



Combustible Floor Coverings Under Fire Curtains

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Discussion Plan

The presentation looks at the use of combustible floor coverings under fire curtains.

- What are the issues
- Where are the current requirements
- What has Greene Fire done to address this
- Results
- How this information should be used

What are the issues

Generally fire curtains are uninsulated fire barriers with varying fabric performance

- Often installed in spaces where there is a desire for combustible floor finished e.g carpet, timber, rubber etc
- Is there a possibility of fire spread through the floor material?
- No current acceptance criteria for this situation
- No current testing procedure or standard



Where are the current requirements

Some people look to the fire shutter standard for answers

- AS1905.2 for fire shutters states

5.5 Threshold

Unless otherwise permitted by the regulatory authority, the threshold shall be of concrete or similar material deemed not combustible when tested in accordance with AS 1530.1.

NOTE: In length, the threshold should extend to the full width of the opening being protected, and in depth, it should be not less than 150 mm each side of the vertical plan of symmetry of the curtain.

- Does a regulatory authority usually give acceptance of a combustible threshold?
- Notes in standards are not mandatory and are for guidance

Where are the current requirements

What is OK for fire doors?

- AS1905.1 for doors allows

2.2 THRESHOLDS

The threshold of the opening in which a fire-resistant doorset is mounted shall be of concrete or other non-combustible material unless an alternative form of construction has been subjected to the fire resistance test. For a sliding fire-resistant doorset, the threshold constructed of such material shall project not less than 100 mm beyond the wall face and extend for a distance of not less than 150 mm on either side of the opening on the side of the wall on which the fire-resistant doorset is mounted.

NOTE: For requirements for clearances around door leaves, see Clause 5.5.

- Similar requirement for non-combustible threshold as in AS1905.2 however states the requirement for testing of a combustible threshold.
- AS1530.4 does not provide requirements on how to test combustible thresholds under fire doors

Where are the current requirements

- AS1905.1 for fire doors specifies gaps as

5.5 CLEARANCES AROUND DOOR LEAVES

5.5.1 Threshold and floor finish

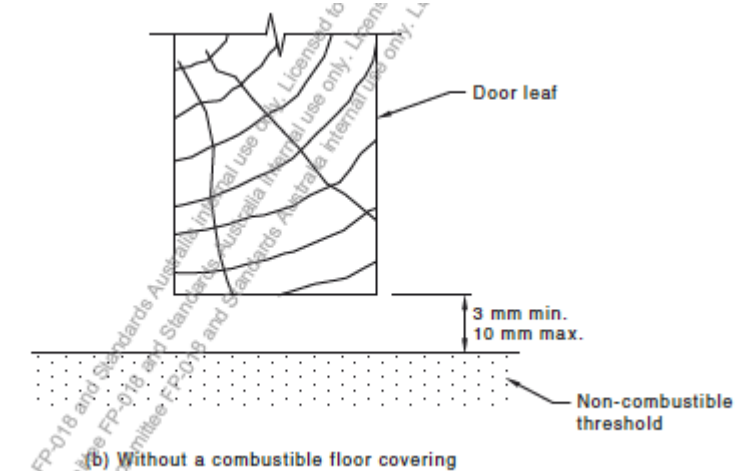
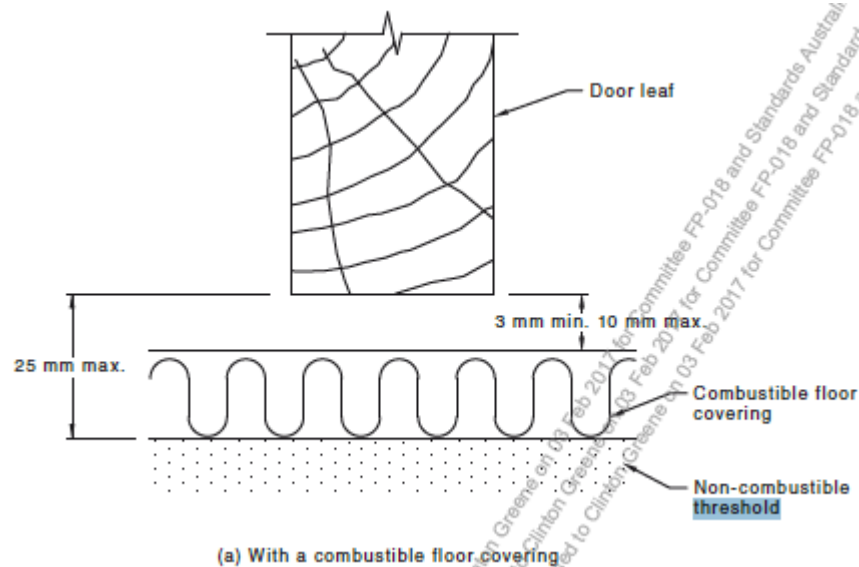
Clearances between the bottom of all door leaves and the floor shall be as follows:

NOTE: See Figures 1.4(A) and 5.5.1.

- (a) Between the leaf and the top surface of the floor including any floor covering—not less than 3 mm and not more than 10 mm.
 - (b) Between the leaf and the top of the non-combustible threshold—not more than 25 mm.
- There is a definition for threshold which is not clear as to whether a non-combustible floor covering is part of the threshold or not. There is no definition for floor covering.

Where are the current requirements

- AS1905.1 specifies gaps as



Where are the current requirements

- What does BS8524 say?
- Currently it has no requirement for thresholds in the standard
- No Australian Standard for fire curtains makes this confusing
- Fire shutters must have a non-combustive threshold – no discussion on floor coverings
- Fire doors can have any combustible floor covering provided it meets the edge gap requirements of the standard and the NCC. And provided there is a non-combustible or fire tested threshold underneath.

Where are the current requirements

The NCC has requirements for floor finishes in

Specification C1.10

- Critical radiant flux (CRF) in Table 2
- The lower the CRF result number the greater the tendency of the material to spread flame.
- Most commercial flooring materials should be able to comply with these requirements

Table 2 CRITICAL RADIANT FLUX (CRF in kW/m²) OF FLOOR MATERIALS AND FLOOR COVERINGS

| Class of building | General | | Fire-isolated exits and fire control rooms |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------|
| | Building not fitted with a sprinkler system complying with Specification E1.5 | Building fitted with a sprinkler system complying with Specification E1.5 | |
| Class 2, 3, 5, 6, 7, 8 or 9b, excluding— (i) Class 3 accommodation for the aged; and (ii) Class 9b as specified below. | 2.2 | 1.2 | 2.2 |
| Class 3 Accommodation for the aged. | 4.5 | 2.2 | 4.5 |
| Class 9a <i>Patient care areas.</i> | 4.5 | 2.2 | 4.5 |
| Areas other than <i>patient care areas.</i> | 2.2 | 1.2 | 4.5 |
| Class 9b auditorium or audience seating area used mainly for— (i) indoor swimming or ice skating; and (ii) other sports or multi-purpose functions. | 1.2 2.2 | 1.2 1.2 | 2.2 2.2 |
| Class 9c <i>Resident use areas.</i> | — | 2.2 | 4.5 |
| Areas other than <i>resident use areas.</i> | — | 1.2 | 4.5 |



What has Greene Fire done about this?

We developed of own test procedure in conjunction with Exova Warringtonfire to test and determine whether fire spread occurred through the fire curtain when there was a combustible floor covering installed underneath it.

