

FIRE RESISTANCE CLASSIFICATION REPORT No. 20859E

Revision 1

OWNER OF THE CLASSIFICATION REPORT

KNAUF INSULATION bv
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5126 RL Gilze
The Netherlands

KNAUF INSULATION GmbH
Heraklithstrasse 8
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Germany

INTRODUCTION

This classification report defines the classification assigned to a loadbearing floor protected with wood wool ceiling panels, type: Heraklith® | Tektalan A2 - SmartTec (1000 mm x 600 mm) – thickness: 50 mm, 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 10 pages and 1 annex and may only be used or reproduced in its entirety.

1 Details of classified product

1.1 General

The element – type: Heraklith® | Tektalan A2 - SmartTec (1000 mm x 600 mm) – thickness: 50 mm, is defined as a loadbearing floor protected with wood wool ceiling panels with fire resistance characteristics.

1.2 Description

The element, Heraklith® | Tektalan A2 - SmartTec (1000 mm x 600 mm) – thickness: 50 mm, is fully described below, in support of this classification. The drawings of the test element as it was tested, are enclosed in the annexe 1 of this classification report.

1.2.1 Composition of the test specimen as tested

The test specimen is a fire-protected structural concrete member: loadbearing floor protected with wood wool ceiling panels.

Outer dimensions of the test specimen:

- width: 3000 mm;
- length: 4400 mm;
- span: 4200 mm;
- thickness slab: 120 mm.

1.2.1.1 Concrete floor

[1] Slab – material: concrete – exposed length L_{exp} : 4000 mm – span L_{sup} : 4200 mm – specimen length L_{spec} : 4400 mm – exposed width W_{exp} : 2950 mm – thickness: 120 mm – production date: 19 January 2021.

[1a] Concrete – material: normal-weight concrete – type: C25/30 EE2 20mm S3 CEM I 52.5 N MF – density: 2380 kg/m³ – compressive strength f_{ck} : 50.8 N/mm² (MV) – covering thickness: 20 mm.

[1b] Lower reinforcement mesh – type: 150/150/10/10 – material: ribbed, steel reinforcement mesh – diameter bars: 10 mm – grade: BE 500 S – yield strength f_y : 500 N/mm² (NV).

- position: inside the slab, at 20 mm from the exposed bottom side.

- [1c] Upper reinforcement mesh – type: 150/150/6/6 – material: ribbed, steel reinforcement mesh – diameter bars: 6 mm – grade: BE 500 S – yield strength f_y : 500 N/mm² (NV).
- position: inside the slab, at 20 mm from the unexposed upper side.
- [2] Release agent – brand and type: Demula Marginel® – material: emulsion of vegetable oils and animal fats in water – volume mass (by 15°C): 0.99 kg/l.

1.2.1.2 Fire protection material

The test sponsor has confirmed to the laboratory that the brand and names listed below apply to identical ceiling panels as those tested.

- [3] Ceiling panel – used brand and names:
- Tektalan A2 - SmartTec
 - Tektalan A2 - SmartTec [1.0]
 - Tektalan A2 - Protect
 - Tektalan A2 - Protect [1.0]
- thickness: 50 mm – dimensions: 1000 mm x 600 mm – surface mass: 13.1 kg/m²
– straight edges.
- composed of:
 - 1 cover layer [3a] – thickness: 10 mm;
 - 1 insulation layer [3b] – thickness: 40 mm;
 - fixing:
 - to the bottom side of the concrete slab;
 - with screws [4];
 - number: 5 screws per full panel;
 - position: 1 at the centre, and 4 at 100 mm from both edges (see annex 3).
- [3a] Cover layer – material: mineral bounded wood wool – thickness: 10 mm (NV) – density: 837 kg/m³ – surface mass: 8.37 kg/m² – fibre width: 2 mm – bevel: 5 mm.
- fixing: glued [3c] to the insulation layer [3b].
- [3b] Insulation layer – material: rock wool – thickness: 40 mm – density: 125 kg/m³.
- [3c] Glue – brand and type: *confidentially communicated to the laboratory.*

For a classification time up to REI 180, RE 180, R 180:

- [4] Soffit insulation screw – brand and type: EJOT DDS plus / DDS MW – material: steel, with 2 mm plastic-laminated head (DDS plus) – total length: 75 mm – threaded length: 40 mm – diameter: 5.8 mm – diameter steel head: 24 mm.

For a classification time up to REI 120, RE 120, R 120:

- [4] Solid battle plug with structured cap – brand and type: Knauf Insulation MSP 75 – material plug: steel – diameter plug: 5.5 mm – material structured cap: plastic – diameter structured cap: 33 mm – total length: 75 mm.

