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## **Assessment report for Conlit 150/150P mounted with welding pins**

### **Executive summary**

DBI – Danish Institute of Fire and Security Technology has been requested by Rockwool A/S to assess Conlit 150/150P mineral wool boards used as passive fire protection for load bearing steel profiles.

It is the opinion of DBI that Conlit 150/150P mineral wool boards with thickness 20 – 50 mm, fixed to the steel profiles with 2.7 mm welding pins and 28 mm washers, with a pin distance of max. 320 mm and placed max. 50 mm from the edges, may be used as passive fire protection for load bearing steel profiles (R30 – R120) according to table 1.1 – 1.4 and the mounting and fixing guide enclosed with this assessment.

DBI refers to the subsequent text which gives insight into the underlying reasons for this assessment.

### **Full text assessment**

DBI – Danish Institute of Fire and Security Technology has been requested by Rockwool A/S to assess Conlit 150/150P mineral wool boards used as passive fire protection for load bearing steel profiles.

### **Product**

Conlit 150/150P is a mineral wool board with nominal density of 165 kg/m<sup>3</sup> and a minimum of 150 kg/m<sup>3</sup>. The thickness is between 20 and 50 mm.

Conlit 150 has a layer of fiberglass cloth glued to one side. Conlit 150P does not.

Conlit 150/150P has the classification A1 according to EN13501-1 and non-combustible according to DS 1057.1.

### **Basis for the assessment:**

- 1) Test report PGA10093, dated 2012-03-16: fire test according to EN13381-4:2002 and prEN13381-4:2010 of two loaded beams and two unloaded references.

- 2) Test report PGA10094, dated 2012-03-16: fire test according to EN13381-4:2002 and prEN13381-4:2010 of 13 unloaded short columns.
- 3) Assessment report PHA10137, dated 2012-10-15: Analysis (Numerical Regression Analysis) according to prEN13381-4:2010 of test results gained in PGA10093 and PGA10094.

### **Fire protection of steel constructions:**

The fire tests were made according to EN13381-4:2002 and prEN13381-4:2010.

The minimum and maximum thicknesses of the passive fire protection boards are each tested on loaded beams to define the stickability – a measure of how well the passive fire protection performs when the profile deflects. This value is used to modify the results gained from the test of the unloaded columns.

13 unloaded columns with varying section factors to cover a wide range are mounted with the passive fire protection in different thicknesses ranging between the minimum and maximum.

The temperature results from the 13 unloaded columns and the stickability from the two loaded beams are used in a numerical regression analysis as defined in EN13381-4 Annex E. The values for the steel are taken from Eurocode 3 – Design of steel structures.

The results of this analysis are tables with information on the required thickness for Conlit 150/150P depending on critical steel temperature and section factor.

### **Assessment:**

It is the opinion of DBI that Conlit 150/150P mineral wool boards with thickness 20 – 50 mm, fixed to the steel profiles with 2.7 mm welding pins and 28 mm washers, with a pin distance of max. 320 mm and placed max. 50 mm from the edges, may be used as passive fire protection for load bearing steel profiles (R30 – R120) according to table 1.1 – 1.4 and the mounting and fixing guide enclosed with this assessment.

DBI specifies the following conditions which are preconditions for the expressed opinion.

- Table 1.1 – 1.4 enclosed this assessment shows thicknesses equal to or larger than the corresponding tables given in assessment report PHA10137.
- The mounting and fixing guide enclosed this assessment is following the description given in test reports PGA10093 and PGA10094.

**Remarks:**

This is an expressed opinion based on the above mentioned reports.

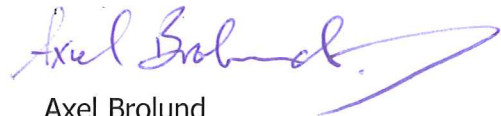
Any changes in the product or the mounting will invalidate this assessment.

