

Report

Classification of an External Cladding System

as per BR135:2013 Annex B

Test Sponsor : Sotech Limited

Project :

Report No. : SR0988 Rev.0

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1. Introduction

This report details the classification of the aluminium cladding system (described in Section 2 of this report) in accordance with BR135:2013 Annex B, when tested in accordance with BS 8414-2:2015 + A1:2017 at Al Futtaim Element Materials Technology Dubai L.L.C (AFE) laboratory in Dubai at the request of:

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2. Test Sample

The test specimen was an external wall cladding system (3mm Anodised Aluminium Optima FC Panel with 125mm Rockwool Duo Slab Insulation) fixed onto a steel substrate.

All the terminations of the cladding system were left open. The interface between the cladding system and the combustion chamber was covered with 3mm aluminium optima FC panel folded inwards. The distance of the finished face of the wing wall to the side opening of the combustion chamber was 260mm.

Materials used in the system are detailed in the table below:

Component	Description	Installation Details
Internal wall board	12.5mm thick British Gypsum Gyproc Fireline boards (2 layers)	1 st layer of boards were fixed to the SFS with Ejot TKR4.8x35mm and 2 nd layer of boards were fixed to the SFS with EJOT TKR4.8 x 50mm self-drilling screws. Board joints were plastered.
Steel framing system (SFS)	150mm Metsec lightweight structural framing system (SFS).	The tracks were fixed to the concrete beams with ITW-4H45 hexagonal tapcon screws. The studs were fixed to the tracks with ITW-CFC26 self-drilling screws.
Insulation	150mm thick Rockwool flexi slab.	Rockwool flexi slab insulation was provided between the studs of the SFS.
Sheathing board	12mm thick RCM Y-wall calcium silicate board.	RCM calcium silicate board was fixed to the SFS with Index ASF79 self-drilling screws. Board joints were sealed with tape.
Breather membrane	Tyvek Firecurb housewrap breather membrane	Tyvek breather membrane was provided to the face of the RCM Y-wall calcium silicate board. Tyvek jointing tape was used at the joints.

Component	Description	Installation Details
Bracket	<p>C-channel: 3mm thick aluminium Top Hat</p> <p>Helping Hand bracket VB90S-6.5 Nvelope aluminium bracket with thermal pad. VB90D-6.5 Nvelope aluminium bracket with thermal pad.</p>	<p>C channel brackets were fixed to SFS through the Y-wall board with EJOT JT3-6-5.5 x 35mm self-drilling screws.</p> <p>Helping Hand brackets were fixed to the C channel with EJOT JT3-6-5.5 x 35mm self-drilling screws.</p>
Cavity barrier	<p>Horizontal intumescent cavity barrier: Siderise RH25S-90/30, horizontal intumescent cavity barrier.</p>	<p>The horizontal cavity barriers were fixed to the concrete slab with steel brackets and ITW-4H45 hexagonal tapcon screws.</p> <p>3 nos. of horizontal continuous cavity barriers were fixed to the main wall and wing wall, at approximately 200mm, 2375mm and 4775mm above the combustion chamber opening.</p>
	<p>Vertical cavity barrier: Siderise RV-90/60, vertical cavity barrier.</p>	<p>Vertical cavity barriers were fixed to the SFS through the Y-wall board with steel brackets and EJOT JT3-6-5.5 x 35mm self-drilling screws.</p> <p>2 nos. of continuous vertical cavity barriers were fixed on the main wall and one on the wing wall.</p>
	<p>Fire stop at slab edge: Corofil C450 fire stop</p>	<p>Fire stop was installed at each slab level between the concrete slab and Y-wall board.</p>
	<p>Cassette insert: Siderise open state cassette insert 100x50mm</p>	<p>Siderise inserts were placed at the folding of the aluminium facade panels at cavity barrier locations.</p>
Thermal insulation	125mm Rockwool Duo Slab insulation.	Rockwool Duo Slab insulations were fixed to the Y-wall boards with Ejot TKR 4.8x180mm long screws and Ejot DDT70 steel washers.
Carrier rails	Extruded aluminium FC carrier railings 3mm aluminium hook plate	<p>Railings were fixed to the Helping Hand bracket with Ejot JT4-FR-4-4.8x19mm hex head self-drilling screws.</p> <p>Aluminium hook plates were fixed to the carrier rails with Ejot JT4-FR-4-4.8x19mm hex head self-drilling screws.</p>
Panel	Anodised aluminium Optima FC façade panel, 3mm thick.	<p>Aluminium Optima façade panels were hooked on to the aluminium hook plate.</p> <p>20mm joints were provided between the panels.</p>

