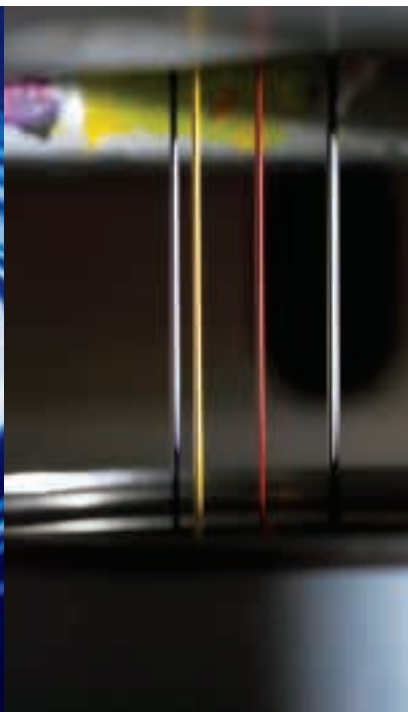


**FIRE RETARDANT COATINGS**

## CONTENTS

- pag. 3** Objective: reducing fire propagation times  
Protection from fire: where is it required?
- pag. 4** Fire reaction
- pag. 6** Fire retardant systems
- pag. 7** Polyurethane products for interiors
- pag. 9** Waterborne coatings for interiors



## 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 + 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) 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.



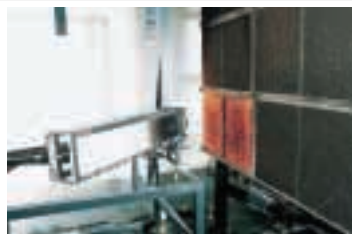
A3) The panel is 50% charred.



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.

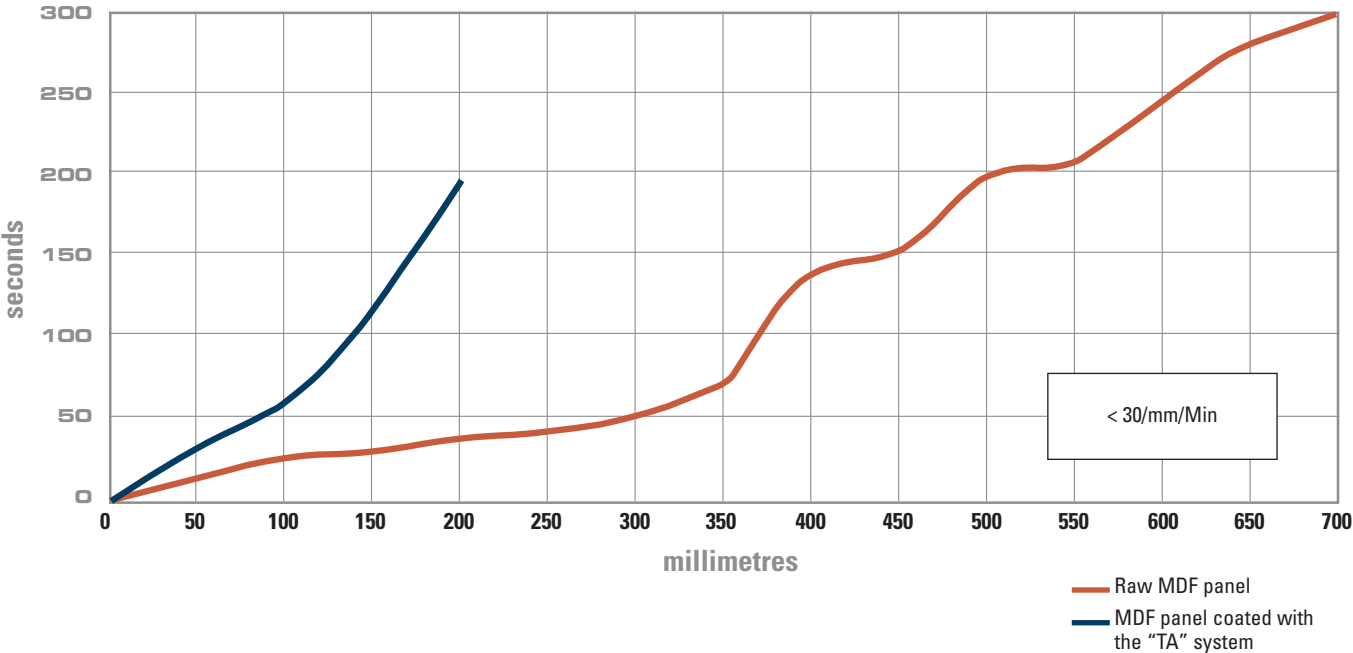
## FIRE REACTION

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** Centro Nazionale per l'Attestazione della Qualità

