SAYERLACK®
INNOVATIVE WOOD SOLUTIONS




FIRE RETARDANT COATINGS

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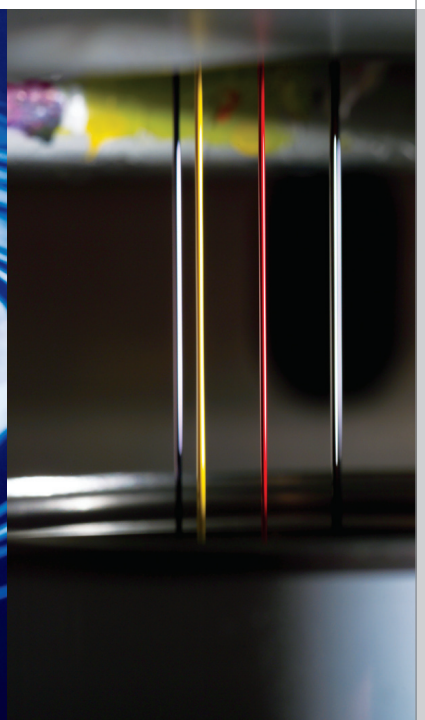

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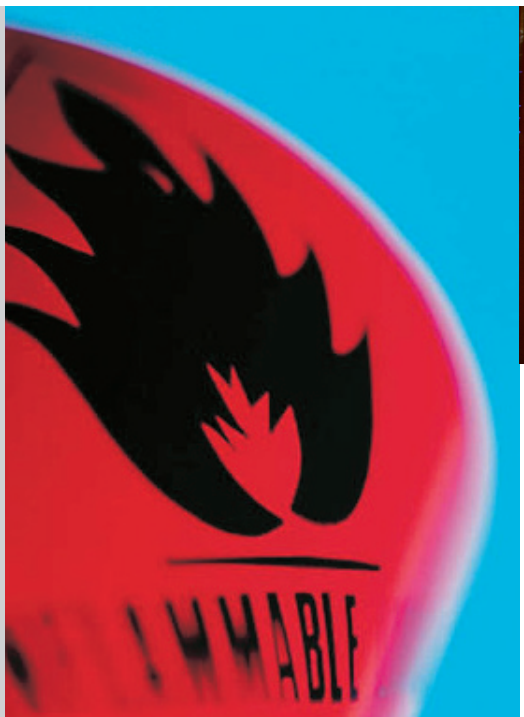


OBJECTIVE:
REDUCING FIRE PROPAGATION TIMES

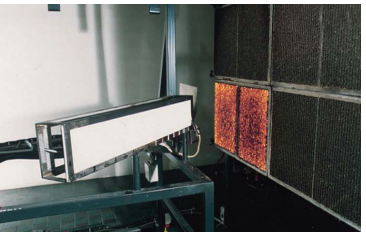
After a fire starts, any reduction in the propagation of flames can be decisive in saving human lives. One of the purposes of fire retardant coatings is to reduce the rate at which the fire spreads and thereby retard it. As regards fire protection, most countries have very strict regulations concerning the performance of fire-resistant and fire-retardant coatings, especially for the treatment of bearing structures, coatings and wooden works.
Wood exhibits an important aesthetic importance and fire retardant coatings for wood should combine fire protection with excellent aesthetic results. “Safety performance and Finish performance”. Customers’ requirements are not only regulation-related (compliance with law), but they are also appearance/functional-related. These are two components that since the design stage have been at the basis of Sayerlack’s progress towards the realisation and formulation of fire retardant coatings.

When it is mandatory to conform to fire regulations, the architect/designer or authoriser issuer of the fire certificate may calculate the fire load (quantity of flammable material per square metre and relevant calorific power) for each room, assessing the class that each construction element falls into, based on emergency exits, fire fighting systems, or internal permanent safety services.

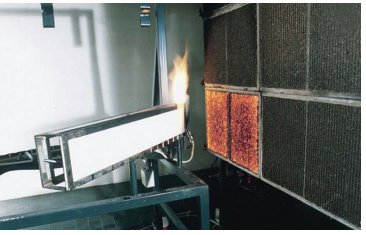
Protection from fire: where is it required?

