

# FIRE RESISTANCE CLASSIFICATION REPORT No. 22359C

## OWNER OF THE CLASSIFICATION REPORT

Joris Ide nv  
Hille 174  
8750 Zwevezele  
Belgium

## INTRODUCTION

This classification report defines the classification assigned to a non-loadbearing partition wall consisting of vertical sandwich panels (type: JI SF/FC/VB WALL 1000 100 mm, stitched at the unexposed side), in accordance with the procedures given in EN 13501-2:2016: Fire classification of products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services.

This classification report consists of 15 pages and 2 annexes and may only be used or reproduced in its entirety.

## 1 Details of classified product

### 1.1 General

The element, type: JI SF/FC/VB WALL 100 mm, stitched at the unexposed side, is defined as a non-loadbearing partition wall consisting of vertical sandwich panels with fire resistance characteristics.

### 1.2 Description

The element, JI SF/FC/VB WALL 100 mm, stitched at the unexposed side, is fully described below, in support of this classification. The drawings of the test element as it was tested, are enclosed in the annexes 1 and 2 of this classification report.

#### 1.2.1 Composition of the test specimen as tested

The test specimen is a non-loadbearing wall consisting of vertically placed sandwich panels. The sandwich panels are fixed to the concrete furnace frame by means of L-profiles. The panels are stitched to each other at the unexposed side.

Outer dimensions of the test specimen:

- height: 3000 mm;
- width: 3000 mm;
- insulation thickness: 100 mm;

#### 1.2.2 Supporting structure

1. L-profile	
Material	Steel
Thickness	0.5 mm
Section dimensions	80 mm x 80 mm
Length	3000 mm
Fixing to the concrete frame	With sealing anchors (reference: HILTI DBZ 6/4.5, material: galvanized steel, diameter: 6 mm, length: 45 mm), c/c distance: 300 mm

#### 1.2.3 Sandwich panels

2. Sandwich panel	
Manufacturer	Joris Ide NV
Reference	JI SF/FC/VB WALL 100 mm

Thickness	100 mm
Dimensions	1000 mm (w) x 3000 mm (h)
Surface mass	13.20 kg/m <sup>2</sup>
Joint system	Type III acc. to EN14509
Joint overlap	Unexposed side: 16 mm Exposed side: 48 mm
Panel orientation	Vertical
Composed of	Exposed panel skin Insulation core Unexposed panel skin
Fixing to the L-profiles	With self-drilling screws with bonded washer (type: Joris Ide Fastovis 6 + VG16, material: galvanised steel, diameter: 6.3 mm, length: 32 mm), c/c distance: 300 mm
Panel to panel stitching	With self-drilling fasteners (reference: SFS Intec CD-D12-6.3 83 mm, material: Carbon steel, diameter: 6.3 mm, length: 83 mm) at the unexposed side, c/c distance: 250 mm
<b>3. Exposed panel skin</b>	
Reference	Linear
Profile	1.3 mm
Material	Polyester coated steel
Sheet thickness	0.55 mm
Coating thickness	25 µm
Colour	RAL 7016
Fixing to the core	Self-adhesive
<b>4. Insulation core</b>	
Manufacturer	Joris Ide NV
Reference	Jl 51G
Material	Polyisocyanurate foam
Thickness (d <sub>c</sub> )	100 mm
Density	45.7 kg/m <sup>3</sup>
<b>5. Unexposed panel skin</b>	
Reference	Linear
Profile	1.3 mm
Material	Polyester coated steel
Sheet thickness	0.37 mm
Coating thickness	15 µm

Colour	RAL 9002
Fixing to the core	Self-adhesive

#### 1.2.4 Free edge cap

6. Free edge cap	
Profile type	L profile
Number	2
Material	Steel
Thickness	1.0 mm
Dimensions	80 mm x 80 mm
Length	3000 mm
Fixing	With self-drilling screw with bonded washer (brand and type: Joris Ide Fastovis 6 + VG16, material: galvanised steel, diameter: 6.3 mm, length: 160 mm) and sound washer (material: steel, thickness: 0.8 mm, dimensions: Ø 70 mm), c/c: 375 mm.
7. Insulation	
Manufacturer	Unifrax
Reference	Fiberfrax Durablanket Z
Material	Zirconia stabilised ceramic fibre
Thickness	25 mm
Density	96 kg/m <sup>3</sup> (NV)
Position	At the horizontal free edge under the free edge cap

