

## EGOLF RECOMMENDATION 066-2025

Subject of Recommendation (max. 65 characters)	<b>EN 13381-4:2013 Joint position for board, slab or matt systems</b>
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### Problem

When single-layer or multi-layer board, slab or matt system is tested and assessed to the EN 13381-4, the standard does not specify how to incorporate joints on the loaded sections.

Joints within the protection system can be incorporated in different ways with and without overlaps.

Clause 6.3.5 in the EN 13381-4 only suggests applying what is used **in practice**: 'For board and slab fire protection systems, the loaded beams and loaded steel column section shall incorporate an example of any constructional or peripheral joint that may be used **in practice**.'

The term '**in practice**' used in the EN 13381-4 is very open to an interpretation. Examples of possible joints positioning for the same system on the loaded beams are shown below for both single-layer and multi-layer systems. Similar examples can be applied to the loaded columns tested in a vertical orientation.

Below example presents a single-layer protection system applied to 12 m long beam **in practice**. 'Red' colour shows protection system joints (see figure 1).



Figure 1 - Single-layer protection system applied to 12 m long beam **in practice**

According to the guidance given in the EN 13381-4 Clause 6.3.5, the same protection system can be tested with 4 m exposed span beam in different ways:

Option 1 – See figure 2:

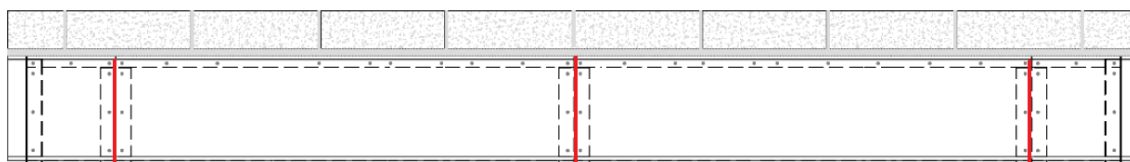


Figure 2

Option 2 – See figure 3:

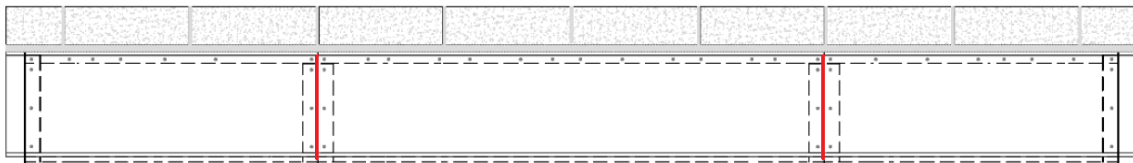


Figure 3

Option 3 - Depending on the length of the board, slab or matt system, one of the following scenarios can also be applied as shown in figures 4 and 5:

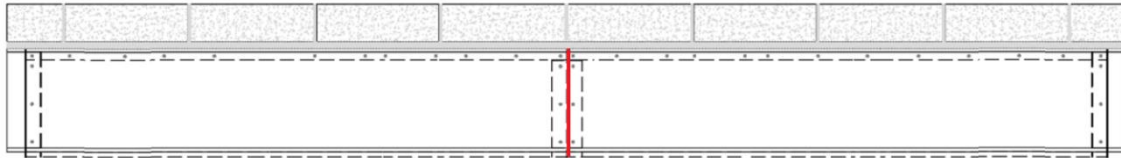


Figure 4

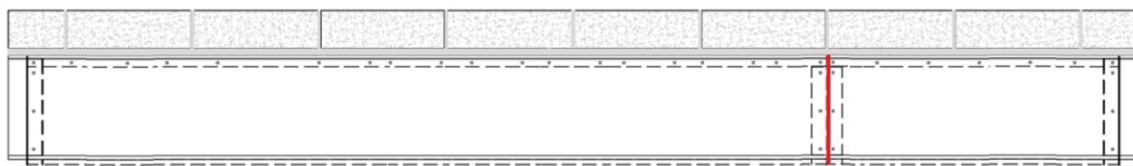


Figure 5

For two-layer system, the same issue apply. 'Blue' colour shows joints for the inner layer and 'red' colour presents joints, for the outer layer (see figure 6).

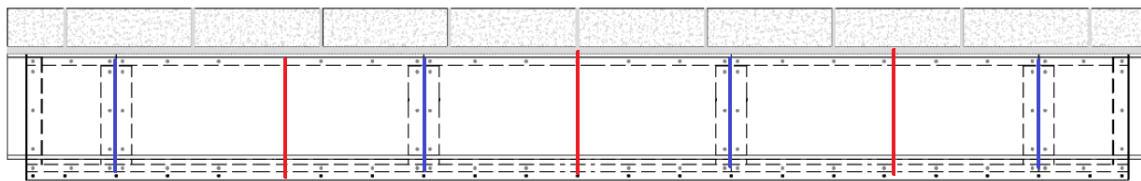


Figure 6

In this case, outer layer joint 'red' is positioned at the mid-span. However, this can be the other way around. Mid-span may have inner layer joint 'blue' and outer layer joints offset from the centre 'red'.