- Public buildings
- Offices/factories
- Clubs, bars, pubs and dance halls
- Banks
- Airports and railway stations
- Hotels and tourist facilities
- Exhibition centres, meeting and fair venues
- Shops
- Schools, colleges, universities and nursery schools
- Auditoriums, theatres, cinemas and museums
- Hospitals
- Gyms and fitness centres
- Churches
- Civil buildings

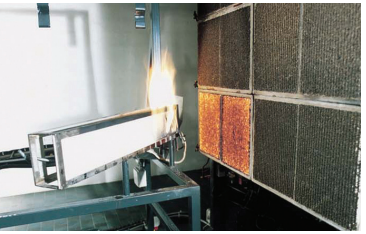
A



A) Test start on MDF coated with a normal polyurethane cycle.



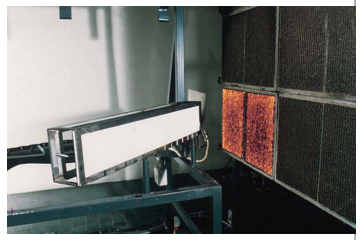
A1) The 750 C° heat of the radiant panel sets the coating film on fire.



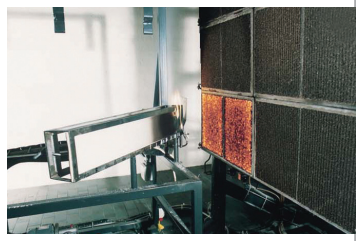
A2) Without protection, the flame reaches the wood.

A3) The panel is 50% charged.

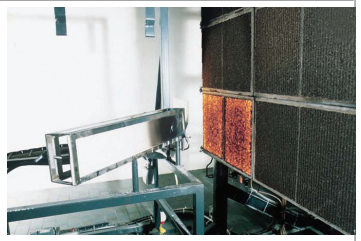
B



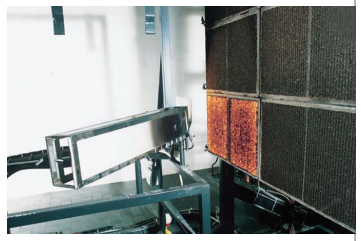
B) Test start on MDF coated with the TB cycle.



B1) Even if only partly damaged, the reaction that reduces the combustion speed is evident on the panel.



B2) The combustion sets off but the flame propagation speed is greatly reduced by the fire retardant coating.



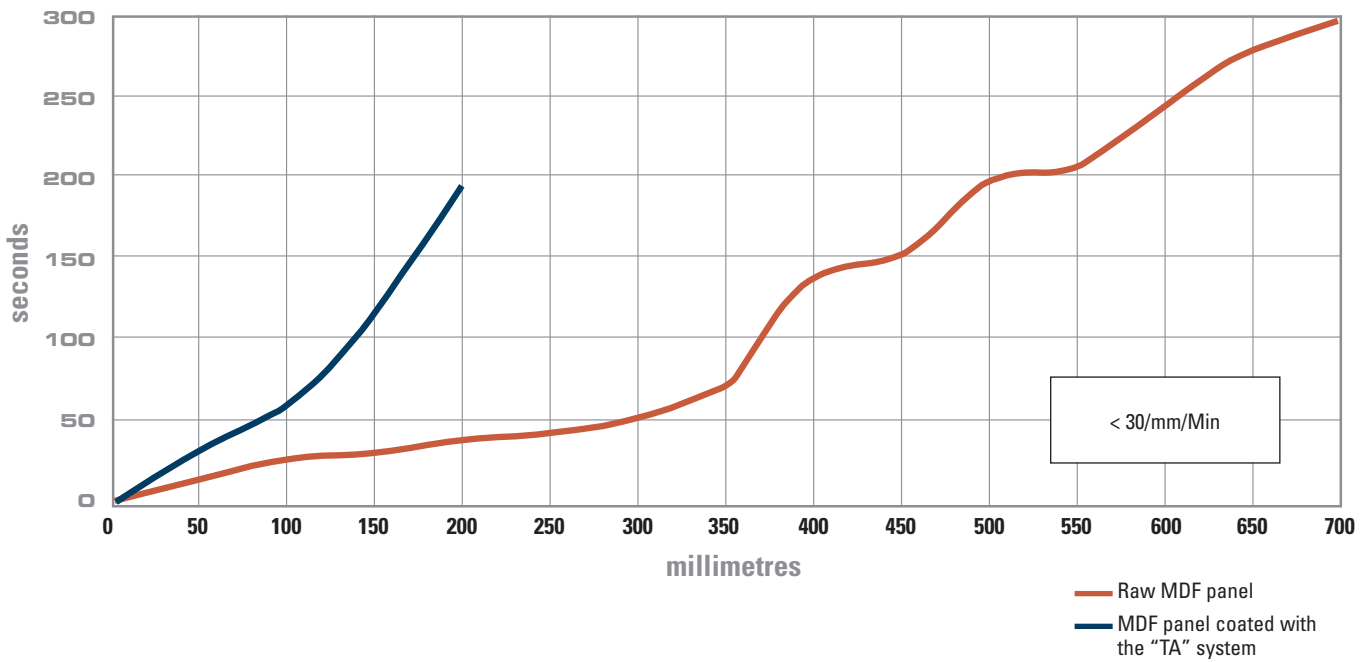
B3) The situation is almost unchanged, the damaged area is minimal and the flame tends to extinguish.