#### 1.2.5 Insulation

8. Insulation	
Manufacturer	Rockwool
Reference	Rockflex 214
Material	Stone wool
Initial thickness	60 mm / compressed 30 mm
Initial density	38.8 kg/m <sup>3</sup>
Position	Pressed tightly in between the concrete furnace frame and the sandwich panels at the horizontal edges and vertical fixed edge, covered by the L-profiles

9. Insulation	
Manufacturer	Rockwool
Reference	Rocktect Floor Strip
Material	Stone wool
Initial thickness	10 mm
Width	100 mm
Initial density	144 kg/m <sup>3</sup>
Position	Between the concrete furnace frame and the sandwich panels at the lower horizontal edge, covered by the L-profiles

### 1.2.6 Sealant

10. Sealing strip	
Reference	Celdex BG1
Material	Foam tape impregnated with acrylatepolymer, which is impregnated with additives.
Quantity	One strip per flange, along the full height of the sandwich panel.
Fixing	Along the free edge of the steel in the joint, auto-adhesive, manually applied.

## 2 Test reports/EXAP reports and test results in support of the classification

### 2.1 Test reports/EXAP reports

Name of the laboratory	Report ref. no.	Name of the owner	Date of the test	Method
WFRGENT nv	22359B	Joris Ide nv	-	EN 15254-5:2018
WFRGENT nv	22359A	Joris Ide nv	07/12/2022	EN 1364-1:2015

#### Exposure conditions during the fire resistance test:

Temperature/time curve: External fire exposure as in EN 1363-2:1999.

Direction of exposure: The test specimen is an asymmetrical construction. The side of the non-loadbearing partition wall consisting of vertical sandwich panels with the stitched side was unexposed to the fire.

No extra load supplementary to the own weight of the non-loadbearing partition wall consisting of vertical sandwich panels was applied during the test.

One vertical edge is free, the other edges are fixed.

## 2.2 Test results

Parameters	Results
<b>Thermal insulation – I</b>	
$\Delta T_m = 140^\circ\text{C}$	120 minutes, no failure <sup>(1)</sup>
$\Delta T_M = 180^\circ\text{C}$	43 minutes
<b>Integrity – E</b>	
Spontaneous and sustained flaming	120 minutes, no failure <sup>(1)</sup>
Failure with gap gauge $\varnothing$ 6 mm	120 minutes, no failure <sup>(1)</sup>
Failure with gap gauge $\varnothing$ 25 mm	120 minutes, no failure <sup>(1)</sup>
Ignition of cotton pad	120 minutes, no failure <sup>(2)</sup>
<b>Radiation – W</b>	
Radiation intensity = 15 kW/m <sup>2</sup>	120 minutes, no failure <sup>(1)</sup>

<sup>(1)</sup> The test was discontinued after 120 minutes at the request of the sponsor.

<sup>(2)</sup> No failure until the moment of failure of the thermal insulation (I).

### 3 Classification and field of application

#### 3.1 Reference of classification

This classification has been carried out in accordance with clause 7 of EN 13501-2:2016.

#### 3.2 Classification

The element, type: JI SF/FC/VB WALL 100 mm, stitched at the unexposed side (by Joris Ide nv), is classified according to the following combinations of performance parameters and classes as appropriate. No other classifications are permitted.

The classifications are valid for the direction as stated in clause 2.1: The side of the non-loadbearing partition wall consisting of vertical sandwich panels with the stitched side unexposed to the fire.

