

Rockwool A/S
Hovedgaden 501
2640 Hedehusene
Denmark

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Sag: PHA10332f
Init.: ABR/DHL
E-mail: abr@dbi-net.dk
Dir.tel.: +45 61220662

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Assessment report for trapezoidal steel roof insulated with Conlit 120

Executive summary

DBI – Danish Institute of Fire and Security Technology has been requested by Rockwool A/S to assess a trapezoidal steel roof mounted with Conlit 120 mineral wool boards underneath as passive fire protection.

It is the opinion of DBI that a trapezoidal steel roof with a plate thickness of minimum 1 mm, mounted underneath with Conlit 120 mineral wool boards with thickness 80 mm, fixed to the steel roof with 100 mm self drilling steel screws and 80 mm washers, with a c/c distance of max. 950 mm along the length of the boards and 800 mm along the width of the boards (with a minimum of 4 screws and washers per mineral wool board), and placed max. 150 mm from the edges, has fire performance equal to a loadbearing roof with the classification R60 given the following conditions:

- 1) A verification of the load bearing capacity in ultimate limit state has been established in accordance with applicable European standards for load and strength.
- 2) The following load limitation is met:
 - a. $M_{\bar{n},Ed} \leq 0.35 M_{Rd}$

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 a trapezoidal steel roof mounted with Conlit 120 mineral wool boards underneath as passive fire protection.

Product:

The trapezoidal steel roof is a corrugated steel plate with a minimum plate thickness of 1 mm. The height of the corrugation may vary.

Conlit 120 is a mineral wool board with nominal density of 120 kg/m³. The thickness is 80 mm.

Basis for the assessment:

- 1) Test report G 10498, dated 1999-07-09: fire test according to DS 1051.1 of a loadbearing roof constructed from a trapezoidal steel plate type Lindab LTP 115 with a plate thickness of 1 mm. The steel plate was insulated underneath with 80 mm thick mineral wool boards type Conlit 120. The steel plate was insulated on top with 205 mm thick mineral wool boards of two different types.
- 2) Assessment H-11003, dated 1999-07-28: Assessment based on test report G 10498 of loadbearing roofs constructed with corrugated steel plates.

Assessment:

It is the opinion of DBI that a trapezoidal steel roof with a plate thickness of minimum 1 mm, mounted underneath with Conlit 120 mineral wool boards with thickness 80 mm, fixed to the steel roof with 100 mm self drilling steel screws and 80 mm washers, with a c/c distance of max. 950 mm along the length of the boards and 800 mm along the width of the boards (with a minimum of 4 screws and washers per mineral wool board), and placed max. 150 mm from the edges, has fire performance equal to a loadbearing roof with the classification R60 given the following conditions:

- 1) A verification of the load bearing capacity in ultimate limit state has been established in accordance with applicable European standards for load and strength.
- 2) The following load limitation is met:
 - a. $M_{fi,Ed} \leq 0.35 M_{Rd}$

where

$M_{fi,Ed}$: Design bending moment derived from the load in accident limit state (fire).
 M_{Rd} : Design bending moment resistance in calculated ultimate limit state.

This assessment deals with load-bearing structures where the expected failure mode is a bending moment failure. Other failure modes such as shear failure or local phenomena's are not included in the assessment. The fire resistance that is addressed in this assessment cannot be uncritically transferred to other steel profiles. The starting point for a transfer to another steel profile is that the structure or profile should be comparable to the design that has been tested (thermally, in shape and materials). DBI would pay particular attention to the sheet thickness.

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

- The mounting and fixing guide enclosed this assessment is following the description given in test report G 10498.

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



Dan Lauridsen
M.Sc. (Civ. Eng.)



Axel Brolund
M.Sc. (Civ. Eng.)

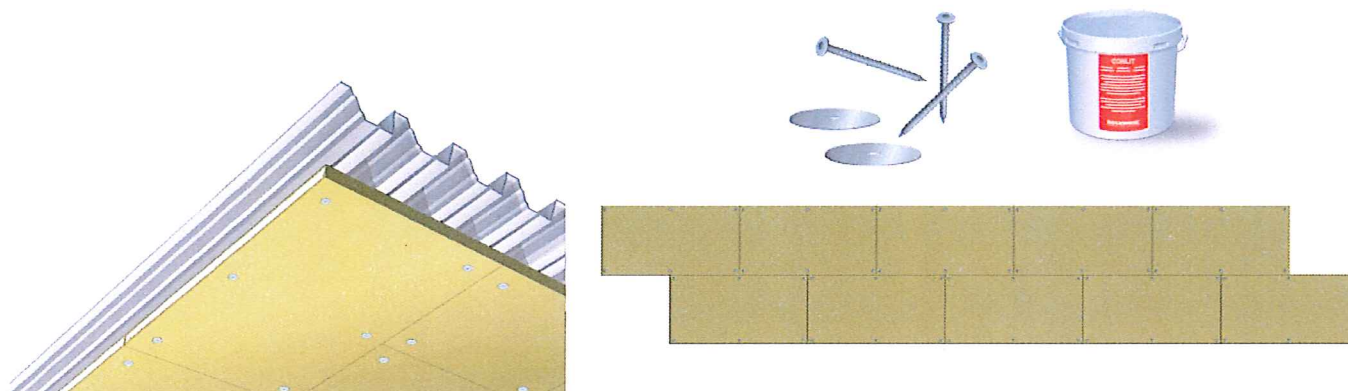
Enclosure:

- Mounting and fixing guide (stamped and signed by DBI)

R 60

Fire protection of trapezoidal steel roof with Conlit 120

Mounting and fixing guide

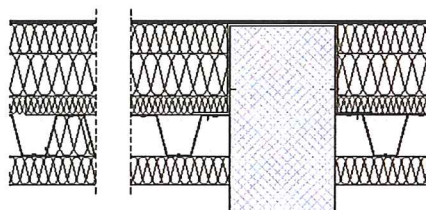


1. The thickness of the Conlit 120 board have to be 80mm. The steel roof thickness have to be minimum 1mm.
2. The sides of the Conlit 120 boards are glue with Conlit glue. (1).
3. The Conlit boards are placed with and offset. The Conlit glue ensures a fire prof joint (2).
4. The boards are fixed to the underside of the roof with screws . The screws have to be 100 mm with a washer of 80 mm. A minimum of 4 screws and washers for each board are used. he boards have to be fixed tightly together to ensure a close-fitting protection. (3+4)
5. If the Conlit fire protection is penetrated by other installations, these also have to be protected to maintain the fire protection



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and Security Technology
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Axel Bolund.



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