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4102
BRUNNER
FURNITURE
SAFETY CER-
TIFICATES IN
CASE OF FIRE
PROCUREMENT
FLAMMABILITY
DIN IN CASE OF
FIRE FIRE TEST
IN CLASSES
FURNITURE
IS SAFE
WITH AN
ELECTRIC
BURNER
STAND-
ARD
-B1-
-B2-
B3

B3
/C
-DIN
4102 -
WITH
INFLAM-
MABLE OR
WITH FLAME
RESISTANT
FIRE PROTEC-
TION PREVEN-
TIVE EQUIPMENT
PAPER CUSHION TEST
TEST AND CIGARETTE
CLASSIFICATION IN AC-
WITH VARIOUS STAND-
TRY-SPECIFIC MATERIAL TEST
WITH BUILDING MATERIALS DECREE TEST METHODS FOR THE FURNITURE
INDUSTRY AND FOR CONTRACT FURNITURE PREVENTIVE MEASURES
TO PREVENT THE SPREADING OF A FIRE SPECIAL EQUIPMENT MADE
FROM WOODEN PARTS AND TREVIRA CS UPHOLSTERY ELEC-
TRIC BURNER FLAME DISPERSION TEST IN ACCORDANCE
WITH NF P 92-503 BRITISH STANDARD BS 5852 CRIB 5
CALIFORNIA TECHNICAL BULLETINS PROTEC-
TION DIN4102 FIRE PROTECTION
EQUIPMENT

A1
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FIRE
SAFETY EX-
PERTS FOR THE
NON-FLAMMABLE
FIRE PROTECTION
CLASS WITH FLAMMA-
BILITY TEST METHODS
AND REQUIREMENTS
FOR FURNITURE,
B1 AND B2
SAFETY

WITH
MATCH
TEST
CORDANCE
ARDS COUN-
IN ACCORDANCE

FIRE PROTECTION

Dear Sir or Madam,

At Brunner, we operate according to the principle of sustainability:

We combine economic success with social and ecological responsibility.

As a family-owned company and one of the leading contract furniture manufacturers in Europe, we consider it our duty to assume responsibility with regard to fire protection.

Therefore, we are continuously working on improving the fire protection properties of our products – for an increased level of safety in case of fire. We place a great deal of emphasis on comfort when we are developing our furniture – while doing this, we are able to ensure excellent safety standards simultaneously. In order to meet the high requirements of our customers, we offer customised and flexible solutions – for every room and every situation of risk.