Protection systems can also contain three-layer and more layers.

Above examples show aligned joints between the boards positioned on the sides and the lower flange of the beams. Some protection systems may contain staggered instead of continuous aligned joints.

Joint positioning in the loaded fire test may affect the loadbearing capacity performance as well as the correction for stickability factors which will have an impact to the end scope of application for the tested and assessed protection system.

Referencing to EN 1365-3 and EN 1365-4 in the EN 13381-4 is only given under Clauses 5.2 and 5.3 dealing with the specimens support and loading conditions. None of the EN 13381-4 Clauses 6.2.2, 6.3.5, 6.6.3 is addressing requirements for the specimens configuration for the purpose of the test.

Therefore, it is necessary to provide a recommendation on how to incorporate joints within a single-layer or multi-layer board, slab or matt system tested and assessed to the EN 13381-4, to provide a consistent approach across member laboratories.

## Recommendation

This recommendation has been prepared following agreement by the majority of member laboratories at EGOLF TC2 meeting, that clarification was required on the incorporation of the joints in single-layer or multi-layer board, slab or matt systems.

The tested single-layer or multi-layer board, slab or matt system on loaded sections shall include joints in accordance with following recommendations.

Aligned continuous joints:

- For loaded beams and columns protected with a single-layer protection system with aligned joints, a joint shall be positioned at mid-span or as close to mid-span as possible on both sides and the lower flange of the horizontally orientated beam. If installation of the joint at mid-span of the beam is not possible, it shall be positioned between the loading points, as close as possible to mid-span. For vertically orientated columns, the protection system shall incorporate a joint at mid-height on all sides.
- Load beams and columns protected with a multi-layer protection system with aligned joints, the outer layer shall contain a joint at mid-span, or as close as possible to mid-span on both sides and the lower flange of the horizontally orientated beam. If installation of the joint in the outer layer at mid-span of the beam is impractical, it shall be positioned between the loading points, as close as possible to mid-span. For vertically orientated columns, the outer layer shall incorporate a joint at mid-height on all sides. The remaining inner layers of a multi-layer board, slab or matt system shall be installed as in practice.

If the standard size of the board, slab or matt system (e.g. 3 m long) does not naturally allow incorporate a joint at the specified locations on the loaded test specimen, an artificial joint shall be introduced as per the above guidance.

Staggered joints:

- For load beams and columns protected with a single-layer protection system with staggered joints, a joint on the lower flange shall be positioned at mid-span or as close to mid-span as possible of the horizontally orientated beam. Joints on both sides shall be positioned as in practice. If the standard size of the board, slab or matt system (e.g. 3 m long) does not naturally allow incorporate joints on the sides, artificial joints shall be introduced at  $\frac{1}{4}$  and  $\frac{3}{4}$  of the exposed length of the beam. If installation of the joint at mid-span of the beam is not possible, it shall be positioned between the loading points, as close as possible to mid-span. For vertically orientated columns, the protection system facing the web shall incorporate a joint at mid-height. Joints on flange sides shall be positioned as in practice. If the standard size of the board, slab or matt system (e.g. 3 m long) does not naturally allow incorporate joints on the flange sides, artificial joints shall be introduced at  $\frac{1}{4}$  and  $\frac{3}{4}$  of the exposed height of the column.
- Load beams and columns protected with a multi-layer protection system with staggered joints, the outer layer shall contain a joint at mid-span, or as close as possible to mid-span of the lower flange of the horizontally orientated beam. Outer layer joints on both sides shall be positioned as in practice. If the standard size of the board, slab or matt system (e.g. 3 m long) does not naturally allow incorporate joints on the sides, artificial joints shall be introduced in the outer layer at  $\frac{1}{4}$  and  $\frac{3}{4}$  of the exposed length of the beam. If installation of the joint in the outer layer at mid-span of the beam is not possible, it shall be positioned between the loading points, as close as possible to mid-span. For vertically orientated columns, an outer layer of the protection system facing the web shall incorporate a joint at mid-height. Outer layer joints on flange sides shall be positioned as in practice. If the standard size of the board, slab or matt system (e.g. 3 m long) does not naturally allow incorporate joints in the outer layer on the flange sides, artificial joints shall be introduced at  $\frac{1}{4}$  and  $\frac{3}{4}$  of the exposed height of the column. The remaining inner layers of a multi-layer board, slab or matt system shall be installed as in practice.

In all cases, inner and outer layer joints shall not be incorporated closer than 150mm to the loading points.