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FireTS Lab

Understanding Passive Fire testing and assessing Passive Fire Systems

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Auckland, July-2023



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Presentation content

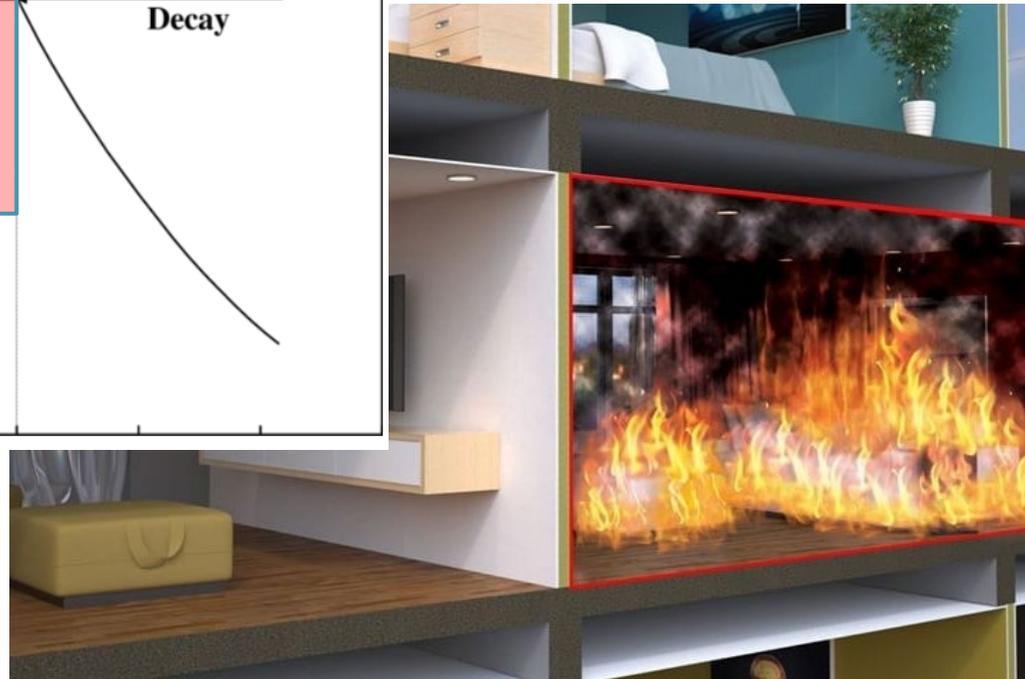
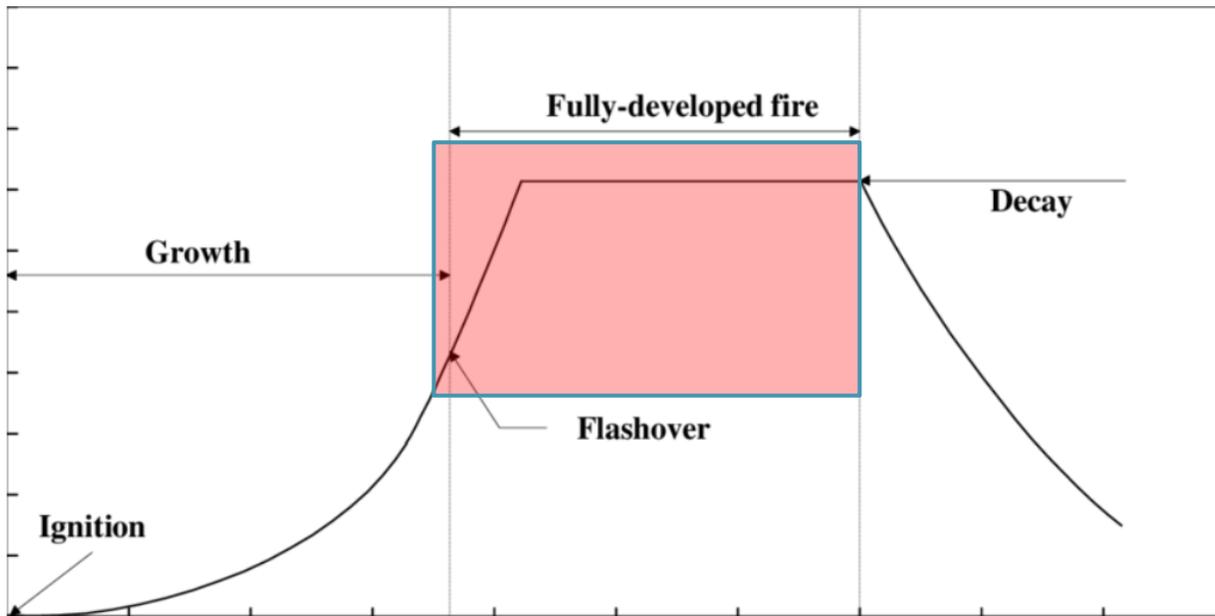
- ▶ Fire resistance testing 101
- ▶ Assessments and formal opinions - variations and overseas standards
- ▶ On-site assessment/inspection
- ▶ Indicators of incorrect installation and recommended actions
- ▶ ISO17020 - 3rd Party Inspection accreditation