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	20859D	KNAUF INSULATION bv	21/04/2021	EN 1365-2:2014
WFRGENT nv	16212A	KNAUF INSULATION bv	06/12/2013	EN 1365-2:1999

Exposure conditions during the fire resistance tests:

20859D:

Temperature/time curve: standard as in EN 1363-1:2020.

Direction of exposure: from below.

Applied load supplementary to the own weight: 371 kg/m², producing a tensile stress of 60% of the yield strength (300 N/mm²) in the longitudinal bars of the lower reinforcement mesh.

Both longitudinal edges are free, the other edges are fixed.

16212A:

Temperature/time curve: standard as in EN 1363-1:2012.

In order to realize a bending moment in the concrete slab of 14.250 kN.m/m width, two line loads of 23.854 kN (P) each have been applied at 1000 mm of the supporting points.

Both longitudinal edges are free, the other edges are simply supported.

Direction of exposure: from below.

Report 16212A was added for the use of the MSP 75 fixation plugs.

2.2 Test results

2.2.1 Test results 20859D

Observations	Exceeded
Thermal insulation – I	
$\Delta T_m = 140^\circ\text{C}$	180 minutes, no failure ⁽¹⁾
$\Delta T_M = 180^\circ\text{C}$	180 minutes, no failure ⁽¹⁾
Integrity – E	
Spontaneous and sustained flaming	180 minutes, no failure ⁽¹⁾
Failure with \varnothing 6 mm gap gauge	180 minutes, no failure ⁽¹⁾
Failure with \varnothing 25 mm gap gauge	180 minutes, no failure ⁽¹⁾
Ignition of cotton pad	180 minutes, no failure ⁽¹⁾
Loadbearing capacity – R	
Deflection $D = L^2/(400 d) = 367$ mm	180 minutes, no failure ⁽¹⁾
Rate of deflection $dD/dt = L^2/(9000 d) = 16.3$ mm/min	180 minutes, no failure ⁽¹⁾

⁽¹⁾ The test was discontinued after 180 minutes at the sponsor's request. The load was removed after 180 minutes.

2.2.2 Test results 16212A

Parameters	Results
Thermal insulation – I	
$\Delta T_m = 140^\circ\text{C}$	121 minutes, no failure ⁽¹⁾
$\Delta T_M = 180^\circ\text{C}$	121 minutes, no failure ⁽¹⁾
Integrity – E	
Spontaneous and sustained flaming	121 minutes, no failure ⁽¹⁾
Failure with gap gauge \varnothing 6 mm	121 minutes, no failure ⁽¹⁾
Failure with gap gauge \varnothing 25 mm	121 minutes, no failure ⁽¹⁾
Ignition of cotton pad	121 minutes, no failure ⁽¹⁾
Loadbearing capacity – R	
Deflection $D = 4200^2 / (400 * 100) = 441$ mm	121 minutes, no failure ⁽¹⁾
Rate of deflection $dD/dt = 4200^2 / (9000 * 100) = 19.6$ mm/min	121 minutes, no failure ⁽¹⁾

⁽¹⁾ The test was discontinued after 121 minutes at the sponsor's request.

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, loadbearing floor protected with wood wool ceiling panels – type: Heraklith® | Tektalan A2 - SmartTec (1000 mm x 600 mm) – thickness: 50 mm, 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 loadbearing floor protected with wood wool ceiling panels exposed to the fire from below.

Soffit insulation screw – brand and type: EJOT DDS plus / DDS MW

**REI 180, REI 120, REI 90, REI 60, REI 45, REI 30,
REI 20, REI 15**

RE 180, RE 120, RE 90, RE 60, RE 30, RE 20

R 180, R 120, R 90, R 60, R 45, R 30, R 20, R 15

Solid battle plug with structured cap – brand and type: Knauf Insulation MSP

REI 120, REI 90, REI 60, REI 45, REI 30, REI 20, REI 15

RE 120, RE 90, RE 60, RE 30, RE 20

R 120, R 90, R 60, R 45, R 30, R 20, R 15

3.3 Field of direct application

This classification is valid for the following end use applications according to EN 1365-2:2014.

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) With respect to the structural building member:
 - The maximum moments and shear forces, which when calculated on the same basis as the test load, shall not be greater than those tested.
- b) With respect to the ceiling system:
 - The size of panels of the ceiling lining may be increased by a maximum of 5 % but limited to a maximum of 50 mm ($\leq 630 \text{ mm} \times \leq 1050 \text{ mm}$).

