Boundaryline

FlameWall PS1

Boundaryline FlameWall Fire-Rated Fence System

Including Fire Resistance Assessment Report

Issue Date: 20/02/2024
Rev: 1.0

Name:

Email:

Company Name:

Phone:

Project Site Address:

Estimated Number of FlameWall Bays:

Application

Engineering specifications & installation details for compliance with **NZBC C3 & C6**

PRODUCER STATEMENT – PS1
DESIGN

BUILDING CODE CLAUSE(S): C3, C6 **JOB NUMBER:** 50292
ISSUED BY: S&T Wellington Limited
(Engineering Design Firm)
TO: Terranota Ltd T/A Boundaryline
(Owner/Developer)
TO BE SUPPLIED TO: The Relevant Building Consent Authority
(Building Consent Authority)
IN RESPECT OF: Flamewall Fence System
(Description of Building Work)
AT:
(Address, Town/City)
LEGAL DESCRIPTION: **N/A** ☑

We have been engaged by the owner/developer referred to above to provide *(Extent of Engagement)*:
Assessment of Fire Resistance to AS 1530.4:2014
in respect of the requirements of the Clause(s) of the Building Code specified above for All , as specified in the Schedule, of the proposed building work.

The design carried out by us has been prepared in accordance with:

- ☐ Compliance documents issued by the Ministry of Business, Innovation & Employment *(Verification method/acceptable solution)* and/or;
- ☑ Alternative solution as per the attached Schedule.

The proposed building work covered by this producer statement is described on the drawings specified in the Schedule, together with the specification, and other documents set out in the Schedule.

On behalf of the Engineering Design Firm, and subject to:

- Site verification of the following design assumptions:
- All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that:

- the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the Schedule, will comply with the relevant provisions of the Building Code and that;
- the persons who have undertaken the design have the necessary competency to do so.

I recommend the CM 1 level of **construction monitoring**.

I, *(Name of Engineering Design Professional)* Jason King , am:

- ☑ CPEng number 235858

and hold the following qualifications BE, DipEngFire

The Engineering Design Firm holds a current policy of Professional Indemnity Insurance no less than $200,000
The Engineering Design Firm is a member of ACE New Zealand.

SIGNED BY *(Name of Engineering Design Professional)*: Jason King
(Signatue below):

Jason King

Digitally signed by Jason King
DN: cn=Jason King, c=NZ, o=Stephenson&Turner Wellington Ltd, email=jking@stephensonturner.com
Date: 2024.06.11 10:28:29 +12'00'

ON BEHALF OF *(Engineering Design Firm)*: S&T Wellington Limited Date: 11/06/2024

Note: This statement has been prepared solely for the Building Consent Authority named above and shall not be relied upon by any other person or entity. Any liability in relation to this statement accrues to the Engineering Design Firm only. As a condition of reliance on this statement, the Building Consent Authority accepts that the total maximum amount of liability of any kind arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in tort or otherwise, is limited to the sum of $200,000.

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

SCHEDULE to PS1

Please include an itemised list of all referenced documents, drawings, or other supporting materials in relation to this producer statement below:

Assessment of fire resistance prepared by a suitably qualified and experienced person, with CPEng field of practice including assessments of fire resistance.

S&T Wellington Limited Assessment Report No. 50292 Rev 1, dated 11/06/2024.

GUIDANCE ON USE OF PRODUCER STATEMENTS

Information on the use of Producer Statements and Construction Monitoring Guidelines can be found on the Engineering New Zealand website
https://www.engineeringnz.org/engineer-tools/engineering-documents/producer-statements/

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects (NZIA), Institution of Professional Engineers New Zealand (now Engineering New Zealand), Association of Consulting and Engineering New Zealand (ACE NZ) in consultation with the Building Officials Institute of New Zealand (BOINZ). The original suite of producer statements has been revised at the date of this form to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with part of the reasonable grounds necessary for the issue of a Building Consent or a Code Compliance Certificate, without necessarily having to duplicate review of design or construction monitoring undertaken by others.