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Fire resistance testing





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Fire curves

ISO 834/AS1530.4/EN/BS curve

UL curve

RABT-ZTV (Car) curve

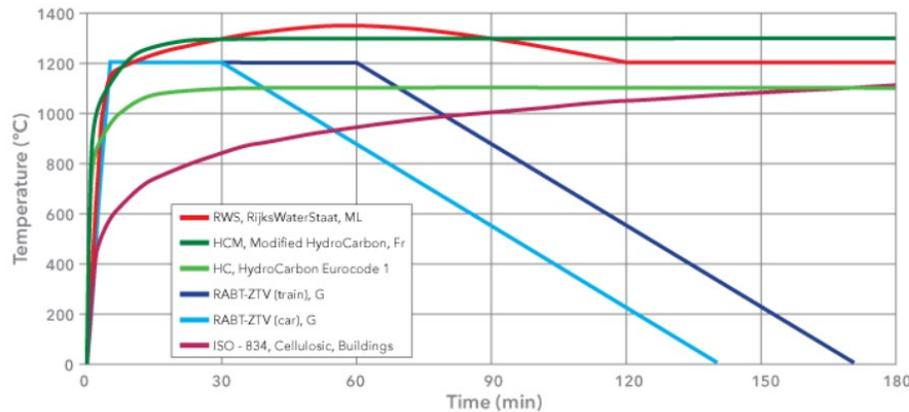
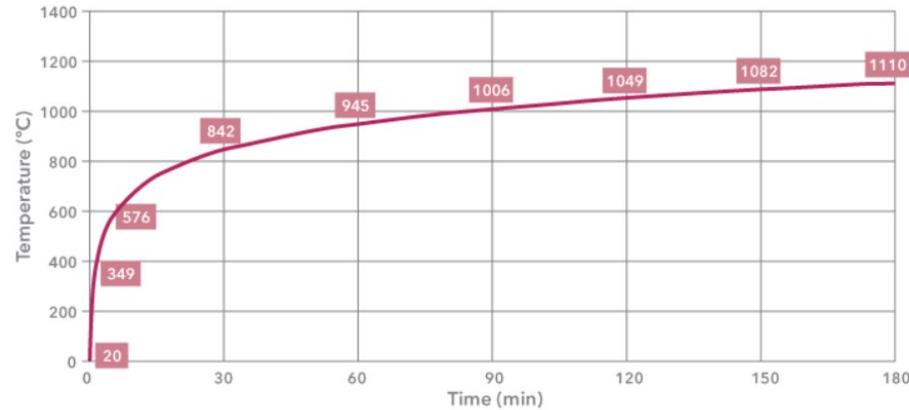
RABT-ZTV (Train) curve

