

Working towards Fire Safe Construction

IFE Fire Safety Conference 2017



David O'Reilly FIFireE

www.asfpireland.ie

Pioneering fire protection through innovation and professionalism

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First the Good News – Passive Fire Protection Systems Work

Despite Appearances, a Positive Result!

The Structure is Protected



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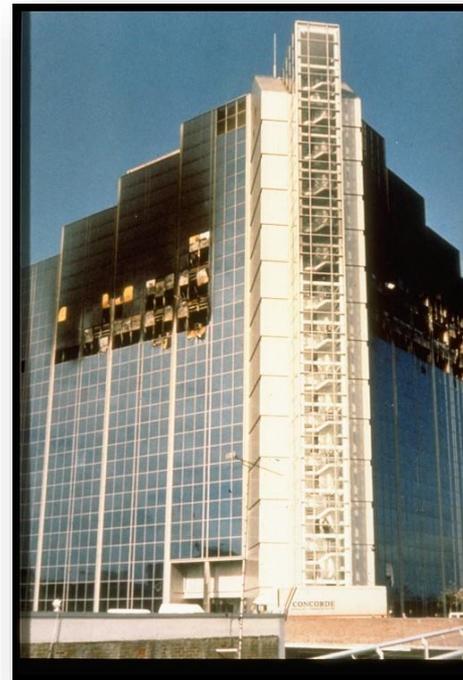


Working towards Fire Safe Construction

Passive Fire Protection Systems Work

If Properly Designed, Installed & Maintained

Fire Contained, Escape Routes Protected!



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**My introduction to the Association
for Specialist Fire Protection (ASFP)**

The Yellow Book

Produced in the 1980's in
collaboration with the
Steel Construction Institute
&
Fire Test Study Group

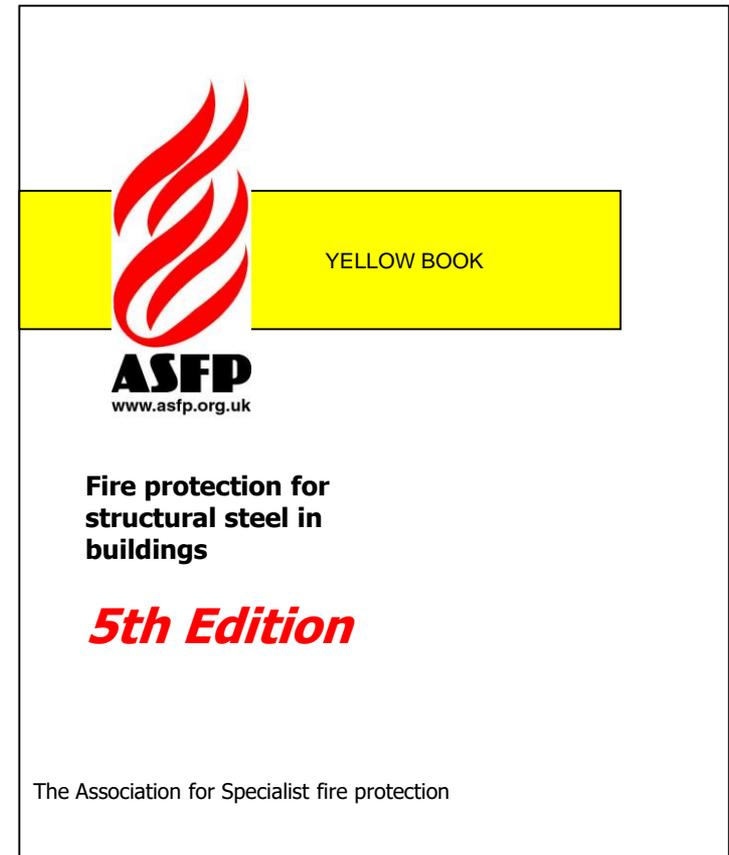


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Known as the Steel Bible

- ASFP website
www.asfpireland.ie
- ASFP Yellow book
- Guidance on:
 - Structural fire engineering
 - How fire protection works
 - Testing & assessment
 - Product listings with thickness tables
 - 3rd party product certification.



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The Association was formed as the Association of Structural Fire Protection Contractors and Manufacturers in 1975



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In 1996 it became the ASFP to represent the widening membership that includes fire testing/certification bodies & other interested parties developing standards & promoting awareness.

Technical Task Groups
comprising Industry Experts
(SIGs)

Technical Officer

Management Council



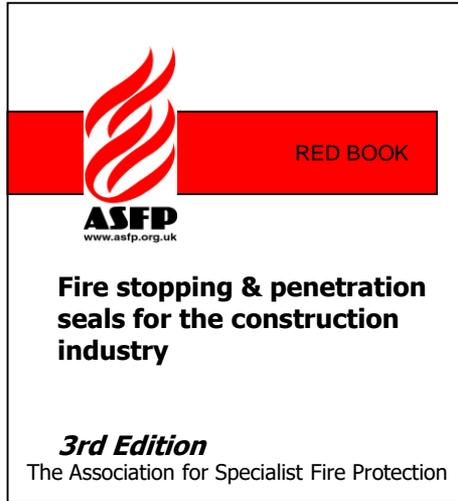
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Task Groups produce guidance on the range of PFP disciplines

Coloured Books

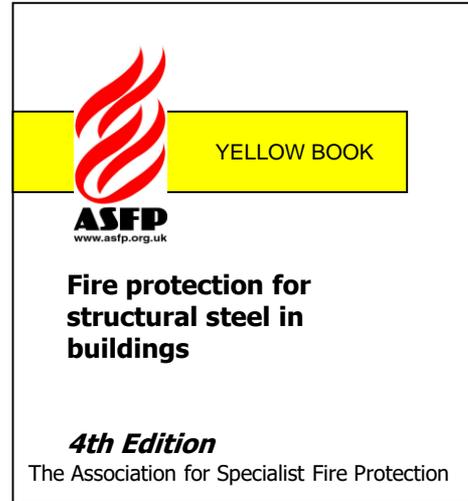



ASFP
www.asfp.org.uk

RED BOOK

Fire stopping & penetration seals for the construction industry

3rd Edition
The Association for Specialist Fire Protection

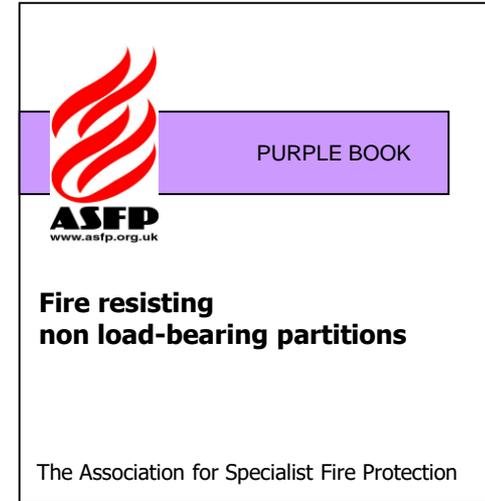



ASFP
www.asfp.org.uk

YELLOW BOOK

Fire protection for structural steel in buildings

4th Edition
The Association for Specialist Fire Protection

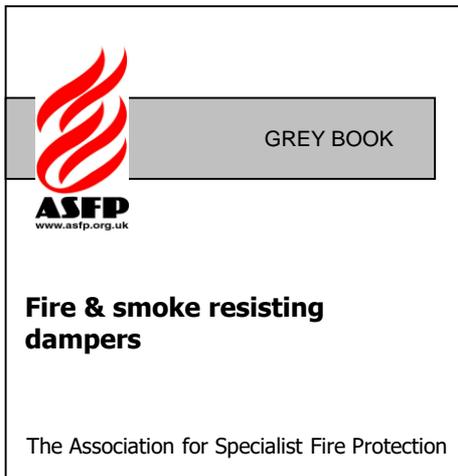



ASFP
www.asfp.org.uk

PURPLE BOOK

Fire resisting non load-bearing partitions

The Association for Specialist Fire Protection

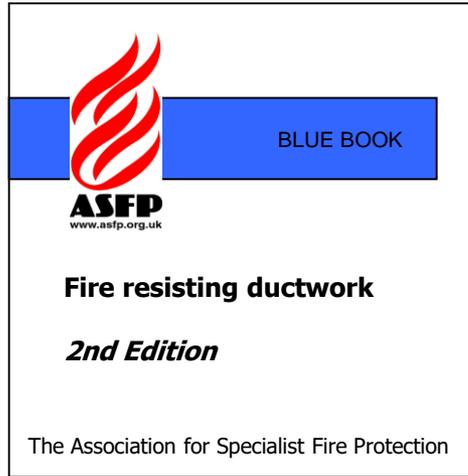



ASFP
www.asfp.org.uk

GREY BOOK

Fire & smoke resisting dampers

The Association for Specialist Fire Protection

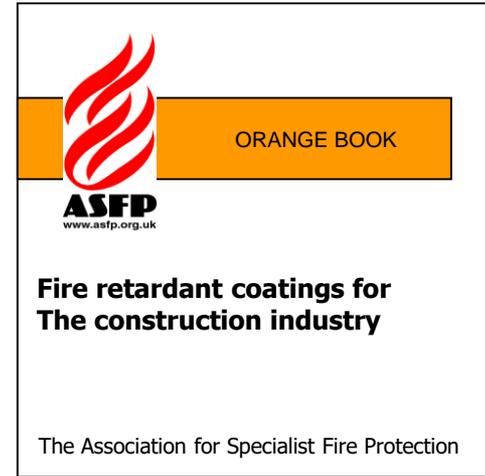



ASFP
www.asfp.org.uk

BLUE BOOK

Fire resisting ductwork

2nd Edition
The Association for Specialist Fire Protection




ASFP
www.asfp.org.uk

ORANGE BOOK

Fire retardant coatings for The construction industry

The Association for Specialist Fire Protection

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An ongoing process

To be published in 2017

Black Book
Active Fire
Barrier
Curtains



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Working towards Fire Safe Construction Codes of Practice