Figure 1: Tested Sample Elevation Showing the Thermocouple and Cavity Barrier Locations

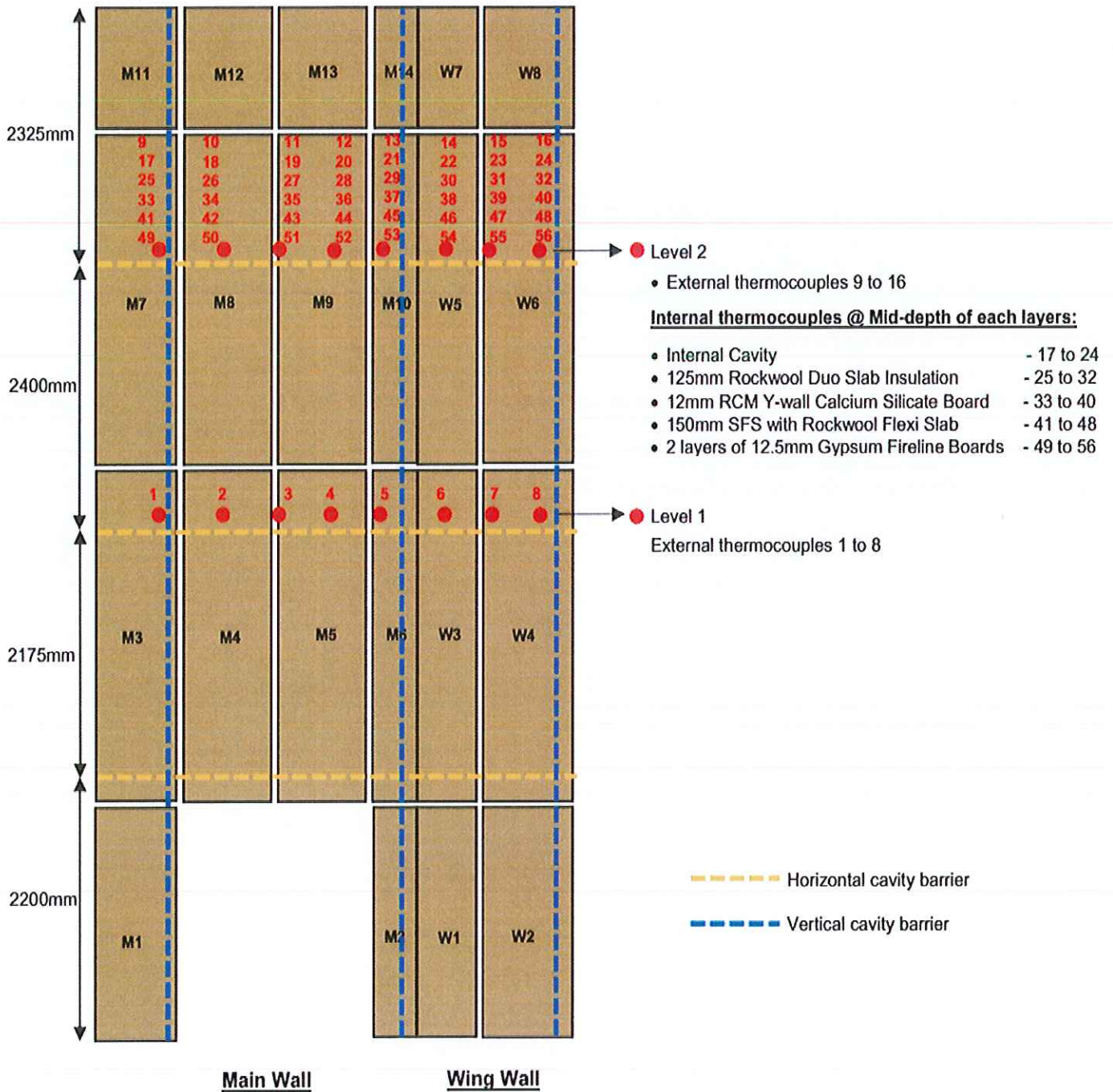