DBI - Danish Institute of Fire and Security Technology



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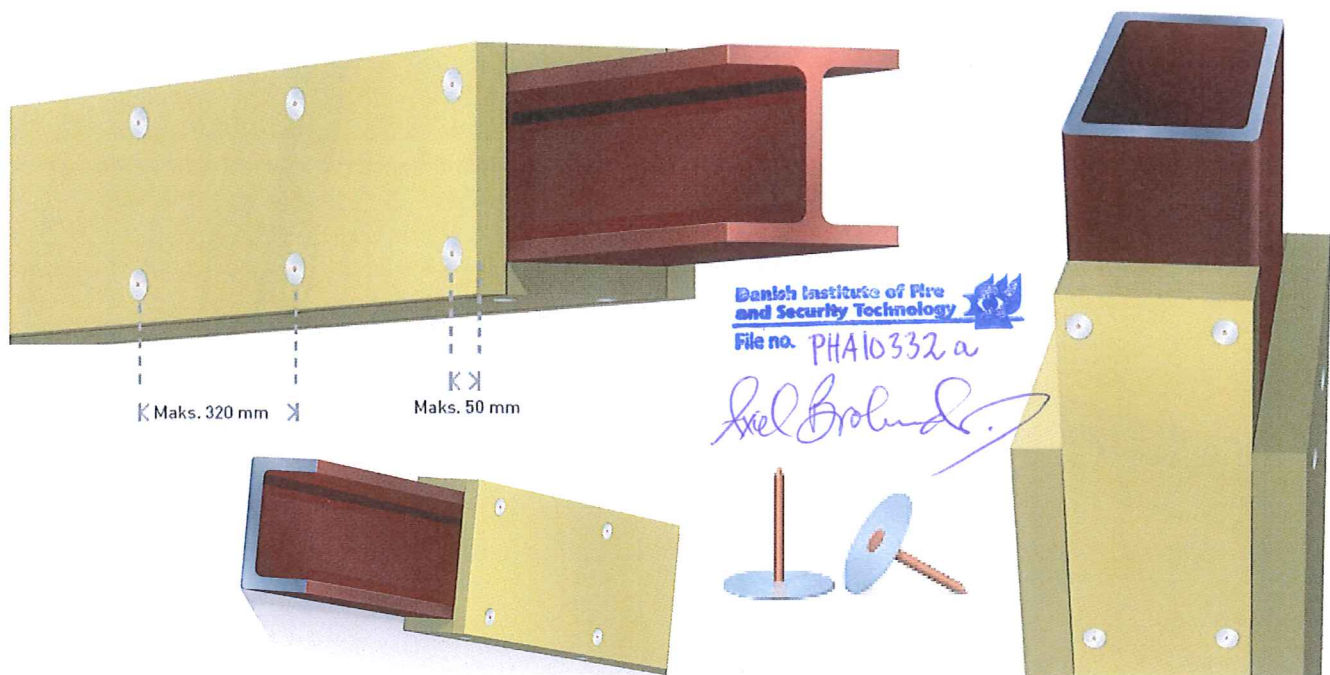
**Enclosure:**

- Mounting and fixing guide (stamped and signed by DBI)
- Table 1.1 – 1.4 (R30 – R120) (stamped and signed by DBI)

# R 30 – R 120

Fire protection of steel beams  
with Conlit 150/150P fixed with welding pins

Mounting and  
fixing guide



1. The thickness of the Conlit board has to be dimensioned after table 1 or according to the Conlit calculation program at [www.rockwool.dk](http://www.rockwool.dk).
2. The Conlit board is cut with accuracy to fit the steel profile.
3. The welding pins are placed maximum 50mm from the edge and maximum 320mm between each other.
4. The welding pins must have a minimum diameter of 2,7mm and the head has to have a minimum diameter of 28mm. The length has to be 2-3mm longer than the Conlit board thickness.
5. The Conlit board is fixed to the steel using welding pins. Make sure the fixing is stable and secure.
6. The boards have to be fixed tightly together to ensure a close-fitting protection.
7. If the Conlit fire protection is penetrated by other installations, these also have to be protected to maintain the fire protection



**ROCKWOOL®**  
FIRESAFE INSULATION

[www.rockwool.dk](http://www.rockwool.dk)

