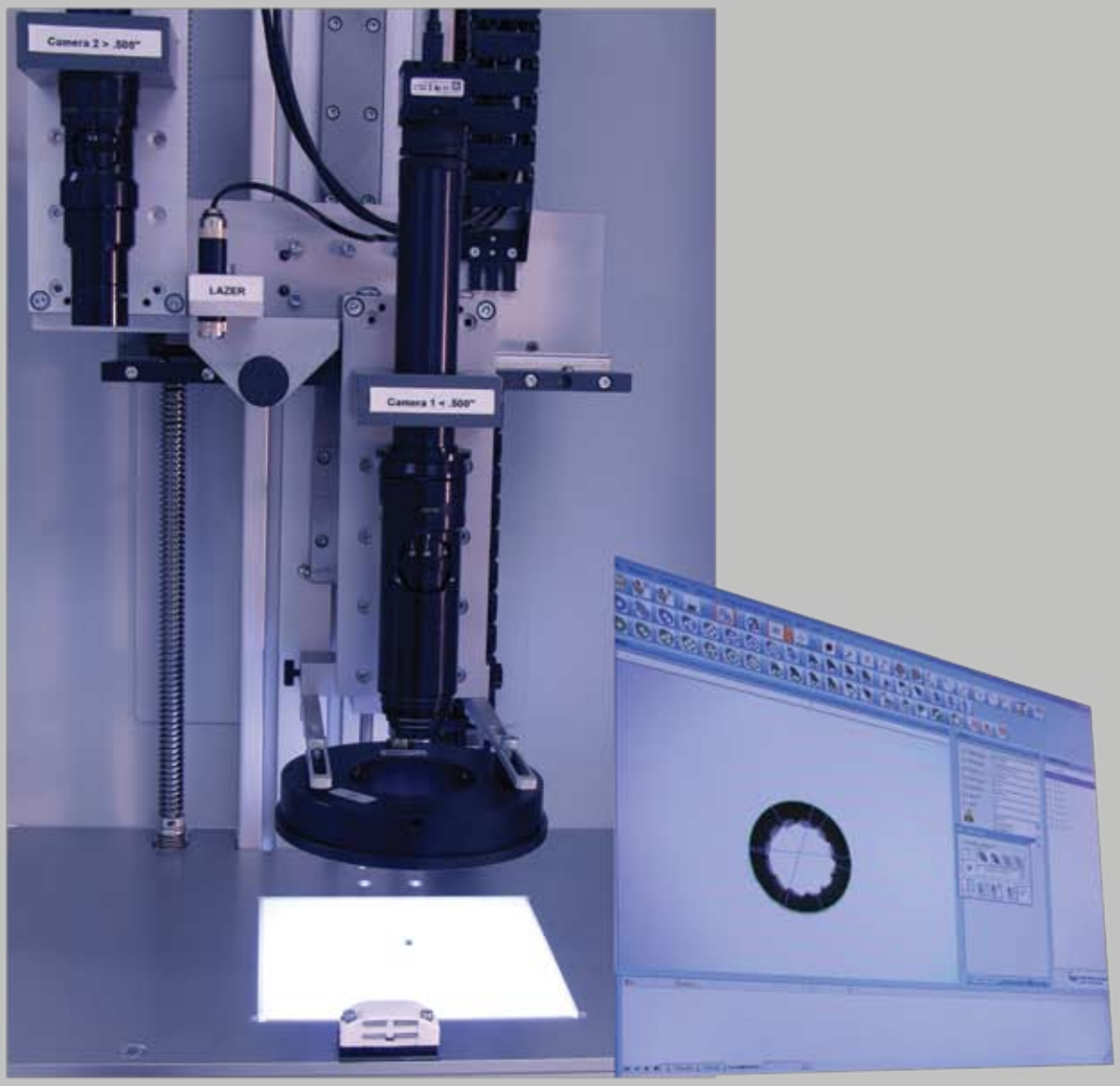
6.1 RoHS/ WEEE Compliance

Scope:
Lapp assures its products meet environmental standards with the help of special equipment.

Technical Data:
Lapp products do not include lead or lead by products and complies with both RoHS and WEEE standards. The test equipment used verifies omissions of all materials which assures that Lapp products conform to the most current standards.

Standards:
UL 83

6.2 Video Microscope



Scope:
Lapp products have a high degree of dimensional precision and consistency. This equipment allows us to quickly and precisely inspect the dimensions of products.

Technical Detail:
Product dimensions are often regulated. This equipment allows us to quickly confirm compliance.

Standards:
UL 1581

800-774-3539
www.lappusa.com

7.1 VW1/FT1/FT2 Flame Test

Scope:
Lapp cable insulations must be selected so they do not propagate flame in a given application. This equipment allows Lapp to perform flammability testing on cables.

Technical Detail:
An external flame is applied to a cable in a draft-free chamber for 15 seconds. After the flame is removed, the cable must not emit flame or glowing particles.

Standards:
UL 94, UL 1581, UL-VW1, ASTM D 5025-99, CSA 22.2 No. 0.3, CSA-FT1, FT2

OLFLEX®

EPIC®

SKINTOP®

UNITRONIC®

SILVYN®

FLEXIMARK®

ETHERLINE®

HITRONIC®

For more information:

Lapp USA
29 Hanover Road
Florham Park, NJ 07932
(800)774-3539
www.lappusa.com

lappusaengineering@lappusa.com

LAPP GROUP