Figure 2: Corner Detail of the Tested System

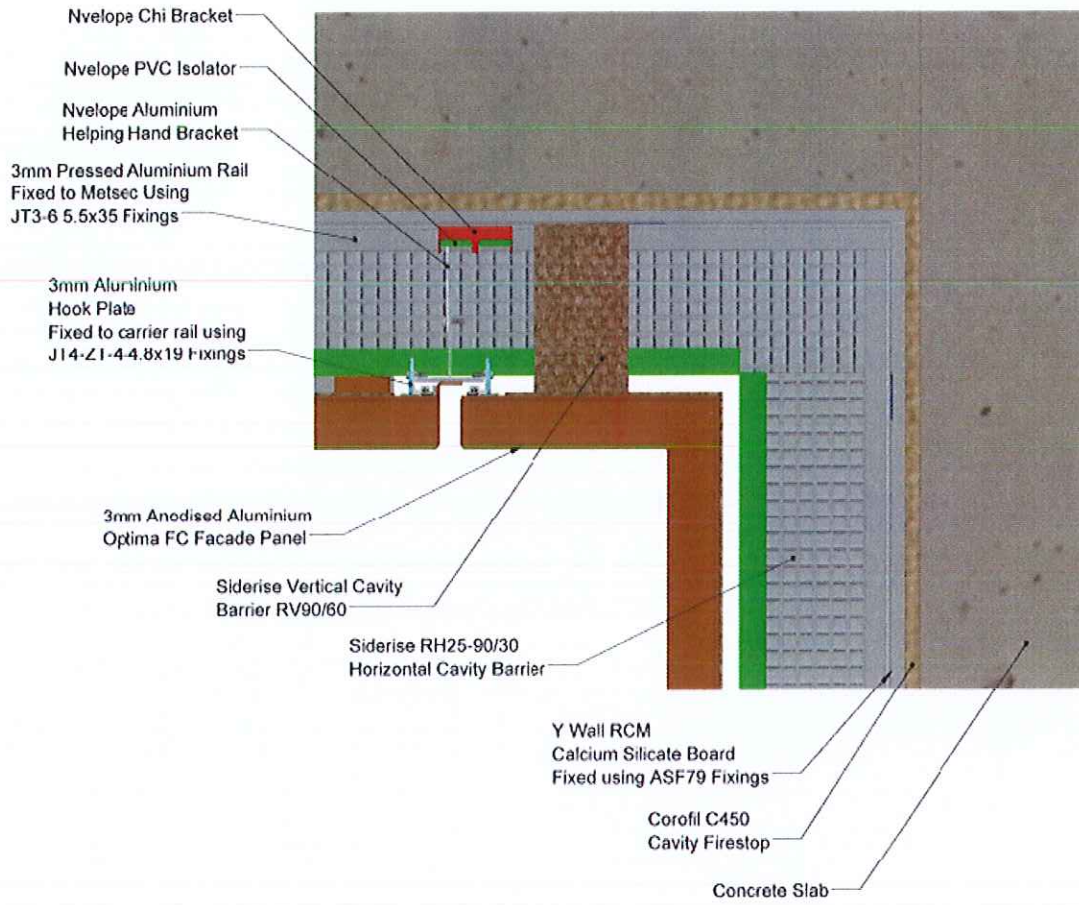


Figure 3: Detail of the