Variable are:

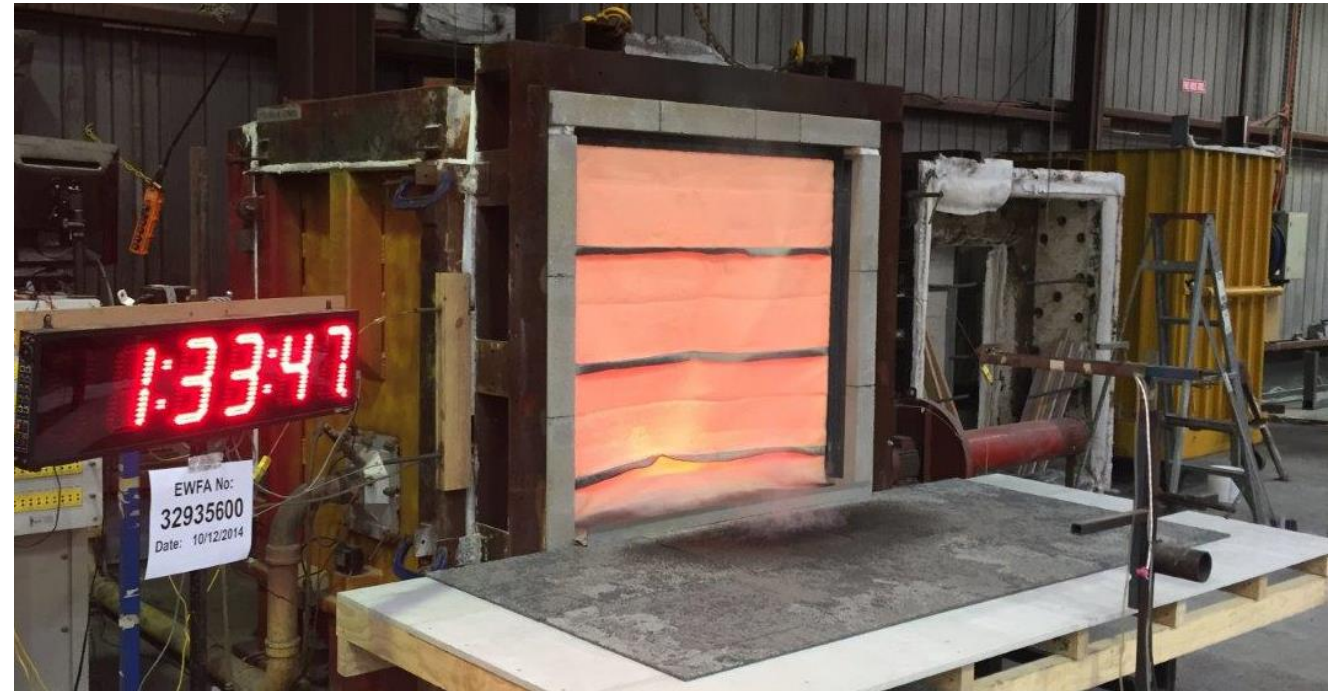
- Curtain material type
- Fire curtain construction
- Floor material type
- Floor material fire performance (CRF)

Results

We wanted to prove a pass/fail based on a certain CRF of the floor material. We chose a low 4.3 CRF direct stick carpet tile as our starting position. Test for 2 hours.