RWS - Rijkswaterstaat curve

HCM - Modified Hydrocarbon curve

HC - Hydrocarbon curve

Other parametric curves

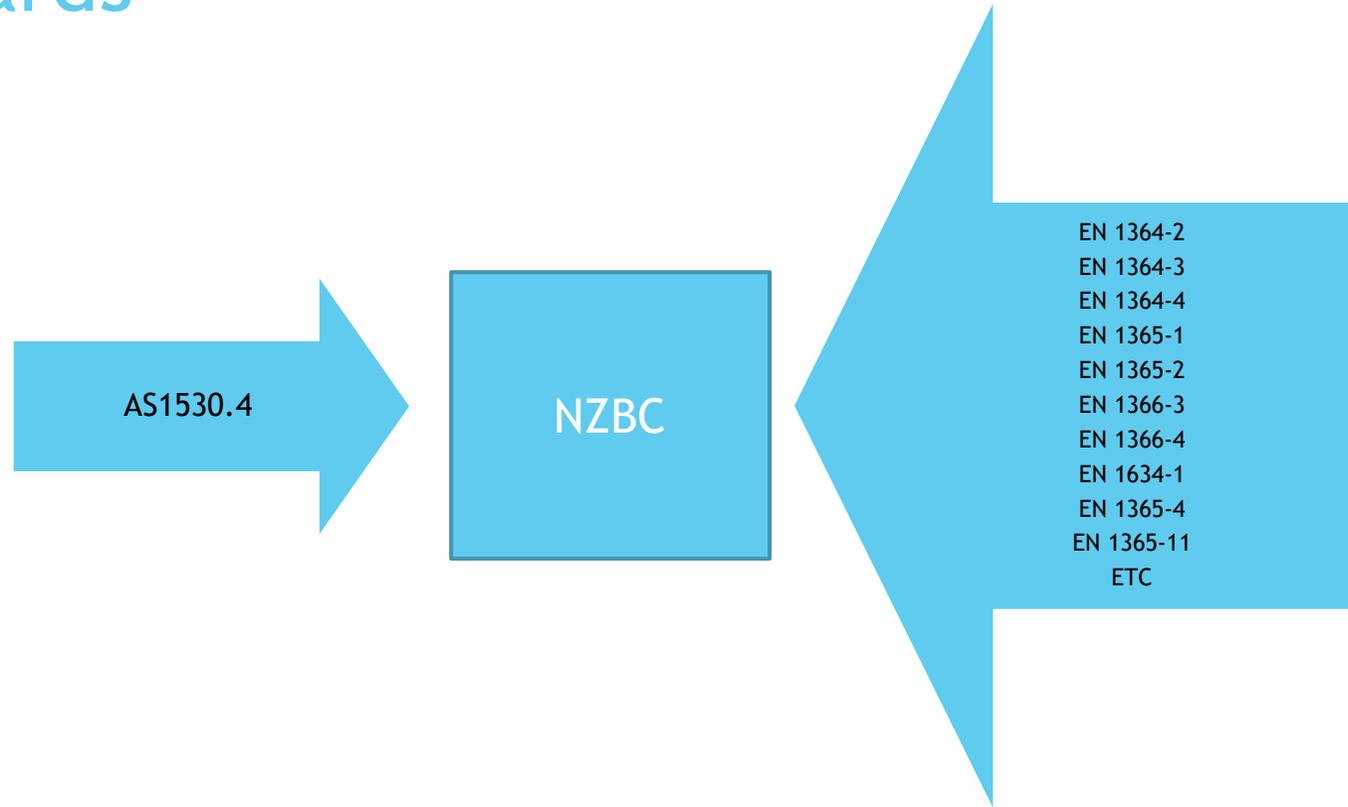




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Assessments and formal opinions - Overseas standards