Report di Prova: 4049 / 1  
Data di Ricezione: 17-09-04  
Data di Conclusione: 24-09-04  
Data di Emissione: 05-09-04  
Dimensioni campione: Rettangolo di legno laminato (profilo massiccio)

**Abrasion Taber UNI 9115/87**

Tipi di materiale sottoposto a prova: Pannello di legno laminato

Resulti della prova:

Prova n°	SA gr/l	SB mg/100 gr	Osservazioni
1	133	337	1.1.1
2	133	338	1.1.1
3	175	338	1.1.1
Valore medio	133	338	

Livello di prova raggiunto: 4

Conclusi:  
Per la prova sono state utilizzate sette dischi con resistenza di 1000 mg come previsto al punto 100 gr del punto 4.1.1.

Scadenza certificato: 18.09.05  
Scadenza rivista serie: 05.09.06

*[Signature]* *[Stamp]* *[Signature]*

La certificazione del campione è valida soltanto nella Città di Genova. Questo rapporto rappresenta i risultati conseguiti a partire da una sola prova, esecuzionale o esplorativa, che deve essere ripetuta su una serie di prove per avere una valutazione globale. Il presente rapporto non deve essere considerato un documento di garanzia per l'utente finale. Per informazioni e chiarimenti, rivolgersi al Centro Nazionale per l'Attestazione della Qualità (CATAS) o al Centro Regionale per l'Attestazione della Qualità (CRA) di competenza.

pag. 1/1

**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	
Scrape: Surface penetration	5	Cuts smooth 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 450° 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 <sup>2</sup>	<b>Class 1 fire reaction according to M.D. 6/3/92 - UNI 9796</b> Ministerial homologation no. <b>BO1159PVI100001</b> of 15/11/96 <b>Class 1: BS 476 - Part. 7</b> – Solid Oak, birch multilayer ply and pine veneered on MDF <b>Class 0: BS476 - Part 6</b> – on Class 0 treated substrate UNE 23.727-90 Clasificaciòn M1 - expediente n. 3008471 - placas de fibrocemento
TB	White polyurethane, 450 gr/m <sup>2</sup>	<b>Class 1 fire reaction according to M.D. 6/3/92 - UNI 9796</b> Ministerial homologation no. <b>BO1159PVI100002</b> of 18/02/97 <b>Class 1: BS 476 - Part. 7 - Class 1</b> – on birch multilayer ply <b>Class 0: BS476 - Part 6</b> – on Class 0 treated substrate.
TC	Pigmented polyurethane, 450 gr/m <sup>2</sup>	<b>Class 1 fire reaction according to M.D. 6/3/92 - UNI 9796</b> Ministerial homologation no. <b>BO1159PVI100003</b> of 22/02/00
TD	White, waterborne, 400 gr/m <sup>2</sup>	<b>Class 1 fire reaction according to M.D. 6/3/92 - UNI 9796</b> Ministerial homologation no. <b>BO1159PVI100004</b> 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 <sup>2</sup>	Ministerial homologation no. <b>BO502B11CD200001</b> of 27/04/88

During the product application, all cycles lose about 20-30% product in “overspray”. We recommend increasing the amount of final product by the same percentage, so as to have the certifies quantity on the item. A loss may also occur during sanding, which should always be very delicate.

## POLYURETHANE PRODUCTS FOR INTERIORS

<b>TA system - Class 1 fire reaction 1</b> <b>M.D. 6/3/92 &amp; BS476 P7 - 450 gr/m<sup>2</sup></b>	
<b>TU 22</b>	Clear polyurethane basecoat – two 150 gr/m <sup>2</sup> coats cured at 50% with <b>TH 222</b>
<b>TZ 22**</b>	Clear polyurethane topcoat – one 150 gr/m <sup>2</sup> coat cured at 50% with <b>TH 222</b>

The system exhibits an excellent transparency (even at such heavy applied weights) and good scratch resistance, with the possibility of choosing between a 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.

