



Fire Behaviour Tests - Cables & Materials

You are a rail or a building material supplier or **manufacturer** and you are requested to evaluate the fire behaviour of your cables or materials?

Our Test & Measurement Lab (LEM) experts can provide you with:

- Appropriate results through **tailored tests – accredited for urban rail and buildings**
- **Consulting services** – thanks to experts who are members of **European standards committees**
- A large set of tests: **A dozen tests exclusively dedicated to fire behaviour**

Many clients have already benefited from our **know-how** and **30 years of experience in fire testing**.
Why not you?

A large, stylized blue chevron graphic pointing downwards, composed of three parallel lines in varying shades of blue, located at the bottom of the slide.

Eurailtest



Created in 1999 to provide customers with services and expertise of the two main French rail operators (RATP & SNCF), EURAILTEST is an independent organization that offers engineering, testing and consulting services worldwide.

EURAILTEST coordinates about ten laboratories, each of them having - in its own specialty - a very long experience in rail testing.

Our Test & Measurement Laboratory (LEM)

Thanks to the Test & Measurement Laboratory (LEM), Eurailtest can mobilize the skills of 70 engineers and technicians capable of providing urban and suburban transport companies, equipment suppliers, cable manufacturers... with the highest level of safety and reliability for their materials, cables or infrastructure.

Test Resources

The Physics & Chemistry Unit has over

30 years

of experience in fire behaviour of various equipment and materials

1,500
measuring devices

2,000 m²
test facilities

External Recognitions

The Test & Measurement Laboratory of RATP, a member of the EURAILTEST joint venture, is recognized by the following organizations:



- EN ISO/IEC 17025 awarded by COFRAC (French Accreditation Committee)
The Test & Measurement Laboratory is COFRAC accredited under the number 1-1523 (scope available at www.cofrac.fr)
- The LEM is also awarded with the ISO 9001:2008 certification

Fire Behaviour of Cables



OUR TESTS



Flame propagation test C2

(according to IEC 60332-1)

- Determination of cable height that is damaged by a 1 kW flame
- Test sample dimensions: 600 ± 25 mm



Smoke opacity test in a 27m³ test chamber

(according to IEC 61034)

- Measurement of optical density for a cable subject to a specific source
- Test sample dimensions: Cables or cable sections ($1,000 \pm 5$ mm)



OUR REFERENCES

- LCIE
- NEXANS

- OMERIN
- SYSTRA



Fire propagation test C1

(according to NF C32-070)

- Determination of cable height that is damaged for a test sample composed of cable sections
- Stranded cables tested in an electric furnace
- Test sample dimensions: 1,600 mm in length



Fire propagation on ribbon cables

(according to IEC 60332-3)

- Determination of cable height that is damaged by a 20.5 kW flame
- Test sample dimensions: 2,500 mm in length



Gas toxicity and corrosivity

(according to NF X70-100 and EN 50267)

- Determination of Conventional Index of Toxicity (CIT)
- Determination of corrosivity of combustion gases



Oxygen consumption calorimetry test

(according to EN 50399)

- Measurement of heat
- Measurement of cable height that is damaged
- Measurement of thermal energy released
- Test sample dimensions: 2,500 mm in length
- Scope of applications: All cables used for rail facilities and buildings (EU Construction Products Regulation - CPR - CE marking)



STANDARDS

- **EN 45545** - Railway applications - Fire protection on railway vehicles
- **EN 50267** - Common test methods for cables under fire conditions - Tests on gases evolved during combustion of materials from cables
- **EN 50399** - Common test methods for cables under fire conditions - Heat release and smoke production measurement on cables during flame spread test - Test apparatus, procedures, results
- **NF X70-100** - Fire tests - Analysis of gaseous effluents
- **NF C32-070** - Classification tests on cables and cords with respect to their behaviour to fire
- **IEC 60332-1** - Tests on electric and optical fibre cables under fire conditions - Procedure for 1 kW pre-mixed flame - Part 1: Test for vertical flame propagation for a single insulated wire or cable
- **IEC 60332-3** - Tests on electric and optical fibre cables under fire conditions - Part 3: Test for vertical flame spread of vertically-mounted bunched wires or cables
- **IEC 61034** - Measurement of smoke density of cables burning under defined conditions

Fire Behaviour of Materials



OUR TESTS



Vertical radiant heating panel

(according to ISO 5658-2)

- Flame propagation on materials used in vertical configuration
- Measurement of Critical Flux at Extinguishment (CFE - kW/m^2)
- Test sample dimensions: 800mm x 155mm (max. thickness: 70mm)



Oxygen consumption calorimetry test

(according to ISO 5660-1)

- Reaction to fire test with a cone calorimeter – Heat release rate
- Measurement of MAHRE (Maximum Average Heat Rate Emission, kW/m^2)
- Test sample dimensions: 100mm x 100mm (max. thickness: 50mm)



OUR REFERENCES

- | | |
|--------------|------------|
| • ALSTOM | • SIB-ADR |
| • HITACHI | • SIEMENS |
| • HUTCHINSON | • SOURIAU |
| • PRODEX | • VON ROLL |



Limiting Oxygen Index (LOI)

(according to ISO 4589-2)

- Determination of fire behaviour of materials thanks to the LOI test
- Measurement of minimum oxygen concentration for sustaining combustion of a material



Gas toxicity

(according to NF X70-100)

- Determination of Conventional Index of Toxicity (CIT)
- Tube furnace



Smoke opacity

(according to ISO 5659-2)

and smoke toxicity measurement using Infrared

(according to EN 45545-2 annex C)

- Determination of optical density: $D_s(\max)$, VOF4 and D_s4
- 25kW/m² furnace with pilot flame or 50kW/m² furnace without pilot flame
- Test sample dimensions: 75mm x 75mm
- Determination of Conventional Index of Toxicity (CIT)



STANDARDS

- **EN 45545** - Railway applications - Fire protection on railway vehicles
- **ISO 4589-2** - Plastics - Determination of burning behaviour by oxygen index - Part 2: Ambient-temperature test
- **ISO 5658-2** - Reaction to fire tests - Spread of flame - Part 2: Lateral spread on building and transport products in vertical configuration
- **ISO 5659-2** - Plastics - Smoke generation - Part 2: Determination of optical density by a single-chamber test
- **ISO 5660-1** - Reaction to fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method)
- **NF X70-100** - Fire tests - Analysis of gaseous effluents
- **NF F16-101** - Rolling stock - Fire behaviour - Materials choosing



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Eurailtest has received **Research Tax Credit Approval**
from the French Ministry of Higher Education and Research