**EI 30** ef span 7.5 m, **EI 20** ef span 7.5 m, **EI 15** ef span 7.5 m

**EW 120** ef span 4 m, **EW 90** ef span 6 m, **EW 60** ef span 7.5 m,  
**EW 30** ef span 7.5 m, **EW 20** ef span 7.5 m

**E 120** ef span 4 m, **E 90** ef span 6 m, **E 60** ef span 7.5 m, **E 30** ef span  
7.5 m,  
**E 20** ef span 7.5 m

Explanation:

span x m: the span length = the vertical length of the vertically placed sandwich panels is limited to x m for that particular classification.

ef: External fire exposure



### 3.3 Field of direct application

This classification is valid for the following end use applications according to EN 1364-1:2015.

The results of the fire test are directly applicable to similar constructions where one or more of the changes listed below are made and the construction continues to comply with the appropriate design code for its stiffness and stability:

- a) unlimited decrease in height and span length of the wall of 3 m;
- b) increase in the thickness of the wall (total thickness:  $\geq 100$  mm);
- c) increase in the thickness of the component materials:
  - thickness L-profile ( $\geq 0.50$  mm)
- d) decrease in linear dimensions of panels, but not the thickness:
  - span length ( $\leq 3000$  mm);
  - height/width ( $\leq 1000$  mm);
- e) decrease in distance of fixing centres:
  - of the L profiles to the edges of the surrounding building structure ( $\leq 300$  mm);
  - of the screws fixing the panels to the L-profiles ( $\leq 500$  mm);
  - of the panel-to-panel stitching ( $\leq 250$  mm);
- f) increase in the number of vertical joints;
- g) increase in span length of the wall up to 4 m, if the expansion allowances are increased pro-rata;
- h) only vertical joints (of the type tested) are permitted;
- i) the use of surface fittings and fixtures is not permitted;
- j) the non-loadbearing sandwich panel may be installed in a high density rigid supporting construction which has the same or greater classified fire resistance as the test specimen:
  - density ( $\geq 2000$  kg/m<sup>3</sup>).

### 3.4 Field of extended application

The situation with combined variations is always very complex and shall be considered case by case. To be able to combine variations there shall be an overrun of at least 20 % subject to a minimum 10 minutes compared to the classification.

#### 3.4.1 Metal facing: Chemical composition of coating

Unexposed side:

- A change in emissivity of - 10 % for a new coating compared to the tested one is allowed for following classification and lower:
  - EI 30, EW 120, E 120.
- Coatings with higher emissivity values compared to the tested one are allowed.
- If modifications in the coatings on the unexposed side are made compared to the tested one, the reaction to fire classification of the product shall be the same or better than the tested one. Test results are though valid for all colours of the same type of coating.

Exposed side:

- The test results are valid for all coatings.

Limitation: When a change in coating is made the manufacturer of the coated sheet shall provide emissivity properties for the products.

#### 3.4.2 Metal facing: Change from coated to non-coated metal

Unexposed side:

- A change from a coated to a non-coated sheet is not allowed.

Exposed side:

- A change from a coated to a non-coated sheet is allowed.

#### 3.4.3 Metal facing: Sheet thickness

Allowed up to  $\pm 0.2$  mm of tested thickness.

#### 3.4.4 Metal facing: Change from one metal to another

The test results are valid for all grades of steel.

### 3.4.5 Metal facing: Change in sheet geometry

Panels with different metal thicknesses on both sides are regarded as symmetrical if the difference in thickness is max. 0.2 mm.

### 3.4.6 Metal facing: Changes in profile geometry of facing

Any change in the range 0 mm to 5 mm profiling is allowed if the declared tensile strength value is equal or higher than for the tested panel. The panels are regarded as symmetrical.

### 3.4.7 Changes in core material: Type

Changes from one core material to another are not allowed.

It is not possible to extend the results from one core material producer to another core material producer.

### 3.4.8 Changes in core material: Change in composition: Polyisocyanurate (PIR)

Density:

- The results are valid for the same chemical system and blowing agent.
- The test results are valid for  $\pm 10\%$  of tested density.

### 3.4.9 Span length: Decrease/Increase

A decrease in span length is allowed.

An increase in span length of up to 7.5 m is allowed for following classification and lower:

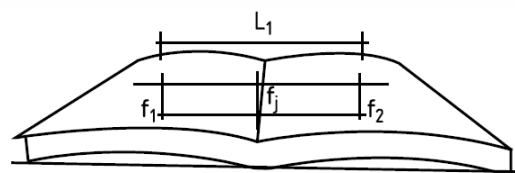
- EI 30, EW 60 and E 60.