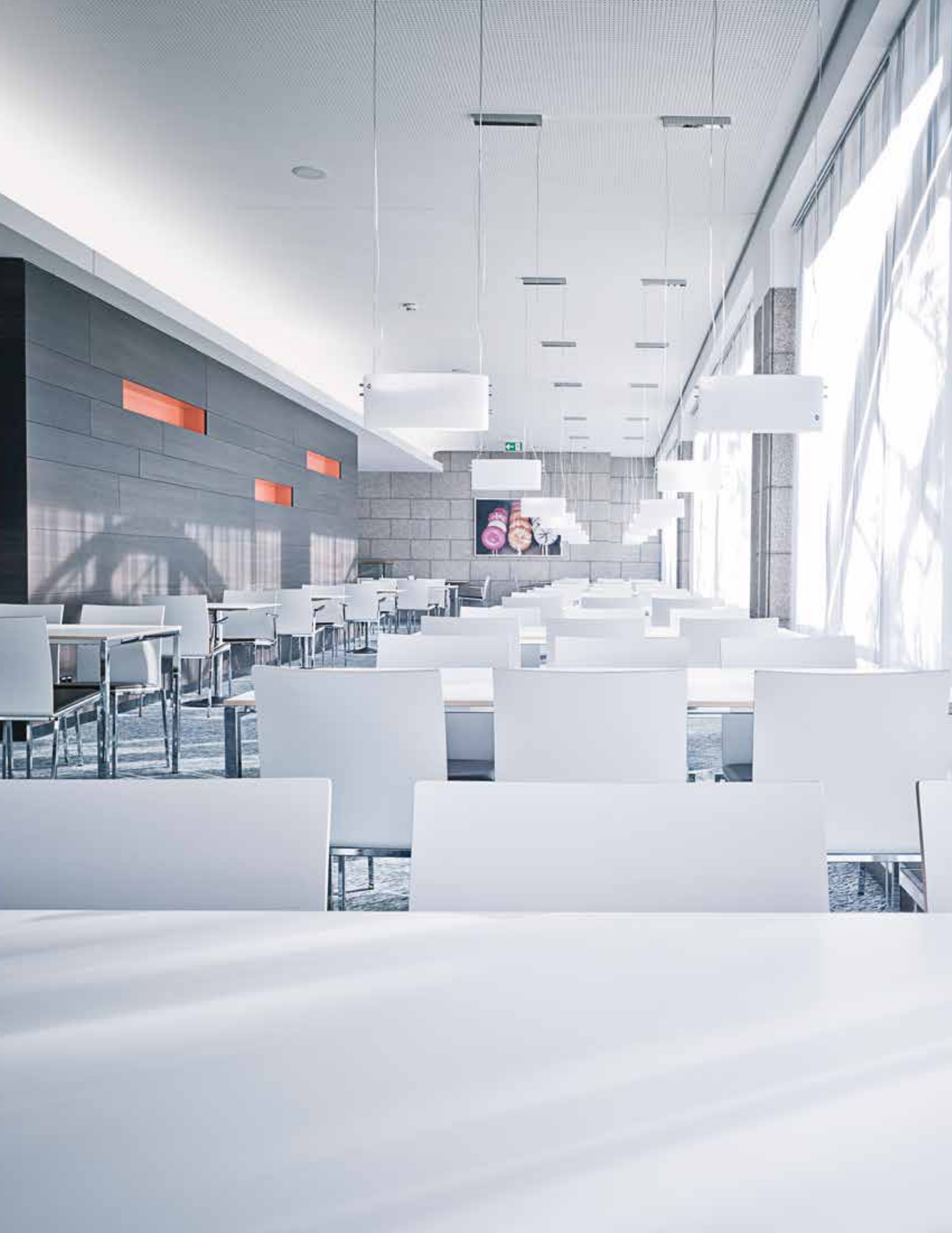
The following brochure contains important information about fire protection requirements and provides an overview of the safety-related characteristics of our product line. If you should still have technical questions not covered by this fire protection brochure, please contact the responsible authorities on site. We will gladly consult with you further individually and provide you with product-specific information.

In order to be able to provide you with intelligent furniture that meets the increasingly stringent fire protection regulations in public facilities, we are also continuing to actively work to improve the fire safety relevant features of our product line - to make your interior even safer in future.

Helena, Tina, Rolf, Dr. Marc and Philip Brunner







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Corporate policy

BRUNNER AND FIRE PROTECTION. WHAT FURNITURE CAN DO FOR FIRE PROTECTION.

Better safe than sorry. Contract furniture must first fulfil certain fire protection requirements in order to be used in public facilities.



» In order to provide our customers suitable furniture for **stringent fire protection requirements**, our development team is continuously working on optimising the **fire protection equipment that we offer**. «



Serving our customers from the very beginning

Rolf and Helena Brunner made the impossible possible with a generous dose of passion, courage and improvisational talent – they also made the first Brunner customers more than satisfied. We have systematically built upon their first step. Today, approximately 400 employees work in our in state-of-the-art plants and with forward-looking technologies. Yet, despite all of the changes: The entrepreneurial ambition to meet and exceed our customer's requests continues to drive us the same way it did on day one.

Brunner and fire protection

The high quality of our products is made abundantly clear through the design, lifespan and quality of material used. In order to be able to provide our customers suitable furniture with high fire protection requirements, our development team is continuously working on optimising the fire protection equipment that we offer.