System Above the Combustion Chamber

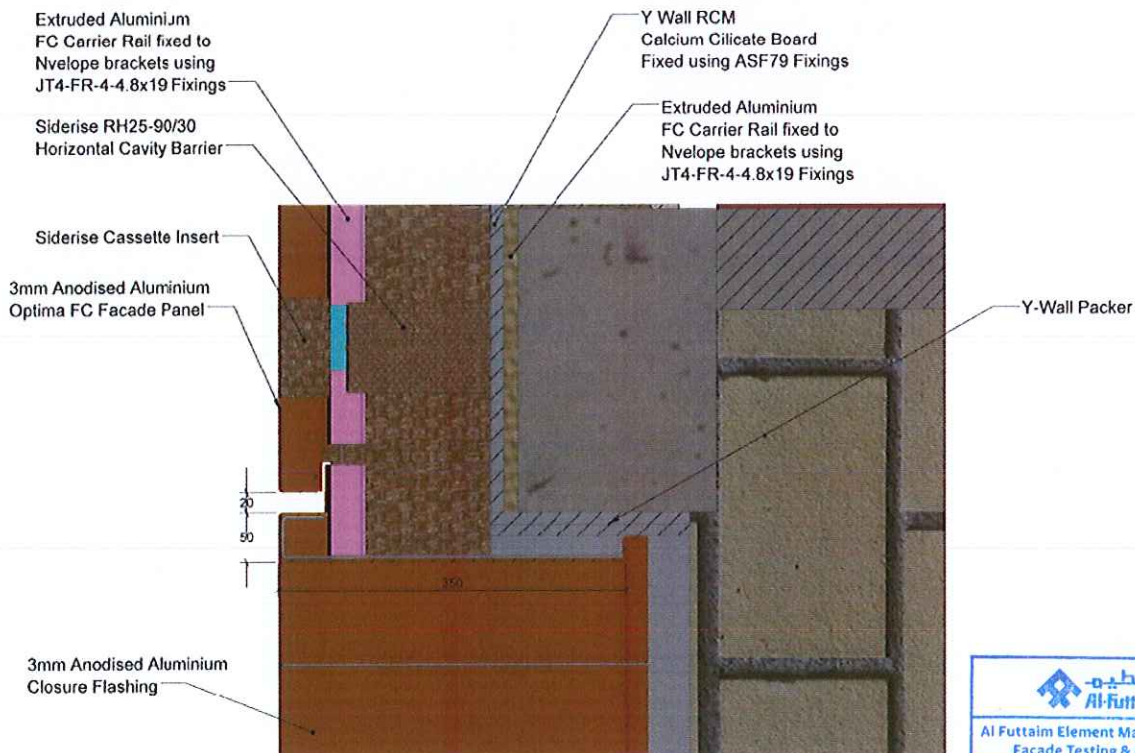
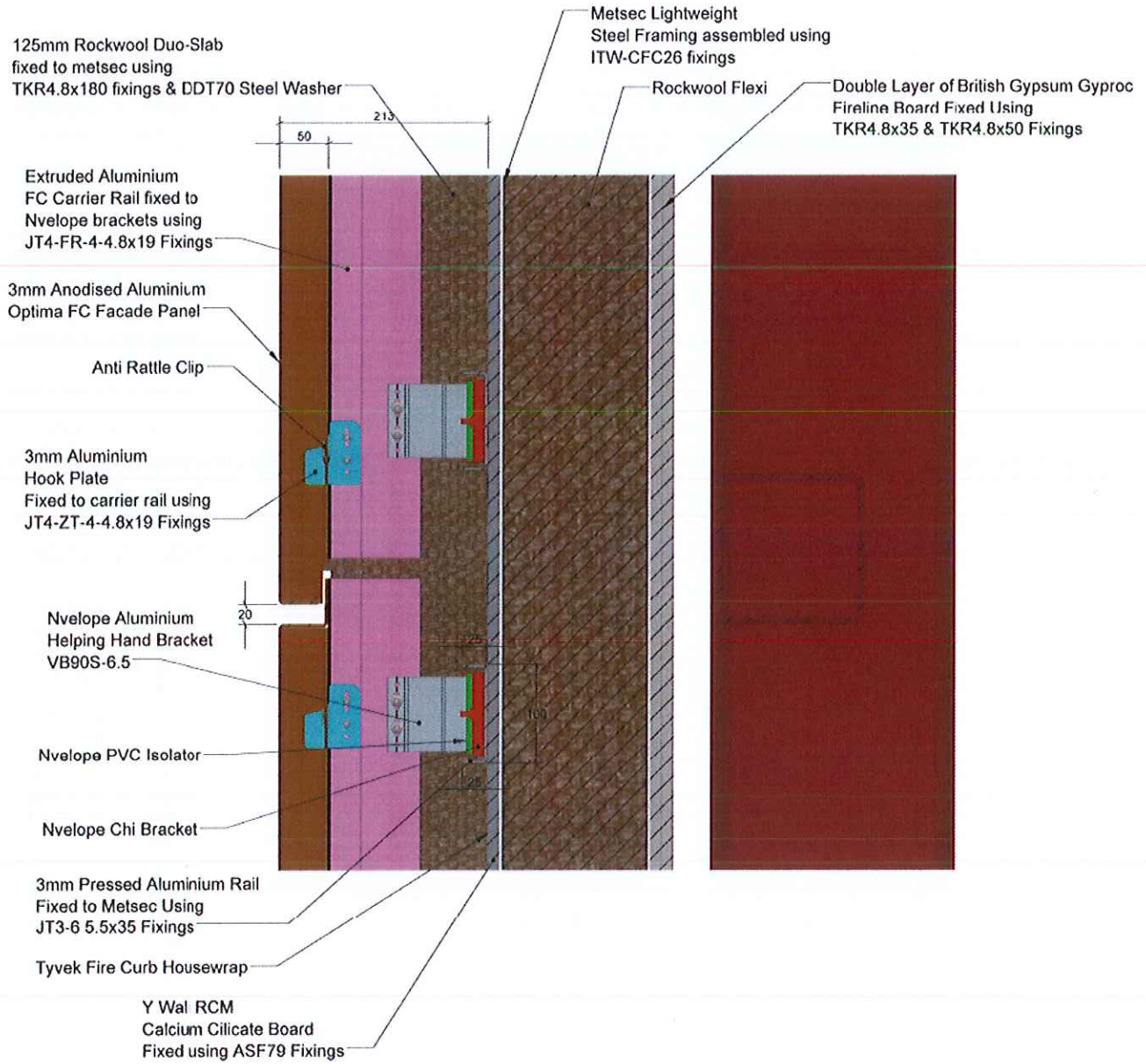


