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Voorbeeld

Nederlandse norm

NEN-EN 2310

(en)

Aerospace series - Test methods for the flame resistance rating of non-metallic materials

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English version

Aerospace series - Test methods for the flame
resistance rating of non-metallic materials

Série aérospatiale - Méthodes d'essai
de comportement au feu pour le
classement des matériaux non
métalliques

Luft- und Raumfahrt - Prüfverfahren
zur Klassifizierung des Brandverhaltens
von nichtmetallischen Werkstoffen

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Foreword

This specification is taken from the «US» «Federal Aviation Administration» regulation, Part 25, change 21 (Amdt. 2561), from which it makes use of equipment and procedures.

It also satisfies the recommendations of the ICAO Airworthiness Technical Manual : DOC 9051-AN/896, section 4, Issue 1974 (3rd part, section 4, chapter 2) of which equivalences are given in annex A.

This standard has been prepared by the European Association of Aerospace Manufacturers

and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member MA, prior to its presentation to CEN.

Under the Common CEN/CENELEC Rules, the following countries are bound to implement this standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden and United Kingdom.

1 Scope and field of application

This standard defines the test methods for the flame resistance rating of non-metallic materials.

It applies exclusively to materials whose specific standard requires this type of test. It cannot be substituted for the statutory tests required for a final specific use of the material concerned.

2 Definitions

2.1 Time of flame application

Time measured by means of a chronometer, during which the burner flame is applied to the lower part of the test piece. It is expressed in seconds.

2.2 Average flaming time of droplets

Average of the time measured for each test piece, during which droplets, released by the test piece, continue to burn after falling. It is expressed in seconds.

2.3 Average after flame time

Average of the time measured for each test piece, during which the test piece continues to burn after the burner flame has been withdrawn. It is expressed in seconds.

2.4 Average burn length

Average of the distances measured for each test piece from the original edges of the test pieces to the farthest extent of damage resulting from flame impingement. This includes areas which have undergone combustion, charring, partial or total embrittlement but excludes areas which have become blackened, stained, distorted, discoloured, or have shrivelled or melted by the heat. The measurements are expressed in millimetres.

2.5 Average rate of combustion

Average rate calculated for each test piece by taking the quotient of the distance covered by a flame between two suitable reference points by the time taken. Measurements are expressed in mm/min.

3 Classification of materials

3.1 Classes (a) and (b)

These categories classify materials tested in accordance with subclause 5.2 and the requirements of the table 1

3.2 Classes (b2) and (b3)

These categories classify materials tested in accordance with subclause 5.3 and meet the requirements of table 1.

Materials which are self-extinguishing shall be classified (b2).

3.3 Requirements

Table 1

Class of material	Type of test	Time of flame application	Burner Name		Average after-flame time	Average flaming time of droplets	Average burn length	Average rate of combustion	Test piece dimensions	
		Seconds	Temp. °C	Height mm	Seconds	Seconds	mm ≤	mm/min. ≤	mm	
(a)	Vertical (see sub-clause 5.2)	60	850 + 30 - 10	38	15	3	152	.	368 × 75	
(b)		12				5	203	.		
(b2)	Horizontal (see sub-clause 5.3)	15			.	.	.	63	.	355 × 102
(b3)					.	.	.	102	.	

4 Apparatus

4.1 Burner (see figure 6)

4.1.1 The burner shall comprise of a barrel of internal diameter 9,5 mm and length (76 ± 6) mm with a fixed upper orifice and a base with a variable orifice for adjusting flame height. It shall be connected to a gas supply fitted with a stopcock.

4.1.2 A metallic rod, approximately 3 mm in diameter shall be supported parallel and at a distance of 13 mm to the burner barrel.

This retractable rod shall include various reference marks enabling distances of 19 and 38 mm above the barrel to be measured.

4.2 Gas mixture

Gases used shall permit compliance with the flame temperatures specified in subclauses 5.2.2 and 5.3.2. Standard propane is generally suitable for this test method.

