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Test Procedure for Combustible Facades (Intermediate Scale)

A report from the *Alternative solution
compliance resource for fire safe timber
design* project

This report can also be viewed on the FWPA website

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1 Introduction

This document specifies modifications to the ISO 13785-1 (ISO, 2002) standard to address two issues, namely:

- To introduce a more realistic, practical and cost effective fuel source by using timber cribs.
- To address the issue of fire spread from adjacent buildings by imposing a radiant heat flux.

ISO 13785-1 was developed to provide a screening method for determining the reaction to fire performance of products and constructions of facades or claddings when exposed to heat from a simulated fire venting through a window. The test covers a simple representation of one fire scenario. The screening method is intended to be used in conjunction with full scale test (such as ISO 13785-2 (ISO, 2002)).

The modifications in this document substitute wood cribs in lieu of a gas burner as the fire source. This is considered to give a more realistic, practical and cost effective test method.

Radiant heat flux is imposed using a radiant panel. This can help generate data relating to fire spread from adjacent burning buildings. BCA Verification methods CV1 and CV2 nominate 10 kW/m^2 as the radiation a building should be able to withstand without igniting when 6 meters from a boundary or 12 meters from an adjacent building.

This document specifies modifications to the ISO 13785-1 standard and therefore should be read in conjunction with the ISO 13785-1 standard.

2 Modifications to ISO 13785-1

2.1 General

The following clauses define additional procedures or modifications to the method specified in ISO 13785-1 for the evaluation of exterior cladding or facades.

2.2 Fire source

A wood crib is used as the fire source. It should be recognised that timber cribs may not be able to give the uniformity of heat release rate specified in ISO 13785-1, so some deviation is inevitable. Custom cribs have been designed and tested that give an approximate heat release rate of 100 kW for 30 minutes.

Crib Specification

Wood: *Radiata Pine* with a density between 440 kg/m³ and 500 kg/m³ and moisture content of 7 % to 10 %, stocked in a standard atmosphere of 23°C and 50 % humidity for at least 48 hours.

Crib size: 5 rows and 4 columns with spacing of 30 mm between sticks. Sticks of dimensions 70 mm x 70 mm and length 370 mm. Approximate mass of 16 kg-18 kg.

The crib shall be placed below the re-entrant corner of the facade.

2.3 Instrumentation

The instrumentation shall comply with the requirements of ISO 13785-1.

2.4 Imposed radiant heat flux

A radiant heat flux of at least 10 kW/m² but no greater than 12 kW/m² shall be imposed using a 3 m x 3 m radiating panel. The heat flux shall be kept constant throughout the test.

2.5 Specimen holder

The specimen holder to be used shall be a modified version of the specimen holder in ISO 13785-1. The length of the side draught screens shall be reduced from 2400 mm to 1900 mm. This allows the specimen to be closer to the radiant panel. The mineral wool is omitted. The specimen holder shall be mounted on a moveable base so that the distance to the radiant panel can be controlled. This allows the radiant heat flux imposed by the radiant panel to be controlled. A non-combustible floor should be incorporated into the specimen holder.

The specimen holder shall be configured so that the bottom edge of the specimen is a nominal 70 cm above the floor of the sample holder. Supports that extend from the floor to the underside of the specimen may be used.

2.6 Test procedure

Minimal changes to the test procedure are required to account for the modifications.

Before the test is started the furnace shall be heated to approximate steady state values.

Clause 11.2(e) of ISO 13785-1 shall be replaced with the following:

- e) Ignite timber cribs.

After the cribs are lit the radiant heat panel shield shall be removed within 10 seconds. The heat flux imposed on the back wall of the test specimen by the radiant panel shall be monitored and kept above the desired level of 10 kW/m^2 . This can be achieved by moving the specimen holder toward or away from the radiant panel as appropriate.

2.7 Test reporting

In addition to the requirements of ISO 13785-1 the test report shall also include the radiant heat flux imposed on the centre of the back wall of the specimen by the radiant panel as a function of time.

3 Validity

The results of this fire test may be used for comparative purposes and may not be used to directly assess fire hazard. The results only relate to the behaviour of the specimen of the element of the construction under the particular conditions of the test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they necessarily reflect the actual behaviour in fires.

4 References

ISO 13785-1:2002, Reaction-to-fire tests for façade – Part 1: Intermediate-scale test.
ISO 13785-2:2002, Reaction-to-fire tests for façade – Part 2: Full scale test.