Contract furniture in use

THE TOPIC OF FIRE PROTECTION. A BURNING ISSUE.

Good planning saves lives. In case of fire, furniture can greatly affect the development of smoke and fire and can therefore be literally a matter of life and death.



» We will gladly consult with you **individually**, providing **practical advice from the initial planning stages** of your project. This offers us the opportunity to show you the configuration in which our contract furniture meets the required fire protection requirements. «



A burning issue

Even today, fires occur in public institutions and in public welfare facilities where there are reports of people being injured and even reports of fatalities.

In the event of a fire, there is a high degree of danger in buildings with heavy pedestrian traffic, such as in foyers, waiting areas and particularly in public welfare facilities. Residents with limited physical and mental capacities have to be brought to safety in the shortest time possible.

It is for these reasons that special safety precautions are necessary. The focus of these measures is the prevention and containment of a fire.

Short and secure escape routes, self-extinguishing or flame-resistant materials as well as low generation of smoke are only a few factors that contribute to preventing and containing fires.

To reduce the risks as well as the effects of a fire, official requirements have been expanded and enhanced over the course of the last ten years.

The ever-increasing requirements for fire protection are posing new challenges to developers, architects and operators.

We will gladly consult with you individually, providing practical from the initial planning stages of your project. This offers us the opportunity to show you the configuration in which our contract furniture meets the required fire protection requirements.

Fire protection in practice

CONTRACT FURNITURE REQUIREMENTS. SAFETY IS OF ABSOLUTE IMPORTANCE.

Standards that are finally easy to understand. There are a wide variety of fire protection tests and testing standards that need to be explained in the context of fire protection.



» We are able to make **clear statements** about the **fire safety** of our furniture and fulfil the highest fire protection requirements that correspond to the **desired equipment** by using additional standards. «



Contract furniture requirements

The rules governing the general building regulations require compliance with **DIN 4102 B1**. Therefore, the proof of flame resistance in accordance with DIN 4102 B1 for tables and chairs is often times required during object tender processes.

The standard regulates the requirements of building materials and components. It classifies, for example, the fire behaviour of walls, fire areas, corridors, ventilation, roofing, wall coverings, etc.

Contract furniture consists of various materials with different, mutually influencing fire behaviours.

Many materials that we use for our products, such as tubular steel, aluminium, wood, upholstery fabrics, lacquers, etc. are tested as individual building materials or as components in accordance with DIN 4102 or the material is classified as generally valid.

Testing in accordance with DIN 4102 requires a flat test object which is tested for flame-resistance in a fire shaft.

Due to these factors, the standard cannot be transferred to contract furniture. In addition to the building regulations, chairs and tables must therefore be tested and classified for their fire behaviour in accordance with additional standards.

An important standard for contract furniture is DIN 66084 on the classification of burning behaviour of upholstered compounds. Composite materials reach the highest possible P-a classification

(high) in accordance with DIN 66084 when passing the cigarette test in accordance with DIN 54341.

We have compiled the most important standards from different countries for you on the following pages to help improve your understanding of them.

