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Title:

The Fire Resistance Performance
of Steel Doorsets With Respect to
BS EN 1634-1

WF Report No:

195977

Prepared for:

**GMP Technical Solutions Pvt
Ltd**

Gunai Road, Kurawala (W)
PO - Mandhala, Via Barotiwala,
Dist – Solan
Himachal Pradesh
India 174103

Date:

6th August 2010

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Executive Summary

Objective	This report presents an appraisal of the fire resistance performance of steel based doorsets, which are required to provide up to 120 minutes integrity performance, if subjected to a fire resistance test in accordance with BS EN 1634-1.
Sponsor	GMP Technical Solutions Pvt Ltd
Address	Gunai Road, Kurawala (W) PO - Mandhala, Via Barotiwala, Dist – Solan Himachal Pradesh India 174103
Summary of Conclusions	It can be concluded that the proposed steel based doorsets should be capable of providing up to 120 minutes integrity performance, if subjected to a fire resistance test in accordance with BS EN 1634-1.
Valid until	1 st September 2015

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Introduction

This report presents an appraisal of the fire resistance performance of steel based doorsets, similar in construction to that tested under the reference WF Test Report No. 167954, but modified as detailed later.

The doorsets are required to provide up to 120 minutes integrity performance, if subjected to a fire resistance test in accordance with BS EN 1634-1.

FTSG

The data referred to in the supporting data section has been considered for the purpose of this appraisal which has been prepared in accordance with the Fire Test Study Group Resolution No. 82: 2001.

Assumptions

General Construction

It is assumed that the general construction of the doorsets and the materials used in the construction will, unless specifically detailed in this report, be identical to those of the tested assembly.

Supporting Construction

It is assumed that the doorsets shall be fixed to a masonry or reinforced concrete supporting constructions which are capable of maintaining adequate support for the required period of up to 120 minutes.

Door Gaps

It is assumed that the door leaf to frame clearance gaps shall not exceed those of the previously fire tested assemblies.

Installation

It is assumed that the doorsets will be installed by competent installers in a similar manner to that used when installing the fire tested assembly.

Proposals

The single-acting, double-leaf, steel based doorset previously fire tested and described within WF Test Report No. 167954, has demonstrated its ability to provide only 115 minutes integrity performance after which time a gap developed at the meeting edges of the door leaves causing failure of the gap gauge integrity criteria of the Standard. It is proposed that the same doorset would provide an integrity performance of 120 minutes where the following modification is introduced:

- Removal of the flush bolt assembly fitted to the tested doorset and its replacement with a stainless steel flush bolt assembly previously proven suitable for use with uninsulated steel based doorsets.

It is further proposed that latched single-acting, single-leaf doorsets, of the same basic construction as the tested doorset, may also provide an integrity performance of up to 120 minutes.

Basic Test Evidence

WF Test Report No. 167954

A fire resistance test in accordance with BS EN 1634-1: 2000, on a single-acting, double-leaf steel based doorset, mounted within a high density rigid supporting construction.

The doorset had overall dimensions of 2200 mm high by 2000 mm wide and incorporated two door leaves. The door leaves had overall dimensions of 2156 mm high by 965 wide by 44 mm thick.

The specimen satisfied the sustained flaming and gap gauge criteria of the test standard for a period of 115 minutes after which time a gap formed at the lower part of the meeting edges of the door leaves. The test was discontinued after a period of 123 minutes.

Assessed Performance

Integrity failure of the previously fire tested doorset occurred when a through gap in excess of the size allowed development between the meeting edges of the door leaves after a period of 115 minutes. No other mode of integrity failure relevant to an uninsulated doorset was observed during the test duration of 123 minutes.

The tested doorset assembly incorporated two door leaves, an active leaf and a passive leaf. The passive leaf was bolted to the door frame at the head and to the concrete floor slab at the base with steel flush bolts. The active leaf was latched back to the passive leaf at its approximate mid-height with a mortice sashlock.

Immediately following termination of the test the doorset was inspected closely to try to determine the cause of failure. Inspection of the doorset revealed that the lower flush bolt assembly, although its bolt was still extended, has disengaged due to distortion of the bolt. The distortion was to such a degree that the bolt had withdrawn from its keep plate in the floor slab allowing the lower edge of the passive leaf to move freely.

In consideration of the mode of failure and the extent of distortion apparent in the flush bolt, it was considered that the bolt was not sufficiently strong enough to resist the thermally induced distortion of the door leaf.

It is further considered that, had the door been provided with a different bolt assembly, of proven fire resistance performance when fitted to steel based doorsets of similar construction, the movement of the door leaf could have been resisted and the leaf edge would have continued to be restrained such that the failure gap would not have been allowed to form.