PS1 DESIGN Intended for use by a suitably qualified independent engineering design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;

PS2 DESIGN REVIEW Intended for use by a suitably qualified independent engineering design review professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;

PS3 CONSTRUCTION Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2011[2]

PS4 CONSTRUCTION REVIEW Intended for use by a suitably qualified independent engineering construction monitoring professional who either undertakes or supervises construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.

This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACE New Zealand and Engineering New Zealand to interpret the Producer Statement.

Competence of Engineering Professional
This statement is made by an engineering firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its personnel.

The person signing the Producer Statement on behalf of the engineering firm will have a professional qualification and proven current competence through registration on a national competence-based register such as a Chartered Professional Engineer (CPEng).

Membership of a professional body, such as Engineering New Zealand provides additional assurance of the designer's standing within the profession. If the engineering firm is a member of ACE New Zealand, this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent engineering professional".

Professional Indemnity Insurance
As part of membership requirements, ACE New Zealand requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI Insurance minimum stated on the front of this form reflects standard practice for the relationship between the BCA and the engineering firm.

Professional Services during Construction Phase
There are several levels of service that an engineering firm may provide during the construction phase of a project (CM1-CM5 for engineers[3]). The building Consent Authority is encouraged to require that the service to be provided by the engineering firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4
Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design Firm's engagement.

Refer Also:

1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013
2 NZIA Standard Conditions of Contract SCC 2011
3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACE New Zealand/Engineering New Zealand 2004)
4 PN01 Guidelines on Producer Statements

www.acenz.org.nz
www.engineeringnz.org

STEPHENSON &TURNER

FIRE RESISTANCE ASSESSMENT REPORT

BOUNDARYLINE FLAMEWALL FIRE RESISTANT FENCE SYSTEM

For
Terranota Ltd

S&T Wellington Limited
Architects and Building Services Engineers
PO Box 11393
Wellington

Rev 1

June 2024

50292

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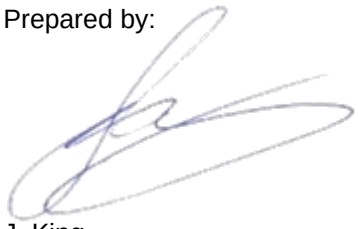
Prepared by:



J. King
BE, DipEngFire, CPEng

Reviewed by:

A. Fiton
MSc Fire, CPEng, CMEngNZ

Table 1 – Quality Assurance

Rev	Date Issued	Valid Until	Comment
0	20/02/2024	20/02/2029	Initial issue
1	11/06/2024	11/06/2029	Updated for 400 mm wall below fence

1 SCOPE

This report examines the fire resistance to AS 1530.4:2014 of a Boundaryline FlameWall fence system. The fence system is intended to be installed where a stand alone structure is required to provide protection against fire spread either to or from a building that is constructed without fire resistance rated external walls.

2 BACKGROUND

In FireTSLab fire resistance test PF23103 a fence was tested in accordance with AS 1530.4:2014 and achieved a fire resistance of 61 minutes integrity, 14 minutes insulation.

The fence comprised nominal 2200 mm long x 600 mm wide by 50 mm thick panels of autoclaved aerated concrete (AAC), placed with the 2200 mm dimension horizontal and the 600 mm dimension vertical, with a post at each end. A steel post was used at one end and an AAC post at the other end. Additional AAC panels were placed at the other side of the AAC post to make up the 3 m width of the furnace opening.

The posts were embedded in a 400 mm high x 140 mm thick wall of filled concrete masonry wall below and the AAC panels rested on the top of the wall. The panels engaged in grooves in the posts and were fixed together and to the posts and concrete wall with FlameWall adhesive. A steel cap was placed over the top of the fence. The fence was not fixed to the specimen frame at top or side edges.