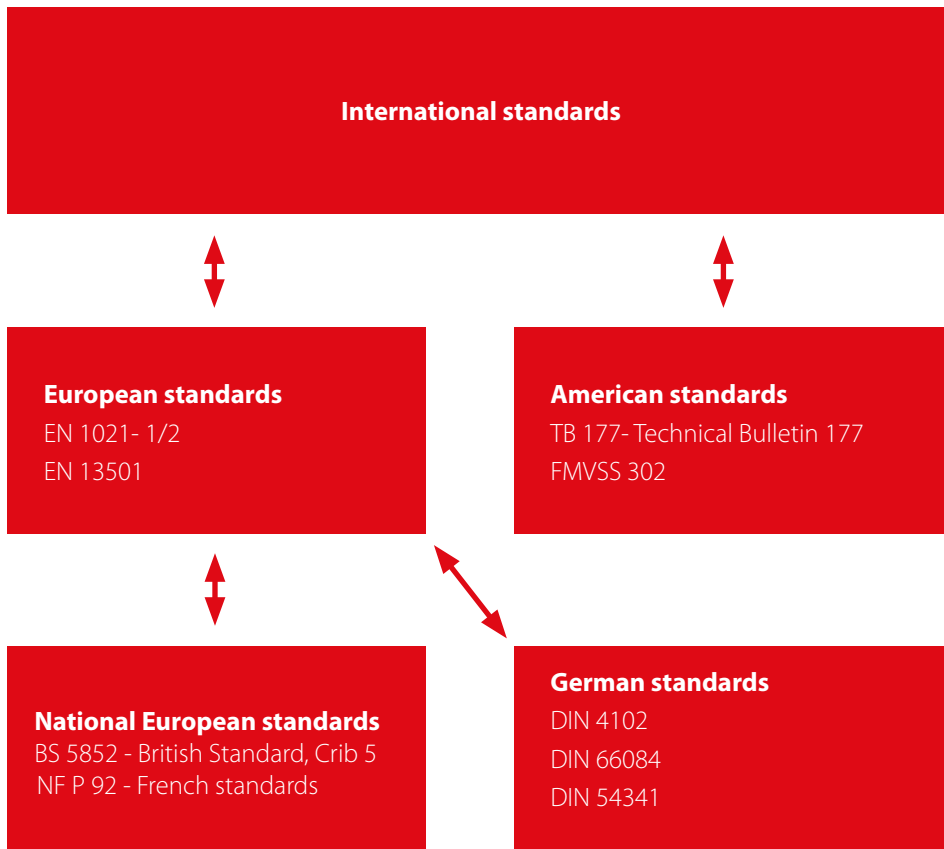
Country-specific standards

STANDARDS AND DIRECTIVES.

A JOURNEY THROUGH THE JUNGLE OF STANDARDS.

It is becoming more and more difficult to understand. There are different standards and directives to be met by contract furniture in regard to fire protection, depending on the country and field of application.





Overview of important standards

It is important to distinguish between the respective scope of application when considering the fire-relevant standards for contract furniture. In addition to the general overview shown above, the most important standards throughout the world are explained in detail below.

STANDARDS IN GERMANY AND EUROPE.

DIN 4102, EN 13501, EN 438, EN 1021, 1/2,
DIN 66084, DIN 54341.

Like fire and flames. In Germany and in the European Union, there are various standards that have partially overlapping content and partially supplemental content.

DIN 4102 - Fire behaviour of building materials and components

The DIN 4102 is the standard valid in **Germany** according to which all building materials and components firmly attached to a building are tested and classified.

This standard distinguishes between non-flammable material A and flammable material B. Materials such as steel or aluminium are considered non-flammable without specific evidence. The flammable materials are divided into flame-resistant (B1), normal flammability (B2) and highly flammable (B3). B3 materials cannot be used in construction.

The behaviour of a material is determined and classified with regard to its flammability, heat, flue gas, burning behaviour and ability to be extinguished when testing in accordance with DIN 4102. Testing in accordance with the B1 classification takes place in a fire shaft using a two-dimensional test object. This testing is possible for all textiles and sheet materials. Wood with a thickness of no more than 12 mm is considered B2, normal flammability.

Fire protection class A - non-flammable
Fire protection class A1 (non-flammable)
Non-flammable building materials without organic and flammable building components such as concrete, brick, steel or aluminium can be found in this fire protection class.

Fire protection class A2 (non-flammable)
Non-flammable building materials with organic building components such as plasterboard or fire protection fabric like

flame-retardant fabrics are included in this fire protection class.

Fire protection class B - flammable
Fire protection class B1 (flame-resistant)

This includes building materials like specially equipped wooden composite or laminated plastic panels, furnishing fabrics made of Trevira CS, special lacquering systems like our Brunner UV-hardening water-based lacquer or individual plastics that contain special flame protection.

Fire protection class B2 (normal flammability) This includes building materials made of unprotected wood with a thickness of no more than 12 mm and other wooden composites, upholstery materials or foam.