Alternative flush bolt

To ensure that the alternative flush bolt is suitable it shall be selected on the basis of the following minimum requirements:

- The bolt assembly shall be of an all stainless steel construction.
- The unit shall be of a proven fire resistance performance when mounted to (and providing restraint to) the passive leaf of an uninsulated steel based doorset having achieved an integrity performance of at least 120 minutes.
- The bolt diameter of the alternative assembly shall be a minimum of 12.8 mm.
- The bolt of the alternative assembly shall have a projection of at least 19 mm and shall engage into a stainless steel keep assembly securely fixed to the floor.
- Engagement of the bolt into the keep shall be a minimum of 14 mm

Subject to the doorset being provided with an alternative flush bolt assembly complying with all of the above requirements, it can be confidently considered that doorsets, identical in all other respects to that tested under the reference WF No. 167954 would be capable of achieving an integrity performance of at least 120 minutes, if subjected to a test in accordance with BS EN 1634-1.

Single-leaf doorsets

The tested doorset was of a double-leaf, single-acting configuration. Based on the performance of this double leaf configuration it is considered acceptable to provide latched single-leaf, single-acting doorsets of the same basic construction which will also be capable of achieving an integrity performance of up to 120 minutes if subjected to testing in accordance with BS EN 1634-1.

Positive assessment of latched single-leaf doorsets is made subject to the following requirements:

- The door leaf shall have maximum sizes equal to those of the individual door leaves included in the original test.
- The leading edge of the door leaf shall include a mild steel 'slam bar' (astragal) minimum dimensions 38 mm by 2 mm stitch welded onto the closing face of the door leaf and overlapping onto the face of the door frame by a minimum of 15 mm.
- The door leaf shall be latched back to the door frame at its mid-height.

The manufacture of the single-leaf doorsets shall in all other respects remain as that of the original tested construction.

Conclusions

It is expected that the modified doorsets considered within this report should provide the required integrity performance of up to 120 minutes, if subjected to a fire resistance test in accordance with BS EN 1634-1.

Validity

This assessment is issued on the basis of test data and information available at the time of issue. If contradictory evidence becomes available to Exova **warringtonfire** the assessment will be unconditionally withdrawn and GMP Technical Solutions Pvt Ltd will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion. The assessment is valid initially for a period of five years i.e. until 1st September 2015, after which time it is recommended that it be returned for re-appraisal.

The appraisal is only valid provided that no other modifications are made to the tested construction other than those described in this report.

Summary of Primary Supporting Data

**WF Test Report
No. 167954**

A fire resistance test in accordance with BS EN 1634-1: 2000, on a single-acting, double-leaf steel based doorset, mounted within a high density rigid supporting construction.

The doorset had overall dimensions of 2200 mm high by 2000 mm wide and incorporated two door leaves. The door leaves had overall dimensions of 2156 mm high by 965 mm and 1205 wide by 44 mm thick.

The doorset was of a mild steel construction with a Rockwool core, the door leaves were each hung on three steel hinges, Door Leaf A was inactive and held in place via two flush bolts, Door Leaf B incorporated a glazed unit fitted with a 6mm thick glass pane referenced 'Schott Jena Pyran S', a mild steel slam bar was fitted along the meeting edge of the leaves on both the unexposed and exposed faces.

The doorset was latched for the duration of the test and was installed such that it is opened away from the heating conditions of the test.

The test results were as follows:

Integrity performance	Sustained flaming	123* minutes
	Gap gauge	115 minutes
	Cotton Pad	57 minutes
Insulation performance	Area 1 (Doorset)	8 minutes
	Area 2 (Glazing)	1 minutes

* The test duration. The test was discontinued after a period of 123 minutes.

Test Sponsor : GM Partitions Pvt. Ltd. (Now GMP Technical Solutions Pvt Ltd)

Test Date : 25th October 2007

Declaration by GM Partitions Pvt. Ltd.

We the undersigned confirm that we have read and complied with the obligations placed on us by the UK Fire Test Study Group Resolution No. 82: 2001.

We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which the assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.

We are not aware of any information that could adversely affect the conclusions of this assessment.

If we subsequently become aware of any such information we agree to cease using the assessment and ask Exova **warringtonfire** to withdraw the assessment.

Signed:

For and on behalf of:

Signatories



Responsible Officer

D Forshaw* - Certification Engineer



Approved

D Hankinson * - Principal Certification Engineer

* For and on behalf of Exova **warringtonfire**.

Report Issued: 6th August 2010

The assessment report is not valid unless it incorporates the declaration duly signed by the applicant.

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