ASFP Technical Guidance Documents

- **TGD 11** **On site sprayed intumescent coatings**
- **TGD 15** **Non - reactive sprayed coatings**
- **TGD 16** **Off site sprayed intumescent coatings**
- **TGD 17** **Code of practice for installation & inspection firestopping**
- **TGD 18** **Code of practice for installing & Inspecting fire resisting ducts**
- **TGD 19** **Test method for open state cavity barriers**



ASFP Technical Guidance Document - TGD 17

Code of practice for the installation and inspection of fire stopping systems in buildings:

Linear joint seals, penetration seals, small cavity barriers

ISBN XXXX
© Association for Specialist Fire Protection
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Tel: +44 (0)1423 471612 www.asfp.org.uk

May 2013

TGD 17

Technical Guidance
Document 17: Code of
practice for the installation
and inspection of fire
stopping systems in
buildings



ASFP Technical Guidance Document - TGD 17

**Code of practice for the installation and
inspection of fire stopping systems in
buildings:**

Linear joint seals, penetration seals, small cavity barriers

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Guidance is used by

- ❑ Building Owners (HSE)
- ❑ Designers / Specifiers
- ❑ Main Contractors
- ❑ Specialist Contractors
- ❑ Setting standards for 3rd Party Installer Certification Providers (BRE, IFC & Warrington)



Working towards Fire Safe Construction Additional Information in Advisory Notes

Relevant Topics

- ❑ Limitations of 'Indicative' or 'Ad-hoc' Testing
- ❑ Understanding the term 'Competent Person'
- ❑ Awareness Guidance for the Responsible Person
- ❑ Using Polyurethane Foams



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ASFP You Tube Videos

Nine videos covering:

Passive Fire Protection

Fire Risk Assessment

Fire Doors

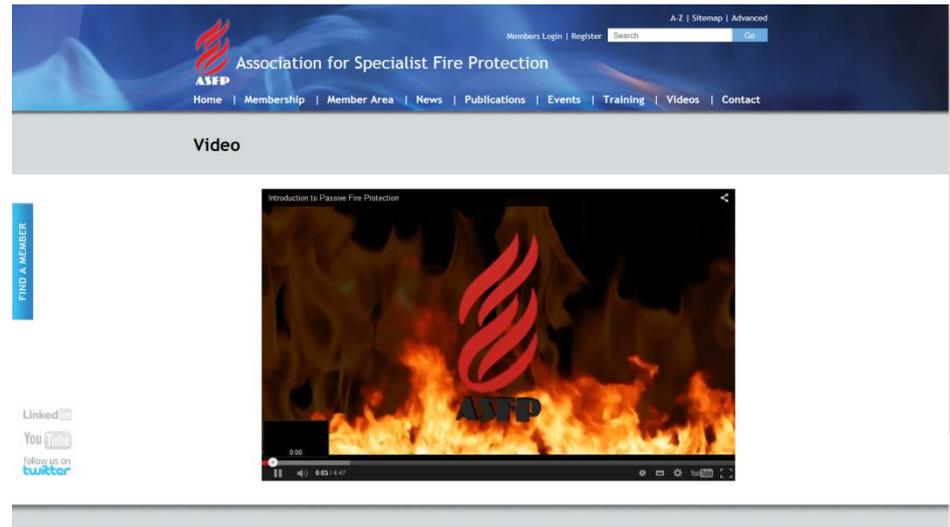
Walls, Floors and Ceilings

Fire Stopping

Ducts & Dampers

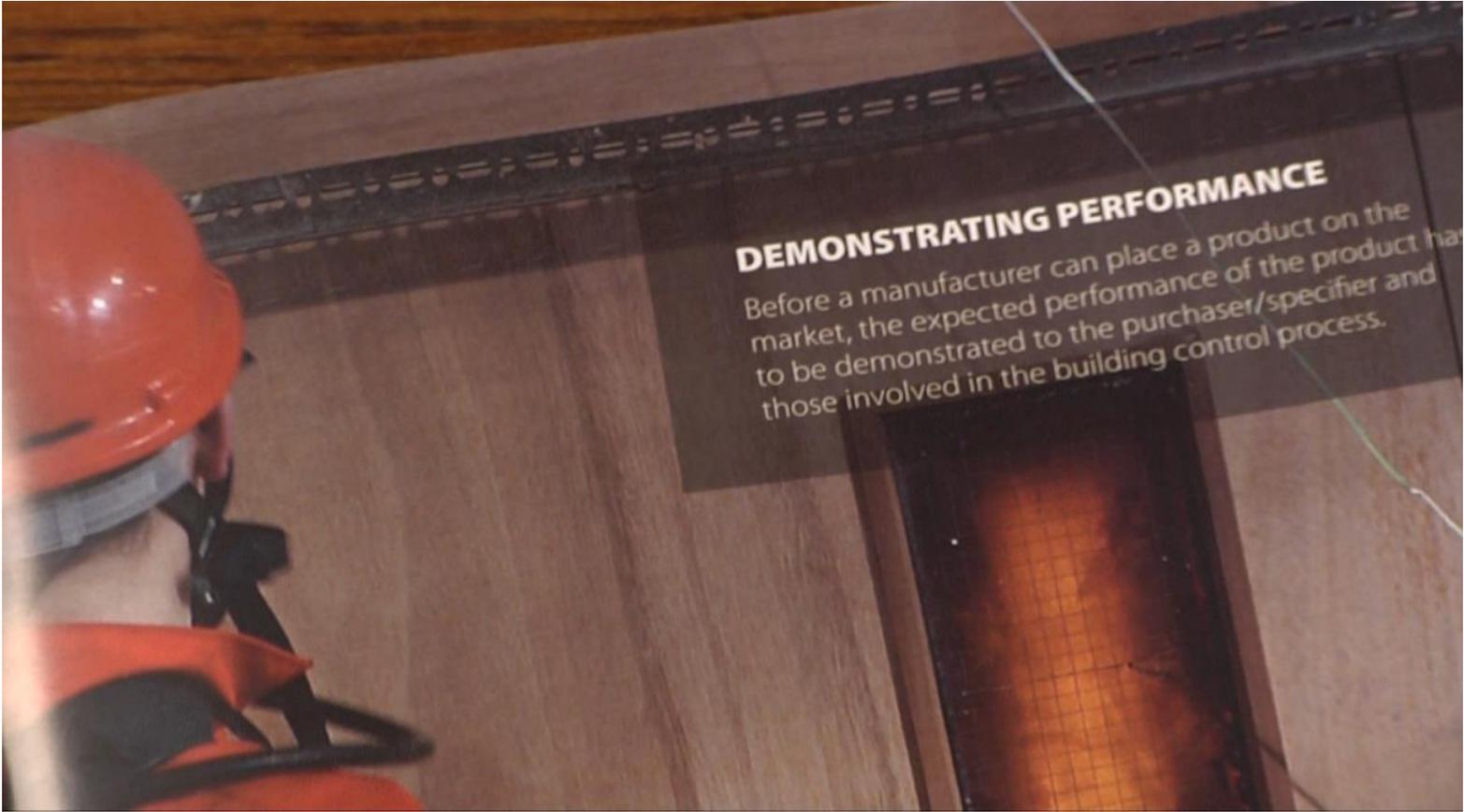
Cavity Barriers

Structural Protection



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Why its important to understand product limitations

Only in Small Linear Gaps



Depth mm	Width mm				
	10	20	30	40	50
10	280	140	93	70	56
20	140	70	46	35	28
30	93	46	31	23	18
40	70	35	23	17	14
50	56	28	18	14	11

Up to 4hrs fire rating

But only in the right context

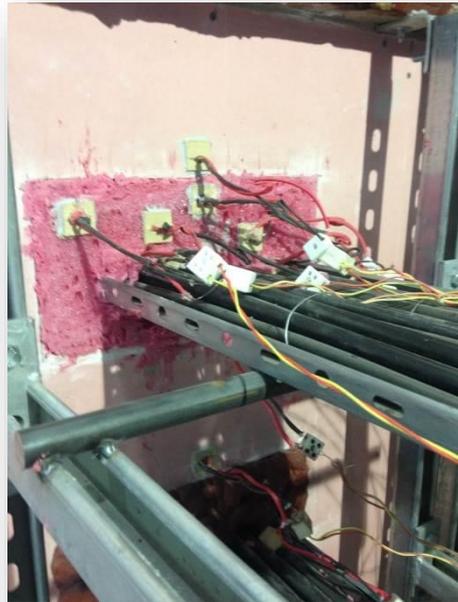
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Not suitable for sealing service penetrations

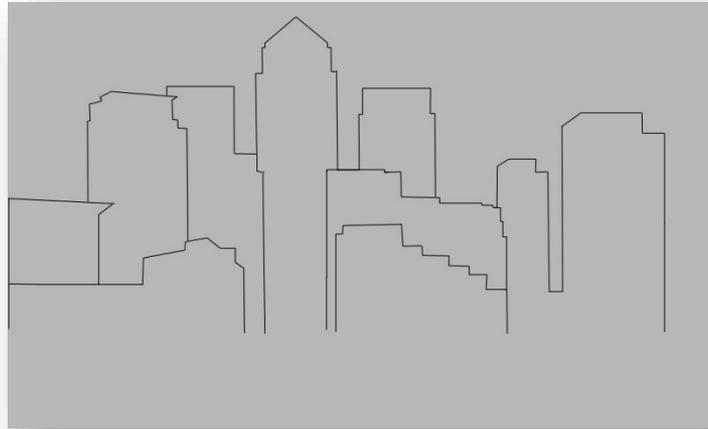
What actually happens – it burns, quickly!



