

CLARIFICATION OF TECHNICAL PERFORMANCE OF SIDERISE 'SIDERISE CW-FS' PERIMETER
BARRIER FIRESTOP SYSTEM

Project Name	Al Wasl Tower
Project Location	Sheik Zayed Road
Document Prepared By	Sreenivas Narayanan
Date	7th September 2021

Technical Letter to clarify: -

Introduction

Movement properties and compliance through ETAG 026-3

Extract from test report during the test

UAE Fire and Life Safety Code Requirements

Compliance to the tested system

Annex 1. Scope of EN1364-4

Introduction

Siderise | Siderise CW-FS systems have been specifically developed, tested and approved as perimeter barrier firestop systems whereby the primary function is to maintain continuity of fire resistance between the compartment floor and the interface with the external façade.

We confirm that these products have been used in this application in the UK and EU for over Thirty years.

They have been fully tested to BS and EN standards and are suitably qualified for use in both horizontal and vertical applications.

We have undertaken a large number of fire resistance tests to BS 476, EN 1366-4, EN 1364-3 and importantly EN 1364-4 – in the specific configuration which tests the compartment floor / spandrel junction and which models the movements of curtain wall and the floor during a fully developed / flashed-over fire.

These tests have provided the necessary supporting data to enable independent test houses, including 'The Loss Prevention Council' (LPC) - now the Building Research Establishment (BRE) - and 'Exova Warrington', to verify performance and system suitability in terms of compliance to regulatory requirements in the UK, Ireland, Europe, UAE, Australia and Malaysia.

The system range is described in the Technical Data Sheet – please see attached.

The system range have been certified by 'Exova Warringtonfire' and granted a listing in the 'Certifire' scheme. This provides formal independent system approval and defines field of application limits. Please refer to 'Certifire' Certificate No. CF563 as verification.
https://www.warringtoncertification.com/certificates/CF563/2753/CF563_Siderise.pdf.

The systems entered the UAE markets in 2010 and were successfully granted all necessary Civil Defense Approvals.

Similarly, the systems entered the Kingdom of Saudi Arabia markets in 2011 and have been successfully granted all necessary Civil Defense Approvals.

Market acceptance of our systems has been largely due to the inherent benefits of ease and speed of installation which combine to provide a total least cost solution.

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Date: 7th September 2021
Ref: SILME0921.04

In addition, they offer a fundamental benefit compared to alternative ablative spray based systems as the Siderise material can be installed at any time without having to be concerned with ambient temperature limits for storage, application and cure.

Consequently, our products have been adopted by a number of façade contractors / main contractors and Consultants as the firestop system of choice.

Recent years have seen the revision, issue and implementation of the revised '2018 | UAE Fire and Life Safety Code of Practice' (UAE Code).

Having been able to review the document we confirm that we are in full agreement that the function of our Siderise CW-FS system is correctly defined by the UAE Code as a 'Perimeter Barrier Firestop System', whereby they are intended to be used to seal the gap between a fire-rated floor and a non-rated exterior wall assembly, and that the Siderise system is fully compliant.

Additionally we also confirm to the performance requirement of the spandrel panel with interface to the slab edge perimeter fire barrier to be compliant with the UAE Fire and Life Safety Code of Practice 2018

Recently the products have also been certified and listed with Intertek for compliance to ASTM and EN standards in addition to the CE Marking.

Hopefully, this information will provide you and your clients with further confidence regarding the excellent performance and credentials of a fully test and compliant system on a project basis.

Regards
Sreenivas Narayanan
Technical and Compliance Director
Siderise Middle East

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Movement properties for compliance required under ASTM and EN

Under section 11 of the ASTM E 2307 the requirements are as follows :-

TABLE 3 Conditions of Test Specimen Cycling

Movement Type	Minimum Cycling Rates (cpm)	Minimum Number of Movement Cycles
Thermal	1	500
Wind Sway	10	500
Seismic	30	100
Combined	30	100
	10	400

NOTE 1—The terms used for movement are indicative of the cyclic rate in expansion and contraction of the perimeter joint and not of the magnitude or direction of movement.