FIRE REACTION

M.D. 26/6/84 - M.D. 6/3/92 (UNI 9796) - Ministry of Internal Affairs Italy

Fire reaction regulations divide coating and panelling related materials, as well as flooring, false ceiling, furnishing and seating surface materials, into several classes. Italian regulations, one of the strictest in the EU in terms of fire reaction performance, assigns six classes. They are assigned a fire reaction class, which ranges from 0 (non-flammable) to 5 (easily flammable). In the event of a fire in a closed place, temperature reaches very high values. Wooden materials start to release gases that considerably contribute to fire propagation. Class 1 is the best to protect the material involved in the fire. The Sayerlack Class 1 fire retardant systems effectively slow down fire spreading time, as they act with several mechanisms at the same time. For example, an MDF 4 mm thick panel with reaction class 4, after treatment with the Sayerlack fire retardant cycle, obtains the reaction class 1. Our certifications were awarded by the Fire Department - Central Technical Prevention and Safety Direction of Roma Capannelle.
Sayerlack's fire retardant products will be tested in the near future also in accordance to new European regulations (Euroclass), this to allow prompt introduction on the market.

Fire reaction test based on UNI 9174
Flame propagation speed



Abrasion test, TABER-UNI 9115/87

CATAS S.p.A.
centro ricerca e sviluppo
Laboratorio prove settore legno-arredo

Rapporto di Prova n°: 46464 / 1 Spett.
Data di Ricevimento: 12-03-04
Data di Esecuzione: 24-03-04
Data di Emissione: 02-04-04
Denominaz.campione: Pannello in legno verniciato ignifugo classe 1

Abrasione Taber UNI 9115/87

Tipo di materiale sottoposto a prova: Pannello di legno verniciato

Risultati della prova:

Provetta n°	RA giri	GA mg/100 giri	Osservazioni
1	155	307	/ / /
2	155	289	/ / /
3	170	208	/ / /
Valore medio	160	335	

Livello di prova raggiunto:	4

Annotazioni :
Per la prova sono state utilizzate carte abrasive che soddisfano il requisito di 110±30 mg come perdita di peso ogni 500 giri della piastra di zinco.

Lotto carte abrasive	1925 del 2002
Durezza media ruote	55 Shore A

Il responsabile di reparto

CATAS S.p.A. S.GIOVANNI AL NATISONE (UD) LABORATORIO PROVE SETTORE LEGNO-ARREDO

Il direttore
Dott. Ing. Angelo Speranza

La denominazione del campione è quella dichiarata dalla Ditta richiedente. Questo rapporto di prova riguarda il campione sottoposto a prova e solo esso. Aggiunte, cancellazioni o alterazioni non sono ammesse. Il rapporto di prova non può essere riprodotto parzialmente. La frase "provato da Catas" può essere riportata nella pubblicità del prodotto; il termine "approvato" non deve essere assolutamente usato.