**Time to failure?
9 minutes!**

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Education - Understanding Passive Fire Protection



In 1998, ASFP participated in a UK government sponsored “Rethinking Construction” investigation into fire safety construction standards.

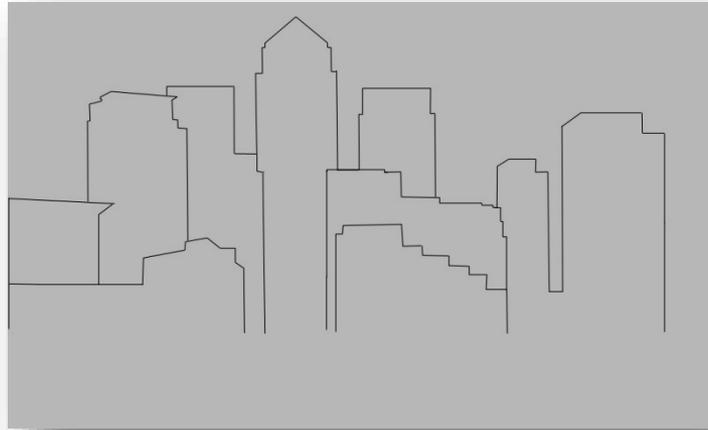
The initiative aimed to achieve radical improvements in the design, quality, **sustainability & customer satisfaction**.

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Research Findings



- ❑ Many buildings are constructed and operated with Passive Fire Protection either badly installed or missing altogether.
- ❑ This situation is compounded by subsequent alterations to the building as changes in occupancy and systems take place.

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Findings published in 2003

ASFP - Ensuring Best Practice for Passive Fire Protection in Buildings

A Significant Document
(worth reading)



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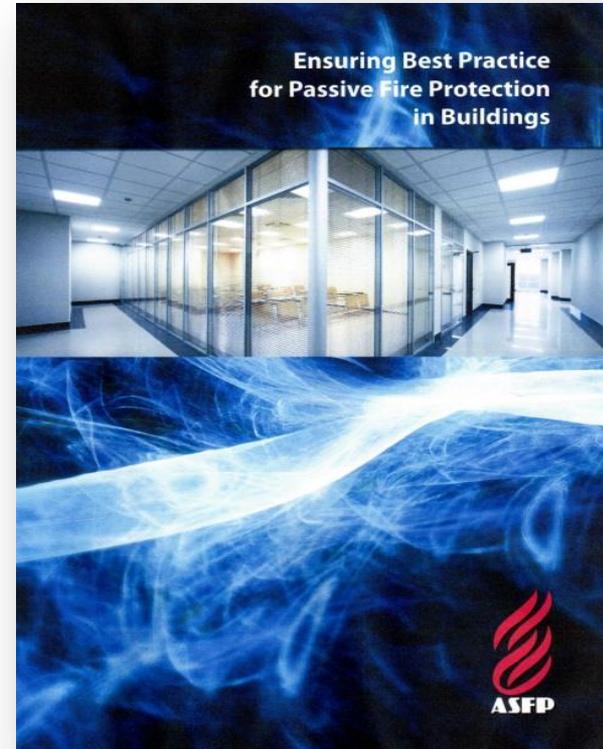


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Recommendations

2nd Edition published in 2016

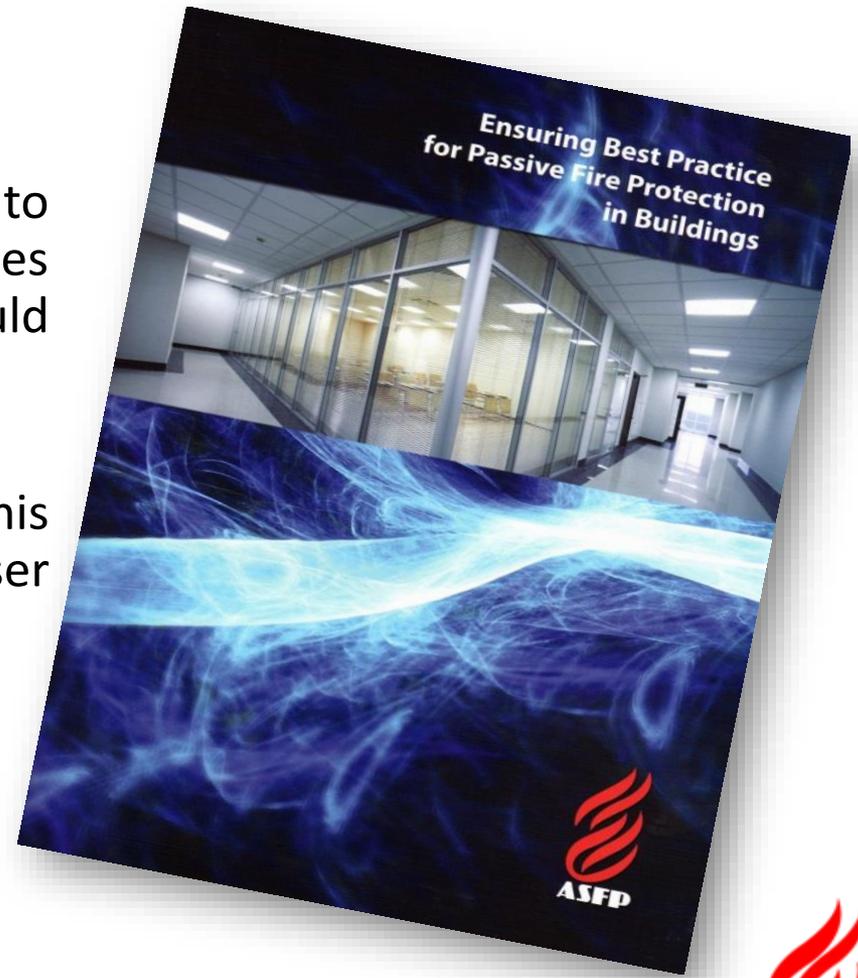
- ❑ Warns about lowest price tendering saying that traditional selection processes need to change, they don't provide best value
- ❑ An integrated team that includes the client should be formed before design and maintained throughout delivery.
- ❑ **Change of culture** between stakeholders from confrontation to collaboration
- ❑ 3rd Party Certified Systems installed by 3rd Party Certified Installers



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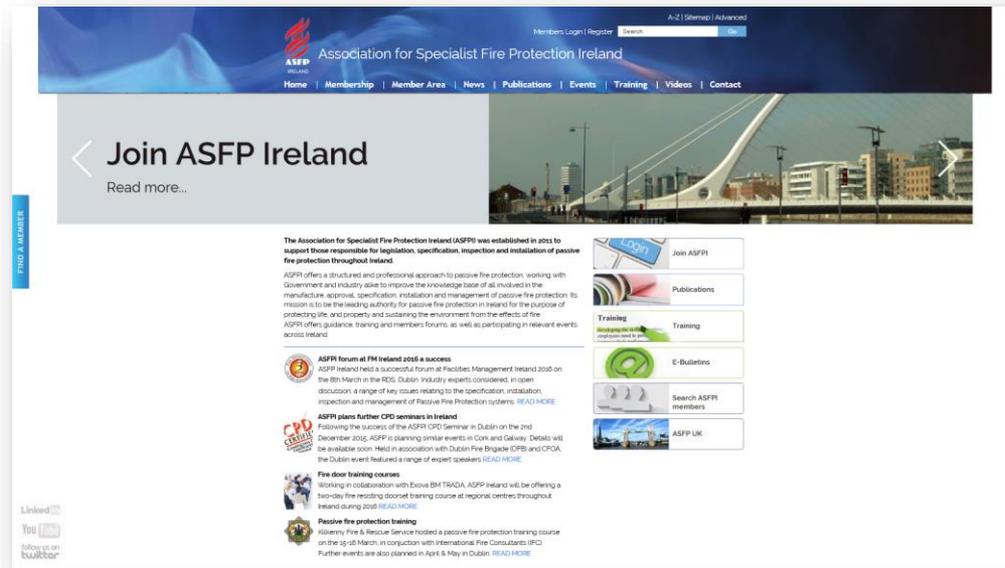
Demonstrating Performance of PFP Products

- ❑ Only products which can be shown to have a fire performance that satisfies the relevant test standard(s) should be put in the market place.
- ❑ Relevant documents to verify this must be made available to the user and enforcement authorities



Established ASFP Ireland in 2010

Building on 35 Years of Experience



To support those involved in legislation, specification, inspection and installation of passive fire protection throughout Ireland

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ASFP Ireland 2010 / 2011



Positive response but limited to a small section of the marketplace

Market now looking to us for the answers – training & certification?

