

Construction Products in the EU Fire Regulation & trends

2nd National Conference Polyurethanes Rigid Foam
26th May 2015, Bologna

Diane Daems
Fire issue manager



Huntsman disclaimer

- The slides following hereafter contain information that is confidential and proprietary to Huntsman International LLC. Recipients of this presentation and the information contained herein shall not copy or replicate them by any means whatsoever and shall not share or show them to third parties.
- While the information contained herein is to the best of our knowledge, information and belief accurate at the date of publication, it is the responsibility of recipients to determine the applicability or the suitability of such information for their own particular purpose. Huntsman International LLC accepts no responsibility for any damages of any nature resulting from the use of, reliance upon, or the misuse of such information for any purpose.

Fire safety is key

- Buildings
- Many different test methods and classifications



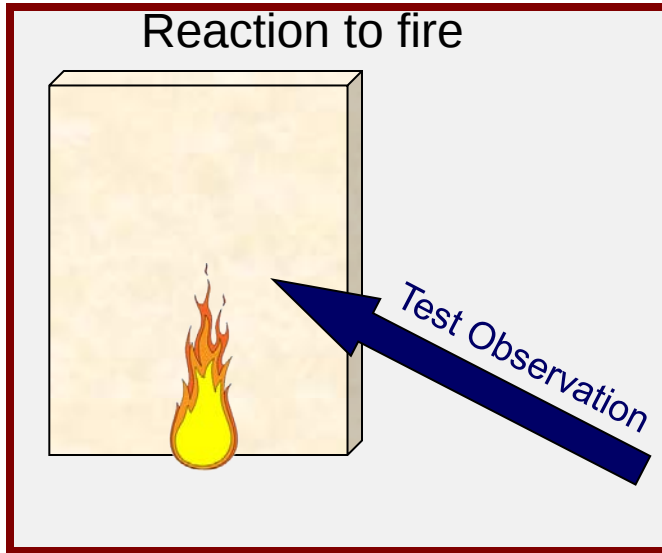
Common rules in the European Market

- From CPD to CPR
- Testing & classification
- Trends



Many different fire tests & classifications exist

Regulatory



Contribution of a product when exposed to a flame

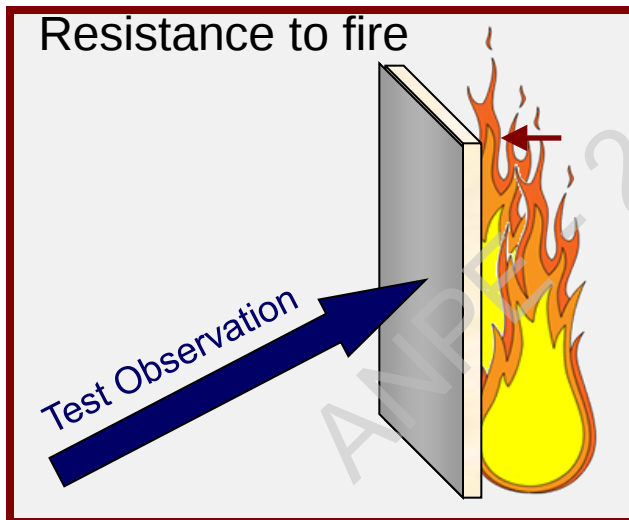
Heat release

Ignitability & flame spread

Smoke

Flaming droplets or particles

e.g. B-s2,d0



Resistance of an element to a full fire

Load bearing (stability) R

Integrity E

Heat insulation I

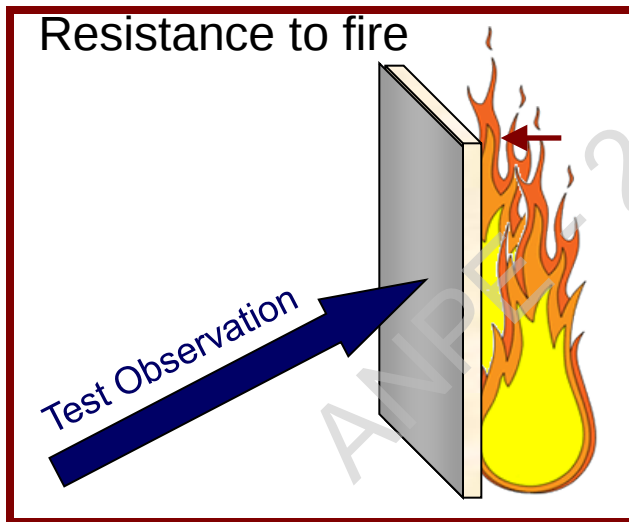
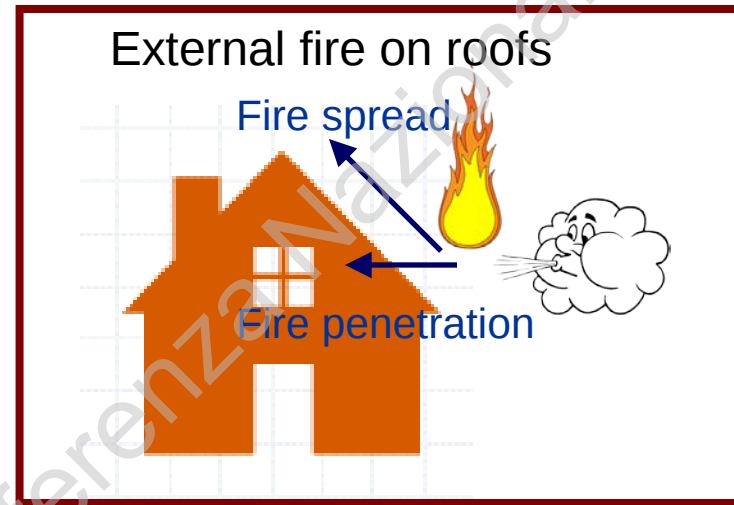
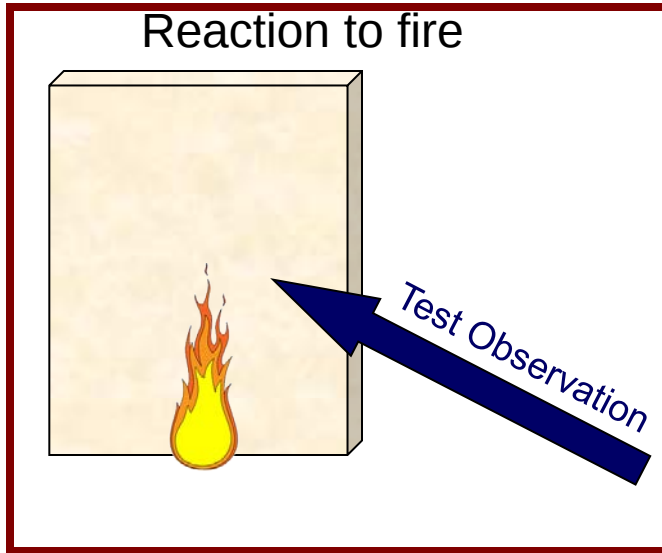
e.g. (R)EI 30 (minutes)