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Dry heat resistance test, EN 12722/97

Temperature °C	Assessment	Remarks
55	not performed	
70	5	-
85	5	Flawless
100	4	Few isolated
120	3	Light halo visible from different directions

Wet heat resistance test, EN 12721/97 FIRA Report: TMCMF03296

Temperature °C	Assessment	Remarks
55	5	No damage
70	3	Disc just visible
85	3	Disc just visible

Surface Resistance to cold liquids, EN 12720/97 FIRA Report: TMCMF03296

Liquid	Assessment	Remarks
Ethanol 48%	5	No damage
Tea	5	No damage
Coffee	5	No damage
Cold Oils (24h)	5	No visible damage
Cold Fats (24h)	5	No visible damage

Resistance to Mechanical Damage BS3962 Part 6:1980 FIRA Report: TMCMF03296

Test	Assessment	Remarks
Crosscut	5	Cuts smooth
Scrape: Surface penetration	5	8.7N
Scrape: Penetration to Substrate	5	20.6N

Light resistance test, UNI 9427/89

Exposure time (hours)	Grey scale evaluation	Remarks
20	5	Flawless

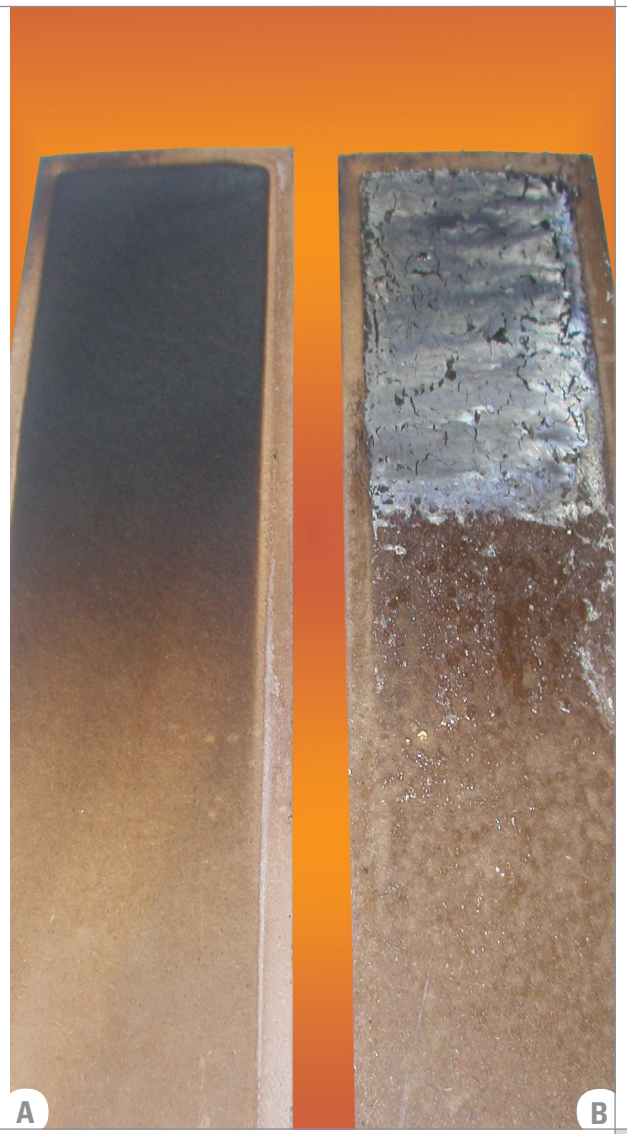
WOOD FOR STRUCTURAL USE IN BUILDING

The fire behaviour of load bearing wooden structures, which requires passive protection, is totally different from that of metal structures. In the event of fire, the temperature reached in a closed room is of several hundreds degrees. Metal, an excellent heat conductor, at temperatures over 450º C softens and loses all mechanical resistance, and virtually "collapses".