Fire protection class B3 (highly flammable)
The building materials classified according to fire protection class B3 cannot be used in building construction.

EN 13501 - Classifying building products and building types by their fire behaviour

This standard is the **European counterpart** to the national DIN 4102 standard. Both are legally valid in Germany. The EN 13501 differentiates building materials in a total of seven classes: A1, A2, B, C, D, E, F. Class F, similarly to class B3, cannot be used in building construction. In addition to the fire behaviour, the development of flue gas is measured and classified.

This standard can also not be used for testing contract furniture.

EN 438 - Decorative high-pressure laminates (HPL)

EN 438 defines the performance requirements for types of high-pressure laminates in various fields of application.

EN 1021 -1/2 - Evaluating the inflammability of upholstered furniture

The standard EN 1021 -1/2 applies to furniture in **Europe**: This standard is valid throughout the entire EU and examines the reaction of a material to a burning cigarette and a butane flame (simulated match). It supplements a wide variety of national tests, including DIN 54342 -1/2 in Germany and BS 5852 in Great Britain.

Test process

An armchair made out of fabric and foam with its rear panel at a right angle to the floor is used as the standard test model. Before the test, the model is soaked with water, the ignition source is positioned in a right angle and is in continuous contact with the backrest and seat.

Cigarette test in accordance with EN 1021, part 1

In the first part of this test, a burning cigarette is positioned in the angle of the test model. The cigarette must burn for its entire length. After 60 minutes, no smouldering or flaming of the fabric should be observed.

Match test in accordance with EN 1021, part 2

In the second part of this test, a butane flame intended to simulate a burning match is positioned between the backrest and the seat.

» The **DIN 4102** is the **standard valid in Germany** according to which **all building materials and components** firmly attached to a building are tested and classified. «

The fabric cannot catch fire within the next two minutes after removing the flame. During the duration of the test, the flame cannot reach the anterior border or the edges of the sample and the threshold zone cannot spread significantly.

DIN 66084 - Classification of burning behaviour of upholstered compounds

This standard examines the burning behaviour of upholstery composites with different testing methods. The composites are tested in different methods using three test standards. In doing so, the test results are classified in **three levels**: P-a (high), P-b (medium), P-c (low). The following tests are to be successfully demonstrated to qualify in the respective class:

Paper cushion test in accordance with DIN 54341 - Testing the seats for rail cars of public transport

A passed paper cushion test corresponds to the **P-a classification (high)**.

The P-a class includes upholstery composites in which the requirements in accordance with DIN 54341 are fulfilled in each individual test. When burning a paper cushion on the test object, the flames must extinguish themselves no later than 15 minutes after beginning the test. In this process, the flame is not allowed to be significantly above the backrest and the side edges should not have been reached after the burning. This test places the highest requirements on seating and can only be passed using a special upholstery configuration with special fire protection equipment.

Cigarette test in accordance with EN 1021, part 1

The cigarette test corresponds to the **P-c classification (low)**. The P-c class includes upholstery composites in which the requirements for each individual test are fulfilled in accordance with EN 1021, part 1. When using a smouldering cigarette, it must not catch fire or progressively smoulder within the 60 minute test duration.

Match test in accordance with EN 1021, part 2

The match test corresponds to the **P-b classification (medium)**. The P-b class includes upholstery composites in which the requirements for each individual test are fulfilled in accordance with EN 1021, part 2. When using a flame that simulates a burning match, the flames must be extinguished within two minutes after the ignition source has been removed.

Application areas of the testing methods

The testing methods can also be implemented on seating without upholstery made from pressed wood parts or injection moulded parts made of plastic. In the annex, we have listed the classifications relevant to the Brunner product line.

The following figures show the burning of a paper cushion in accordance with DIN 54341 in three steps.



1.) Positioning the paper cushion



2.) Burning the paper cushion



3.) Evaluating the burning behaviour

Country-specific standards

STANDARDS IN FRANCE, BELGIUM, SPAIN, PORTUGAL. NF P 92.