Many different fire tests & classifications exist

Regulatory

HUNTSMAN

Enriching lives through innovation



Fire safety is key

- Buildings
- Many different test methods and classifications



Common rules in the European Market

- From CPD to CPR
- Testing & classification
- Trends



Common rules in the European market

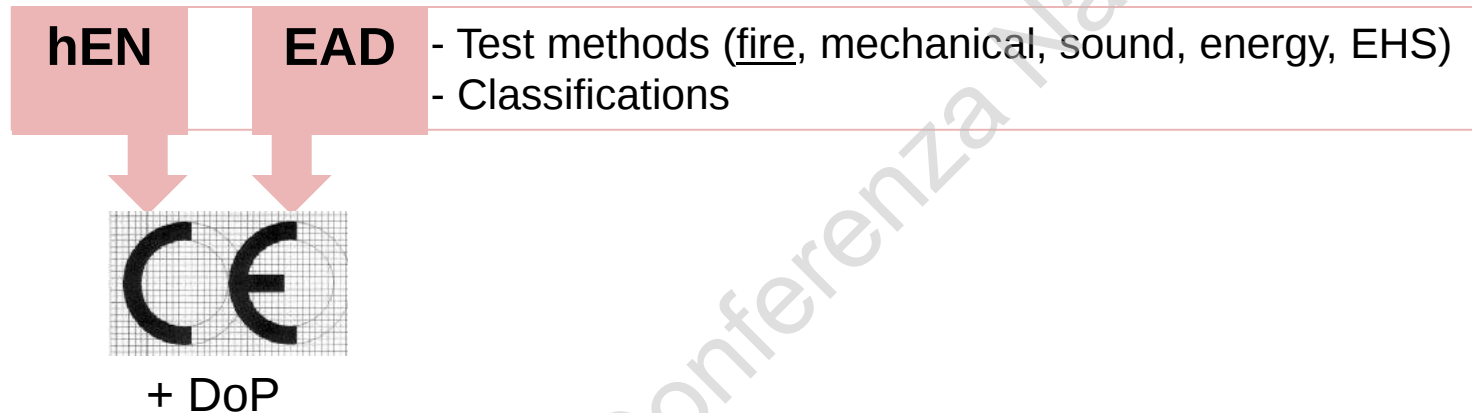
since 1989

- From Construction Products Directive (CPD) – since 1989 to Construction Products Regulation (CPR) – since July 2013
 - Harmonized standards, incl. fire standards
 - CE-marking becomes mandatory
 - Declaration of Performance (DoP)
 - National conflicting standards must be replaced in all EU countries
- More info on http://ec.europa.eu/enterprise/sectors/construction/index_en.htm

Common rules in the European market

But countries set requirements

- National building code sets requirements for construction products
- Using EU product standards (hEN) or Assessment Docs (EAD)



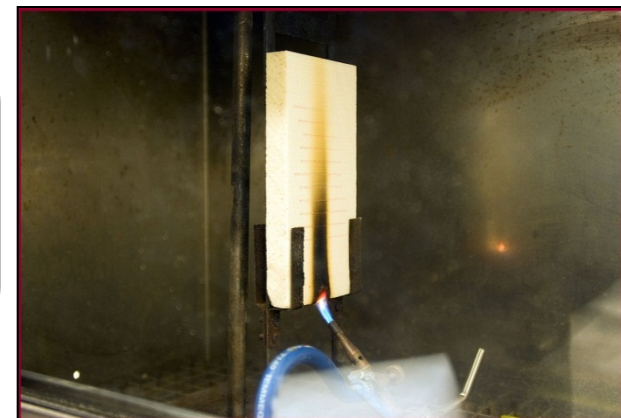
- Fire classification adopted in 2000
hEN 14509 – sandwich panels published in 2009, into force 2010
- EU 15: transitions into National codes since 2000
EU 25: 2004
EU 27: 2007

Common rules in the European market

Revision EN 14509, steel faced panels

- Applicable since August 2014, mandatory as from August 2015
- Improvements compared to first version
- Small flame test: ONLY on naked foam

- ✓ Class F core leads to class F panel
- ✓ Class E core needed to achieve fire rating (B, C, D)



Reaction to fire classification excl flooring

EN 13501-1: Small flame and SBI test

HUNTSMAN

Enriching lives through innovation



Small flame test
EN ISO 11925-1



Sample height: 200 mm
Small flame attack on surface and edge of sample
Flame exposure time: 15 or 30 sec
Criteria: Flame height $\leq$ 150 mm
flaming droplets

SBI test
EN 13823

Single burning item



Sample height: 1500 mm
Gas burner attack in corner
Burner exposure time: 1200 sec
Horizontal (at 500 mm) and vertical joint (at 200 mm)
Criteria: FIGRA, heat release, lateral flame spread,
smoke, flaming droplets