An increase in span length of up to 6 m is allowed for following classification and lower:

- EW 90 and E 90.

Calculation of  $\Delta f$ :

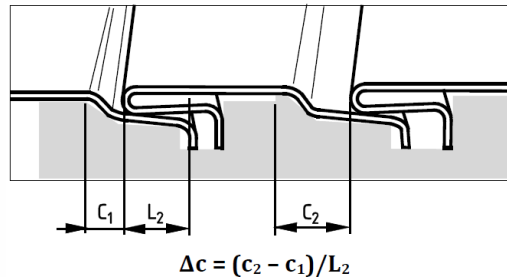
Time (min)	$\Delta f_1$	$\Delta f_2$
15	0.00	0.00
30	-0.01	-0.01
45	-0.01	-0.01
60	-0.01	-0.01
90	-0.01	-0.01
120	-0.01	-0.01



$$\Delta f = (f_j - 0,5x(f_1 + f_2)) / L_1$$

Calculation of  $\Delta c$ :

Time (min)	$\Delta c_1$	$\Delta c_2$
15	0.1	0.1
20	0.1	0.1
30	0.1	0.1
45	0.2	0.1



- To determine the amount of fasteners (n) required to support the extended weight up to 7.5 m the calculation below is used.

Tensile force:

$$F_{t,Ed} = \frac{Lbq}{2} = \frac{7.5\text{m} \times 1.0\text{m} \times 0.3\text{kPa}}{2} = 1.125\text{kN}$$

Shear force:

$$F_{v,Ed} = Lb(q + g) = 7.5\text{m} \times 1.00\text{m} \times (0.3\text{kPa} + 0.1295\text{kPa}) = 3.221\text{kN}$$

with:

L = the panel span length (m)

b = the panel width (m)

q = the air pressure (0.3 kPa if nothing is specified) (kPa)

g = the own weight (kPa)

$F_{t,Ed}$  and  $F_{v,Ed}$  = the calculated forces acting on the fasteners (kN)

Calculation for the amount of fasteners (n):

$$\frac{F_{t,Ed}}{F_{t,Rd}} + \frac{F_{v,Ed}}{F_{v,Rd}} \leq n k_{y,\theta}$$

$$\frac{1.125\text{kN}}{F_{t,Rd}} + \frac{3.221\text{kN}}{F_{v,Rd}} \leq n k_{y,\theta}$$

with:

$F_{t,Rd}$  and  $F_{v,Rd}$  = the design tensile load on the used fastener in practice at normal temperature (kN)

$k_{y,\theta}$  = the decrease on the yield strength of the used steel according to EN 1993-1-2 ( $k_{y,\theta} = 1$  for steel temperature up to 400 °C, below 1 for steel temperature above 400 °C)

n = the number of fasteners

Limitation: It has to be noted that extension in span length is only allowed with tested panel orientation.

#### **3.4.10 Variations in orientation**

The test results are only valid for the tested orientation.

#### **3.4.11 Panel width (height): Decrease/Increase**

A decrease in panel width is allowed.

An increase in panel width is allowed up to 20 % of the tested width.

#### **3.4.12 Panel thickness: Decrease/Increase**

A decrease in panel thickness is not allowed.

An increase in panel thickness is allowed.

#### **3.4.13 Joint Construction: Type**

Even small changes in the joint construction can easily affect the integrity of the wall and shall not be allowed with the following exception:

An increase in the overlap in the metal facing at the joint is allowed if other dimensions remain unchanged.

#### **3.4.14 Joint Construction: Panel to panel stitching decrease/increase**

A decrease in amount of stitching is not allowed.

An increase in amount of stitching is allowed.

#### **3.4.15 Joint construction: Sealants**

The result is only valid for joints with the same type of sealing materials and shall not be valid for joints without sealants.