Play it safe. In France, in addition to the test using the electric burner, there is also the flame dispersion test as well as the dripping test.



» In France, Belgium, Spain and Portugal, there are **different test methods** for the burning behaviour of materials in accordance with NF P 92. «



NF P 92 - Safety against fire - Building materials - classification according to burning behaviour

In **France, Belgium, Spain and Portugal**, there are different test methods for the burning behaviour of materials in accordance with NF P 92.

Electric burner (NF P 92-503)

A sample is mounted above an electric fan heater from which heat emanates. After 20 seconds, a butane gas flame is held to the surface of the material.

After the test, the flame duration, occurrence of dripping flame residue, the length and width of the damaged sample are evaluated. The result is a classification of the fabric sample between M1 and M4, in which M1 represents the highest class.

Flame dispersion test (NF P 92-504)

This test is used as a supplement to the testing methods using the electric burner. It offers the ability to subsequently classify samples that displayed atypical burning behaviours caused by the electric burner during the test.

During the flame dispersion test, a flame is held to the end of a horizontal sample repeatedly. It measures the duration of the afterflame as well as the emergence of burning drops.

Dripping test (NF P 92-505)

An additional, supplemental test for the electric burner is the dripping test. In this process, the possible hazards caused by burning drops that have been observed during the first test are examined. A sample is placed on a grille, which is located beneath a fan heater. A drip tray with cotton is installed below.

The sample is heated repeatedly using the fan heater. If the cotton ignites, the fabric is classified in the M4 class.

If the sample does not ignite, the classification from the test with the electric burner remains valid.

STANDARDS IN THE UNITED KINGDOM.

BS 5852.

Not directly visible. The correct upholstery is determined by the fire protection properties of the furniture; in addition to the cover, the foam material also plays an important role.



» The majority of the seating from the **Brunner product line** can also be equipped with **CMHR foams** upon request. «



BS 5852 - Methods of test for assessment of the ignitability of upholstered seating by smouldering and flaming ignition sources

In **Great Britain**, the British standard BS 5852 Crib 5, among others, is used to test the fire safety of furniture. This standard places higher requirements on fire protection than EN 1021, parts 1+2, and is therefore used as a supplement for testing the burning behaviours of upholstery composites.

For this test, as for the EN 1021, an ignition source is simulated. In most cases, the Crib 5 ignition source is tested, in which a stack of wood shaped like a crib is ignited with an alcohol-soaked wick. The test is successful if all flames extinguish themselves within ten minutes. Smouldering or smoke development must stop 60 minutes after ignition; the weight loss of the model, including Crib 5, cannot be more than 60 g.

Foam materials that meet the high requirements of the standard are designated as CMHR (Combustion Modified High Resilience) foams. The majority of the seating from the Brunner product line can also be equipped with CMHR foams upon request.

Country-specific standards

STANDARDS IN THE UNITED STATES.

TB 117, FMVSS 302.

Not just suited for contract furniture. Some testing methods are from outside of the industry but are also used to test upholstered furniture.



» **TB 117** is a **mandatory requirement** for upholstered furniture components. In the **FMVSS 302** standard, the **self-extinguishing properties** of a material, e.g. a foam material, are determined after the removal of a defined flame. «



TB 117 - Requirements, Test Procedure and Apparatus for Testing the Flame Retardance of Resilient Filling Materials Used in Upholstered Furniture.

In the **United States**, there is the California Technical Bulletins (TB) Test, TB 117, section E, for testing the burning behaviour of seating. TB 117 is thereby a mandatory requirement for upholstered furniture components.

Section E deals with the resistance of a material to a small flame. Almost all upholstery fabric from Brunner passes this test.

FMVSS 302 - Federal Motor Vehicle Safety Standard

The FMVSS 302 is a test standard for the fire behaviour of materials used in the automotive industry.

In this standard, the self-extinguishing properties of a material, e.g. a foam material, after the removal of a defined flame are determined. To fulfil this standard, the fabric must extinguish itself after brief exposure to fire.