Reaction to fire classification excl flooring

EN 13501-1: Small flame and SBI test

HUNTSMAN

Enriching lives through innovation



Small flame test
EN ISO 11925-1



SBI test
EN 13823

Single burning item



Euroclasses
Fire – smoke, flaming drops

Small flame test

SBI test

A1

A2

s1 s2 s3
d0 d1 d2

B

s1 s2 s3
d0 d1 d2

C

s1 s2 s3
d0 d1 d2

D

s1 s2 s3
d0 d1 d2

E or Ed2

F

Does not meet E



EN ISO 1182
Non combustibility or calorific value



EN ISO 1716

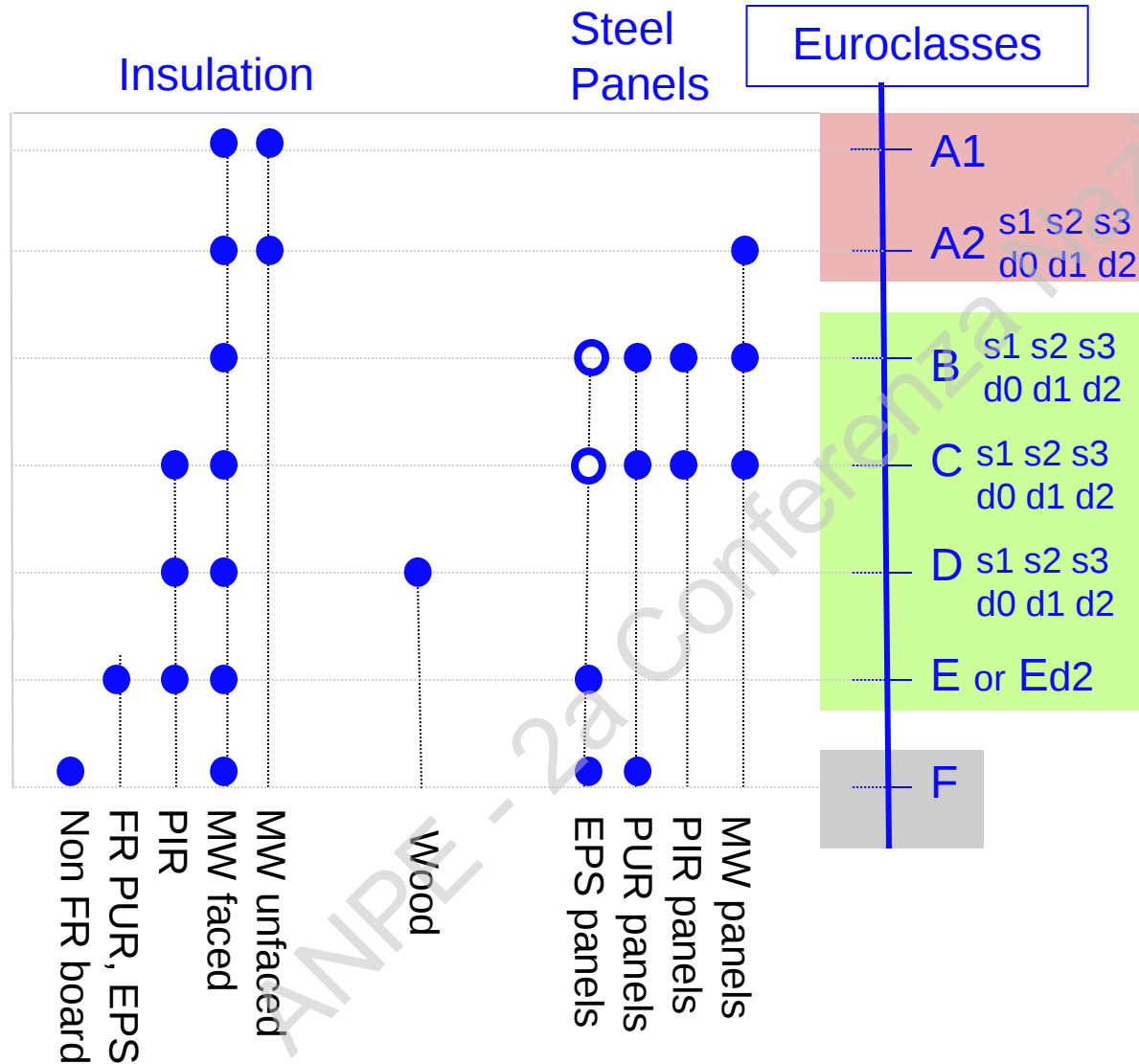
Non combustibility or calorific value

Reaction to fire classes excl flooring

typical examples

HUNTSMAN

Enriching lives through innovation



Common rules, but ...