Tabel 1.1

Product: Conlit 150/150P  
 Fire resistance: R 30

U/A	Critical steel temperature									
	350	400	450	500	550	600	650	700	750	800
50	20	20	20	20	20	20	20	20	20	20
55	20	20	20	20	20	20	20	20	20	20
60	20	20	20	20	20	20	20	20	20	20
65	20	20	20	20	20	20	20	20	20	20
70	20	20	20	20	20	20	20	20	20	20
75	20	20	20	20	20	20	20	20	20	20
80	20	20	20	20	20	20	20	20	20	20
85	20	20	20	20	20	20	20	20	20	20
90	20	20	20	20	20	20	20	20	20	20
95	20	20	20	20	20	20	20	20	20	20
100	20	20	20	20	20	20	20	20	20	20
105	20	20	20	20	20	20	20	20	20	20
110	20	20	20	20	20	20	20	20	20	20
115	20	20	20	20	20	20	20	20	20	20
120	20	20	20	20	20	20	20	20	20	20
125	20	20	20	20	20	20	20	20	20	20
130	20	20	20	20	20	20	20	20	20	20
135	20	20	20	20	20	20	20	20	20	20
140	20	20	20	20	20	20	20	20	20	20
145	20	20	20	20	20	20	20	20	20	20
150	20	20	20	20	20	20	20	20	20	20
155	20	20	20	20	20	20	20	20	20	20
160	20	20	20	20	20	20	20	20	20	20
165	20	20	20	20	20	20	20	20	20	20
170	20	20	20	20	20	20	20	20	20	20
175	20	20	20	20	20	20	20	20	20	20
180	20	20	20	20	20	20	20	20	20	20
185	20	20	20	20	20	20	20	20	20	20
190	20	20	20	20	20	20	20	20	20	20
195	20	20	20	20	20	20	20	20	20	20
200	20	20	20	20	20	20	20	20	20	20
205	20	20	20	20	20	20	20	20	20	20
210	25	20	20	20	20	20	20	20	20	20
215	25	20	20	20	20	20	20	20	20	20
220	25	20	20	20	20	20	20	20	20	20
225	25	20	20	20	20	20	20	20	20	20
230	25	20	20	20	20	20	20	20	20	20
235	25	20	20	20	20	20	20	20	20	20
240	25	20	20	20	20	20	20	20	20	20
245	25	20	20	20	20	20	20	20	20	20
250	25	20	20	20	20	20	20	20	20	20
255	25	20	20	20	20	20	20	20	20	20
260	30	20	20	20	20	20	20	20	20	20
265	30	20	20	20	20	20	20	20	20	20
270	30	20	20	20	20	20	20	20	20	20
275	30	20	20	20	20	20	20	20	20	20
280	30	20	20	20	20	20	20	20	20	20
285	30	20	20	20	20	20	20	20	20	20
290	30	20	20	20	20	20	20	20	20	20

Tabel 1.2

Product: Conlit 150/150P  
 Fire resistance: R 60

U/A	Critical steel temperature									
	350	400	450	500	550	600	650	700	750	800
50	20	20	20	20	20	20	20	20	20	20
55	20	20	20	20	20	20	20	20	20	20
60	20	20	20	20	20	20	20	20	20	20
65	20	20	20	20	20	20	20	20	20	20
70	20	20	20	20	20	20	20	20	20	20
75	25	20	20	20	20	20	20	20	20	20
80	25	20	20	20	20	20	20	20	20	20
85	25	20	20	20	20	20	20	20	20	20
90	25	20	20	20	20	20	20	20	20	20
95	30	20	20	20	20	20	20	20	20	20
100	30	25	20	20	20	20	20	20	20	20
105	30	25	20	20	20	20	20	20	20	20
110	40	25	20	20	20	20	20	20	20	20
115	40	25	20	20	20	20	20	20	20	20
120	40	30	20	20	20	20	20	20	20	20
125	40	30	25	20	20	20	20	20	20	20
130	40	30	25	20	20	20	20	20	20	20
135	40	30	25	20	20	20	20	20	20	20
140	40	30	25	20	20	20	20	20	20	20
145	50	40	25	20	20	20	20	20	20	20
150	50	40	25	20	20	20	20	20	20	20
155	50	40	30	20	20	20	20	20	20	20
160	50	40	30	25	20	20	20	20	20	20
165	50	40	30	25	20	20	20	20	20	20
170	50	40	30	25	20	20	20	20	20	20
175	50	40	30	25	20	20	20	20	20	20
180		40	40	25	20	20	20	20	20	20
185		50	40	25	20	20	20	20	20	20
190		50	40	25	20	20	20	20	20	20
195		50	40	30	20	20	20	20	20	20
200		50	40	30	20	20	20	20	20	20
205		50	40	30	20	20	20	20	20	20
210		50	40	30	25	20	20	20	20	20
215		50	40	30	25	20	20	20	20	20
220		50	40	30	25	20	20	20	20	20
225		50	40	30	25	20	20	20	20	20
230			40	40	25	20	20	20	20	20
235			50	40	25	20	20	20	20	20
240			50	40	25	20	20	20	20	20
245			50	40	25	20	20	20	20	20
250			50	40	30	20	20	20	20	20
255			50	40	30	20	20	20	20	20
260			50	40	30	20	20	20	20	20
265			50	40	30	20	20	20	20	20
270			50	40	30	20	20	20	20	20
275			50	40	30	25	20	20	20	20
280			50	40	30	25	20	20	20	20
285				40	30	25	20	20	20	20
290				40	30	25	20	20	20	20

