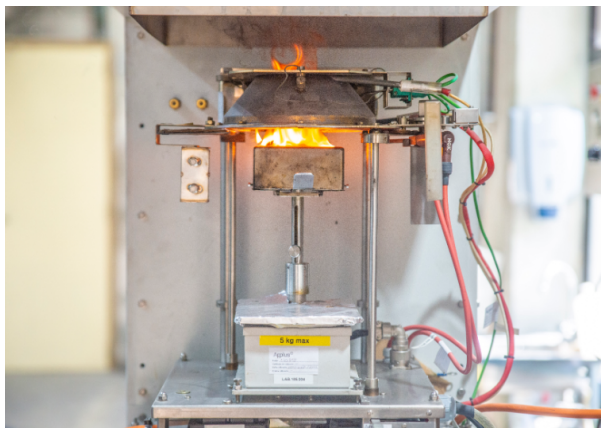


Fire Testing of Railway Components

Requirements for fire protection in the railway sector are strict and affect practically all the components that make up the train. These elements must therefore pass different fire safety tests. It is the manufacturers and importers who are directly responsible for ensuring the correct performance of their products prior to installation. They must demonstrate that their products comply with current regulations to be able to place them in their target markets.



APPLICABLE REGULATIONS

Each component must pass whichever fire safety standards are in force in the country in which the train will operate (EN, NFPA, etc.). In Europe, a testing standard for components of railway vehicles has been developed (EN 45545) covering all aspects of fire protection (design, fire behaviour, fire resistance, electrical equipment, detection and alarms, etc.).

This standard establishes measures and requirements with the aim of containing and limiting the development of a possible fire while maintaining an acceptable level of safety for passengers and crew. That is to say, that people on board can protect themselves and escape from a possible fire by their own means, reaching the established safety zone without assistance.

In the same way, for the North American market, there is a fire protection assessment system under the NFPA 130 standard.

OUR METHODOLOGY

Our experts study each project to identify the most optimal route for the testing and classification of the manufacturer's products.

Our service includes:

- Project study and sample definition
- Laboratory testing and product classification
- Issuance of test reports and extension of test results
- Inspection, sampling and certification (where applicable)

OUR LABORATORIES

Applus+ Laboratories, a European benchmark in fire safety

At Applus+ (LGAI Technological Center S.A.), our state-of-the-art fire safety laboratories have Quality Systems adhering to **ISO/IEC 17025**. We can carry out all the tests required by the main testing standards of reference in the railway sector.

Fire Resistance Testing for Structural Train Elements

The structural elements of the carriage (i.e. the floors, walls, doors, partitions and barriers) are tested under the relevant fire resistance testing standards. The structural integrity of these elements is tested against high temperatures or their fire insulation capacity, to safeguard against the rapid spread of a fire between the different compartments of the carriage. **We are an ENAC-accredited laboratory, with accreditation number 9/LE895**, to test under the main reference testing standards in the sector and with different heating curves:

- ASTM E119: ASTM E119 curve
- UL 263: UL 263 curve
- EN 1363: ISO 834 curve
- EN 45545-3

We have specialized, highly-versatile equipment that allows us to carry out all the fire resistance tests required for your product. We have 8 furnaces, in different vertical and horizontal configurations of up to 4 m wide and 5 m high.

Reaction to Fire Testing of Train Components

The interior components of a train are the weakest link in the event of fire. This is because of the flammability of their materials (fabrics, foams, plastics) and the

opacity and toxicity of the fumes they can generate. For this reason, the various railway regulations require their fire behaviour to be assessed in order for them to be classified in relation to just how hazardous they are.

The various parameters to be assessed are as follows:

- **Flame spread**
- **Flammability**
- **Heat release rate**
- **Smoke opacity**
- **Toxicity of gases**

Applus+ Laboratories has all the necessary equipment and expertise to test the fire performance of train components, including fabrics, walls, seats, ceiling and floor coverings and plastic components, amongst others. **We test under the main international standards, notably EN 45545-2 and NFPA 130.**

A+ Fire Safety Certification

To facilitate access to the global market for manufacturers of fire protection products, Applus+ Laboratories has created the A+ Fire Safety certification. This is a proprietary and voluntary mark, supported by a certification system that allows all types of systems to be certified under the corresponding testing standards. **Applus+ Fire Safety certification is the ideal solution for railway components.**

We offer a complete service to manufacturers of products requiring fire testing:

- **Certification and access to international markets**
- **Fire simulation and full-scale fire testing in tunnels**
- **Full-scale open field fire testing**