Additional tests may apply

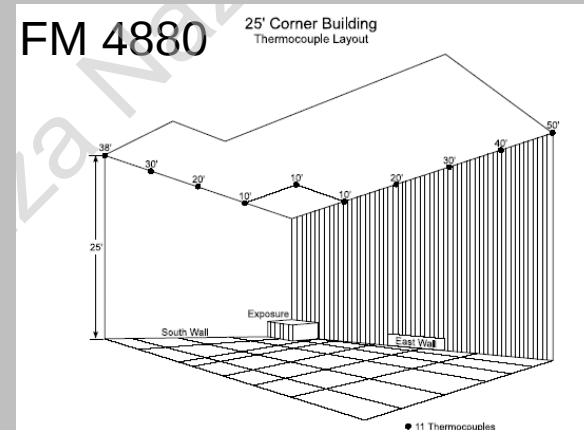
National application tests

German façade test DIN 4102 p20

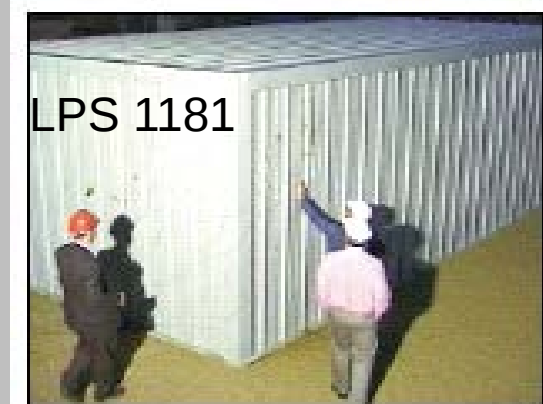


Insurance tests

Factory Mutual (FM)

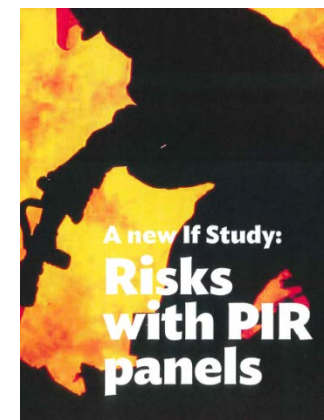
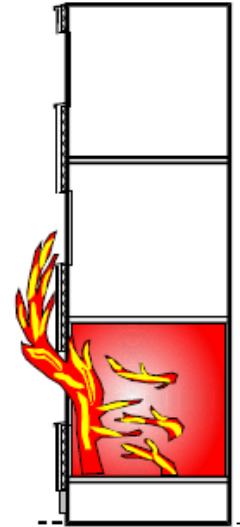


LPC, UK



Recent developments in the EU

- ✓ New EU harmonized smoldering test positively voted
- ✓ Development of harmonized large scale reference scenario's
e.g. Facades
- ✓ National revisions of building codes
- ✓ Competitive activities of mineral insulants



Fire safe building applications

- Safety of combustible insulation has been questioned
- Often fueled by mineral insulation producers
 - Propaganda & campaigns
 - Demonstrations, Youtube
 - Involvement in studies, e.g. IF sandwich panel testing
- But is safety really at stake?



Mineral wool
propaganda

LATEST NEWS

Façades in Fire, Espoo, Finland,
9.10.2014
(FSEU press release)