We are advised that the “FlameWall Adhesive” used in the test comprised Soudal Gorilla Primer 150 applied to the AAC, and Soudal Soudaseal Firestop MS sealant. The primer was applied to the AAC as required and the sealant was applied during construction to the concrete footing, each panel joint and inside the AAC post rebate. The surface of each panel joint and the joints between the panels and posts were similarly sealed.

The insulation failure at 14 minutes was measured on the steel capping, followed by insulation failures measured on the steel post. No insulation failure was measured on the AAC panels or post. No failure of integrity was observed for the 61 minute duration of the test.

Details of the construction and the performance achieved are included in FireTSLab test report PF23013 Revision 3, dated 22/01/2024.

3 PROPOSED CONSTRUCTION

It is proposed to construct fences using AAC panels, steel posts, steel top edge capping, primer and sealant as tested. An optional 140 mm thick wall of concrete or filled concrete masonry up to 400 mm high may be provided under the AAC panels.

The posts are to be set into the ground with a concrete foundation. The posts shall extend below ground level to a depth suitable for a “Very High” wind zone (as defined in NZS 3604:2011), with a minimum of 600 mm, and shall have a minimum 250 x 250 mm square or 300 mm diameter concrete foundation extending at least 100 mm below the bottom of the post.

A concrete strip at least 140 mm wide x 150 mm deep shall be placed centrally below the bottom panel, extending at least 50 mm above ground level. Where a concrete or masonry wall is provided the strip shall be at least 140 mm wide, directly below the wall, and may be integral with the wall.

The AAC panels are to engage in the posts by 35 mm ± 5 mm.

It is proposed that the fence system as described above would protect an adjacent building to a level equivalent to a -/60/60 FRR wall if the building is constructed below the level of the top capping and

between the steel posts, or-/60/- if the building is constructed to the full width and height of the fence including capping and posts.

A drawing of the proposed construction, including component reference numbers, is included in Appendix A to this report.

4 PROPOSED VARIATIONS

The proposed wall system differs from the tested specimen as follows:

- Steel posts are used at each end of the FlameWall AAC panels instead of the AAC post at one end as tested,
- The foundation may be set directly into the ground rather than a concrete masonry wall,
- The concrete masonry wall may be replaced with a concrete wall of the same dimensions,
- A concrete strip is to be provided below the wall in place of, or additional to, the concrete masonry wall tested,
- A tolerance of ± 5 mm is allowed for the engagement of the panels in the posts,
- The side and top edges are open rather than adjacent to other construction.

5 ANALYSIS

5.1 Steel Posts

The deflection of the fence measured during the test shows that the steel post deflected convex to the furnace, with a maximum deflection at the top of 97 mm away from the furnace at 60 minutes. The AAC post also deflected convex to the furnace, with the maximum deflection being 74 mm away from the furnace at 60 minutes.

The panels also became convex towards the furnace, with the maximum deflection of the mid width relative to the ends of the panel of 37.5 mm at the top edge of the top panel at 60 minutes.

The curvature of the AAC post and the steel post were generally similar. Assuming that the bottom of each post remained fixed, the maximum deflection at mid height relative to the top and bottom was 11.5 mm for both post types. Since the panels have demonstrated the capability to withstand this level of curvature of the posts, it is expected that the use of steel posts at both ends of the panel would not adversely affect the fire resistance of the fence.

5.2 Foundation

In the test the furnace pressure is required to be controlled to be neutral compared to the atmosphere outside the furnace at 500 mm above the bottom of the specimen. In the referenced test the differential pressure was set to neutral at 500 mm above the floor of the furnace, so exceeded the minimum required pressure for the fence alone, and met the requirement for the fence with a 400 mm high wall below. As per the AS 1530.4:2014, the pressure in the furnace is taken to increase at 8Pa/m, so that the pressure at the top of the fence would have been 13.6 Pa. If this pressure were produced by wind impact on the fence the corresponding wind speed would be less than 5 m/s.