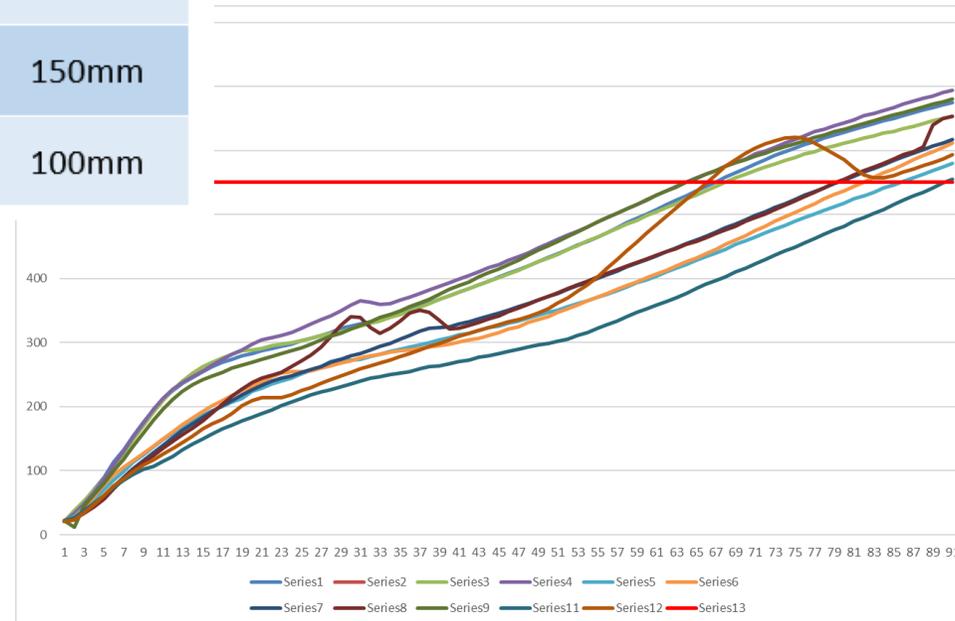


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Assessments and formal opinions - Overseas standards

| Test standard | Criteria | 4m long beam of depth x (mm) | | |
|---------------|---------------------|------------------------------|-------|-------|
| | | 200 | 300 | 400 |
| BS476-21 | Limiting deflection | 200mm | 200mm | 200mm |
| EN 1363-1 | Limiting deflection | 300mm | 200mm | 150mm |
| AS1530.4 | Limiting deflection | 200mm | 133mm | 100mm |





Assessments and formal opinions - Overseas standards

| | Tested | | | | |
|------------------------------------|------------|------------|------------|------------|------------|
| | | <i>U/U</i> | <i>C/U</i> | <i>U/C</i> | <i>C/C</i> |
| Covered | <i>U/U</i> | Y | N | N | N |
| | <i>C/U</i> | Y | Y | N | N |
| | <i>U/C</i> | Y | Y | Y | N |
| | <i>C/C</i> | Y | Y | Y | Y |
| Y = acceptable, N = not acceptable | | | | | |

