

MEMO 45	Dato: 26.10.2006	Sign.: pi
TSS / RVK	Siste rev.: 13.06.2018	Sign.: sss
FIRE RATING	Dok. nr.: K3-11/12E	Kontr.: tb
PLANNING		

FIRE RATING OF RVK AND TSS

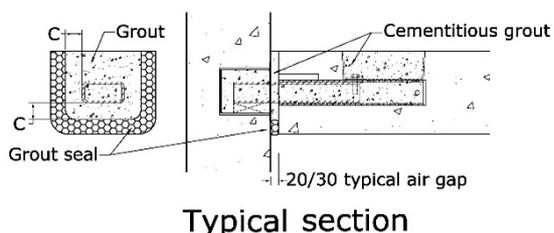
General

Stairwells are important escape routes and can also be designated as firefighting shafts, and for this reason their behaviour in a fire is important.

(Note: the structural assessment and design of the actual precast landings and flights is the responsibility of the Engineer and the precaster, and is not considered here).

RVK and TSS telescopic connectors act as short cantilever beams between the landing and the supporting walls. They bridge a small air gap, where they could be vulnerable to fire unless protective measures are taken. Normal practice (Invisible Connections' advice) is that the air gap is locally grouted using a flowable, cementitious non-shrink grout, which completely surrounds the connector, see typical section below. See also memo and video on our website under the technical manual, stair connections and manufacturing/assembly for further details.

EN 1994-1-2:2005 gives guidance on fire protecting a steel beam using concrete cover. The figures below are taken from table 4.3 of that standard.



Required fire resistance	R30	R60	R90	R120
Minimum cover 'C' mm	0	25	30	40

To achieve the required fire resistance, it is important that care is taken to ensure that the minimum cover 'C' is maintained all around the steel section which bridges the air gap. As the non-shrink grout is confined between the wall and the landing, within a narrow gap, then spalling under fire conditions is not considered to be a realistic concern.

Invisible Connections do not specify any particular manufacturer of grout, but it should be of good quality and pourable so that it flows into the air gap, the wall recess and the inner tube of the connector. The grout must also be capable of taking any imposed loads. Grout manufacturers typically confirm fire protection properties comparable to or exceeding that of concrete. If in doubt, consult with the grout manufacturer to confirm suitability.

Sometimes the inner tube of the connector is left exposed for visual/architectural reasons. In these cases, alternative measures must be taken to achieve the required fire rating. Most common amongst these is an intumescent coating applied to the inner tube. Guidance should be sought from manufacturers of such coatings to select a suitable treatment.

Note on US-practice/PCI advice:

The text below is an extract from the PCI-Journal , May-June 2000. This gives a different view on the requirements to fireprotection of TSS/RVK connections in stairways, and might be valid in some countries.

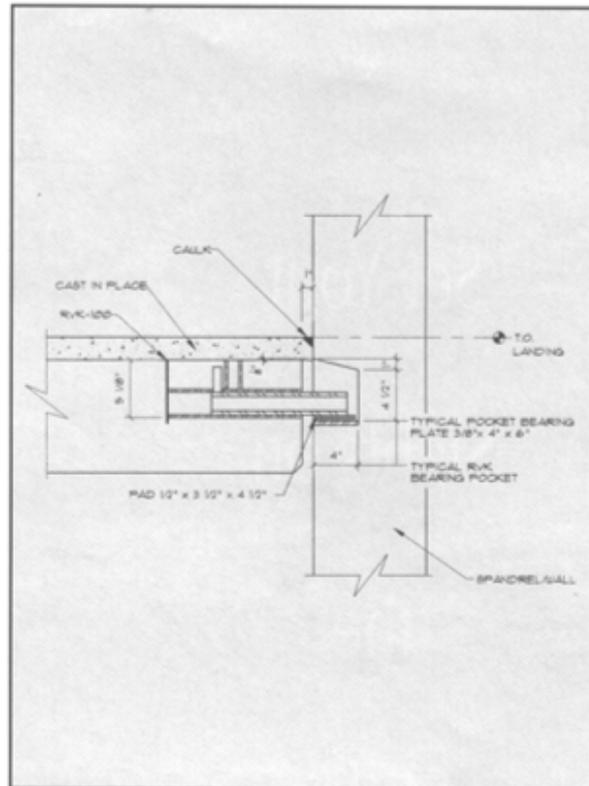
Q2: With reference to the stair connection detail shown on the right-hand page, does the slight exposure of the steel element making the connection have to be fire rated?

A2: The illustration shows how the landing is connected to the wall of a stair shaft. Notice that there is a slight gap between the landing and the wall. Assume that this is a two-hour shaft.

The answer to the question is that the steel element does not have to be fire rated. When a stair shaft is fire rated, it means that the inside of the shaft is being protected from a

fire outside the shaft. The walls of the shaft must be rated for two hours in this case, but nothing inside the shaft need be. The situation is analogous to walking up an unprotected steel stairway inside a stair shaft.

To further reinforce this concept, take a look at the Uniform Building Code (UBC), Chapter 6, of Volume 1. For Types I and II construction (this is for non-combustible construction), look at Section 602 (Type I) and Section 603 (Type II), and specifically those subsections addressing stairway construction. The provisions plainly state that stairway construction shall be "...of reinforced concrete, iron or steel with treads and risers of concrete, iron or steel." That's it! Non-combustible construction, but having no required fire rating. In Type III construction and beyond, the stairway construction may be of "...any material permitted by this code."



Typical "RVK" detail. (Courtesy: JVI, Inc.).