Fire statistics show success of fire regulations

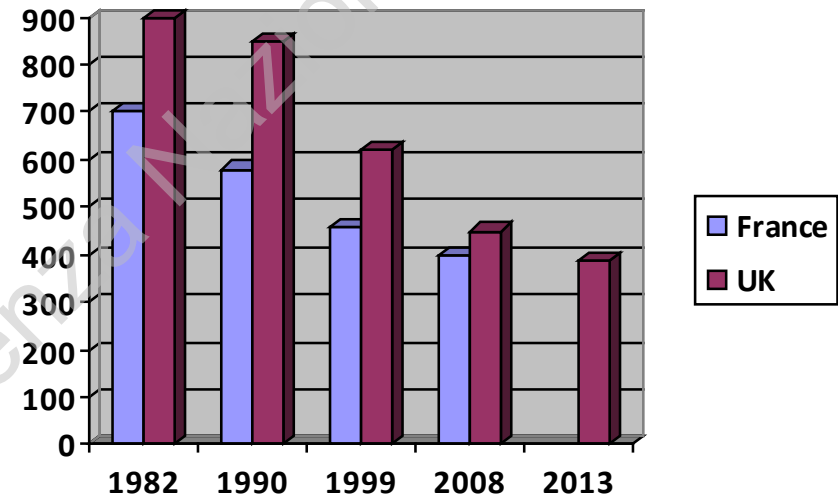
Fire fatalities reduce every year

59% less in France 1982-2012

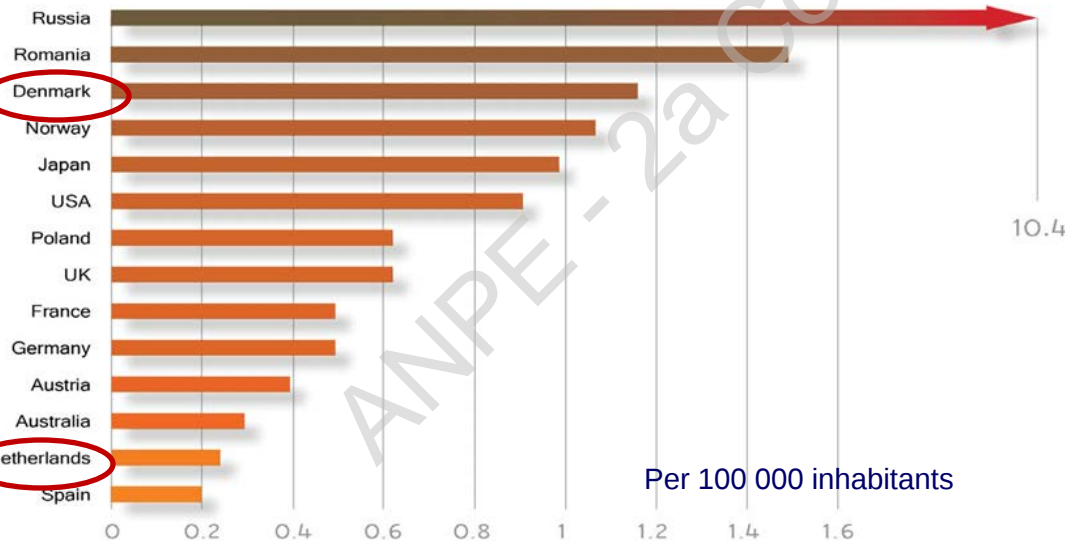
56% less in UK 1982-2013

Sources: UK dep for communities,
French dep of civil security (DSC)
CTIF world fire statistics

Fire fatalities per year



Deadly victims at home vs country



Denmark 5 times more victims than the Netherlands, despite rigorous regulation on materials

Asia Express Food Kampen, NL

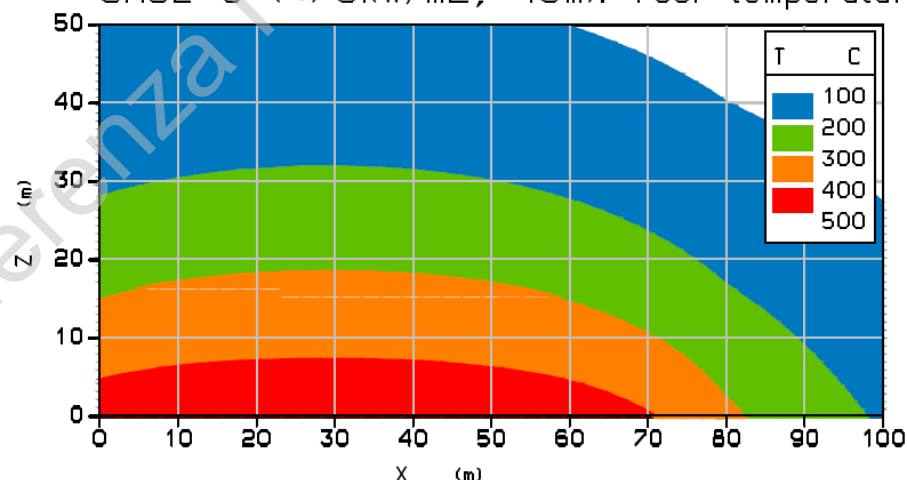
Fire incident analyzed

HUNTSMAN

Enriching lives through innovation



CASE 3 (75kW/m², 45m): roof temperature



Left: Fire in pallet factory

Right: roof was exposed and caught fire
PIR insulated & PVC roof cover

Investigation

- No fire spread over the roof
- PIR insulation charred when exposed
- Self extinguished, no intervention

