



TORONTECH

LEAKAGE TRACKING TESTER



Leakage Tracking Tester - ToronFT™ LTT

ToronFT™ LTT Leakage Tracking Tester is a precision laboratory instrument designed for determining the proof and comparative tracking indices (PTI and CTI) of solid insulating materials. The comparative tracking index (CTI) is a fundamental electrical safety parameter — it measures the resistance of solid insulating materials to leakage tracking and electrical erosion under the combined action of electric fields and surface contamination, representing the maximum voltage at which a material can withstand 50 drops of contamination solution without tracking failure.

The ToronFT™ LTT is suitable for equipment components and disk-shaped specimens where alternating voltage is applied, and complies with the standard requirements of IEC 60112 — the primary international standard for the determination of proof and comparative tracking indices of solid insulating materials.

APPLICATIONS

Leakage Tracking Tester - ToronFT™ LTT Applications

The ToronFT™ LTT is applicable for CTI and PTI leakage tracking testing of the following insulating material categories:

- Solid insulating materials for electrical and electronic equipment — including thermosets, thermoplastics, ceramics, and composites — for comparative tracking index determination per IEC 60112
- PCB substrate materials and printed circuit board laminates for tracking resistance characterization and CTI classification
- Electrical connector bodies, terminal block housings, and electrical enclosure materials for leakage tracking compliance
- Insulating materials for high-voltage equipment — including switchgear, transformers, and motor components — requiring CTI tracking resistance data

- Disk-shaped specimen materials and equipment components subjected to alternating voltage where leakage tracking is a safety concern
- Research and development of new insulating materials and polymer compounds for improved leakage tracking resistance and higher CTI performance



Standards

The ToronFT™ LTT is designed to comply with the following international standards for leakage tracking index testing:

- IEC 60112: Method for the determination of the proof and comparative tracking indices of solid insulating materials
- ASTM D3638: Standard Test Method for Comparative Tracking Index of Electrical Insulating Materials
- UL 746A: Polymeric Materials: Short Term Property Evaluations (including CTI)
- IEC 60664-1: Insulation coordination for equipment within low-voltage supply systems

FEATURES

Leakage Tracking Tester - ToronFT™ LTT Key Features

- Precision CTI and PTI leakage tracking tester compliant with IEC 60112 — providing the standardized electrode geometry, contamination delivery system, and test chamber required for internationally recognized comparative tracking index determination
- Precisely dimensioned platinum electrodes (2 mm $\pm$ 0.1 mm thick $\times$ 5 mm $\pm$ 0.1 mm wide $\times$ 40 mm $\pm$ 5 mm long, 12 mm $\pm$ 3 mm° slope) meet the exact IEC 60112 electrode specifications for reproducible leakage tracking test results
- Electrode spacing of 4 $\pm$ 0.01 mm with 60° $\pm$ 5° included angle and 4 mm gauge provides the standardized electrode geometry required for consistent CTI and PTI determination across all solid insulating material types
- Controlled electrode pressure of 1.0 $\pm$ 0.001 N ensures reproducible and standardized electrode-to-specimen contact force throughout all leakage tracking test sequences
- Precision contamination liquid delivery system applies defined droplet volumes of 0.1% NH₄Cl solution at specified intervals for accurate and reproducible tracking index test conditions
- Large test chamber volume >0.5 m³ made of high-temperature electrostatic paint provides a thermally stable, durable enclosure for leakage tracking tests across a range of specimen sizes and material types

- Complies with IEC 60112 and ASTM D3638, providing comparative and proof tracking index test results recognized by international electrical product certification bodies in North America and globally

THEORY & METHOD

Theory and Method

Comparative tracking index (CTI) testing evaluates the resistance of a solid insulating material surface to electrical leakage tracking under the combined action of an applied alternating voltage and repeated exposure to a controlled contamination liquid (0.1% NH₄Cl ammonium chloride solution). Tracking failure occurs when conductive carbonized paths (leakage tracking paths) form across the insulator surface, creating a short-circuit condition between the electrodes.

In the ToronFT™ LTT, a specified voltage is applied across the surface of the solid insulating specimen between two platinum electrodes of specified size (2 mm ± 0.1 mm thick × 5 mm ± 0.1 mm wide × 40 mm ± 5 mm long, with 12 mm ± 3 mm° platinum electrode slope). A controlled droplet volume of 0.1% NH₄Cl contamination liquid is dropped onto the specimen surface between the electrodes at defined intervals. The test continues until tracking failure (overcurrent trip or tracking path formation) occurs or the specified number of drops (50) is reached without failure. The electrode spacing is 4 ± 0.01 mm with an included angle of 60° ± 5°, equipped with a 4 mm gauge. Electrode pressure is 1.0 ± 0.001 N. The studio (test chamber) volume is greater than 0.5 m³, made of high-temperature electrostatic paint.

TECHNICAL SPECIFICATIONS

Leakage Tracking Tester – ToronFT™ LTT Technical Specifications

Component / Parameter	Specification Details
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General Information	
Product Name	Leakage Tracking Tester — ToronFT™ LTT
Model	ToronFT™ LTT
Compliance Standards	IEC 60112; ASTM D3638; UL 746A
Test Capabilities	• CTI (Comparative Tracking Index) measurement • PTI (Parametric Tracking Index) measurement • Etching depth measurement
Test Chamber & Control	
Working Chamber Volume	≥0.5 m³
Chamber Material	High-temperature electrostatic sprayed steel plate
Control Method	PLC + Touch Screen
Electrode System	
Electrode Material	Platinum
Electrode Dimensions	2 mm ± 0.1 mm (Thickness) × 5 mm ± 0.1 mm (Width) × 40 mm ± 5 mm (Length)
Electrode Spacing	4 ± 0.01 mm
Electrode Included Angle	60° ± 5°
Platinum Electrode Slope	12 mm (30° ± 2°)
Electrode Pressure	1.0 ± 0.001 N
Electrical Parameters	
Test Voltage	100–600 V (adjustable)
Voltage	AC 220V / 50–60 Hz (Power: 2100 W) (110V is also available)

Maximum Current	3 A
Short Circuit Current	1.0 A (Voltage drop $\leq 50V$ at 600V)
Full Load Voltage Drop	$\leq 7\%$
Dropping System	
Contamination Liquid	0.1% NH ₄ Cl (ammonium chloride) solution
Drip Interval	30 ± 0.1 s
Drip Height	35 ± 5 mm
Drip Count	1-9999 drops (adjustable)
Drip Accuracy	• 20 drops: 0.380-0.480 g • 50 drops: 0.997-1.147 g
Test Conditions & Auxiliary	
Sample Size	$\leq \Phi 90 \times 20$ mm
Wind Speed	0.2 m/s
Judgment Current	$0.5 \text{ A} \pm 10\%$ (lasting for 2 s)
Measurement Equipment	• 4 mm standard gauge (included) • Force measuring device: $150 \text{ g} \pm 0.01 \text{ g}$
Calibration	Conductivity meter calibration supported (meter to be provided by the customer)

For more information, pricing, or to request a quotation, please contact ToronFT. Specifications are subject to change without prior notice.



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