

GENERAL CONCEPTS OF FIRE REACTION

Fire reaction is one of the measures of fire prevention in Italy. Its aim is to measure the degree of fire reaction of products such as:

- curtains;
- blankets;
- bedcovers;
- upholstered furniture (chairs, armchairs, sofas, sofa-beds, mattresses, bed-bases, pillows, etc.);
- furniture that is not upholstered (chairs, tables, office desks and storage furniture, tables for school, etc.);
- walls;
- flooring;
- suspended ceilings;
- wall and ceiling covers;
- flame retardant coatings for wood based materials.

Fire reaction is defined by UNI CEI EN ISO 13943 standard as the "response of a material in contributing to its own decomposition to a fire to which it is exposed, under specified conditions".

It is not to be confused with "fire resistance", defined by the same standard as the "ability of an element to fulfill, for a stated period of time, the required criteria of fire stability and/or fire integrity and/or fire thermal insulation and/or every other performance specified in a standard fire resistance test".

Products destined for incorporation in a permanent manner in constructions works, including both buildings and civil engineering works, are subject to European Regulation No. 305/2011 "Construction products".

CE marking can be applied only to products for which the harmonized European standards have been published.

The fire reaction classifications in force in Italy, products subject to European Regulation No. 305/2011 excluded, are the following:

- class 0 (zero) for non combustible materials;
- classes 1 (the most stringent) - 2 - 3 - 4 and 5 for combustible materials (except upholstered furniture);
- classes 1.IM (the most stringent) - 2.IM and 3.IM for upholstered furniture.

In Italy there are two scenarios. The tests can be carried out:

- for classification only (voluntary);
- to obtain certification and eventual homologation concerning the fire prevention premises controlled by Fire Brigades (mandatory).

The test methods and the classification of materials are practically the same. Only the bureaucratic requirements change, as imposed by D.M. 26.06.1984 "Classificazione di reazione al fuoco ed omologazione dei materiali ai fini della prevenzione incendi", modified by D.M. 03.09.2001.

With the publication of this last decree, the test methods are exclusively those defined by UNI standards. Therefore these standards have replaced the CSE RF methods (identical to UNI standards) that the Home Office set up in the 1970's.

ITALIAN FIRE REACTION CLASSIFICATIONS

The materials are assigned the classes 0, 1, 2, 3, 4, 5 depending on their reaction to fire; the class 0 is for non-combustible materials, classes 1 to 5 are for combustible materials, with class 1 being the best and class 5 the worst.

The class 0 materials according to the decree of 14-01-1985 are:

- building materials, compacts or foams made of metallic oxides (calcium oxide, magnesium, silicon, aluminum and others) or made of inorganic compounds (carbonates, sulfates, calcium silicates and others) without organic binders;
- insulator materials made of mineral fibers (rock, glass, ceramic and others) without organic binders;
- materials made of metals with or without inorganic surface coating.

To upholstered furniture we assign the classes 1.IM (the best), 2.IM and 3.IM; upholstered furniture is not classified if it does not have at least the class 3.IM.

ITALIAN TEST METHODS

CLASS 0 (ZERO)

Non-combustibility test: UNI ISO 1182

CLASSES 1, 2, 3, 4 and 5

- a) Small flame test on both surfaces: UNI 8456
- b) Small flame test on one surface: UNI 8457
- c) Ignition flame with radiant heating test: UNI 9174
- d) Flame retardant coating products for wood based materials: UNI 9796

To classify a material (UNI 9177), c) test must be combined with a) test or b) test.

UNI 9796 refers to standard's methods UNI 8457 and UNI 9174.

CLASSES 1.IM, 2.IM and 3.IM
Small flame test on upholstered furniture: UNI 9175

ASSESSED PARAMETERS

UNI ISO 1182

- Temperature rise
- Duration of flames
- Mass loss

UNI 8456 and UNI 8457

- Afterflame time
- Afterglow time
- Damaged length
- Dripping

UNI 9174

- Rate of spread of flame
- Afterglow time
- Damaged length
- Dripping

UNI 9175

- Afterflame time
- Afterglow time

The products that are included in the European Regulation No. 305/2011 "Construction products" are tested in accordance with the specific European standards and classified in accordance with the European classification.