ASFP Website January 2011

Providing information on Irish Activities and linking to ASFP Guidance & Documentation

Free Download / Sample documents



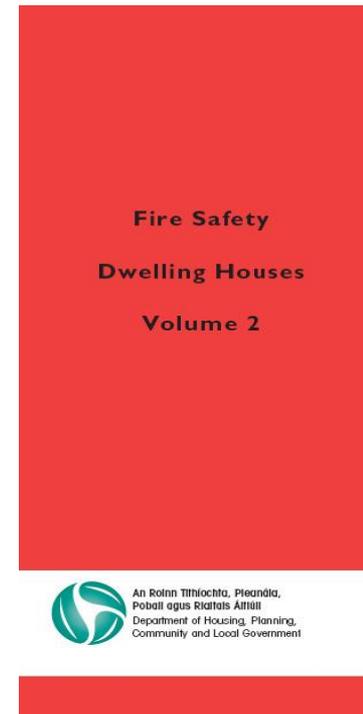
www.asfpireland.ie

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Building Regulations setting minimum Life Safety Standards

Supported by Industry Guidance

- Technical Guidance Document B (TGD B) referenced “Ensuring Best Practice for Passive Fire Protection in Buildings” (2006 Revision)
- The Colour Books (2017 Revision – Volume 2)



B

Building
Regulations
2017

Technical
Guidance
Document



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ASFP Seminar – RDS – September 2011



- ❑ Concerns expressed by an educated attendance representing Fire Industry
- ❑ Dissatisfaction - 'Opinions of Compliance' – Inspection - Prosecutions?
- ❑ Industry Reports & Recommendations – ACEI, BRAB, CFOA, RIAI, SCS & The National Consumer Agency
- ❑ Call for Mandatory Certificates of Compliance for Design & Construction backed by an audit process / real inspection

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Everything changed in October 2011



- High Court Eviction of Priory Hall Residents
- BBC N I Spotlight interview - Tom McFeely
- "I don't think it's a shoddy building, you see. I don't think it is any different than most of the other buildings in Dublin."*
- So how right is he?

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Priory Hall shoddy? – a pretty good description!



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Strengthening the Building Control System (April 2012)

‘In the light of a number of recent high profile failures on the parts of developers/builders and their agents to meet their statutory responsibilities it is considered that sticking with the existing arrangements is no longer tenable’.

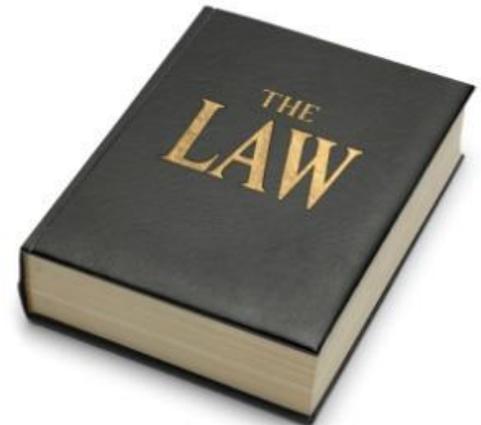


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The most significant step forward since Building Control Act 1990

Building Control (Amendment) Regulations 2014

- Code of Practice for Inspecting & Certifying Buildings & Works (ASFP Best Practice Guidance)
- Provides structures that are the envy of many in other jurisdictions including my ASFP UK colleagues
- Presentations - Firex and UL European Forum



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BCAR defines roles & allocates responsibilities



Designed to improve Construction Industry Standards

BCAR is a positive step but there are limitations

Building Owner's Role

The Building Owner is ultimately responsible for ensuring that buildings or works are carried out in accordance with the requirements of the Building Regulations. In relation to the Design and Construction of buildings, the Building Owner should ensure that they **appoint a competent Builder and competent registered professionals as Design and as Assigned Certifiers.**



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BCAR provides a definition of competence, how is this acquired?

- Definition: A person is deemed to be competent where, having regard to the task he or she is required to perform and taking into account the size and/or complexity of the building or works, the person possesses **sufficient training, experience and knowledge appropriate** to the nature of the work to be undertaken.
- How is 'Fire' competence to be acquired & demonstrated?
- Assigned Certifiers are professionally qualified but what training in Passive Fire Protection systems have they received?
- Ancillary Certifiers may be experts in their primary field but what do they know about 'Fire'?

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Who designs & specifies Passive Fire Protection?

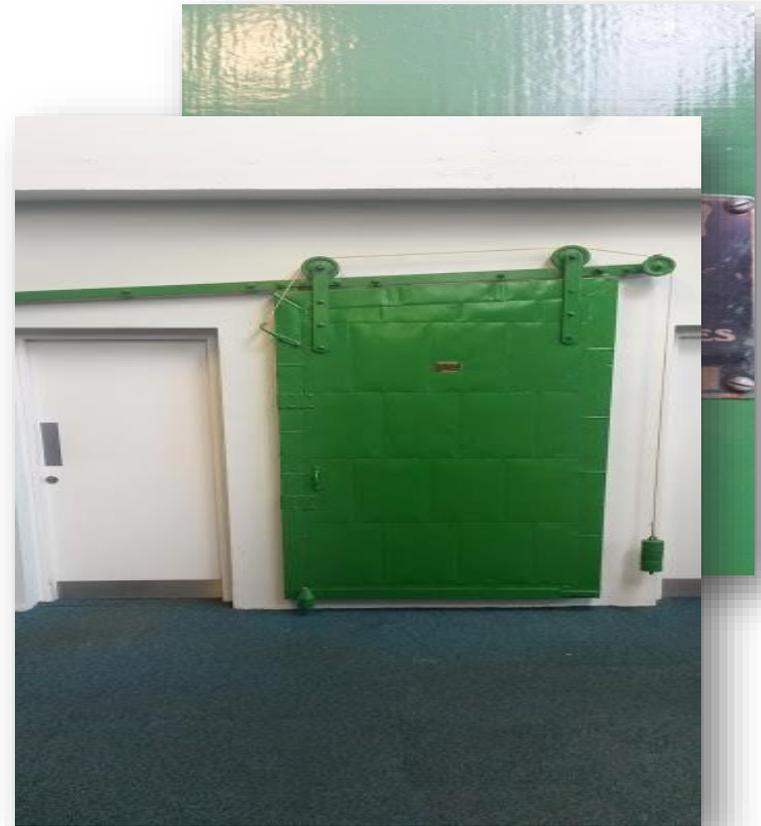


Architects can use performance specifications

Detailed design is often provided by a range of Ancillary Certifiers

How do they demonstrate competence?

- ❑ Sub-contractors, suppliers and manufacturers, both in relation to certifying Design and Construction, and also in relation to components or assemblies supplied for the works, and/or in relation to tests
- ❑ No formal 'Fire' education system



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BCAR limitations



BCAR only covers new construction & material alterations

Doesn't cover Legacy Issues in Buildings (Opinions of Compliance)

- Partially built construction now being completed
- Apartment Complexes
- Hotels
- Schools
- Commercial Building fit-outs



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ASFP is working with others to bridge the knowledge gap

London / Dublin Panel Discussions – Recurring Themes

- ❑ Fragmentation within the construction industry is a key concern, often leading to the incorrect specification and installation of fire protection materials and systems.
- ❑ Finding a means of improving the interaction between all construction industry disciplines must be a priority.
- ❑ Recognition of the amount of design carried out by non-professionals – manufacturers, distributors & sub-contractors
- ❑ Educating all in the built environment including the end user, insurer, contractors and designers is key

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Investigation – engaging with relevant disciplines?

London ASFP ‘Roundtable’ concluded the need to,

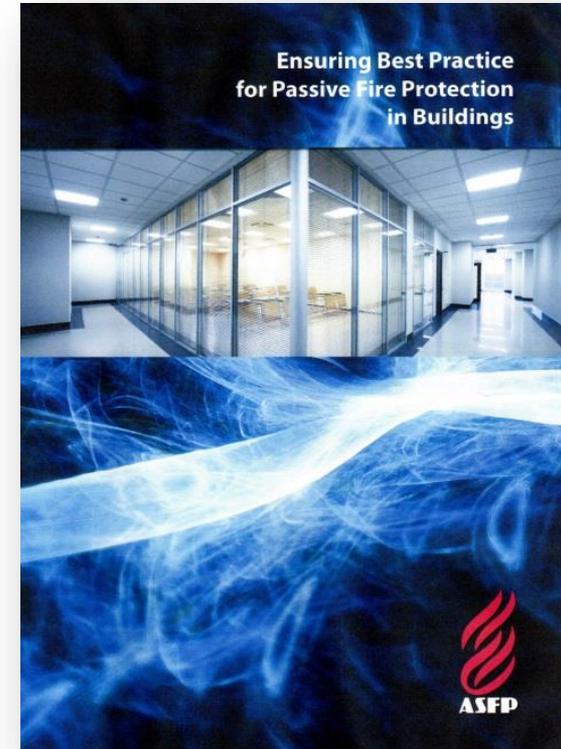
- Investigate the possibilities for introducing a sign off process as construction progresses, with all information reaching the end-user
- The BCAR Code of Practice for Inspecting & Certifying Buildings & Works is being used in developing a ‘Plan of Works’
- We found agreement in Dublin & London for the need to provide**
- Education – A formal structure leading to professional qualifications for those directly engaged in the design, installation & maintenance of PFP
- Supporting guidance providing consistent and simple information on what needs to be done, when and by whom for Architects etc.