Danish Institute of Fire and Security Technology  
 File no. PHA 10332 a

*Axel Bolund*

Tabel 1.3

Product: Conlit 150/150P  
 Fire resistance: R 90

U/A	Critical steel temperature									
	350	400	450	500	550	600	650	700	750	800
50	25	20	20	20	20	20	20	20	20	20
55	25	20	20	20	20	20	20	20	20	20
60	30	25	20	20	20	20	20	20	20	20
65	30	25	20	20	20	20	20	20	20	20
70	40	30	25	20	20	20	20	20	20	20
75	40	30	25	20	20	20	20	20	20	20
80	40	30	25	20	20	20	20	20	20	20
85	40	40	30	25	20	20	20	20	20	20
90	50	40	30	25	20	20	20	20	20	20
95	50	40	30	25	20	20	20	20	20	20
100	50	40	40	25	25	20	20	20	20	20
105	50	40	40	30	25	20	20	20	20	20
110		50	40	30	25	20	20	20	20	20
115		50	40	30	25	20	20	20	20	20
120		50	40	40	25	25	20	20	20	20
125		50	40	40	30	25	20	20	20	20
130		50	50	40	30	25	20	20	20	20
135			50	40	30	25	20	20	20	20
140			50	40	30	25	20	20	20	20
145			50	40	40	30	25	20	20	20
150			50	40	40	30	25	20	20	20
155			50	50	40	30	25	20	20	20
160				50	40	30	25	20	20	20
165				50	40	30	25	20	20	20
170				50	40	40	25	25	20	20
175				50	40	40	30	25	20	20
180				50	40	40	30	25	20	20
185				50	50	40	30	25	20	20
190					50	40	30	25	20	20
195					50	40	30	25	20	20
200					50	40	40	25	20	20
205					50	40	40	30	25	20
210					50	40	40	30	25	20
215					50	40	40	30	25	20
220					50	50	40	30	25	20
225						50	40	30	25	20
230						50	40	30	25	20
235						50	40	30	25	20
240						50	40	40	25	20
245						50	40	40	30	20
250						50	40	40	30	25
255						50	40	40	30	25
260						50	50	40	30	25
265							50	40	30	25
270							50	40	30	25
275							50	40	30	25
280							50	40	30	25
285							50	40	40	25
290							50	40	40	25

*Axel Broholm*

Tabel 1.4

Product: Conlit 150/150P

Fire resistance: R 120

U/A	Critical steel temperature									
	350	400	450	500	550	600	650	700	750	800
50	40	30	25	20	20	20	20	20	20	20
55	40	30	25	20	20	20	20	20	20	20
60	40	40	30	25	20	20	20	20	20	20
65	50	40	30	25	20	20	20	20	20	20
70	50	40	40	30	25	20	20	20	20	20
75	50	40	40	30	25	20	20	20	20	20
80		50	40	30	30	25	20	20	20	20
85		50	40	40	30	25	20	20	20	20
90		50	50	40	30	25	25	20	20	20
95			50	40	40	30	25	20	20	20
100			50	40	40	30	25	20	20	20
105			50	40	40	30	25	25	20	20
110			50	50	40	40	30	25	20	20
115				50	40	40	30	25	20	20
120				50	40	40	30	25	25	20
125				50	50	40	40	30	25	20
130					50	40	40	30	25	20
135					50	40	40	30	25	25
140					50	40	40	30	30	25
145					50	50	40	40	30	25
150						50	40	40	30	25
155						50	40	40	30	25
160						50	40	40	30	30
165						50	50	40	40	30
170						50	50	40	40	30
175							50	40	40	30
180							50	40	40	30
185							50	50	40	30
190							50	50	40	40
195							50	50	40	40
200								50	40	40
205								50	40	40
210								50	50	40
215								50	50	40
220								50	50	40
225									50	40
230									50	40
235									50	40
240									50	50
245									50	50
250									50	50
255										50
260										50
265										50
270										50
275										50
280										50
285										50
290										