If industrial gas is not available, a synthetic gaseous mixture conforming with the following requirements may be used (standard conditions of analysis) :

- Hydrogen : $(55 \pm 3) \%$
- Methane : $(24 \pm 1) \%$
- Ethane : $(13 \pm 1) \%$
- Carbon monoxide : $(10 \pm 1) \%$.

Density : $0,365 \pm 0,018$ (air = 1)

Calorific power at 21 °C (when dry) : $20120 \begin{matrix} + 746 \\ 0 \end{matrix} \text{ kJ/m}^3$

4.3 Chamber for vertical test (see figures 1, 2 and 3)

The chamber and its accessories shall be manufactured in conformity with the information provided in figures 1, 2 and 3 from galvanized plate or other suitable metal. The inside rear wall shall be completely painted black to facilitate observation of the test piece and the flame. The observation window shall be manufactured from heat resistant glass.

4.4 Chamber for horizontal test (see figures 4 and 5)

4.4.1 The metal chamber and its accessories shall be manufactured in conformity with the information provided in figures 4 and 5. It shall include a glass observation window (B) and a removable cover (C), having a peripheral clearance of 13 mm for ventilation. This removable cover shall have two observation ports (D) of heat resistant glass, located near the end of the chamber. The four corners of the chamber base shall rest on a support (J) raising it 10 mm above the surface of the table or any other piece of furniture on which it is located.

Each side of the chamber base shall have five equally spaced ventilation holes (O) of 19 mm diameter. A slot in one side of the chamber shall permit the test piece holder to be passed through and slid horizontally, along a rail (K), into a test position (P), such that the centre of the edge of the test piece is located 19 mm above the top of the burner.

4.4.2 The test piece holder (figure 5), made of chrome or nickel plated steel bars shall be in the form of two fitted rectangular frames. The two frames shall be aligned by means of two studs (M).

4.4.3 Heat resistant metallic reference wires (N) shall be fixed to the upper frame, crossing the test piece at right angles but not touching it.

One wire shall be located 51 mm from the inside of the burner side of the frame and the other, 38 mm from the other side. A third wire, running transversely on the upper frame, shall be located 13 mm from the inside on the burner side. This shall act as a guide for positioning the test piece in its holder.

4.4.4 The burner (E) shall be located in the chamber in such a way that when the test piece is in position, the center point of the end of the test piece is on the centre line and 19 mm above the top of the burner.

4.5 Measuring equipment

4.5.1 Timing device with an accuracy of 0,2 s.

4.5.2 Measuring device graduated in mm.

5 Procedure

5.1 Test pieces

5.1.1 Test piece dimensions

5.1.1.1 Vertical tests :

368 mm X 75 mm

5.1.1.2 Horizontal tests:

355 mm X 102 mm

In the case of extremely thick cellular materials (foams) the test piece shall not be more than 13 mm thick. The edges of the test piece shall not consist of a finished production edge but shall be representative of an actual cut of the material.

The test piece thickness shall be that indicated in the relevant material standard.

5.1.2 Number of test pieces

At least three test pieces shall be subjected to testing. This shall be increased to five if doubt arises (see subclause 5.1.4, special cases).

5.1.3 Conditioning of test pieces

Test pieces shall be conditioned at a minimum temperature of 18 °C and a maximum temperature of 24 °C and relative humidity of $(50 \pm 5)\%$ until a moisture equilibrium is obtained, or for 24 h.

Only one test piece at a time shall be withdrawn from the conditioning environment; testing shall be carried out immediately after removal.

5.1.4 Mounting of test pieces

For the tests, the test piece shall be clamped in their metal frame as follows :

- 1) Vertical tests : the two long edges and the upper edge of the test piece shall be firmly held,
- 2) Horizontal tests : the two lengths and the edge of the test piece away from the flame shall be firmly held,

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