



HALOGEN ACID GAS RELEASE TESTER

Halogen Acid Gas Release Tester - ToronFT™ HA-RG

ToronFT™ HA-RG is an Halogen Acid Gas Release Tester engineered to quantify the total amount of halogen acid gases — excluding hydrofluoric acid — released during the combustion of halogenated polymer-based mixtures and halogen-containing additive mixtures. It is specifically applicable to materials taken from the construction of electric or optical cables, providing critical data for material characterization and fire safety assessment.

As a precision halogen acid measurement instrument, the HA-RG evaluates both the acidity (pH) and electrical conductivity of gases dissolved in an aqueous solution during the combustion process. This dual-parameter approach enables a comprehensive assessment of the halogen acid release behavior of each component material within a cable or optical cable assembly, making it an essential tool for manufacturers, laboratories, and certification bodies working with LSZH (low-smoke zero-halogen) cable compounds.

APPLICATIONS

Halogen Acid Gas Release Tester - ToronFT™ HA-RG Applications

- Halogen acid gas content testing of insulation and jacketing materials for electric and optical cables
- Compliance testing of low-smoke, zero-halogen (LSZH) cable compounds and polymers
- Evaluation of halogenated polymer-based additives and flame-retardant compounds in cable materials
- Quality control testing for LSZH cable manufacturers and material suppliers
- Research and development of halogen-free cable materials and formulations
- Third-party and accredited laboratory certification testing for halogen acid release



Standards

- IEC 60754-1 — Test on Gases Evolved During Combustion of Materials from Cables: Determination of the Amount of Halogen Acid Gas
- IEC 60754-2 — Test on Gases Evolved During Combustion of Materials from Cables: Determination of Degree of Acidity of Gases by Measuring pH and Conductivity

FEATURES

Halogen Acid Gas Release Tester - ToronFT™ HA-RG Key Features

- Intelligent, automated test control with precise temperature programming and monitoring throughout the combustion cycle
- High-temperature tubular furnace with a heating cavity effective length of 600 mm and tube diameter of $\phi 58$ mm, providing uniform heating across the specimen
- Adjustable electric heating system powered at 220V/6 kW, ensuring stable and reproducible furnace temperature conditions
- Combustion tube constructed from refractory high-temperature quartz (silica) material, offering excellent resistance to corrosive halogen acid gases generated during specimen combustion
- Dual-parameter measurement capability: simultaneous evaluation of acidity (pH) and electrical conductivity of absorption solution for complete halogen acid characterization
- Designed for testing individual component materials from cable and optical cable assemblies, supporting component-level halogen acid analysis
- Compatible with testing of both halogenated polymer mixtures and halogen-containing additive mixtures, providing broad material applicability
- Robust system design with corrosion-resistant materials throughout the gas pathway, ensuring long-term reliability when working with aggressive halogen acid gases

THEORY & METHOD

Theory and Method

The ToronFT™ HA-RG subjects cable material specimens to controlled combustion inside a high-temperature tubular furnace. During combustion, halogen-containing compounds within the material thermally decompose and release halogen acid gases (such as HCl, HBr, and HI). These gases are carried by a controlled airflow through the combustion tube and are subsequently absorbed into a defined volume of distilled water in a collection vessel.

The resulting aqueous solution is then analyzed for two key parameters: (1) pH — measured by a pH meter to determine the acidity (degree of halogen acid gas content), and (2) electrical conductivity — measured by a conductivity meter to quantify the total ionic concentration of dissolved halogen acid gases. These two measurements together provide the complete halogen acid gas characterization required under IEC 60754-1 and IEC 60754-2.

TECHNICAL SPECIFICATIONS

Halogen Acid Gas Release Tester - ToronFT™ HA-RG Technical Specifications

Component / Parameter	Specification Details
General Information	
Product Name	Halogen Acid Gas Release Tester
Brand / Model	ToronFT™ HA-RG
Applicable Standards	IEC 60754-1; IEC 60754-2

Component / Parameter	Specification Details
Applicable Materials	Halogenated polymer mixtures and halogen-containing additive mixtures from cables
Test Capabilities	• High-temperature decomposition of cable materials • Meets testing requirements for Low-Smoke Halogen-Free (LSZH) materials • Supports dual analysis of pH and conductivity
Output Results	Halogen acid gas content, pH value, and conductivity (μS/cm)
Tube Furnace & Heating System	
Furnace Type	Tubular electric furnace
Heating System	Adjustable electric heating
Heating Zone Effective Length	600 mm
Furnace Tube Diameter	Φ58 mm
Voltage	220V (110V is also available)
Heating Power	6 kW
Combustion Tube & Boat	
Combustion Tube Material	Refractory high-temperature quartz (silicon dioxide); resistant to corrosive halogen acid gases
Combustion Tube Dimensions	• Inner Diameter: 40 mm • Extension Length (Inlet Side): 60-200 mm • Extension Length (Outlet Side): 60-100 mm
Combustion Boat Specifications	• Material: Quartz • Dimensions: 75 × 27 × 8.5 mm
Sample Injection Method	Magnet + Platinum wire traction
Gas Supply & Collection System	
Gas Absorption System	NaOH solution absorption method

Component / Parameter	Specification Details
Absorption Bottles	3 units
Absorption Solution	≥220 mL NaOH solution
Stirring Mechanism	Equipped with a magnetic stirring device
Air Flow Rate	50-500 mL/min (adjustable)
Air Supply	Compressed air (provided by the customer)
Testing & Analysis (Optional)	
pH Measurement (Acidity)	• Measurement Range: -1.00 to 15.00 pH • Accuracy: ±0.01 pH • Temperature Compensation: 0-100°C
Conductivity Measurement	• Measurement Range: 0 to 2×10⁵ μS/cm • Accuracy: ±1.0% FS (Full Scale) • Temperature Compensation: 15-35°C



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