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ASFP Foundation Course in Passive Fire Protection

To Provide Education in support of Guidance

- Setting knowledge based competence standards
- Basic training for Installers (coal face)
- More in-depth training for Supervisors
- Higher level for Designers & Project Managers
- CPD to Educate the Marketplace
-
- A cradle to grave Four Module Programme



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Module One – Essential Underpinning Knowledge (Fire Science)

- Human Behaviour
- Fire Protection (Active, Passive etc.)
- Understanding Building Performance
- Fire Testing, Assessment & Product Certification
- Fire Strategy



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Module Two – Passive Fire Protection Disciplines

- Fire Protecting the Structural Frame
- Fire Resisting Floors, Walls & Ceilings
- Fire Stopping & Penetration Seals
- Fire Resisting Ductwork
- Fire Resisting Doorsets
- Fire Resisting Glazing
- Fire Retardant Coating Systems



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Module Three – Fire Safety (relating disciplines)

- Smoke & fire detection
- Fire fighting, portable & fixed
- Fire suppression
- Signage & lighting
- Fire engineering



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Module Four – Legislation

- Building Regulations
- Legislation
- CDM Regulations
- CE Marking
- Codes of Practice
- Business Information Modelling



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Working towards Fire Safe Construction 2018 - IFE Examination & Certification

- IFE Certificates in Passive Fire Protection
- IFE Level 2 Certificate in PFP
- IFE Level 3 Certificate in PFP - TIFireE
- Minimum level for Ancillary Certifiers
- Progression to higher levels / membership grades in due course



January 2018 – October 2018

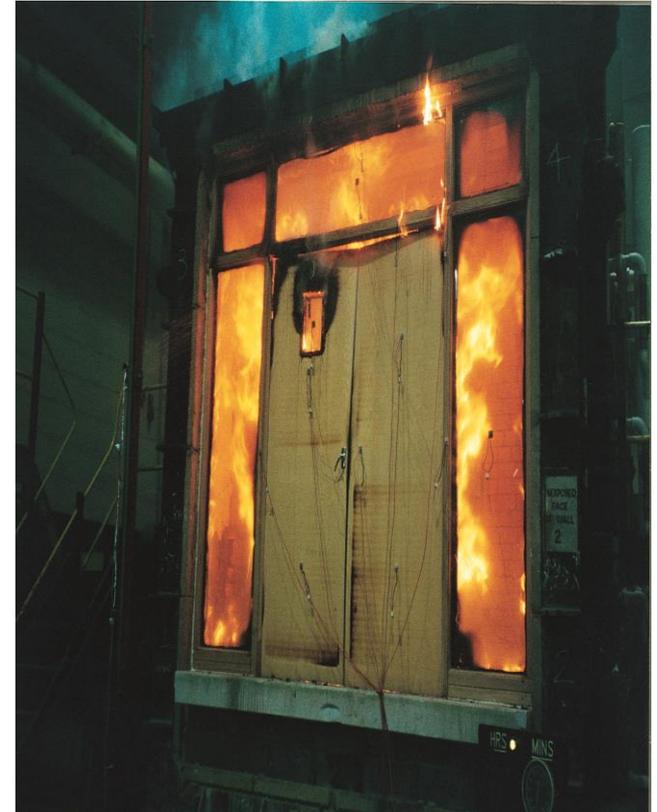
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Why is correct design, installation & maintenance so important?

- ❑ Total Reliance on Installed Systems.
- ❑ Correct Specification & Certification.
- ❑ Manufacturer's Fire Test Programme.
- ❑ System Installer Competence & Integrity.
- ❑ Systems must be installed in accordance with the Manufacturer's instructions



Understanding PFP requires a knowledge of 'Fire Testing'

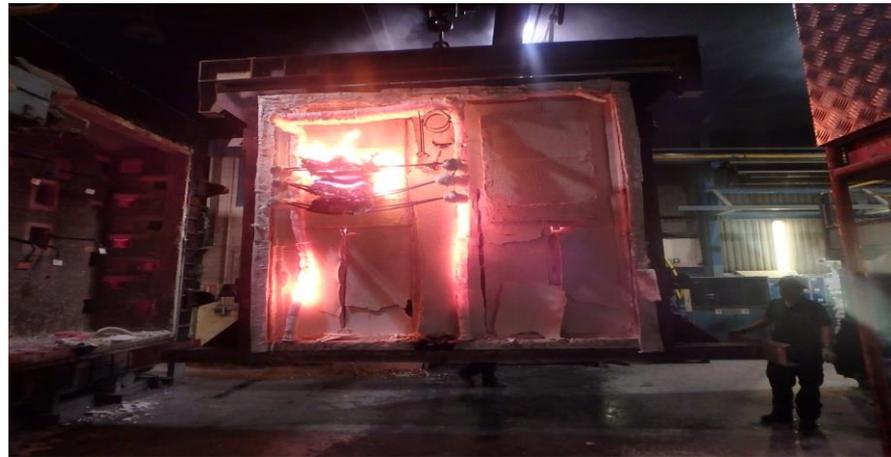
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Understanding how systems are fire tested

Fire Testing - How the system works?

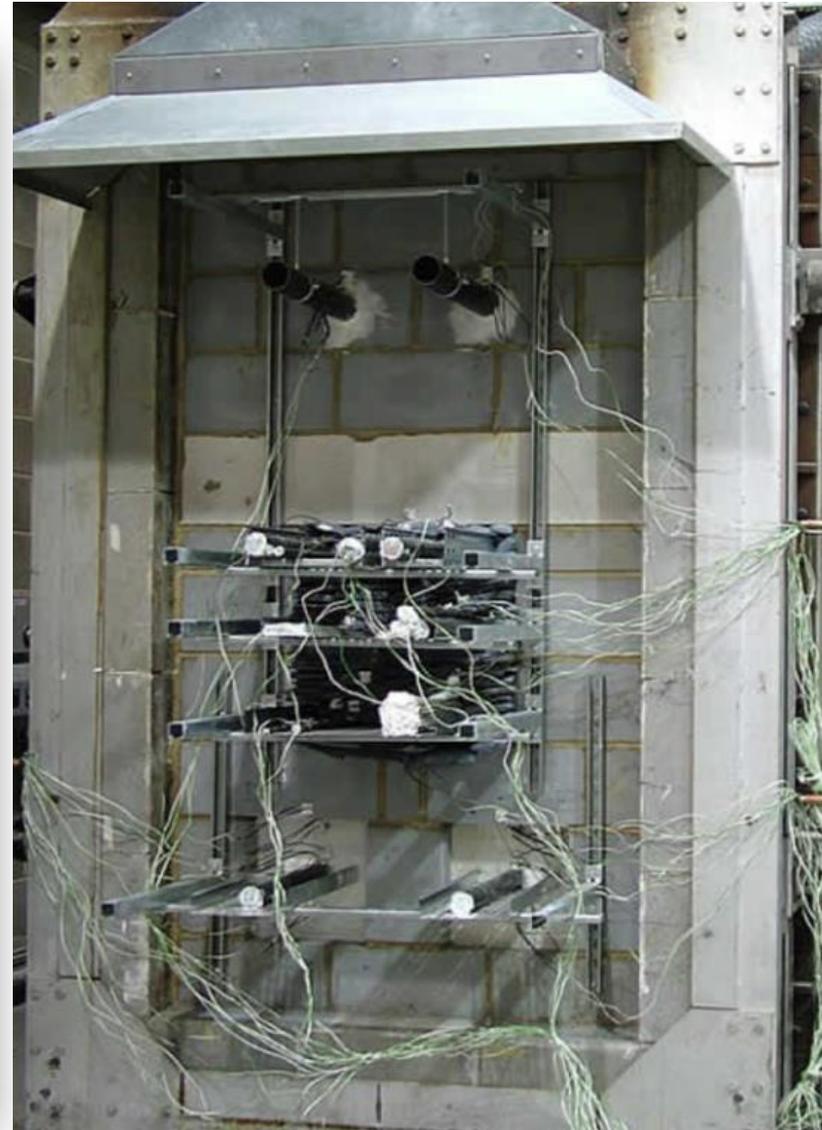


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How are products/systems Fire Tested?