4 Limitations

This classification report does not represent type approval nor certification of the product(s).

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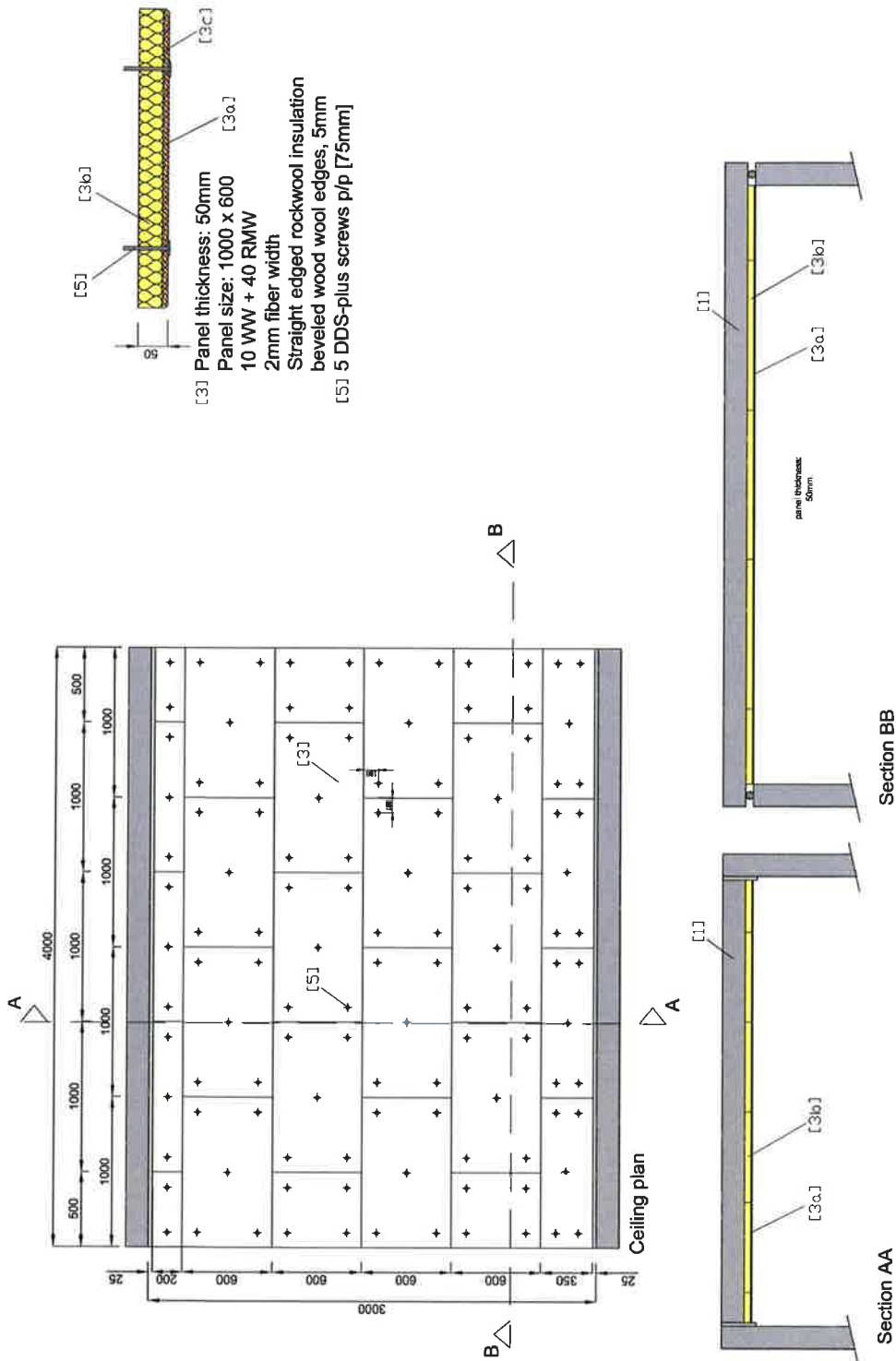
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In case of doubt, the most recent version prevails, originally issued in English.

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Top view (unexposed side) - sections A-A and B-B - dimensions (provided drawing).



