

# Expert's opinion

## Egcodorn<sup>®</sup> N & Q

G13-042 | 14.04.2016 | english

Constructive fire protection

Tested by: Hegger + Partner Ingenieure GmbH, Aachen

Note: This is a translation of the German original document not examined by Hegger + Partner Ingenieure GmbH, Aachen

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## Expert's opinion - Short version -

### Constructive fire protection by Max Frank Egcodorns

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## 1 Reason and objective

Max Frank GmbH & Co KG has commissioned the Ingenieurbüro H + P Ingenieure GmbH with the provision of an expert's opinion on the structural fire protection of shear force dowel connections using Egcodorn N and Egcodorn Q.

Max Frank GmbH & Co KG already possesses the national technical approval no. DIBt Z-15.7-301 for the Egcodorn, which is used as a shear force dowel in reinforced concrete construction. Following the expert's opinion issued by the Materials Testing Institute (MPA) of the Technical University of Braunschweig, a fire resistance duration F120 has been stated for the Max Frank Egcodorns by means of preliminary fire tests based on DIN DIN 4102-4 and DIN 4102-22.

In our expert's opinion G13-042 of 26/08/2013 we will review whether the previous classification can be retained against the backdrop of the current Eurocode DIN EN 1992-1-2. In this short version of the expert's opinion only the application is described and the result of the review summarised.

## **2 Description of the construction**

### **2.1 General information**

Shear force dowels are designed for transmitting shear forces in structural joints between steel reinforced concrete components. The Egcodorn N or Q consists of a mandrel part and an associated sleeve part, which are equipped with an anchor body for the transmission of the load into the concrete. The anchor body consists of a front washer and two differently bent loop-type stirrups.

The Egcodorns are manufactured as standard types 40, 50, 70, 95, 100, 120, 150, 170, 210, 300 and 350, each as moveable along centre-line N version and as moveable along centre-line and transversely Q version. In the case of the Egcodorn N, the sleeve is the round counterpart to the mandrel, so that movements are possible only in the direction of the centre axis of the mandrel. In the case of the Egcodorn Q, the sleeve part is manufactured as a rectangular sleeve, so that adjustment perpendicular to the longitudinal axis of the mandrel is additionally possible.

The maximum joint width between the components to be joined is 60 mm. Use is restricted to normal concrete of a strength class greater than or equal to C20/25.

[...]