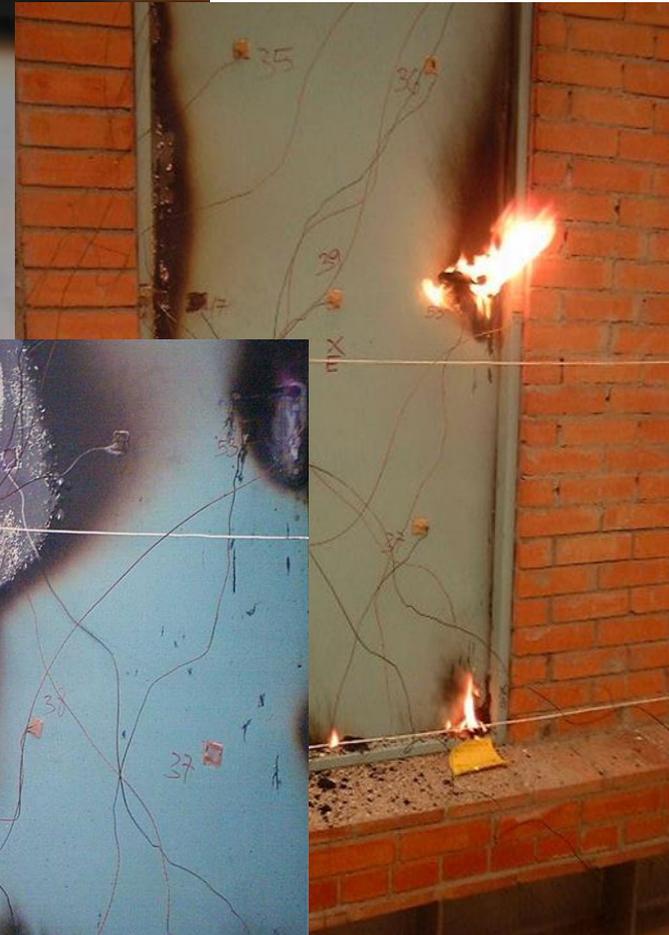
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Fire resisting separating element criteria

INTEGRITY

The time for which a specimen can maintain separation without:

- ❑ Causing ignition of a cotton pad
- ❑ Resulting in sustained flaming
- ❑ Penetration by:
 - ❑ 25mm diameter gap gauge
 - ❑ 6mm diameter gap gauge traversed 150mm
- ❑ Other/extra criteria for ducts and dampers



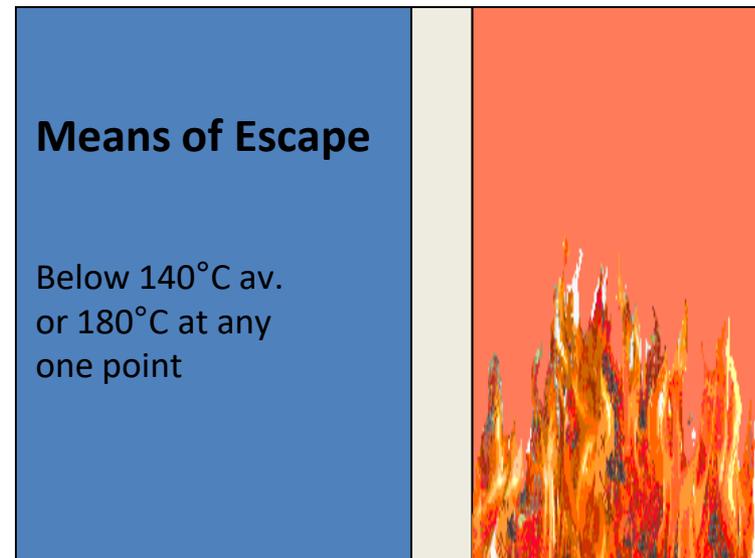
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Fire resistance test criteria

INSULATION

The time for which a specimen can maintain its separating function without the temperature on its unexposed face:

- ❑ Rising on average in excess of 140°C above the initial average
- ❑ Rising at any one location in excess of 180°C above the initial average



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Sample – Testing Intumescent Fire Collars

- ❑ Manufacturers spend €0,000's
- ❑ Extreme care preparing samples
- ❑ Tests in Accredited Laboratories
- ❑ Performance Test Reports
- ❑ Scope of Certification
- ❑ 3rd Party Certification



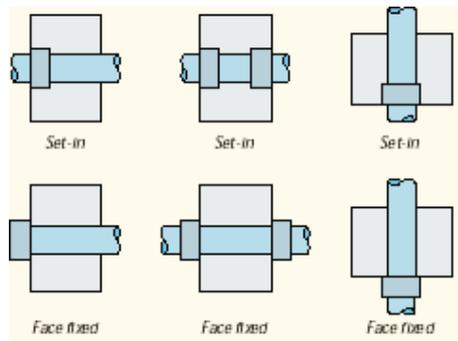
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Problem - Anyone can buy a Fire Collar

Intumescent Fire Collars



Example: For surface mounting instructions state – Secure pipe collar to the structure with 50mm x 8mm masonry screws or minimum 50mm expanding metallic bolts

Remember the purpose is to protect the hole in the structure after the pvc pipe has melted and fallen away



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Tests are carried out to an approved standard

BS 476:20 1987

BS 476:21 1987

BS 476:22 1987

BS 476:21 1987

BS 476:24 1987

Loadbearing
elements

Separating
elements

Contribution to
fire resistance

Fire resisting
ducts

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Tests are carried out to an approved standard

EN 1363-1
General
Requirements

EN 1363-2
Alternative & Additional
Requirements

EN 1364
Non-loadbearing
Elements
(6 standards)

EN 1365
Loadbearing
Elements
(6 standards)

EN 1366
Service
Installations
(10 standards)

EN 1634
Fire Doors
& Shutters
(3 standards)

ENV 13381
Contribution to
Fire Resistance
(7 standards)

Separating
elements

Loadbearing
elements

FR/smoke
ducts/
dampers, fire
stopping

Fire doors,
smoke doors,
ironmongery

Contribution
to fire
resistance

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Understanding the terminology

DEFINITION OF DIFFERENT REPORT TYPES

The UK Fire Test Study Group, which represents all the major fire test laboratories in the UK, has identified three fire test types and has agreed to report the results as follows:

Standard Test

The results of such a test are the subject of a full report in accordance with the Standard. The report will be comprehensive, with full details of the construction of the test specimen and the testing process.

Standard tests are the best type of test report and are the ideal

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Understanding the Terminology

Indicative Test

Reporting is normally by letter only, which should give the data relevant to the test result but shall not interpret those results against any classification requirements. A statement is included as follows:

“This (these) test result(s) relate to an investigation which utilised the test methodology given in (the relevant Standard); the full requirements of the Standard were not, however, complied with. The information is provided for the test sponsor’s information only and should not be used to demonstrate performance against the Standard nor compliance with a regulatory requirement. The test was not conducted under the requirements of UKAS accreditation.”

- Indicative reports are just that – indicative
- They are not a proper test result and should not be used to promote a product

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Understanding the terminology