- Result 1
FireMaster Concertina with 4.3CRF carpet

• **PASS**



Results

- Result 2
FireMaster with 4.3CRF carpet

• FAIL



Results

- Result 3

FireMaster with 4.3CRF carpet and SLAT bottom bar

- **FAIL –**

significantly less fire spread



Results

- Result 4
FireMaster with 6.5CRF carpet

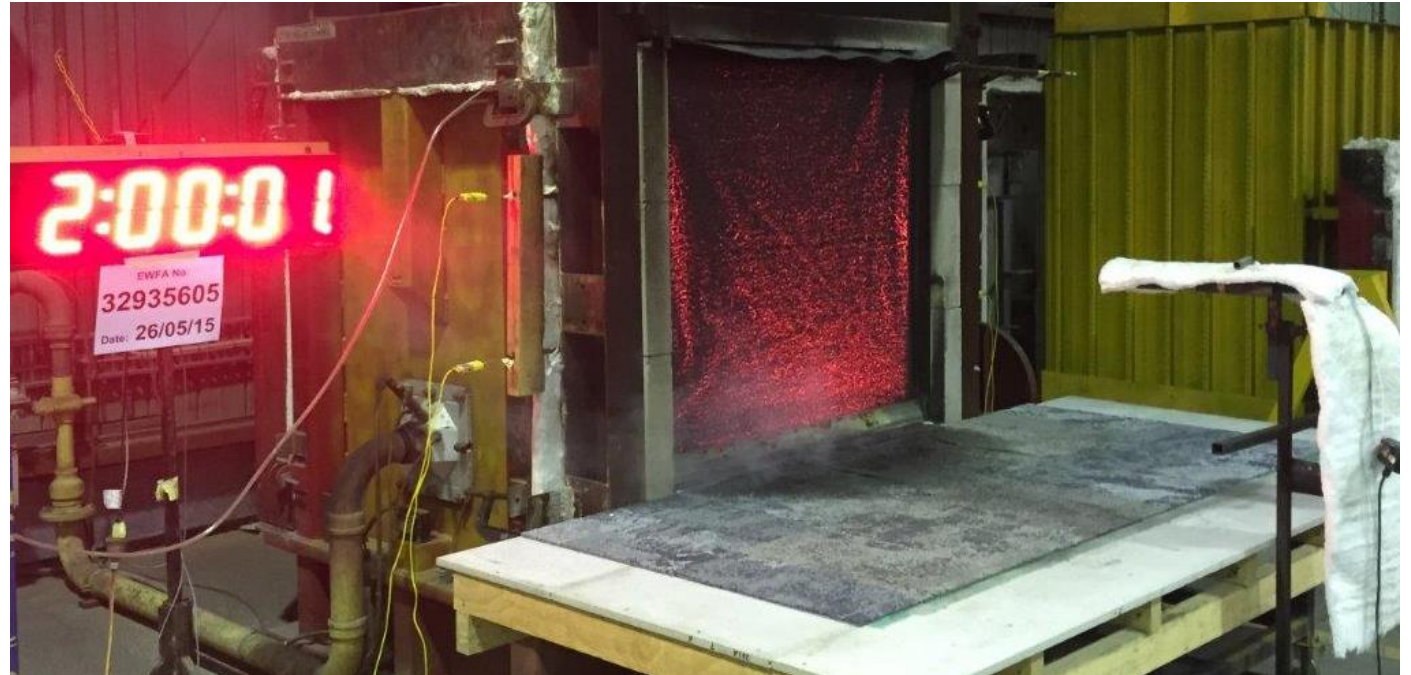
- **FAIL –**
significantly less fire spread



Results

- Result 5
FireMaster PLUS with 4.5CRF carpet

• PASS





Results

Summary of results by product type

| Product | Criteria |
|---------------------------------|-------------------------------------------|
| FireMaster Concertina | Pass for CRF > 4.3 |
| FireMaster Plus | Pass for CRF > 4.5 |
| FireMaster | Fail CRF = 4.3 burn extinguishment 1000mm |
| FireMaster | Fail CRF = 6.5 burn extinguishment 470mm |
| FireMaster with SLAT bottom bar | Fail CRF = 4.3 burn extinguishment 500mm |

If interested in more details please contact us for Advisory Report 39803300.



How this information should be used

Testing demonstrated that some fire curtains can have good results and some not so good.

Limitations

- Results are only validated for the products and carpets tested
- Different types of flooring material may test/react differently e.g. underlays, timber, rubber etc

Assumptions

- A higher CRF carpet than what was tested would perform better than what was tested
- A higher CRF flooring material perform better than a lower CRF tested carpet

How this information should be used

Other things to consider

- Sprinklered building
- Specifying a fire curtain type that tested and passed
- Making a non-combustible floor covering a requirement under the fire curtain
- Manufacturer can not provide a tested prototype for every possible combination of floor coverings and fire curtains systems. The number of variables is endless.

Who should be addressing this

- Should be part of the risk assessment by the fire engineer and addressed in the fire engineering report



Thank you for your attention.

Questions??



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