The ETAG 026 is not replaced with EAD 350141-00-1106 (<https://www.nlfnorm.cz/en/ehn/6339>)

EAD 350141-00-1106

Linear joint and gap seals

Status:	Harmonized EAD 350141-00-1106 replaces ETAG 026-1 (Canceled) ETAG 026-2 (Canceled)
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Under section 2.2.14 of the EAD document the requirements are as follows :-

2.2.14 Cycling of perimeter seals for curtain walls

The test construction shall be subject to cycling a minimum of 500 times between the minimum and maximum joint width corresponding to the movement capability for a certain nominal joint width. Cycling shall start at the nominal joint width and finish at the maximum joint width. Cyclic rates of 30 cpm (cycles per minute) shall be designated as seismic, cyclic rates of 10 cpm shall be designated wind sway, and those rates below 1 cpm shall be designated thermal. The applicant shall designate a cyclic rate that shall be recorded in the test report.

After cycling, the test construction shall be allowed to stabilise for 24 hours, without alteration before fire testing, if not, the reasons shall be stated in the report.

Joint seals tested at a higher frequency are deemed to perform at lower frequencies.

Compression set data shall be provided on test specimens relying solely upon compression for placement in joints to satisfy long term performance.

The resistance against movement is given as "cycle tested at 30 cpm", "cycle tested at 10 cpm", or "cycle tested at 1 cpm".

Both Standards have identical requirements for the SEISMIC movement which is 30 cycles per minute but the number of cycles for a EAD compliance is 500 cycles compared to 100 cycles with the ASTM requirement.

Both Standards require the specimen to be cycled prior to the fire test.

Siderise CWFS complies and have proven data through UL test report as extracted in the following page:

File No: NC30616

Issued: 24th October 2019

File: NC30616
Project: 4789163864 Issue No. 2
Test Date: 26th September 2019

TEST REPORT

The Fire Resistance Performance Of
Siderise CW-FS120 When Tested With
A Specimen Of A Curtain Walling – Part
Configuration

In Accordance with

EN 1364-4: 2014

Test Sponsor:

Siderise Insulation Limited
Forge Industrial Estate,
Maesteg,
Bridgend,
CF34 0AY
United Kingdom



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File No: NC30616



Issued: 24th October 2019

Project No. 4789163864

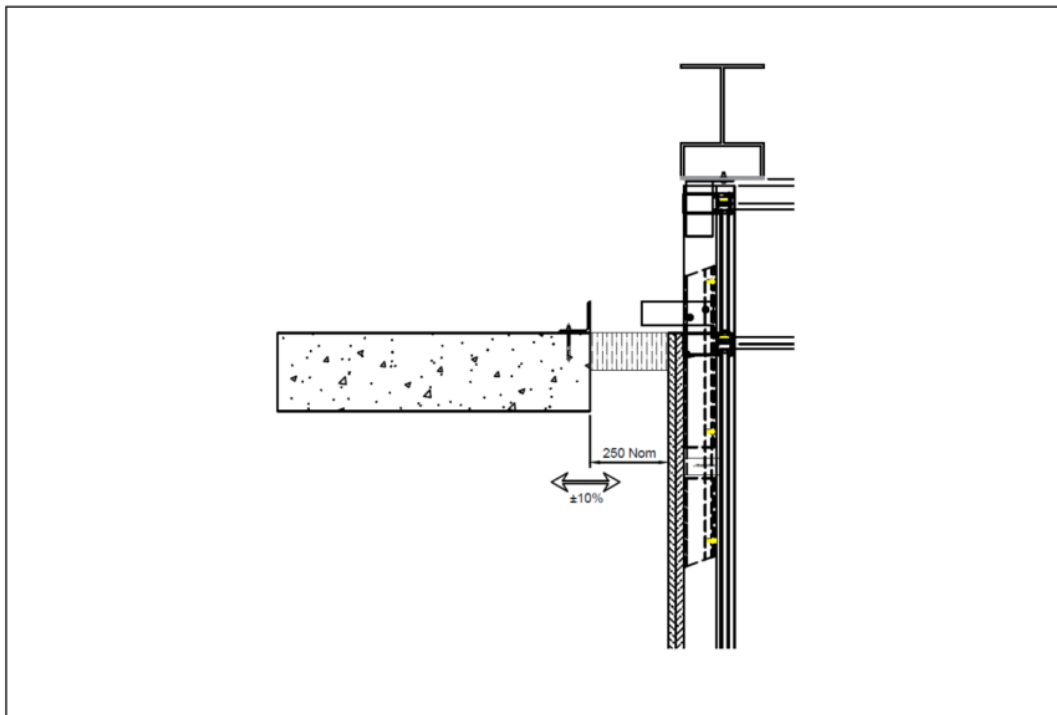
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1. Introduction