#### **3.4.16 Fixing to the surrounding building structure: Decrease/Increase**

Minor changes in the boundary conditions and fixing system (for example an increased amount of fasteners, increased diameter of fasteners; but material cannot be changed) are allowed provided that it can be shown that the bearing capacity is not reduced and the risk of collapse is not increased according to calculations as given in paragraph 3.4.9.

### **3.4.17 Protection of the fixings decrease/increase**

An increase in protection ability is allowed.

### **3.4.18 Length of assembly: Vertical installation**

The length of the wall can be freely increased.

### **3.4.19 Change of support structure**

In practice, the panel assembly can be fixed to different types of support structures. The test results shall be valid if the following requirements on the support structure are fulfilled:

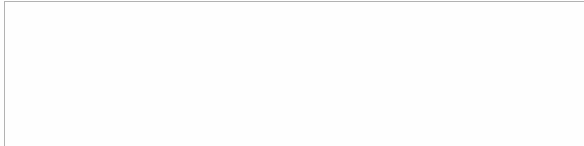
- the support structure has at least the same fire resistance classification time for loadbearing capacity (R) as the panel assembly has for insulation and/or integrity;
- the fixing system has the same loadbearing capacity (R) in the support structure as in the frame used in the reference test.

The fixation area can also be protected with thermal insulation. If such thermal insulation is used in the test, thermal insulation with at least same fire performance shall also be used in end use conditions.

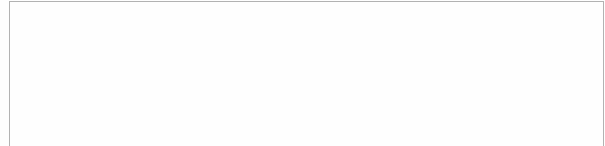
## 4 Limitations

This classification report does not represent type approval nor certification on the product.

SIGNED



APPROVED



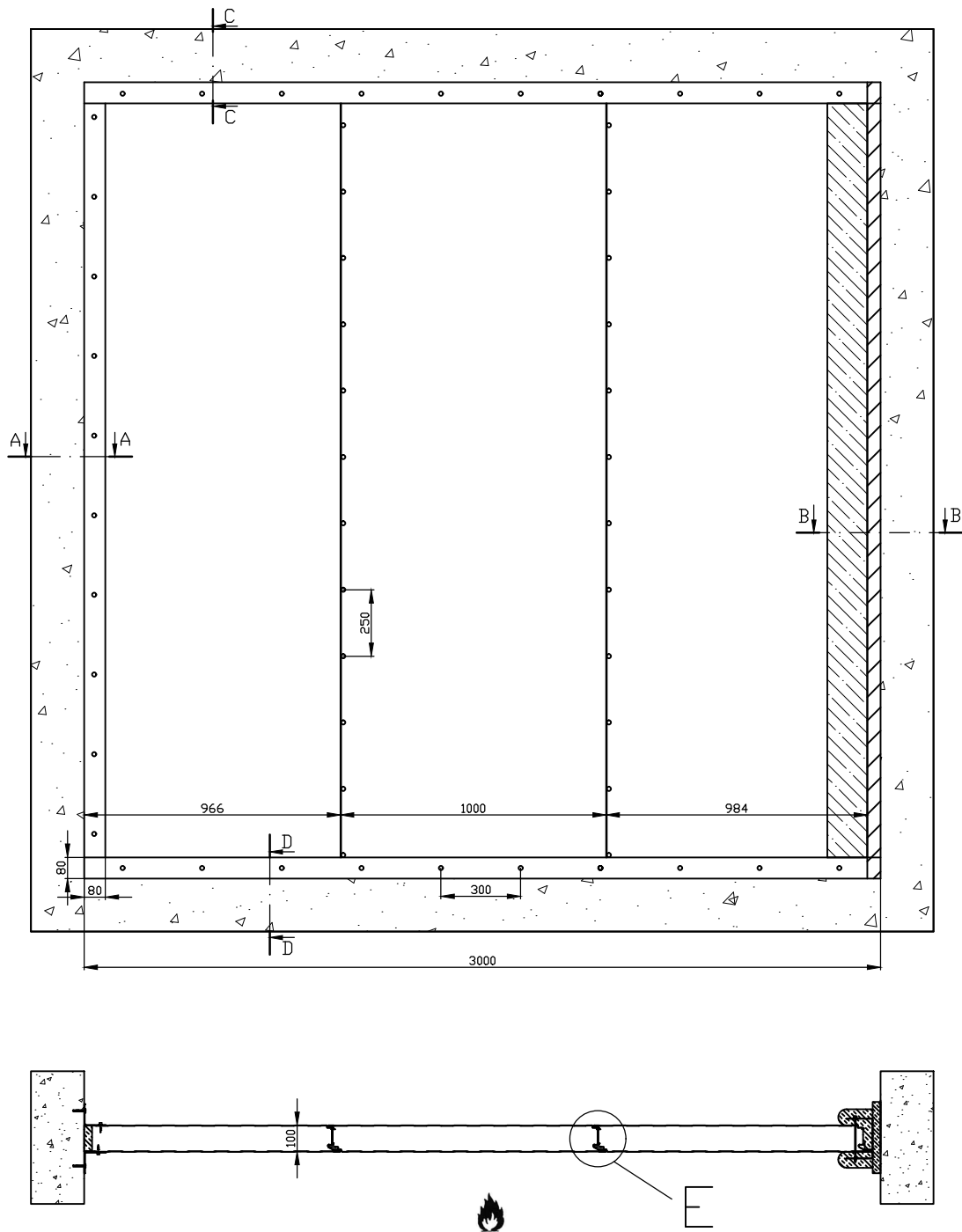
This document is the original version of the classification report and is written in English.

