

# FIELDERS FACT FILE

FILE REFERENCE NUMBER: F.3.6B /// SEPT 2016

## FIRE DESIGN OF FIELDERS SLIMFLOR® CONSTRUCTION (CF210 SLAB)

This fact file assists designers with designing their Fielders CF210 slab for fire conditions.

When undertaking a fire design for a SlimFlor design both the slab and beam sections need to be considered. This fact file discusses the fire rating of the CF210 slab, for details on fire rating the Asymmetric Beams refer to Fielders Fact File F.3.6a.

### FIELDERS SLIMFLOR®

SlimFlor® utilises Fielders CF210 flooring profile in conjunction with Asymmetric Steel Beam Sections (ASB) to provide a floor system with a reduced construction zone. It does this by combining the floor slab and supporting structure in the same plane, providing a lightweight, versatile, long spanning floor system.

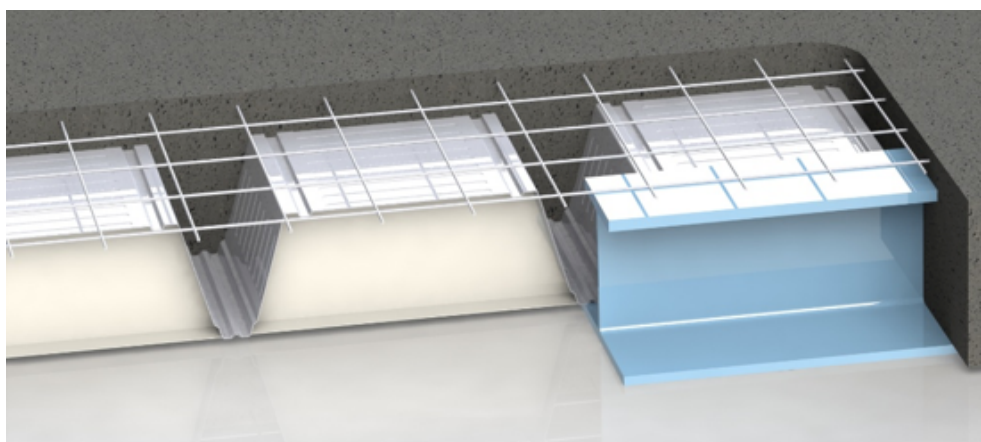


Figure F.3.5.1 Fielders SlimFlor®

### CF210® SLAB

One of the principal considerations governing the choice of slab depth is the required fire resistance level. Minimum depths in Table 3.6b.1 are given for normal density concrete (2400 kg/m<sup>3</sup> wet density) as a function of the fire resistance periods for insulation, integrity and fire resistance requirements.

| FRL (minutes) | Minimum Dcs (mm) |
|---------------|------------------|
| 60            | 280              |
| 90            | 290              |
| 120           | 305              |

Table F.3.6.1 CF210® Fire Resistance

### THE FIRE ENGINEERING METHOD

The capacity assessment in fire is based on a single or double layer of standard mesh at the top and one bar in each concrete rib. For CF210 the bar is placed at the centerline of the formed concrete rib with the distance to the bottom of the rib dependent on the required fire reinforcement. The distance must not be less than 70mm. To maximize fire resistance capacity, the axis distance needs to be 70mm, 90mm and 120mm (from the soffit of the deck) for 60, 90 and 120 minutes of fire resistance respectively. However, where fire resistance is not the limiting factor it may be more structurally effective for the axis distance to be at the minimum.

## FIRE COLLARS

Hilti's CP680 fire collars can be used to achieve a fire rating in penetrations of the slabs for services up to 4 hours. The fire rating level for various fire collar and pipe diameter configurations was assessed by the CSIRO. An extract from their report *Performance of Hilti CP690 N/S cast-in fire-stop collars in a KingFlor CF210 floor system* can be found in the Appendix to this fact file.



Figure F3.7b Hilti CP680 Fire Collar

## PROCESSING AND APPLICATION OF ZINCALUME® STEEL & TRUECORE® STEEL.

ZINCALUME® aluminium/zinc/magnesium alloy coated steel is supplied with a specially formulated clear resin file. TRUECORE® aluminium/zinc/alloy coated steel is supplied with a specially formulated blue resin film. Both films have very good impact resistance and flexibility and provide excellent resistance to hand marking.

While the use of resin files has significantly inherit benefits, its use necessitates specific recommendations associated with the processing of ZINCALUME® steel and TRUECORE® steel.

## STORING ZINCALUME® STEEL AND TRUECORE® STEEL.

It is recommended that ZINCALUME® steel and TRUECORE® steel are kept dry during transit and storage. Storage location should be off-ground and under cover to prevent water or condensation becoming trapped between adjacent surfaces. If storage packs become wet, separate sheets and wipe with a dry clean cloth and then place in a suitable position to enable air circulation to complete the drying process.

## FIELD PAINTING ZINCALUME® STEEL AND TRUECORE® STEEL.

ZINCALUME steel may be overpainted after installation. Ensure paint manufacturers' recommendations are followed. Appropriate consideration should also be given to environmental conditions, end use, location and product application.

## SLITTING ZINCALUME® STEEL AND TRUECORE® STEEL.

Where friction drag pads are used to maintain tension during slitting/recoiling resin dust can be generated. If drag pads are used the appropriate pad pressures should be used to minimise the frictional forces. Some lubricants and surface treatments can cause skin irritation or sensitisation. Skin contact should be avoided by wearing gloves. Good personal hygiene, which includes washing hands prior to eating or smoking, should be practiced.

