This technical note is issued to provide comment upon the guidance for fire doors in Approved Document B (ADB) of the Building Regulations England, which states that “...the requirement is for test exposure from each side of the door separately”. ADB refers to fire resistance testing in accordance with BS476: Part 22: 1987 or BS EN 1634-1: 2014.

Peter Jackman, the founder of International Fire Consultants Ltd (IFC), was lead author of BS476: Part 22: 1987, and he included the statement that “doorsets and shutter assemblies shall be tested from both sides, i.e. two specimens, unless the doorset or shutter assembly, including the hardware, is entirely symmetrical, or unless the weakest direction can be clearly identified, or unless the doorset or shutter assembly is known to be exposed to a fully developed fire from one side only ...”.

IFC has established principles, based upon extensive experience of testing timber doors for fire resistance in both directions of exposure. These principles define which orientation is ‘the weakest direction’ for timber doors installed in timber or metal frames.
When testing timber, hinged or pivoted, door assemblies, it is the opinion of IFC that the weakest direction is that where specimens are installed with the leaf opening in towards the furnace. Testing in this orientation is therefore incorporated into Engineering Assessments to cover doors opening in the opposite direction.

The primary reason for this is that as the timber is heated under fire resistance test conditions, it shrinks due to thermal dehydration from the exposed cell structure. Following exposure to the extreme heat experienced in a fire resistance test, the exposed face will shrink resulting in bowing of the door with the top and bottom corners of the leaf distorting towards the furnace. The bowing of the door leaf will create the potential for the passage of hot furnace gases around the leaf perimeter, often leading to premature integrity failure under the criteria of the test standard.

When tested in the opposite orientation, bowing of the leaf will generally be arrested by the stops, hence why this is the less onerous direction.

This principle has been endorsed in the European Standard for fire resistance testing of doors, shutters and openable windows, EN 1634-1: 2014(+A1: 2018). Table 2 in Clause 13.4 lists the ‘direction for testing’ for different door types. For a hinged or pivoted, timber leaf in timber or metal frames, Table 2 states that a door assembly tested with the leaf opening towards the furnace, will cover the same door assemblies when installed to open in the opposite direction.

Whilst BS476: Part 22: 1987 and EN 1634-1: 2014 each have an independent methodology, it is evident that the principles long established within IFC are echoed within the more recent EN 1634-1 Standard. This only serves to confirm the suitability of the principle that has been applied by IFC within Engineering Assessments.

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