A specimen of Siderise CW-FS120, tested with a specimen of non-fire rated aluminium curtain wall of typical construction – Part Configuration was subjected to a fire resistance test in accordance with EN 1364-4: 2014 and where relevant EN 1363-1, to evaluate its fire resistance performance.

Prior to the fire test, a cycle test was conducted on the perimeter seal in accordance with the requirements of EAD 350141-00-1106, September 2017, Clause 2.2.14. The seal was cycled 500 times at a rate of 30 cycles per minute and was provided with a minimum compression of 10%, and a maximum extension of 10%. The cycle test was conducted approximately 2 hours prior to the fire test due to the late arrival of test samples.

5.7 Cycling parameters



Movement properties

Clarification has been requested regarding the dynamic movement properties of the Siderise CW-FS system. To that end, please kindly note the following: -

Dynamic movement

The maximum movement that a fire resistive joint system can accommodate is critically important for perimeter firestop barriers. As we know, this gap is variable – due to project designs and site tolerances – and the firestop system used needs to have a degree of ‘dynamic’ movement capability in order to accommodate serviceability movement.

Main modes of movement effecting perimeter barrier performance are vertical deflection due to dead and live loads and Negative and Positive in/out movement, typically due to wind pressure.

Performance is always a function of, and limited by, both Specification and Installation. Our systems are made to a consistent specification with quantified movement properties.

Where the anticipated design movement on a project exceeds a standard +/-10%, the Method Statement reflects a specific compression requirement to allow the movement up to +/-20mm, i.e. 40mm amplitude permissible on cavities up to 300mm.

In addition, we need to understand movement capability of the system in the event of a fire. To that end, the EN 1364-4 provides us with information on how the seal performs in a real-world assembly when subject to a real-world fire scenario, at high pressure, where the forces impacting on the barrier are significant, unpredictable and changing – dynamic in the true sense.

We confirm that Siderise CW-FS products have been tested in accordance with BS EN 1364-4. This test isolates the junction between the compartment floor and the spandrel zone, and specifically models and measures the movements of curtain wall and the floor during a fully developed / flashed-over fire. It is a three-dimensional test with real live dynamic movement induced by extreme heat, with a closed furnace pressurised to 20 PA.

Siderise CW-FS180, 150mm thick

Under test to EN1364 Part 4, subjected to 20 PA and EN1363 time temperature curve, the joint system accommodated 45% shear on 150mm thick product, and 14% dynamic compression on 250mm gap. No integrity failure.

Verification of this is provided by the attached extract from test report WF No. 317785.

Siderise CW-FS120, 120mm thick

Under test to EN1364 Part 4, subjected to 20 PA and EN1363 time temperature curve, the joint system accommodated 20% shear on 120mm thick product, and, at end of test due to curtain wall twisting, -1.2% / +0.8% dynamic compression on 250mm gap. No integrity failure.

Verification of this is provided by the attached extract from test report EFR-15-U-001110.