Heraklith Taktalan Δ2 International RFI test

FIRE RESISTANCE CLASSIFICATION REPORT No. 20860E

Revision 1

OWNER OF THE CLASSIFICATION REPORT

KNAUF INSULATION bv
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The Netherlands

KNAUF INSULATION GmbH
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84359 Simbach am Inn
Germany

INTRODUCTION

This classification report defines the classification assigned to a loadbearing floor protected with wood wool ceiling panels, type: Heraklith® | Tektalan A2 - SmartTec (1000 mm x 600 mm) – thickness: 225 mm, 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 10 pages and 1 annex and may only be used or reproduced in its entirety.

1 Details of classified product

1.1 General

The element – type: Heraklith® | Tektalan A2 - SmartTec (1000 mm x 600 mm) – thickness: 225 mm, is defined as a loadbearing floor protected with wood wool ceiling panels with fire resistance characteristics.

1.2 Description

The element, Heraklith® | Tektalan A2 - SmartTec (1000 mm x 600 mm) – thickness: 225 mm, is fully described below, in support of this classification. The drawings of the test element as it was tested, are enclosed in the annexe 1 of this classification report.

1.2.1 Composition of the test specimen as tested

The test specimen is a fire-protected structural concrete member: loadbearing floor protected with wood wool ceiling panels.

Outer dimensions of the test specimen:

- width: 3000 mm;
- length: 4400 mm;
- span: 4200 mm;
- thickness slab: 120 mm.

1.2.1.1 Concrete floor

[1] Slab – material: concrete – exposed length L_{exp} : 4000 mm – span L_{sup} : 4200 mm – specimen length L_{spec} : 4400 mm – exposed width W_{exp} : 2950 mm – thickness: 120 mm – production date: 19 January 2021.

[1a] Concrete – material: normal-weight concrete – type: C25/30 EE2 20mm S3 CEM I 52.5 N MF – density: 2380 kg/m³ – compressive strength f_{ck} : 47.8 N/mm² – covering thickness: 20 mm.

[1b] Lower reinforcement mesh – type: 150/150/10/10 – material: ribbed, steel reinforcement mesh – diameter bars: 10 mm – grade: BE 500 S – yield strength f_y : 500 N/mm² (NV).

- position: inside the slab, at 20 mm from the exposed bottom side.

- [1c] Upper reinforcement mesh – type: 150/150/6/6 – material: ribbed, steel reinforcement mesh – diameter bars: 6 mm – grade: BE 500 S – yield strength f_y : 500 N/mm² (NV).
- position: inside the slab, at 20 mm from the unexposed upper side.
- [2] Release agent – brand and type: Demula Marginel® – material: emulsion of vegetable oils and animal fats in water – volume mass (by 15°C): 0.99 kg/l.

1.2.1.2 Fire protection material

The test sponsor has confirmed to the laboratory that the brand and names listed below apply to identical ceiling panels as those tested.

- [3] Ceiling panel – used brand and names:
- Tektalan A2 - SmartTec
 - Tektalan A2 - SmartTec [1.0]
 - Tektalan A2 - Protect
 - Tektalan A2 - Protect [1.0]
- thickness: 225 mm – dimensions: 1000 mm x 600 mm – surface mass: 27.1 kg/m² – straight edges.
- composed of:
 - 1 cover layer [3a] – thickness: 10 mm;
 - 1 insulation layer [3b] – thickness: 215 mm;
 - fixing:
 - to the bottom side of the concrete slab;
 - with screws [4];
 - number: 5 screws per full panel;
 - position: 1 at the centre, and 4 at 100 mm from both edges (see annex 3).
- [3a] Cover layer – material: mineral bounded wood wool – thickness: 10 mm (NV) – density: 837 kg/m³ – surface mass: 8.37 kg/m² – fibre width: 2 mm – bevel: 5 mm.
- fixing: glued [3c] to the insulation layer [3b].
- [3b] Insulation layer – material: rock wool – thickness: 215 mm – density: 90 kg/m³.
- [3c] Glue – brand and type: *confidentially communicated to the laboratory.*

For a classification time up to REI 180, RE 180, R 180:

- [4] Soffit insulation screw – brand and type: EJOT DDS plus / DDS MW – material: steel, with 2 mm plastic-laminated head (DDS plus) – total length: 253 mm – threaded length: 40 mm – diameter: 5.8 mm – diameter steel head: 24 mm.

For a classification time up to REI 120, RE 120, R 120:

- [4] Solid battle plug with structured cap – brand and type: Knauf Insulation MSP 250 – material plug: steel – diameter plug: 5.5 mm – material structured cap: plastic – diameter structured cap: 33 mm – total length: 250 mm.