Wood, a bad conductor, does not collapse: flames and heat carbonise it's surface, which limits the propagation of combustion to the outer layers. Intumescent coatings increase such protective layer as when heated, they cause a swelling of the coating film (several centimetres) which acts as a barrier to fire.

This is why wood is increasingly used in current engineering and architectural works.

FIRE RETARDANT SYSTEMS



Comparison between fire retardant (A) and intumescent (B) cycle

System		Certification Achieved
TA	Clear polyurethane, 450 gr/m^2	**Class 1 fire reaction according to M.D. 6/3/92 - UNI 9796** **Ministerial homologation no. BO1159PVI100001** of 15/11/96 **Class 1: BS 476 - Part 7** – Solid Oak, birch multilayer ply and pine veneered on MDF (United Kingdom) **Class O: BS 476 - Part 6** – on Class O treated substrate UNE 23.727-90 **Clasificaciòn M1 - expediente n. 3008471** - placas de fibrocemento (España)
TB	White polyurethane, 450 gr/m^2	**Class 1 fire reaction according to M.D. 6/3/92 - UNI 9796** **Ministerial homologation no. BO1159PVI100002** of 18/02/97 **Class 1: BS 476 - Part 7 - Class 1** – on birch multilayer ply **Class O: BS 476 - Part 6** – on Class O treated substrate.
TC	Pigmented polyurethane, 450 gr/m^2	**Class 1 fire reaction according to M.D. 6/3/92 - UNI 9796** **Ministerial homologation no**. **BO1159PVI100003** of 22/02/00
TD	White, waterborne, 400 gr/m^2	**Class 1 fire reaction according to M.D. 6/3/92 - UNI 9796** **Ministerial homologation no. BO1159PVI100004** of 05/09/00

System to obtain the class 2 fire reaction according to D.M. 26/6/84		
CABE 61	Clear polyurethane, 450 gr/m^2	Ministerial homologation no. **BO502B11CD200001** of 27/04/88

System required to achieve M1 Class reaction-to-fire status based on French standard NF P92-501		
TU 74**	Clear acrylic polyurethane sealer-topcoat.	Use 20% TH 790 hardener and add 5% of XT 500 additive. Apply 2 coats of 120g/m^2.

Coating systems, during spray application can lose 20-30% of product due to “overspray”. We recommend increasing the purchase quantity of the final product by the same percentage in order to ensure the substrate receives the certified quantity. Losses due to sanding can also occur; sanding should therefore always be very light.

TA system – Class 1 fire reaction 1 M.D. 6/3/92 & BS476 P7 - 450 gr/m²	
TU 22	Clear polyurethane basecoat – two 150 gr/m² coats cured at 50% with **TH 222**
TZ 22**	Clear polyurethane topcoat – one 150 gr/m² coat cured at 50% with **TH 222**

The system exhibits an excellent transparency (even at such heavy applied weights) and good scratch resistance, with the possibility of choosing between a 10 or 25 gloss mat topcoat or a 75 gloss semigloss topcoat. It can be used by spray or curtain coater for a highly professional use to meet the aesthetic and functional requirements of architects and designers.

TB system – Class 1 fire reaction 1 M.D. 6/3/92 & BS476 P7- 450 gr/m²	
TU 22/13	White polyurethane basecoat – two 150 gr/m² coats cured at 50% with **TH 333**
TZ 2225/13	Mat white polyurethane topcoat – one 150 gr/m² coat cured at 50% with **TH 333**

The cycle exhibit excellent flow and covering. It features good scratch resistance and excellent finish.
It's available in two versions: a 25 gloss mat topcoat or a 75 gloss semigloss topcoat.

TC system – Class 1 fire reaction 1 M.D. 6/3/92 - 450 gr/m²	
TU 22/13	White polyurethane basecoat – two 150 gr/m² coats cured at 50% with **TH 333**
TZ 22**	Clear polyurethane topcoat – one 150 gr/m² coat cured at 50% with **TH 333** + 40% max of polyurethane paste **TP 4140/XX**

If a pigmented finish is required featuring excellent appearance, the "**TC**" cycle (a compound of basecoat and mat or semigloss binder + pigmented pastes **TP 4140/XX** at 30%) is the most appropriate system to use: thousands of colour shades are possible with just 12 polyurethane pastes. Perfect for interior decorators and designers.