A summary is tabled below: -

Test Standard	Test Reference	Slab Deflection	Rate of Slab Deflection	Façade Deflection	E	I	Lateral Movement		Vertical Seal Movement	Vertical Slab Movement
EN 1364-4	EFR-14 U-001019	50 mm	0.48 mm/min	-24 mm			-9.6%		41.7%	25.00%
EN 1364-4	EFR-15 U-001110	24 mm	0.4 mm/min	- 2mm +3mm	155	155	-1.2%	0.8%	20.0%	12.00%
EN 1364-4	WF 313078	>80 mm	1.0 mm / min	-21 mm			-8.4%		66.7%	40.00%
EN 1364-4	WF 317785	67mm	0.4 mm/min	-34 mm	213	213	-13.6%		44.7%	33.50%

The Movement property of our systems whilst maintaining Integrity is considerable and is considered to be a key benefit.

UAE Fire and Life Safety Code Requirements

Under Chapter 1 Section 3.3 – Firestop systems testing and acceptance the following relevant information And Section 4.5.9. Opening on the external walls

- 3.3.5.** Perimeter fire barrier system ratings shall be established in accordance with ASTM E 2307, BS EN 1364-3 (Full configuration test) or BS EN 1364-4 (Part configuration test) or other equivalent tests using the Intermediate-Scale, Multi Story Test Apparatus (ISMA) as the test method. See **Section 7.1.17.**
- 3.3.6.** System rating: The rating of installed firestop systems shall be equivalent to the rating of the barrier (floor/wall) in which the Firestopping is installed.
- 3.3.7.** Single source limitation: Firestop systems for each kind of classified assembly shall be obtained from a single manufacturer. Materials from different manufacturers shall not be installed in the same firestop system or opening.
- 4.5.9.2.** Where a Spandrel Panel is used to satisfy the requirement in **Section 4.5.9.1.**, it shall be ensured that the materials used and spandrel panel as system provides a minimum of 60 minutes fire resistance from BOTH sides of the panel. All transoms and Mullions must be protected in this respect.
- 4.5.9.3.** Fire safing forming the perimeter edge protection must ensure the same performance as the structural floor slab in respect of F and T ratings.

Compliance to the above UAE FLS code requirements as follows :-

Siderise confirms the product testing through the EN 1364 part 4 route and certification to 3rd Party certification body Certifire by Warrington as listed under accredited bodies. All components are single sourced as manufactured and supplied to site for the full system.

The Spandrel performance for the 60 minute is also assessed through the EN 1364 – 4 test data. The rating (EI / F and T) for the floor slab continuity is maintained through the perimeter slab edge

Annex 1. Scope of EN1364-4

1 Scope

This European Standard specifies a method for determining the fire resistance of parts of curtain walling and of the perimeter seal. It examines the fire resistance to internal and external fire exposure of:

- the spandrel panel, i.e. downstand, upstand or a combination thereof, or
- the perimeter seal, or
- the fixing of the framing system (anchoring) used to attach the curtain walling to the floor element, or
- combinations thereof.

Results from tests according to this standard form the basis for classification of curtain walling type A (see 3.3 for definition).

For curtain walling type B (see 3.4 for definition) results may be used to determine fire resistance of parts of a curtain walling to increase the field of application when previously tested to EN 1364-3. For intended classification EW and for corner/faceted specimens EN 1364-3 should be used.

This European Standard does not cover double skin façades, over-cladding systems and ventilated façade systems on external walls. It does not deal with the reaction to fire behaviour of curtain walling.

This standard is intended to be read in conjunction with EN 1363-1 and EN 1363-2 as well as EN 1364-3 for curtain walling type B.

NOTE Annex A gives informative guidance on the principles of testing parts of curtain walling and the test method.

We trust the above information meets your immediate requirements. Should you or any other party require any further information and/or clarification on any matter, please do not hesitate to contact me directly.

Best Regards
Sreenivas Narayanan
Technical and Compliance Director
Siderise Middle East

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