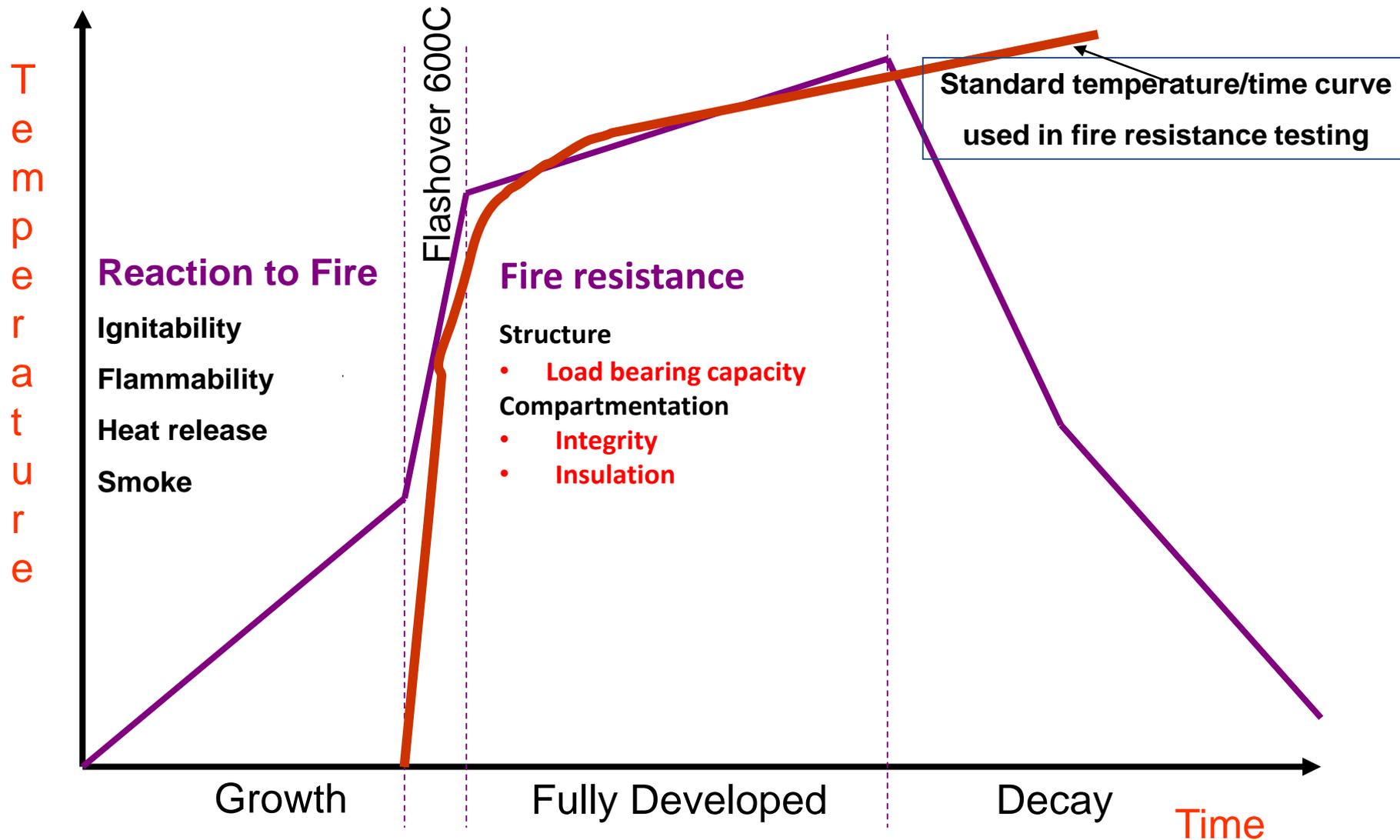
Ad-hoc Test

A test which has been performed to a non-standard procedure, in the absence of a Standardised procedure, but which utilises the principles of fire resistance testing given in the relevant test method. The reports of such tests shall bear the following statement:

- Ad-hoc tests are a 'last resort' usually if there is no test method
- Always query why an ad-hoc test has been used
- Ad-hoc tests should be supported by an assessment or expert judgment
- The issuing laboratory will give guidance if asked

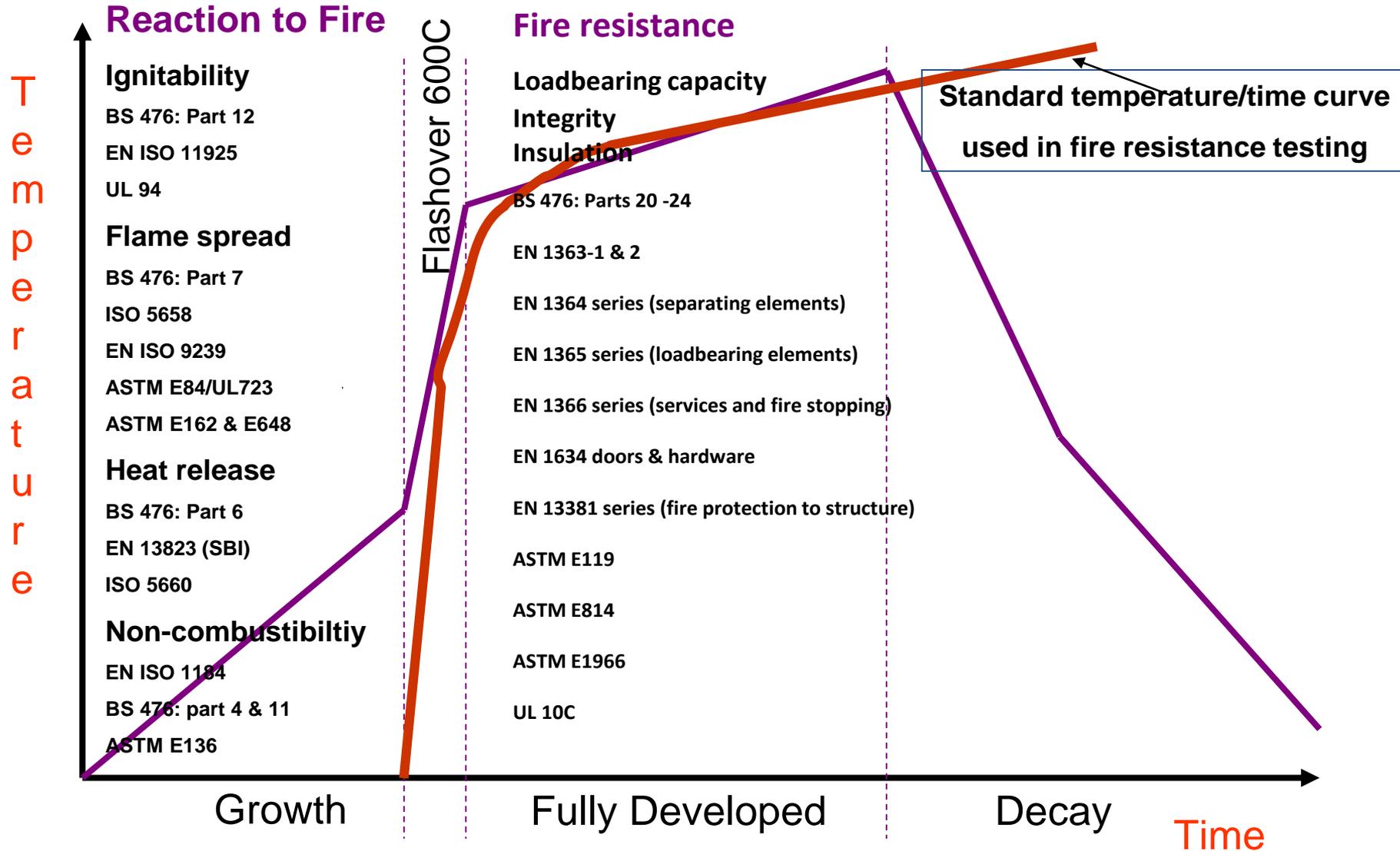
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Fire testing designed to replicate the stages of a fire



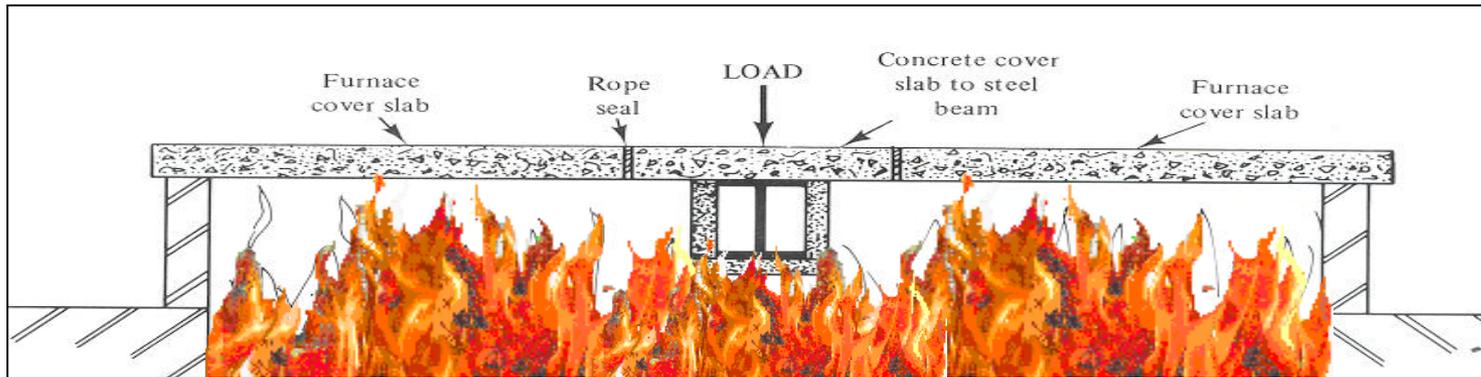
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Important to understand what is being tested

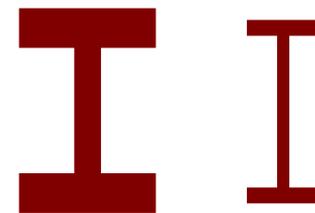


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Sample - Testing Structural Fire Protection Systems



- Beam is tested under load with the fire protection applied.
- Fire resistance test criteria designed to replicate reality
- Calculation methods predict the thicknesses required
 - Section factor of beam to be protected (surface area to volume ratio)
 - Fire resistance period (30, 60, 120 minutes)



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Minimum – Fire test report for the proposed system



CLIENT
Boral Australian Gypsum Ltd
676 Lorimer Street
Port Melbourne
VIC 3207
Australia



PROJECT NUMBER	ISSUE DATE	PAGE
FT4887	18 May 2012	1 of 10

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‘Pecking Order’

1. Certificate from a Third Party Certification Body
2. Assessment / Expert Judgment from an accredited fire test laboratory or qualified fire consultant
3. Fire test report
 - I. Standard test
 - II. Indicative test
 - III. Ad-Hoc test

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Assessment covering the field of application



FIRE ASSESSMENT REPORT **FAR 4137**

ASSESSMENT REPORT ON FIRE PERFORMANCE OF VARIOUS Boral
PLASTERBOARD WALL AND CEILING PRODUCTS

CLIENT
Boral Australian Gypsum Ltd
3 Trackery Street
Port Melbourne
VIC 3207
Australia

PROJECT NUMBER:	ISSUE DATE:	PAGE:
FC4137	10 September 2013	1 of 7

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 - I. Standard test
 - II. Indicative test
 - III. Ad-Hoc test

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Example – A global assessment for a fire resisting doorset

Will include all tested components

Fire Resisting Glazing

- Complete system:
 - Fire resisting glass
 - Frame
 - Glazing bead
 - Intumescent/other gaskets
 - Setting blocks
 - Edge cover can be crucial



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Minor deviations make a major difference



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Preferably 3rd Party Certification

Ensures consistent manufacture?