## SEALING, FASTENING, JOINING AND WELDING ZINCALUME® STEEL AND TRUECORE® STEEL

There are specific recommendations for sealing, fastening, joining and welding ZINCALUME® steel and TRUECORE® steel. For full details please contact fielders on 1800 182 255.

## PLEASE CHECK WITH FIELDERS THAT YOU HAVE THE CURRENT FIELDERS FACT FILE FOR THIS TOPIC.

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## REFERENCES;

Lara-Ledermann, M, 2014, Performance of Hilti CP680 N/S cast-in fire-stop collars in a KingFlor CF210 floor system, FCO-3069, CSIRO, Infrastructure Technologies, North Ryde NSW.

*The product information presented in this brochure is intended as a guide only. It is recommended that you obtain qualified expert advice when seeking confirmation of product application. More comprehensive information can be sourced from Specifying Fielders - KingFlor Manual and KingFlor Designer Suite Software.*

## APPENDIX

Extract from "Performance of Hilti CP680 N/S cast-in fire-stop collars in a KingFlor CF210 floor system"

Table 1

| Material  | Pipe Nominal Diameter | Pipe Nominal Wall thickness | FRL Rating | Collar Size                        |
|-----------|-----------------------|-----------------------------|------------|------------------------------------|
| PVC       | 32 mm                 | 1.9 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PVC       | 40 mm                 | 2.0 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PVC       | 50 mm                 | 2.2 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PVC       | 65 mm                 | 2.7 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PVC       | 80 mm                 | 2.9 mm                      | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| PVC++^    | 100 mm                | 3.2 mm                      | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| PVC       | 100 mm                | 3.2 mm                      | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| PVC       | 150 mm                | 4.5 mm                      | -/240/240  | CP 680-160/6" N                    |
| PVC PN 12 | 32 mm                 | 2.2-2.6 mm                  | -/240/240  | CP 680-75/2.5" N                   |
| PVC PN 12 | 40 mm                 | 2.5-3.0 mm                  | -/240/240  | CP 680-75/2.5" N                   |
| PVC PN 12 | 50 mm                 | 3.1-3.6 mm                  | -/240/240  | CP 680-75/2.5" N                   |
| PVC PN 12 | 65 mm                 | 3.9-4.5 mm                  | -/240/240  | CP 680-75/2.5" N                   |
| PVC *     | 32 mm                 | 1.9 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PVC *     | 40 mm                 | 2.0 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PVC *     | 50 mm                 | 2.2 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PVC *     | 65 mm                 | 2.7 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PVC *     | 80 mm                 | 2.9 mm                      | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| PVC *++^  | 100 mm                | 3.2 mm                      | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| PVC *     | 100 mm                | 3.2 mm                      | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| PVC *     | 150 mm                | 4.5 mm                      | -/240/240  | CP 680-160/6" N                    |

APPENDIX - CONTINUED

Table 2

| Material | Pipe Nominal Diameter | Pipe Nominal Wall thickness | FRL Rating | Collar Size                        |
|----------|-----------------------|-----------------------------|------------|------------------------------------|
| PP       | 32 mm                 | 2.9 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PP       | 40 mm                 | 3.7mm                       | -/240/240  | CP 680-75/2.5" N                   |
| PP       | 50 mm                 | 4.6 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PP       | 63 mm                 | 5.8 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PP       | 75 mm                 | 6.8 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PP       | 90 mm                 | 8.2 mm                      | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| PP       | 110 mm                | 10.0 mm                     | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| PP-R     | 32 mm                 | 4.4 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PP-R     | 40 mm                 | 5.5 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PP-R     | 50 mm                 | 6.9 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PP-R     | 63 mm                 | 8.6 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| PP-R     | 75 mm                 | 10.3 mm                     | -/240/240  | CP 680-75/2.5" N                   |
| PP-R     | 90 mm                 | 12.3 mm                     | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| PP-R     | 110 mm                | 15.1mm                      | -/180/180  | CP 680-110/4" N or CP 680-110/4" S |
| Silere   | 110 mm                | 5.6 mm                      | -/240/240  | CP 680-110/4" N                    |
| HDPE     | 50 mm                 | 3.0 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| HDPE     | 56 mm                 | 3.0 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| HDPE     | 63 mm                 | 3.0 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| HDPE     | 75 mm                 | 3.0 mm                      | -/240/240  | CP 680-75/2.5" N                   |
| HDPE     | 90 mm                 | 3.5 mm                      | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |
| HDPE     | 110 mm                | 4.3 mm                      | -/240/240  | CP 680-110/4" N or CP 680-110/4" S |

APPENDIX - CONTINUED

Table 3 (floor waste)

| Material                         | Pipe Nominal Diameter | Pipe Nominal Wall thickness | FRL Rating | Collar Size              |
|----------------------------------|-----------------------|-----------------------------|------------|--------------------------|
| Floor waste uPVC*++              | 100 mm                | 3.2 mm                      | -/240/240  | CP 680-110/4"N/S + N-RAD |
| Floor waste 4 ways riser uPVC*++ | 100 mm                | 3.2 mm                      | -/240/240  | CP 680-110/4"N/S + N-RAD |
| uPVC                             | 50 mm                 | As per tested prototype     | -/240/240  | CP 680-75/2.5"N + N-RAD  |
| uPVC                             | 50 mm                 | As per tested prototype     | -/240/240  | CP 680-75/2.5"N + N-RAD  |

**Note:** (i) \* =Systems where the flange of the elbow was pushed / fitted inside the Hilti fire-stop collar CP 680 N/S.  
(ii) ++ = PVC sandwich type construction  
(iii)^= The annular gap between the pipe and the opening is backfilled with CP 611 A Intumescent Firestop mastic to a nominal depth of 10-mm as reported in WF145216 Issue 2, as shown in Appendix A.3.