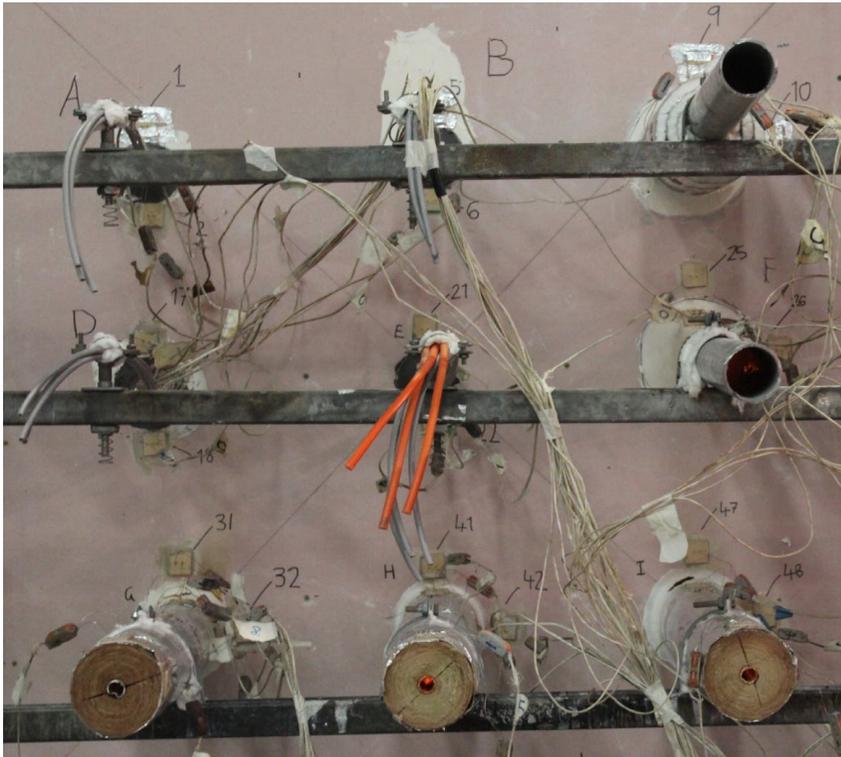


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Assessments and formal opinions - Variations

Test report is always a story of success

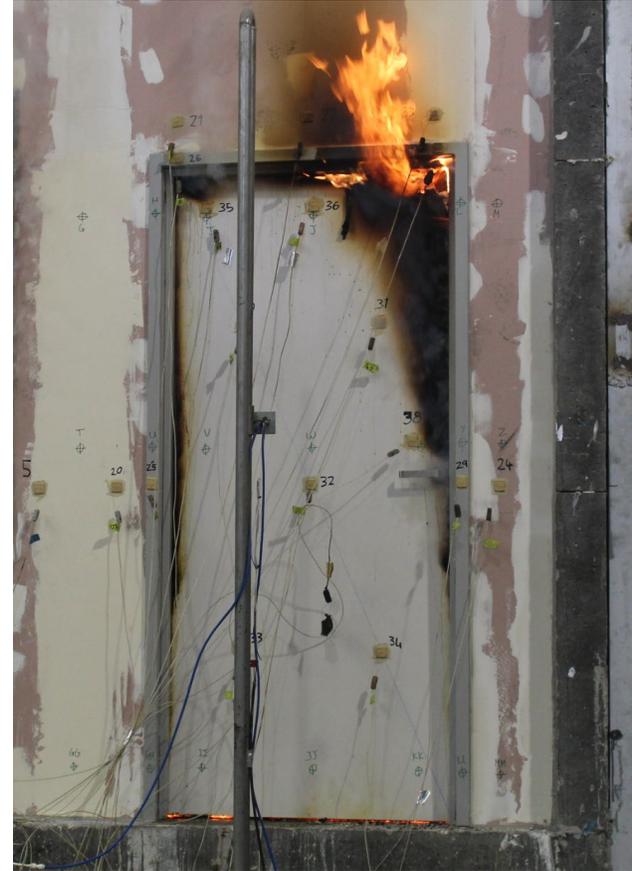




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Assessments and formal opinions - Variations





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Assessments and formal opinions - Variations