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	20860D	KNAUF INSULATION bv	23/04/2021	EN 1365-2:2014
WFRGENT nv	16212A	KNAUF INSULATION bv	06/12/2013	EN 1365-2:1999

Exposure conditions during the fire resistance tests:

20860D:

Temperature/time curve: standard as in EN 1363-1:2020.

Direction of exposure: from below.

Applied load supplementary to the own weight: 358 kg/m², producing a tensile stress of 60% of the yield strength (300 N/mm²) in the longitudinal bars of the lower reinforcement mesh.

Both longitudinal edges are free, the other edges are fixed.

16212A:

Temperature/time curve: standard as in EN 1363-1:2012.

In order to realize a bending moment in the concrete slab of 14.250 kN.m/m width, two line loads of 23.854 kN (P) each have been applied at 1000 mm of the supporting points.

Both longitudinal edges are free, the other edges are simply supported.

Direction of exposure: from below.

Report 16212A was added for the use of the MSP 250 fixation plugs.

2.2 Test results

2.2.1 Test results 20860D

Observations	Exceeded
Thermal insulation – I	
$\Delta T_m = 140^\circ\text{C}$	180 minutes, no failure ⁽¹⁾
$\Delta T_M = 180^\circ\text{C}$	180 minutes, no failure ⁽¹⁾
Integrity – E	
Spontaneous and sustained flaming	180 minutes, no failure ⁽¹⁾
Failure with \varnothing 6 mm gap gauge	180 minutes, no failure ⁽¹⁾
Failure with \varnothing 25 mm gap gauge	180 minutes, no failure ⁽¹⁾
Ignition of cotton pad	180 minutes, no failure ⁽¹⁾
Loadbearing capacity – R	
Deflection $D = L^2/(400 d) = 367 \text{ mm}$	180 minutes, no failure ⁽¹⁾
Rate of deflection $dD/dt = L^2/(9000 d) = 16.3 \text{ mm/min}$	180 minutes, no failure ⁽¹⁾

⁽¹⁾ The test was discontinued after 180 minutes at the sponsor's request. The load was removed after 180 minutes.

2.2.2 Test results 16212A

Parameters	Results
Thermal insulation – I	
$\Delta T_m = 140^\circ\text{C}$	121 minutes, no failure ⁽¹⁾
$\Delta T_M = 180^\circ\text{C}$	121 minutes, no failure ⁽¹⁾
Integrity – E	
Spontaneous and sustained flaming	121 minutes, no failure ⁽¹⁾
Failure with gap gauge \varnothing 6 mm	121 minutes, no failure ⁽¹⁾
Failure with gap gauge \varnothing 25 mm	121 minutes, no failure ⁽¹⁾
Ignition of cotton pad	121 minutes, no failure ⁽¹⁾
Loadbearing capacity – R	
Deflection $D = 4200^2/(400*100) = 441$ mm	121 minutes, no failure ⁽¹⁾
Rate of deflection $dD/dt = 4200^2/(9000*100) = 19.6$ mm/min	121 minutes, no failure ⁽¹⁾

⁽¹⁾ The test was discontinued after 121 minutes at the sponsor's request.

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, loadbearing floor protected with wood wool ceiling panels – type: Heraklith® | Tektalan A2 - SmartTec (1000 mm x 600 mm) – thickness: 225 mm, 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 loadbearing floor protected with wood wool ceiling panels exposed to the fire from below.

Soffit insulation screw – brand and type: EJOT DDS plus / DDS MW

**REI 180, REI 120, REI 90, REI 60, REI 45, REI 30,
REI 20, REI 15**

RE 180, RE 120, RE 90, RE 60, RE 30, RE 20

R 180, R 120, R 90, R 60, R 45, R 30, R 20, R 15

Solid battle plug with structured cap – brand and type: Knauf Insulation MSP

REI 120, REI 90, REI 60, REI 45, REI 30, REI 20, REI 15

RE 120, RE 90, RE 60, RE 30, RE 20

R 120, R 90, R 60, R 45, R 30, R 20, R 15

3.3 Field of direct application

This classification is valid for the following end use applications according to EN 1365-2:2014.

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) With respect to the structural building member:
 - The maximum moments and shear forces, which when calculated on the same basis as the test load, shall not be greater than those tested.
- b) With respect to the ceiling system:
 - The size of panels of the ceiling lining may be increased by a maximum of 5 % but limited to a maximum of 50 mm ($\leq 630 \text{ mm} \times \leq 1050 \text{ mm}$).


4 Limitations

This classification report does not represent type approval nor certification of the product(s).

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Top view (unexposed side) – sections A-A and B-B – dimensions
 (provided drawing)