Figure 4: Vertical Section Detail of the Sample



3. Summary of Test Data

Parameters	Temperature Data
T_s , start temperature	27°C
t_s , start time	93 seconds after ignition of the crib (thermocouple 3)
Has temperature exceeded 627°C (600°C above T_s) within 15 minutes from t_s and sustained for at least 30 seconds?	No
Peak temperature & time at Level 2 (External)	421°C at 819 seconds from t_s (thermocouple 11)
Peak temperature & time at Level 2 (Mid-depth of Cavity)	329°C at 831 seconds from t_s (thermocouple 19)
Peak temperature & time at Level 2 (Mid-depth of 125mm Rockwool Duo Slab Insulation)	159°C at 1143 seconds from t_s (thermocouple 27)
Peak temperature / time at Level 2 (Mid-depth of 12mm RCM Y-wall Calcium Silicate Board)	65°C at 765 seconds from t_s (thermocouple 37)
Peak temperature / time at Level 2 (Mid-depth of 150mm SFS with Rockwool Flexi Slab Insulation)	38°C at 3114 seconds from t_s (thermocouple 48)
Peak temperature / time at Level 2 (Mid-depth of 2 layers of 12.5mm British Gypsum Gyproc Fireline Boards)	40°C at 3129 seconds from t_s (thermocouple 55)

See Figure 2 for the thermocouple locations.

Level 1 Height: 2500mm above the top of the combustion chamber opening in the test apparatus.

Level 2 Height: 5000mm above the top of the combustion chamber opening in the test apparatus.

Start Temperature, T_s : Mean temperature of the thermocouples at Level 1, five minutes prior to ignition of the heat source.

Start Time, t_s : Time when the temperature recorded by any external thermocouple at Level 1 $\geq 200^\circ\text{C}$ above T_s and remains above this value for at least 30 seconds.

4. Compliance Criteria

External fire spread

Failure due to external fire spread is deemed to have occurred if the temperature rise above T_s of any of the external thermocouples at level 2 exceeds 600°C, for a period of at least 30 seconds, within 15 minutes of the start time, t_s .

Internal fire spread

Failure due to internal fire spread is deemed to have occurred if the temperature rise above T_s of any of the internal thermocouples at level 2 exceeds 600°C, for a period of at least 30 seconds, within 15 minutes of the start time, t_s .

5. Test Results

Parameters	Fire Spread Time, t_s	Result
External fire spread	>15 minutes	Compliant
Internal fire spread (Mid-depth of Cavity)	>15 minutes	Compliant
Internal fire spread (Mid-depth of 125mm Rockwool Duo Slab Insulation)	>15 minutes	Compliant
Internal fire spread (Mid-depth of 12mm RCM Y-wall Calcium Silicate Board)	>15 minutes	Compliant
Internal fire spread (Mid-depth of 150mm SFS with Rockwool Flexi Slab Insulation)	>15 minutes	Compliant
Internal fire spread (Mid-depth of 2 layers of 12.5mm British Gypsum Gyproc Fireline Boards)	>15 minutes	Compliant
Mechanical performance	<p>Approximately 3.5m² of the total external visible surface area was completely consumed.</p> <p>Approximately 2.5m² of the total external visible surface area was discoloured.</p> <p>The heat source was extinguished 30 minutes from ignition and observations were continued for another 30 minutes.</p>	

6. Classification

The system described in this report has been tested in accordance BS 8414-2:2015 + A1:2017 and complied with the performance criteria detailed in BR135:2013 Annex B.

This classification report shall be read in conjunction with AFE laboratory test report DLR1585 Rev.0, which fully details all aspects of the tested system and test carried out.

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Document Status

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