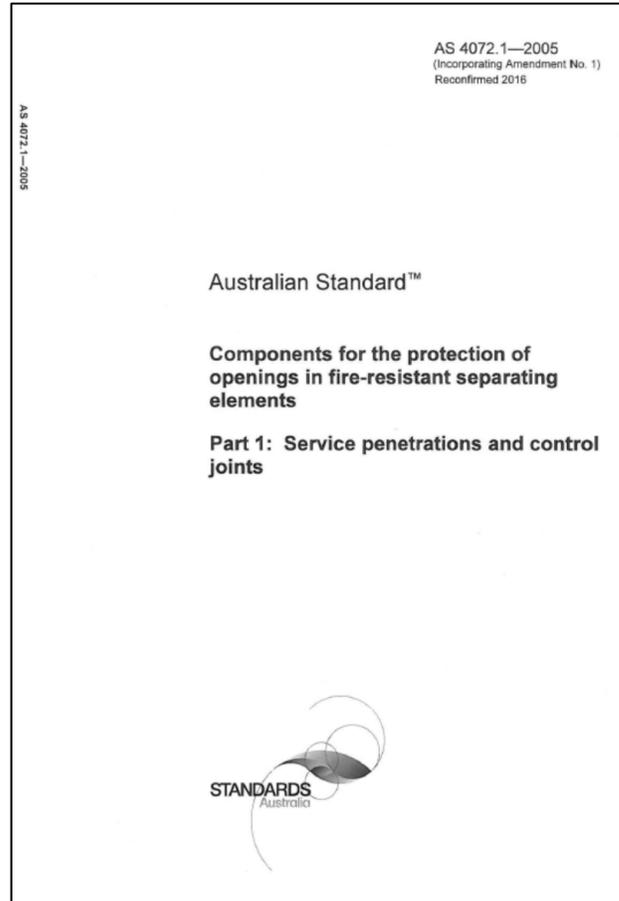




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Assessments and formal opinions - Variations





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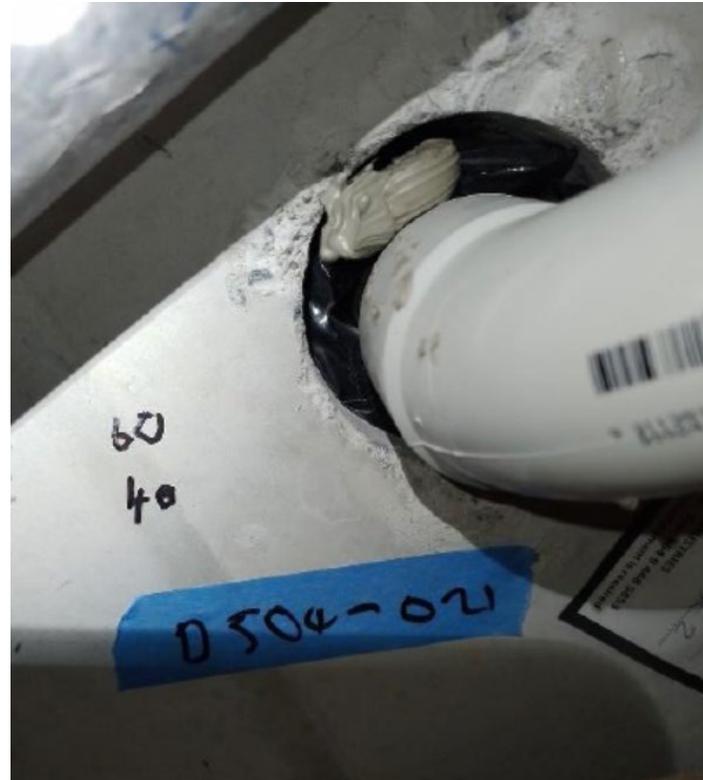
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Assessments and formal opinions - Reality



Indicators of incorrect installation - plastic pipes

- Oversized core holes
- Sealants for plastic pipes
- Pipe or floor waste
- Pipe wall thickness
- Pipe material





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Indicators of incorrect installation - steel pipes

- Oversized core holes
- Sealants for steel pipes
- Insulation requirements - wraps or blankets
- Pipe wall thickness
- Pipe material





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Indicators of incorrect installation - Interchangeability - sealants

- Different expansion rate
- Different chemical composition
- Different thermal conductivity
- Manufacturers does not test each other products





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Indicators of incorrect installation