Fire protection properties

BRUNNER CONTRACT FURNITURE. SAFE FURNITURE FOR ALL FACILITIES.

Safety is the first priority. In order to offer our customers tailor-made solutions, we have suitable fire protection equipment for each type of interior furniture.



» The **majority of our products** have a base made out of **non-flammable tubular steel or aluminium**.
Furthermore, we can meet even very **stringent fire protection requirements** for upholstered furniture **upon customer request**. «

What does our furniture achieve?

We only use materials for our chairs, seating and tables that already meet the minimum fire protection requirements in the **STANDARD** version. **Our lacquers are flame-resistant in accordance with DIN 4102 B1**, our shell and wooden chairs with varnished and with laminated surfaces fulfil the requirements of the highest DIN 66084 P-a class (paper cushion test).

In the **STANDARD** upholstered version, our upholstered furniture, in accordance with EN 1021, 1 passes the cigarette test and in doing so, reaches the **P-c classification (low)** in accordance with DIN 66084.

Many of our upholstery fabrics, such as the flame-resistant Trevira CS (4102-B1), fulfil the requirements of EN 1021, 1+2 (cigarette test and match test) in the upholstery composite and are classified as **P-b (medium)** according to DIN 66084. At Brunner, we designate this upholstery composite as **STANDARD PLUS**.

Our furniture in the **EXTRA** upholstered design, which is upholstered with flame-resistant upholstery fabrics (4102-B1) and CMHR foam, fulfil the BS 5852 fire protection test with **Crib 5** ignition source in addition to the DIN 66084 **P-b (medium)**.

Furthermore, we can meet even very stringent fire protection requirements for upholstered furniture upon customer request. This is possible by using upholstery foam in CMHR quality and base upholstery made of non-flammable fire protection fabrics. Upholstery such as this, which is

designated as **ULTRA** by Brunner, fulfils the requirements of DIN 66084 **P-a (high)** (paper cushion test) in addition to the BS 5852, Crib 5.

The majority of our products have a base made out of non-flammable tubular steel or aluminium.

For tables, we use high-quality support plates exclusively. These support plates are heat-resistant in accordance with EN 438 (Decorative high-pressure laminates (HPL)). These are plates that are based on thermosetting resins (laminates). For more stringent fire protection requirements for table tops, we use flame-resistant laminates and support plates in accordance with DIN 4102-B1.

For the highest requirements for fire protection, we also offer a complete selection of seating made from non-flammable materials like steel or aluminium.

An overview of individual components and products can be found in the accompanying "Fire protection classifications" insert.

Furthermore, we will gladly offer you more assistance if you would like more information on the topic of fire protection. This also includes our expertise and fire simulation for the highest fire protection requirements.

The first illustration shows the structure of the **STANDARD** upholstery composite, which, in combination with flame-resistant upholstery fabrics, fulfils the EN 1021 1+2 as well as the DIN 66084 P-b and P-c. The **ULTRA** upholstery composite with flame-retardant fabric is depicted below, which, in combination with flame-resistant upholstery fabrics and CMHR foam, can be classified as P-a in accordance with DIN 66084.



STANDARD/STANDARD Plus upholstery composite



ULTRA upholstery composite with Interglas flamline

Note

For details, prices, terms and conditions, refer to the current price list. We reserve the right to make technical changes, errors and colour variations without prior notice. The aforementioned fire protection requirements are provided exclusively as example cases. The fire protection requirements for the building and the interior can vary depending on the project. Therefore, the furniture must be coordinated and tested in a project-specific manner in terms of equipment and in accordance with the building requirements on an individual basis. Some models are displayed as special versions that are subject to additional costs. Wood is a natural product. We exclusively use high-quality beech wood from sustainable forestry for our line of furniture. Despite our careful selection of wood, there may be variations in colour. Differences in colour and structure do not constitute grounds for complaint, but are an expression of the individual character of furniture made from wood.

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