Source: Kingspan

Fire safety is applicable to the building, train, ship, etc.

MYTH: Fire safety is determined by the choice of the material

FACT: No. The choice of the material is only one factor. Other:

- Product design
- Use of the product
- Design of the premise, e.g. emergency exit
- Active fire protection, e.g. sprinklers, smoke detectors
- etc

Are there more fires in insulated buildings?

Belgium: Hoge raad brandveiligheid (High council fire safety)

- A passive house does not constitute a higher risk for escape of occupants
- There may be a higher risk for firemen, due to different building physics, i.e. air tightness

Netherlands: National study by Efectis on combustible insulation

The current and correct application in the building envelope does neither significantly contribute to the severity of the fire nor to an increase in victims

MYTH: Non combustible insulation does not contribute to flashover

FACT: Misleading. A fire in a well insulated building may grow faster compared to and un-insulated because the heat is retained in the building. This is irrespective of the insulation type.

Conclusions

- Common European standards in place, incl. fire
- Further developments as needed, eg. facades
- New building practices are introduced
- Building regulations may be reviewed
- Growing interest in PU insulation
- Fire safe building applications are possible with PU
- Fire safety is taken seriously by the PU industry
- Polyurethane products should be installed and used in a responsible way and as a minimum comply with regulation





While all the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NO GUARANTY, WARRANTY OR REPRESENTATION IS MADE, INTENDED OR IMPLIED AS TO THE CORRECTNESS OR SUFFICIENCY OF ANY INFORMATION OR RECOMMENDATION OR AS TO THE MERCHANTABILITY, SUITABILITY OR FITNESS OF ANY PRODUCTS FOR ANY PARTICULAR USE OR PURPOSE

Legal statement

HUNTSMAN

Enriching lives through innovation

Huntsman Polyurethanes warrants only that its products meet the specifications agreed with the buyer. Typical properties, where stated, are to be considered as representative of current production and should not be treated as specifications. While all the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NO GUARANTY, WARRANTY OR REPRESENTATION IS MADE, INTENDED OR IMPLIED AS TO THE CORRECTNESS OR SUFFICIENCY OF ANY INFORMATION OR RECOMMENDATION OR AS TO THE MERCHANTABILITY, SUITABILITY OR FITNESS OF ANY PRODUCTS FOR ANY PARTICULAR USE OR PURPOSE. IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE. NOTHING IN THIS PUBLICATION IS TO BE CONSTRUED AS RECOMMENDING THE INFRINGEMENT OF ANY PATENT OR OTHER INTELLECTUAL PROPERTY RIGHT AND NO LIABILITY ARISING FROM ANY SUCH INFRINGEMENT IS ASSUMED. NOTHING IN THIS PUBLICATION IS TO BE VIEWED AS A LICENCE UNDER ANY INTELLECTUAL PROPERTY RIGHT. Products may be toxic and require special precautions in handling. The user should obtain Safety Data Sheets from Huntsman Polyurethanes containing detailed information on toxicity, together with proper shipping, handling and storage procedures, and should comply with all applicable safety and environmental standards. Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent on the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users. Huntsman Polyurethanes is an international business unit of Huntsman International LLC. Huntsman Polyurethanes trades through Huntsman affiliated companies in different countries such as Huntsman International LLC in the USA and Huntsman Holland BV in Western Europe. Except where explicitly agreed otherwise, the sale of products referred to in this publication is subject to the general terms and conditions of sale of Huntsman International LLC or of its affiliated companies. Copyright 2014 Huntsman International LLC or an affiliate thereof. All rights reserved