In case of doubt, the most recent version prevails, originally issued in English.

This report may be used only literally and completely for publications. - For publications of certain texts, in which this report is mentioned, our permission must be obtained in advance.

The authenticity of the electronic signatures is assured by Belgium Root CA.

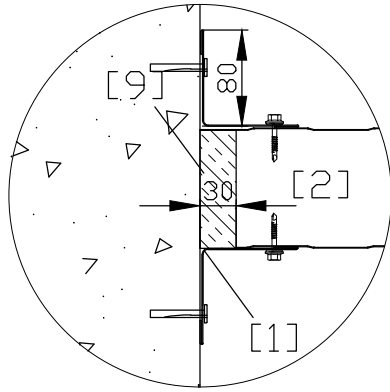
Front view (unexposed side) - dimensions.



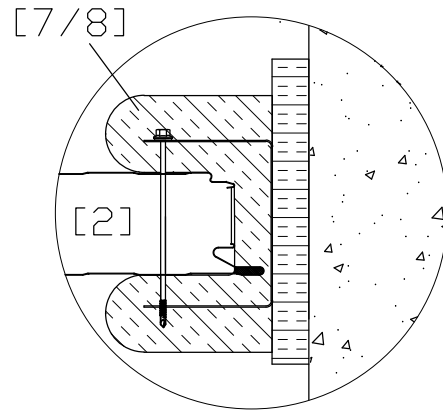


Section details A-A, B-B, C-C, D-D and E - dimensions.

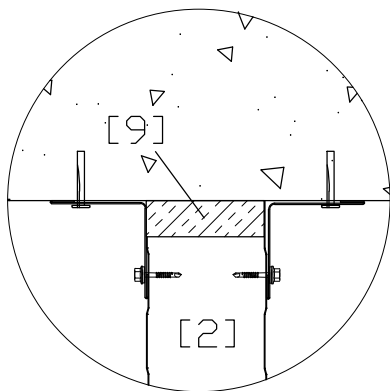
Section detail A-A



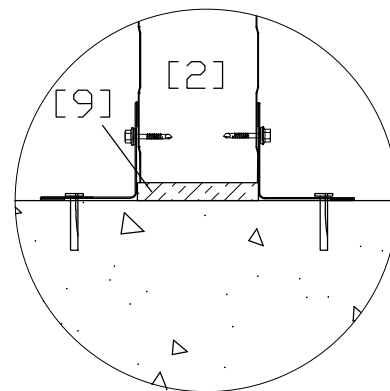
Section detail B-B



Section detail C-C



Section detail D-D



Section detail E