As noted above, the fence is to be designed for a “Very High” wind zone (NZS 3604:2011 Table 5.4) for which the specified wind speed is 50 m/s. Therefore, given that the foundations are to be designed to withstand at least 50 m/s wind speed they are expected to easily withstand the furnace pressure.

The proposed 600 minimum embedment of the post into the foundation exceeds the depth as tested, i.e., 400 mm and is therefore expected to perform at least similarly to the tested installation.

5.3 Concrete Strip

As tested there was no failure at the bottom edge of the bottom panel. The proposed concrete strip effectively duplicates the interface between the bottom panel and the concrete masonry wall as tested. With the concrete strip partially set into the ground it would be protected from the fire to a greater extent than the wall as tested, and is therefore expected to remain in place and perform at least similarly to the wall tested.

5.4 Concrete or Masonry Wall

The fence as tested was installed over a 400 mm high x 140 mm thick filled concrete masonry wall. The wall was intended primarily to allow the posts to be embedded in surrounding structure to simulate the intended embedment of the posts into concrete foundations embedded into the ground.

As tested, the posts were attached to the specimen frame via a horizontal steel beam on the unexposed side, and were not directly attached to the wall.

In the proposed arrangement the posts will be supported by the concrete foundation embedded in the ground, and will not be expected to impose any significant loads on the wall.

Temperature measurements for insulation of the concrete masonry wall were not taken during the test. Generic insulation performance is therefore considered to apply to the wall below the fence. As per NZS3101.1:2006, a 140 mm thick wall of any type of concrete would provide at least 180 minutes insulation. Similarly, the New Zealand Concrete Masonry Manual Section 2.1 confirms that a 140 mm thick wall of filled concrete masonry would provide at least 180 minutes insulation.

With respect to integrity, solid concrete is expected to perform at least similarly to filled concrete masonry, therefore the proposed wall below the fence is expected to provide at least the required 60 minutes integrity as tested, and to provide well in excess of the required 60 minutes insulation based on the references noted above.

5.5 Increased Tolerance

The internal flanges of the steel post are 20 mm wide. As tested the panels engaged by nominally 35 mm into the steel post, so extended 15 mm past the point of contact with the steel flanges, with a 13.2 mm clearance to the web of the post.

It is considered that the primary interaction between the panel and the post is the contact area between the flanges and the panel, with the extension beyond this having little effect on the performance. On this basis it is considered that reduction of the length of engagement by 5 mm, or increase by 5 mm, would not have any significant effect on of the fire resistance of the fence.

5.6 Free Edges

The installation details of the test specimen are as required by the test standard. As tested the top and side edges of the fence were free to move. In the proposed use scenario these edges would also be free to move, therefore the tested specimen is considered to be as close to representative of the proposed construction as it is possible to achieve while complying with the standard, and the result is considered applicable to the proposed use.

6 OPINION

Based on the above analysis it is our opinion that the protection to an adjacent building provided by the Boundaryline FlameWall fence system, constructed as described in this report, with or without a concrete or filled concrete masonry wall below, would be equivalent to a wall having fire resistance in accordance with AS 1530.4-2014 of at least 60 minute for integrity, and for insulation provided that the building height is below the steel capping of the fence, and the building width falls between the two steel end posts.

7 LIMITATIONS

This assessment report may only be quoted or reproduced in full, and is subject to the completeness and accuracy of information provided.

The assessment contained in this assessment report is issued on the basis of test data and information available at the time of issue. If test evidence contradictory to this assessment becomes available, we reserve the right to withdraw the assessment unconditionally.

The opinion stated represents our assessment of likely performance, based on our experience and professional judgement in addition to the information provided. This is in line with internationally accepted practice of extrapolation from test results to increase the range of options available. It is recognised that the particular construction assessed has not been subjected to the standard fire resistance test.

Appendix A – Drawing