Base colours of the TP 4140/XX series polyurethane pastes

The stains in the table may be subject to alterations over time; so, their values are only approximate.

TP 4140/C4	TP 4140/A8	TP 4140/B8	TP 4140/B2
TP 4140/B6	TP 4140/A5*	TP 4140/C9	TP 4140/A2
TP 4140/B3	TP 4140/B9	TP 4140/A1	TP 4140/C7

N.B.: neutral binders of the "TC" cycle are available at 10 and 25 gloss (mat) and 75 gloss (semigloss) but with the addition of some types of polyurethane pastes, the gloss level may slightly change.
* Black A5 does not have high opacity and should only be used for stain recipes, or mixed with other bases. If you need a lacquered black, use paste TP 4140/57.

CABE 61 system – Class 2 fire reaction 1 M.D. 26/06/84 - 450 gr/m²

TU 280	Clear polyurethane basecoat – two 150 gr/m² coats cured at 50% with **TH 755**
TZ 3325	Mat polyurethane topcoat – one 150 gr/m² coat cured at 50 % with **TH 755**

The system, applied on beech multilayer ply for wall panels, is comparable to an normal polyurethane finishes, both for ease of application and for the final result; in fact, the finish features excellent smoothness and transparency. Drying times are similar to a normal polyurethane without whitening problems.

WATERBORNE COATINGS FOR INTERIORS

TD system – Class 1 fire reaction 1 M.D. 6/3/92 - 400 gr/m^2	
AF 22/13	Mat white waterborne topcoat – two 200 gr/m^2 coats (including 20% of tap water)

The "**TD**" waterborne system meets the requirements of exhibition stand organisers that need a quick and easy to apply product. With only two coats, for 400 gr/m^2 total (330 gr/m^2 + water) you can obtain a Class 1 fire reaction coating. As it is free from solvents, the product can be used for applications and/or retouches in places (such as fairs, museums, tunnels) where flammable coatings cannot be used. Also with the "**TD**" cycle you can obtain stains by adding 3% of **XA 2006** series waterborne paste to the **AF 22/13** white product.
Below are the mixtures obtained.

Mixtures with waterborne pastes, XA 2006/XX series

The stains in the table may be subject to alterations over time; so, their values are only approximate.

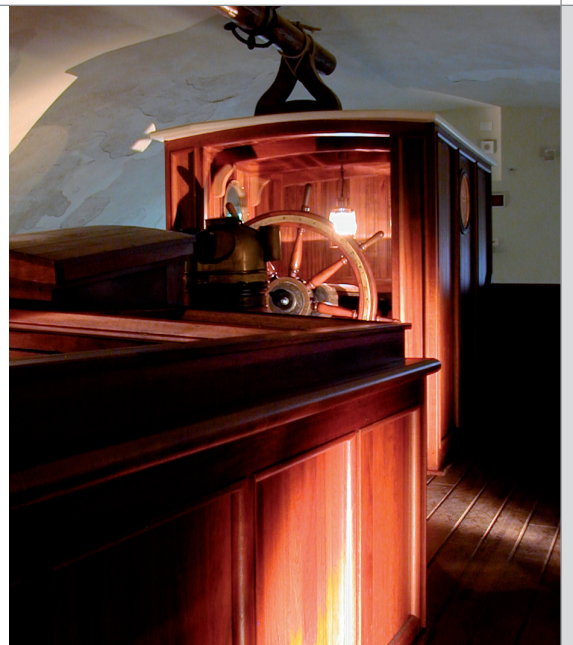
XA 2006/06	XA 2006/08	XA 2006/17	XA 2006/21	XA 2006/26
XA 2006/42	XA 2006/52	XA 2006/53	XA 2006/61	XA 2006/69
XA 2006/72	XA 2006/BB			

N. B.: the white topcoat of the "TD" cycle is only available in the 5 gloss version (matt) but, if some kinds of water-based pastes are added, it can slightly change.