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Inspection - ISO17020

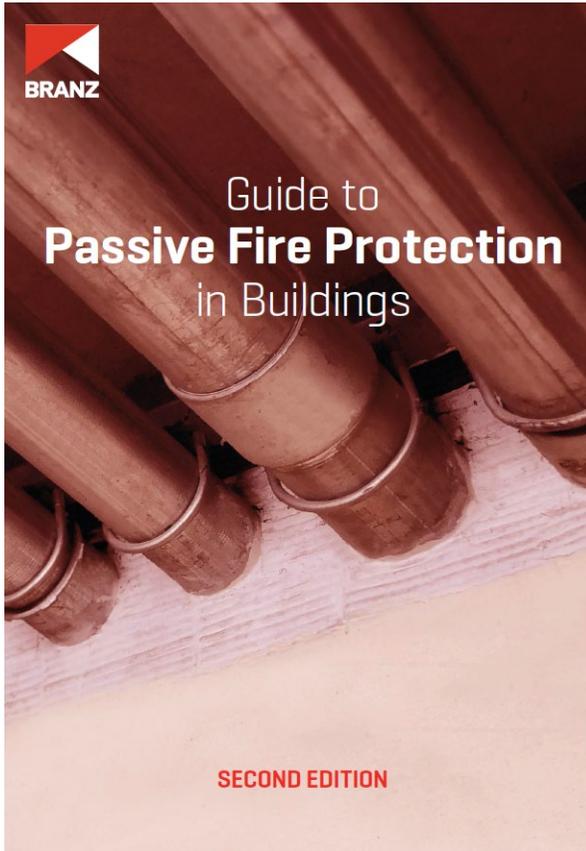
- General requirements - Impartiality, independence and confidentiality
- Structural requirements - Administrative and Organization
- Resource requirements - Personnel, Facilities, equipment, subcontracting
- Process requirements - Inspection methods and procedures, Inspection records and reports, Complaints and appeals
- Management system requirements - documentation control and QMS (ISO9001)

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Inspection - Scope



CHECKLIST 6: PENETRATION SEALS

Penetration seal products include:

- mastics, in tube or pail, for lineal gap seals (control joints), wall joints (perimeter of walls) or pipes
- foams
- putties
- mineral boards, with or without a coating
- mortars
- pillows
- wraps
- collars
- sleeves
- blocks and plugs.

Penetration types include:

- pipes
- cables in singles, bundles or on cable trays
- ducts, dampers (see above)
- control joints
- lineal gap seals (control joints)
- wall joints (perimeter of walls).

This checklist addresses specific items for the installation of penetration seals where services pass through fire-rated wall and floor construction:

- Obtain copies of site installation specification and consent documents.
- Obtain the compartmentation plan.
- Obtain copies of product specification.
- Is the penetration seal approved for the wall/floor type (masonry, plasterboard etc.)?
- Is the penetration seal approved for the penetration and its application (floor waste, plastic pipe, steel pipe, cable tray, control joint)?
- Are wall (or floor) openings (apertures) prepared to the job specification or the requirements of the installer?
- Are any apertures greater than specified dimensions or badly formed (i.e. chipped edges, irregular)? These should be made good with materials that maintain the FRR of the wall (or floor) and are capable of supporting the seal.
- Is the opening structurally sound with lintels as appropriate?
- Is the wall or floor sound and of appropriate FRR?
- Are pipes supported as specified by the manufacturer or tested if report available?
- Seal is installed as per specification:
 - Both sides or one side of floor, wall or ceiling.
 - Filled to correct depth - for example, mastics and pillows.
 - Either surface mounted or within wall.
 - With pipe, cable tray etc. supports at correct spacing from the wall.

- With appropriate backing material if required.
- With radiation shields or insulation to metal pipes or as per specification.
- With correct fixings to the building element.
- Check penetration label includes (if provided):
 - number of the applicable standard
 - FRR in minutes
 - name and details of the installer
 - installation date
 - unique installation reference number
 - name of the manufacturer.

Applicable standards: AS 4072.1-2005(R2016),¹³ AS 1530.4-2005/2014.

**Fire and smoke containment barrier
and penetration system**
(to AS 1530.4 and AS 4072.1)
FRR: -/60/60

Installed by (company name):

Phone no:

Installation date:

Installation reference:

**Contact the above in the event of damage or
if reinstatement is required**



Inspection - Inspection plan

- Inspection activity
- Description
- Equipment
- Acceptance criteria
- Type of inspection
 - R - review of provided documents
 - M - monitoring of ongoing activities, no statement of compliance
 - W - Whiteness of operation, Inspector shall be notified prior to any activity performed
 - H - Hold point. Activity is prohibited without Inspector presence and approval to proceed
- Frequency