<b>TB cycle - Class 1 fire reaction 1</b> <b>M.D. 6/3/92 &amp; BS476 P7- 450 gr/m<sup>2</sup></b>	
<b>TU 22/13</b>	White polyurethane basecoat – two 150 gr/m <sup>2</sup> coats cured at 50% with <b>TH 333</b>
<b>TZ 2225/13</b>	Mat white polyurethane topcoat – one 150 gr/m <sup>2</sup> coat cured at 50% with <b>TH 333</b>

The cycle exhibit excellent flow and covering. It features good scratch resistance and excellent finish.

<b>TC cycle - Class 1 fire reaction 1</b> <b>M.D. 6/3/92 - 450 gr/m<sup>2</sup></b>	
<b>TU 22/13</b>	White polyurethane basecoat – two 150 gr/m <sup>2</sup> coats cured at 50% with <b>TH 333</b>
<b>TZ 22**</b>	Clear polyurethane topcoat – one 150 gr/m <sup>2</sup> coat cured at 50% with <b>TH 333</b> + 40% max of polyurethane paste <b>TP 4140/XX</b>

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.

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

N.B.: neutral binders of the "TC" cycle are available at 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.

<b>CABE61 system - Class 2 fire reaction 1 M.D. 26/06/84 - 450 gr/m<sup>2</sup></b>	
<b>TU 280</b>	Clear polyurethane basecoat – two 150 gr/m <sup>2</sup> coats cured at 50% with <b>TH 755</b>
<b>TZ 3325</b>	Mat polyurethane topcoat – one 150 gr/m <sup>2</sup> coat cured at 50 % with <b>TH 755</b>

The system, applied on beech multilayer ply for wall panels, is comparable to a 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/m²	
AF 22/13	Mat white waterborne topcoat – two 200 gr/m² 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/m² total (330 gr/m² + 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 4011** series waterborne paste to the **AF 22/13** white product. Below are the mixtures obtained.



Mixtures with waterborne pastes, XA 4011/XX series

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

 XA 4011/07	 XA 4011/61	 XA 4011/42	 XA 4011/25	 XA 4011/08
 XA 4011/06	 XA 4011/65	 XA 4011/49	 XA 4011/52	 AF 22/13
 XA 4011/72	 XA 4011/04	 XA 4011/09	 XA 4011/53	 XA 4011/26

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.



# 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



11/2004

Z02A06UK

Arch Coatings assumes no contractual liability or responsibility in regards to the texts and photographs included herein.



ARCH COATINGS UK Ltd - A1 Business Park - Knottingley  
West Yorkshire - WF11 0BU - England  
ph. +44 (0) 1977 673363 - fax +44 (0) 1977 673521  
info@archcoatings.co.uk - www.sayerlack.it  
Customer service: ph. +39 051 770770  
fax +39 051 770521 - customerservice@sayerlack.it



ARCH COATINGS USA - Highway 933, P.O. BOX 547  
Brandenburg, KY 40108  
ph. +1 270 4226860 - fax +1 270 4226096  
archcoatingsusa@archchemicals.com - www.sayerlack.it  
Customer service: ph. +39 051 770770  
fax +39 051 770521 - customerservice@sayerlack.it

ARCH CHEMICALS COATINGS SINGAPORE Pte Ltd  
1 Kim Seng Promenade - #13-09 Great World City West Tower  
Singapore 237994 - ph. +65 67351268 - fax +65 67351298  
coatingsasia@archchemicals.com - www.sayerlack.it  
Customer service: ph. +39 051 770770  
fax +39 051 770521 - customerservice@sayerlack.it

ARCH COATINGS EXPORT DEPT.  
Via del Fifico, 12 - 40065 Pianoro (BO) Italia  
ph. +39 051 770511 - fax +39 051 770527  
sales@archcoatings.it - www.sayerlack.it  
Customer service: ph. +39 051 770770  
fax +39 051 770521 - customerservice@sayerlack.it