PROCEDURES ACCORDING TO THE CERTIFICATION OF MATERIALS AS IMPOSED BY D.M. 26-06-1984 MODIFIED BY D.M. 03-09-2001

D.M. 26-06-1984 "Classificazione di reazione al fuoco ed omologazione dei materiali ai fini della prevenzione incendi", modified in 2001, establish two procedures relating to the certification:

- art. 8: to support the ministerial homologation;
- art. 10: not to support the ministerial homologation.

Art. 8 procedure (mandatory for mass produced items)

The homologation of a material/product according to the fire prevention Regulations shall be understood as follows; "the tech-administrative procedure which tests a prototype of material, certifies the fire reaction class and is issued by the Home Office as the authorization for reproduction of the prototype, before its place on the market for use in the premises subject to the fire prevention regulations" **(1)**.

There are two phases to obtain homologation:

- a) relationship between Manufacturer **(2)** and Laboratory **(3)**;
- b) relationship between Manufacturer and Authority for homologation.

In the first phase the Manufacturer must: submit some documents (request form, technical data sheet, any technical drawings and any declarations), deliver the test samples and the control samples (these must be preserved for 5 years by the Laboratory) and pay in advance the fees for ministerial dispositions.

The Laboratory carries out the tests and issues the test certificate, enclosing the test report/s and all the Manufacturer's stamped documents **(4)**.

In the second phase, the Manufacturer sends the documents issued by the Laboratory along with the request for homologation. The authorized office checks the documents and, if they are correct, issues the homologation.

After obtaining the homologation, the Manufacturer must affix on the products a mark of conformity bearing a permanent and indelible label containing the following data:

- name or mark of the Manufacturer;
- year of production;
- fire reaction class;
- homologation code;
- end use;
- maintenance.

When it is not possible to affix the mark of conformity, the Manufacturer must issue a conformity declaration where he attests the conformity of the product to the homologated prototype. This declaration must report also the homologation code.

Homologation is valid for 5 years and can be renewed upon the expiry. The renewal doesn't involve the repetition of the test if the Manufacturer declares that the material hasn't been modified in comparison with the homologated material. Hence, the homologation lapses when the product has any modification.

Art. 10 procedure

As an alternative, it is possible to certify a product or a series of products without requesting the Home Office's homologation. This procedure is permitted for these materials:

- materials already in place/use;
- materials for one specific use (not mass produced);
- materials for a time limited use;
- materials for a limited production.

The certification obtained in the last case is strictly dependent on supply, with the identification of the company and the final destination of the supply.

It is impossible to follow both procedures (art. 8 and art. 10) with the same certification.

MISCELLANEOUS PROCEDURES

The documents submitted to the Laboratory, that is a Home Office authorized laboratory, must be written by the applicant who is usually the Manufacturer.

CATAS offers all the necessary assistance in preparing and completing the necessary documents, including technical drawings.

Tests are carried out on samples of the finished product. In particular, for the upholstered furniture, the test is carried out on samples taken only from the cover material, the upholstery and the eventual interliner **(5)**, so it is not necessary to deliver complete items for the test.

NOTES

The Home Office has introduced some simplifications to aid manufacturers in certifying and eventually homologating a series/family of products. To consider the items belonging to the same series, it is necessary to have a common commercial denomination and the same range of samples or sub range of samples of the representative item of the series.

Every item of the series can be different in dimension and form, for example, the seat, the back, the legs. In this case it is necessary to make the technical drawings for all the items (views and sections) of series/family.

(1) This is the definition 2.3 of D.M. 26-06-1984.

(2) For Manufacturer (definition 2.5) read "the manufacturer of the material and any person who marks or signs the material and introduces himself as the manufacturer. A manufacturer is also any person who imports and/or markets an imported material.

Equally, a manufacturer can be a foreign producer who has their Head Office in the European Community, that is in a Country with the SEE agreement.

(3) The Laboratory must be a Home Office authorized laboratory in compliance with D.M. 26-03-1985.

(4) Every step of the procedure must be dealt with in a definite chronological order according to the date of registration.

(5) In compliance with circular n° 27 MI.SA. (85) 7 of 21-09-1985, the structural materials of armchairs are not subject to classification. The color and/or the design of the cover fabric are not important.