| ## | Inspection activity | Description | Equipment | Acceptance criteria | Scope of Inspection | Frequency |
|----|--|--|------------------------|-------------------------------|---------------------|-----------|
| 1 | Type of wall/floor | Wall type shall be as tested/assessed | Visual/ruler /calliper | Same as tested/ assessed | R | 10% |
| 2 | Penetration apertures | As per Installation and Product specifications, as tested/assessed | Visual/ruler /calliper | Within tolerances | R | 10% |
| 3 | Dimensions and service type | As tested/assessed | Visual/ measuring tape | 300mm from separating element | S | 10% |
| 4 | Service support | As per Installation and Product specifications, as tested/assessed | Visual/ measuring tape | Within tolerances | W | 10% |
| 5 | Penetrate any structural element | Yes/No | Visual | Special permission | M/R | 10% |
| 6 | Fire stopping symmetrical, installed both sides or one side only | As per Installation and Product specifications, as tested/assessed | Visual | Same type | M/R | 10% |
| | | As per | | | | |



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Inspection - Personnel

- The inspection body shall **define and document the competence requirements** for all personnel involved in inspection activities, including requirements for education, training, technical knowledge, skills and experience.
- The inspection body shall **make clear to each person their duties, responsibilities and authorities**.
- The inspection body shall have **documented procedures for selecting, training**, formally authorizing, and monitoring inspectors and other personnel involved in inspection activities.
- Each **inspector shall be observed on-site**, unless there is sufficient supporting evidence that the inspector is continuing to perform competently.

| Inspection Body Accreditation Programme | |  | |  | |
|---|--|---|---------|---|-------------|
| Schedule to | | CERTIFICATE OF ACCREDITATION | | | |
| BMTECH LIMITED | | Inspection Body | | Accreditation Number 164 | |
| SCOPE OF ACCREDITATION | | | | | |
| Signatories | | | | | |
| Mr Andrew Bain | | Design Inspection Verification and certification of passive fire systems and variations | | | |
| | | Plant Inspection Installation and commissioning inspection of passive fire systems | | | |
| Mr Alexey Kokorin | | Design Inspection Verification and certification of passive fire systems and variations | | | |
| | | Plant Inspection Installation and commissioning inspection of passive fire systems | | | |
| Operations Manager Authorisation: | |  | Issue 1 | Date:14/10/22 | Page 3 of 3 |

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Tel 09-529 6655 info@ianz.govt.nz ianz.govt.nz



Inspection - Report

- identification of the issuing body;
- unique identification and date of issue;
- date(s) of inspection;
- identification of the item(s) inspected;
- signature or other indication of approval, by authorized personnel;
- a statement of conformity where applicable;
- the inspection results

| | | | | | |
|---|---|---|---------------|---|--|
| Inspection Body Accreditation Programme | |  | |  | |
| Schedule to CERTIFICATE OF ACCREDITATION | | | | | |
| BMTECH LIMITED Inspection Body | | Accreditation Number 164 | | | |
| SCOPE OF ACCREDITATION | | | | | |
| Fire Protection (Passive Fire Systems) | | | | | |
| Type A Inspection Body | | | | | |
| Design Inspection | | | | | |
| Verification and certification of passive fire systems and variations in accordance with: | | | | | |
| AS4072.1 AS1905.1 NZS4520 AS1530.4 NZS/BS 476 part 20, 21, 22 Acceptable Solutions and Verification Methods of the C Clauses of the New Zealand Building Code | | | | | |
| Plant Inspection | | | | | |
| Installation and commissioning inspection of passive fire systems: | | | | | |
| Walls Floors, roofs and ceilings Columns Beams, girders and trusses Doorsets and shutter assemblies Uninsulated glazing Air ducts Service penetrations and control joints Fire damper and air transfer grille assemblies Critical services | | | | | |
| The above inspections for compliance with: | | | | | |
| AS4072.1 AS1905.1 NZS4520 AS1530.4 NZS/BS 476 part 20, 21, 22 Acceptable Solutions and Verification Methods of the C Clauses of the New Zealand Building Code | | | | | |
| Operations Manager Authorisation: |  | Issue 1 | Date:14/10/22 | Page 2 of 3 | |
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THANK YOU FOR YOUR ATTENTION