'Pecking Order'

1. **Certificate from a Third Party Certification Body**
2. **Assessment / Expert Judgment from an accredited fire test laboratory or qualified fire consultant**
3. **Fire test report**
 - I. Standard test
 - II. Indicative test
 - III. Ad-Hoc test



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3rd Party Product Certification

What can you expect?

- ❑ Performance of products from a range to be tested (not single tests)
- ❑ Evidence from tests used in assessments to create a scope of certification to cover performance of product range
- ❑ Factory Production Control audits / inspections of production of the products, typically these will be conducted annually.
- ❑ Requirements for manufacturers to declare changes to products – no substitutions without supporting evidence
- ❑ Ongoing product verification (audit tests / inspections) at predetermined frequencies.

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Common Problems

Even when it looks right, can you be sure ?



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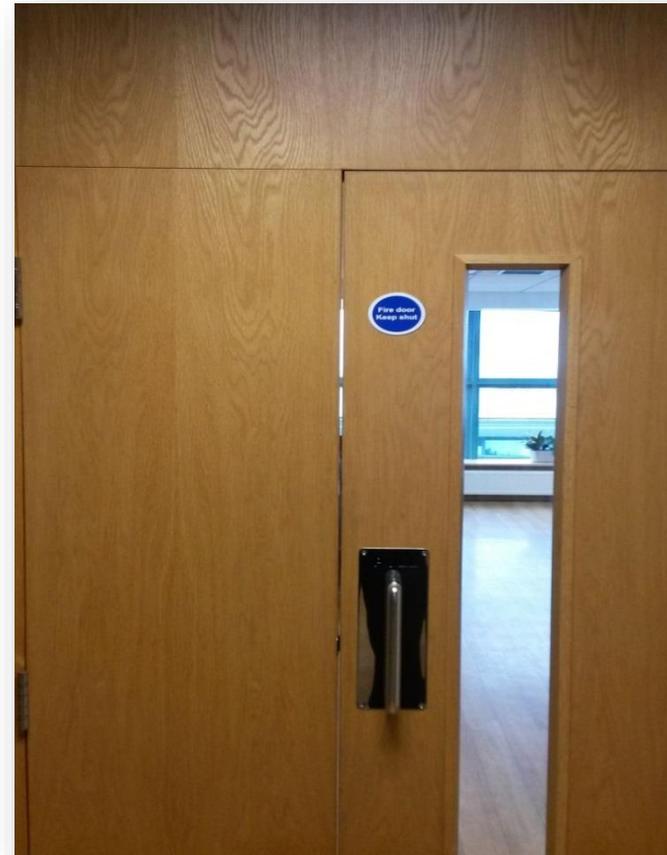
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Common Problems

Fire Resisting Doorset ?



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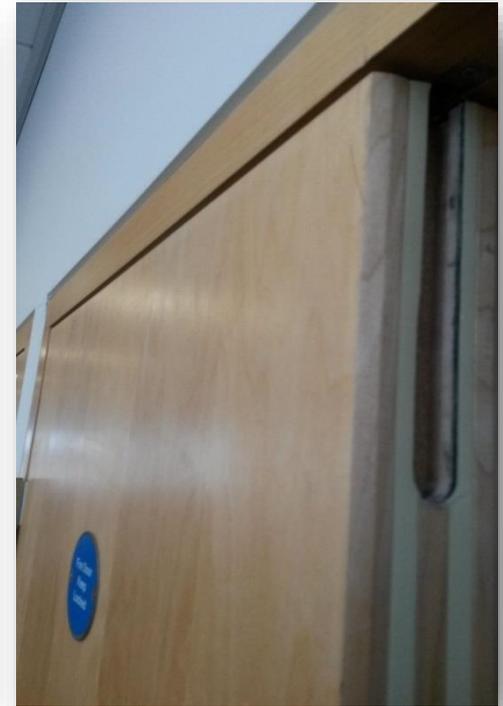
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Difficult to detect

Fire Resisting Doorset ?



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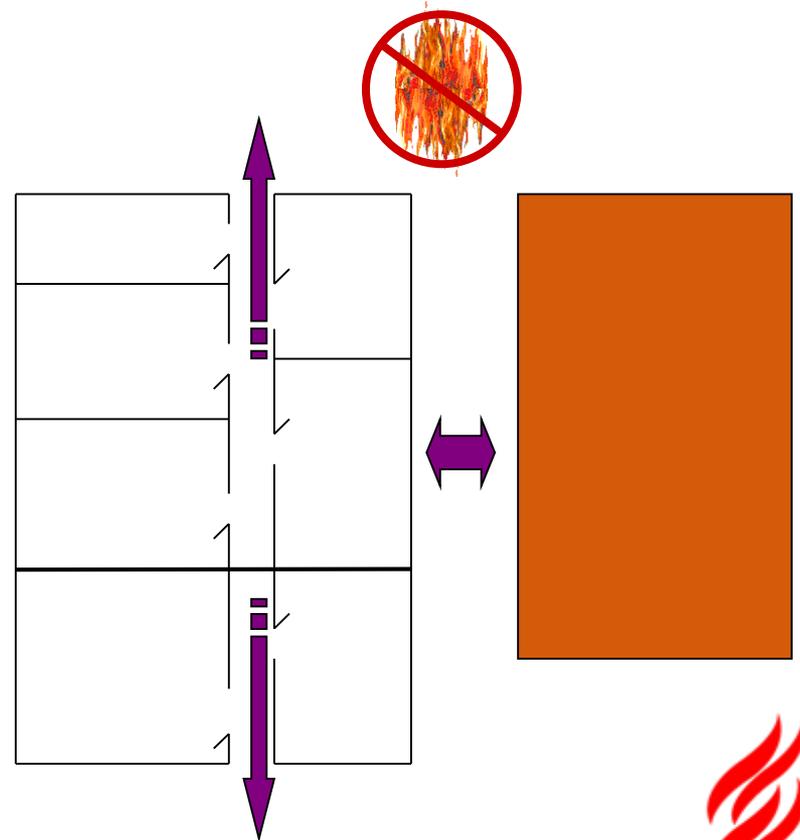


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Remember

Properly designed, installed and maintained Passive Fire Protection save lives!

- Subdividing buildings into areas of manageable risk
- Providing adequate means of escape
- Providing fire separation between adjacent/adjoining buildings
- Controlling the properties of materials/surfaces of buildings



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A Final Example

Devastation
The Burnt out Compartment of Origin



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Fire Compartmentation Works

Internally - Minor smoke damage on non-fire side of fire resisting doorset



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Fire Compartmentation Works

Externally - Fire Contained
Limited to smoke damage to the Floor above



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IFE Fire Safety Conference 2017



Thank you for your time

David O'Reilly FIFireE

www.asfpireland.ie

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Competent Installation ?



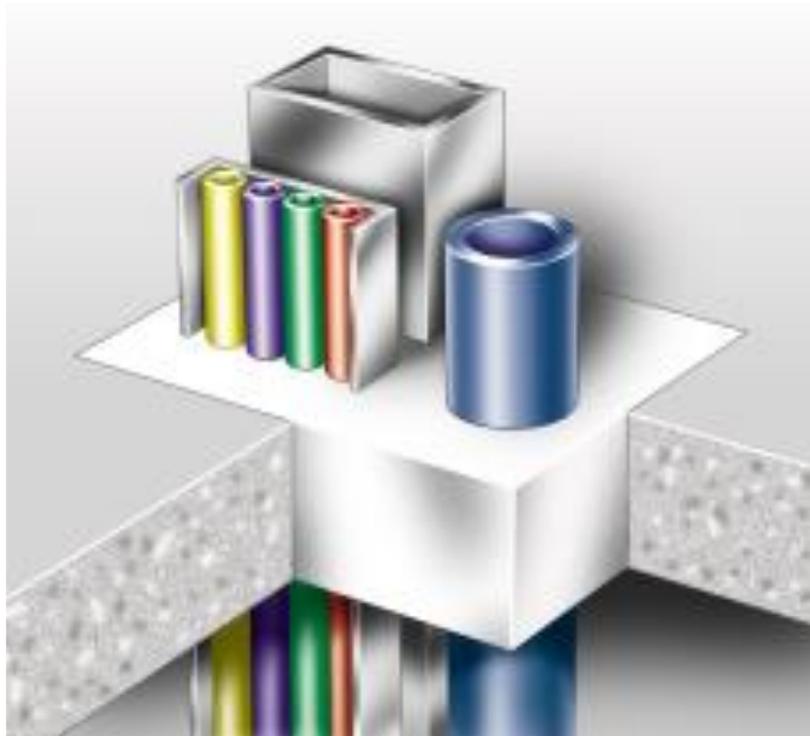
Intumescent
pipe wrap
installed
around a
plastic pipe in
a basement
car park in
East London

The instructions...



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Fire Compound is Designed to be load bearing



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