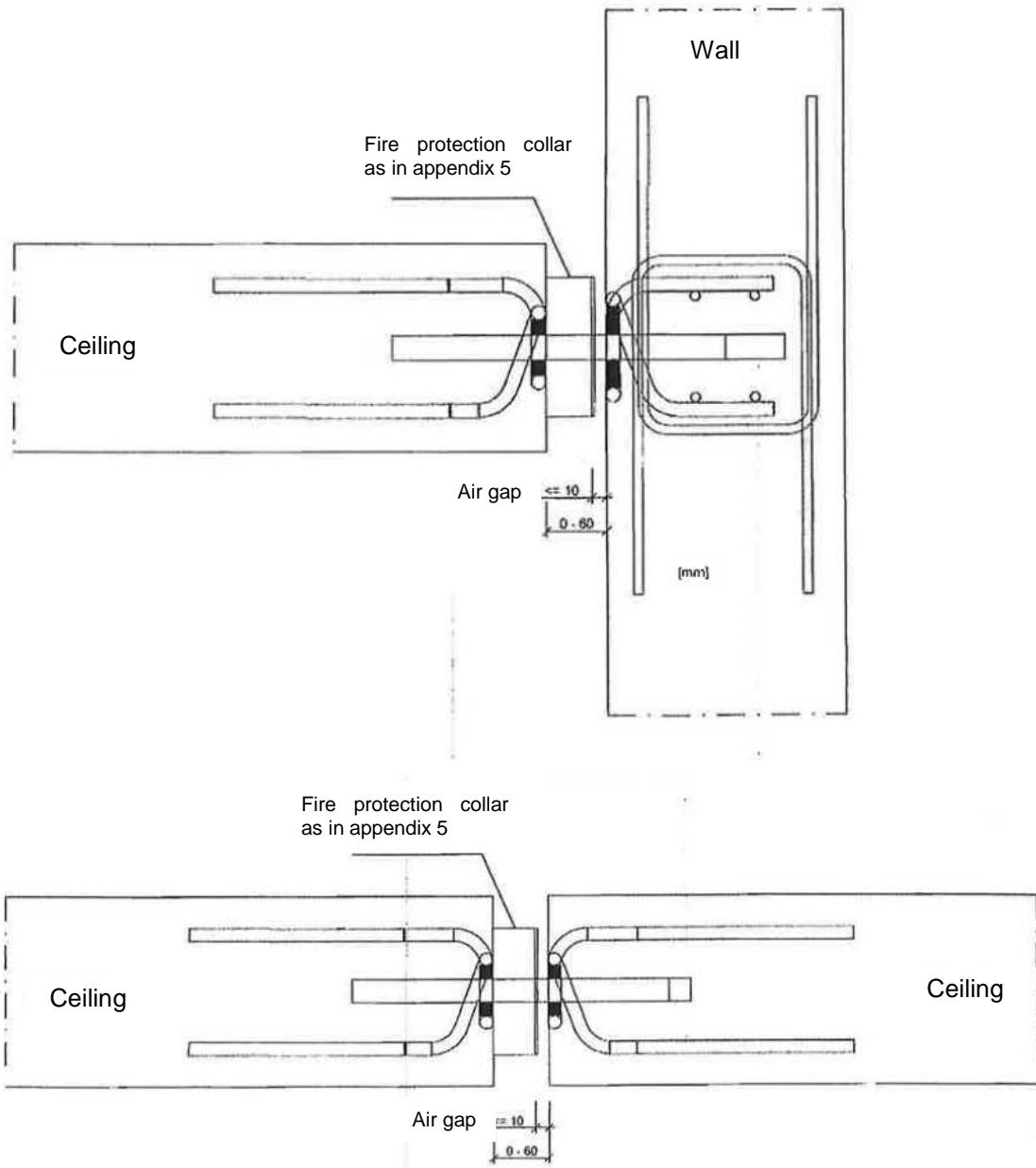


Figure 2.1: Location of the fire protection collar

[...]

## 5. Summary

In our expert's opinion G13-042 of 26/08/2013, the structural fire protection of steel reinforced concrete components using shear force dowels of the type Egcodorn from Max Frank is assessed on the basis of Eurocode 2-1-2. In accordance with the previous classification by the TU Braunschweig into fire resistance class F120, the dowels can be classified in fire resistance class R120 if

- (1.) the table values in accordance with Section 5 of Eurocode 2 DIN EN 1992-1-2 are used for the adjacent walls and slabs and
- (2.) the special notes from the expert's opinion of the TU Braunschweig [1] and [2] are observed.

Aachen, 14/04/2016

Dr.-Ing. Wolfgang Roeser

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### Documents used (excerpt)

- [1] Mertin/Schmieder: Expert's opinion on the fire behaviour of steel reinforced concrete components in connection with "egcodorn" and "egcodübel" shear force dowels and "egcotritt" stair landings in case of multi-sided exposure to fire following the standard time/temperature curve according to DIN 4102-2:1977-09 based on DIN 4102-4:1994-03, as well as the results of a preliminary fire test of "egcodorn" shear force dowels and "egcotritt" stair landings; Materials Testing Institute(MPA) Braunschweig, Braunschweig, 12/09/2006, letter 14649/2006
- [2] Rohling/Schmieder: Expert's opinion on the fire behaviour of steel reinforced concrete components in connection with "egcodorn" and "egcodübel" shear force dowels and "egcotritt" stair landings in case of multi-sided exposure to fire following the standard time/temperature curve according to 4102-2:1977-09 based on DIN 4102-4:1994-03, as well as the results of a preliminary fire test of "egcodorn" shear force dowels and "egcotritt" stair landings; Materials Testing Institute(MPA) Braunschweig, Braunschweig, 30/03/2012, letter 6,594/2006