Courtesy of Galata Museo del Mare, Genova

Procedure to issue the Statement of Conformity (Certificate of Supply)

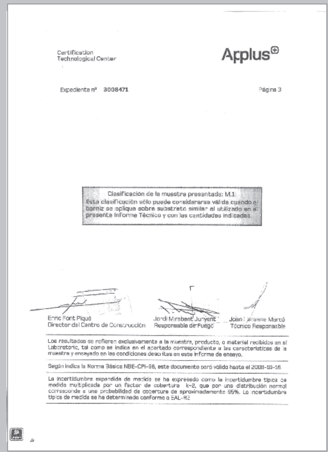
At the end of the work, the painter must fill in a pre-printed form (**Statement of application** – provided by Sayerlack when the order is placed). The form is used to state the use of the homologated basic weight for the specific fire retardant cycle. The filled in form shall be faxed to Sayerlack, which shall issue a **Statement of Conformity**, valid for **5 years. This process may vary slightly depending on the EU member state the product is in use.**



N.B. Fire services or interested authorities, in certain EU member states may ask for an update even if the certificate has not expired, if the item is damaged or chipped. We can only issue certificates for the square metres corresponding to the homologation: the owner (with the old but still valid certification) shall have to prove to any inspectors that the new certificate is for maintenance only.
After several objections by the manufacturers of homologated coatings, a second edition of the UNI 9796 standard was issued in January 1998. Compared to the previous edition, an ageing cycle has been added subject to a series of tests, so when a standard is mentioned, the most recent edition is the valid one. With this amendment, the 5 year expiry has been eliminated.

For those who have never performed these works we suggest that you always ask for the room specifications with the Fire services specification, so as to prevent any unpleasant situations.

Certifications for Sayerlack fire retardant coatings


Applus
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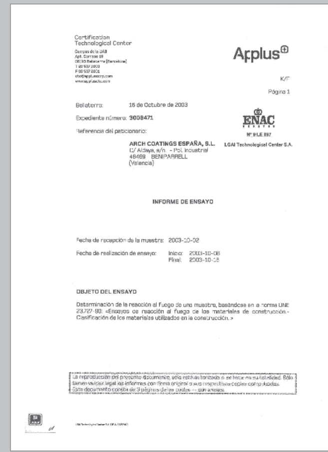
LNE
PROCES-VERBAL DE CLASSEMENT DE REACTION AU FEU D'UN MATERIAU


Applus
INFORME DE ENSAYO


Ministero dell'Interno
CERTIFICATO DI PROVA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CERTIFICATO DI PROVA


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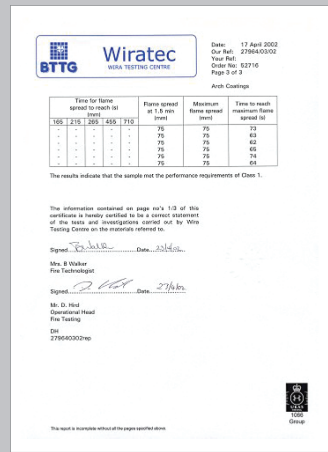
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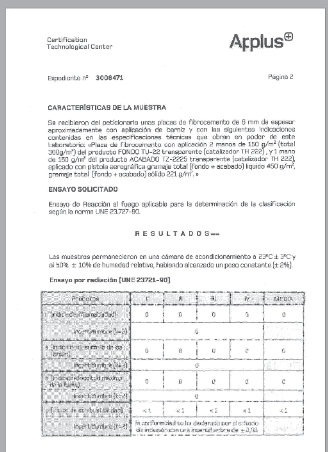
Ministero dell'Interno
CERTIFICATO DI PROVA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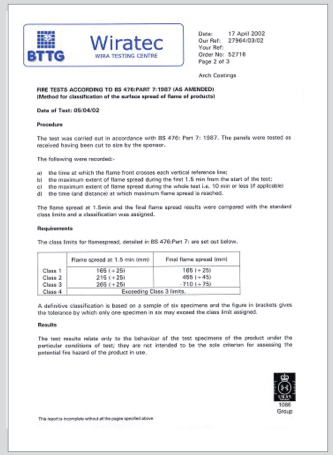
FIRE TESTING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09/2011
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