

MEMO 522a

BSF 225

EXAMPLE: REINFORCEMENT IN BEAM

END WITH MAXIMUM LOAD 225kN

DESIGN

Date: 17.04.2013

Last rev.: 13.11.2018

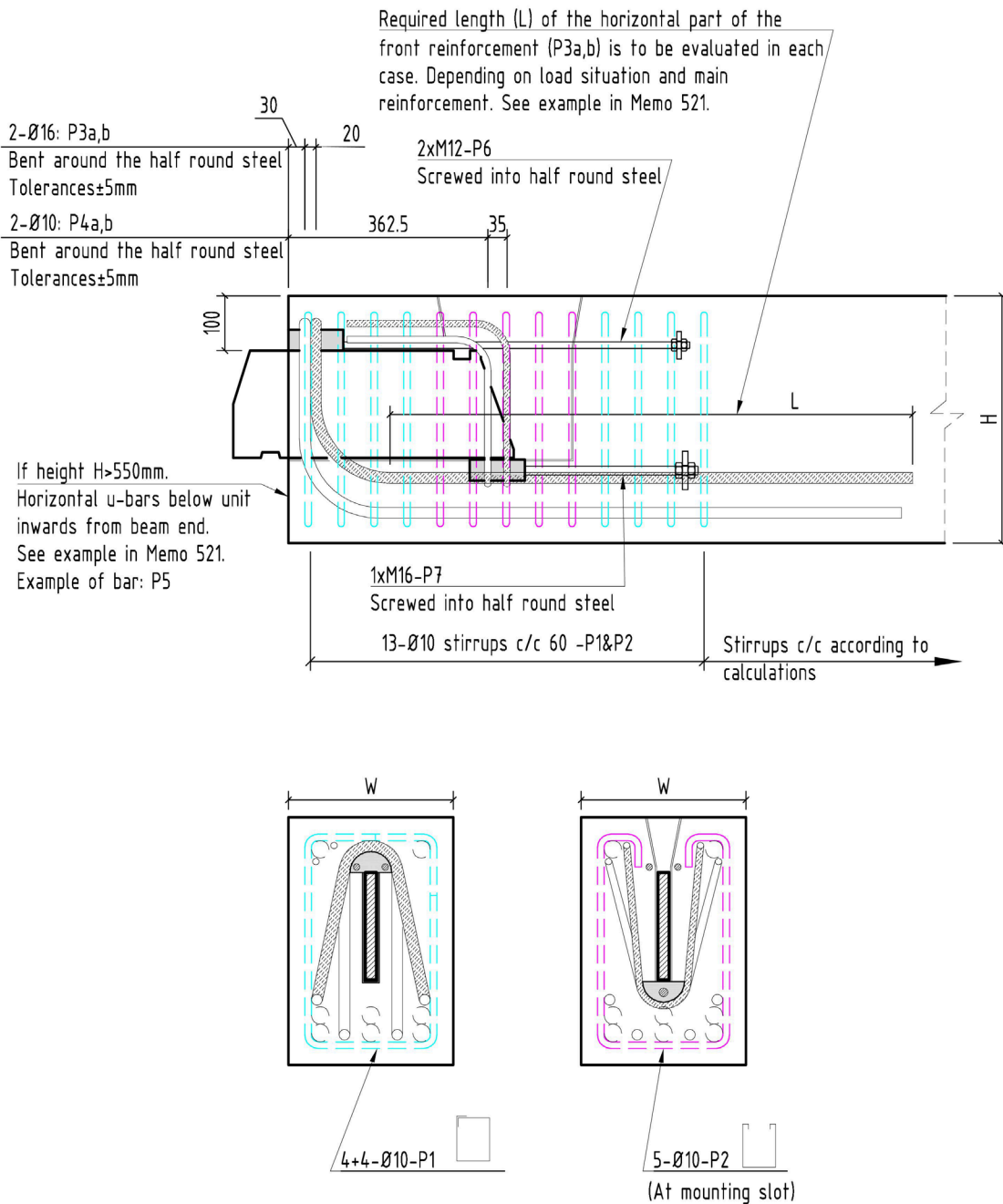
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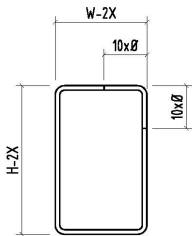
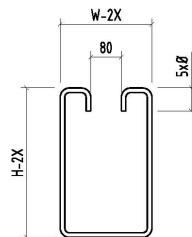
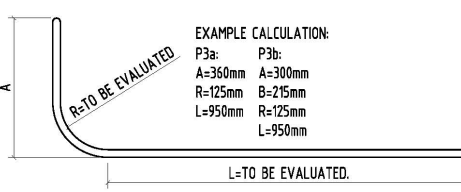
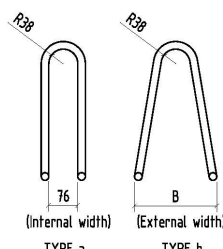
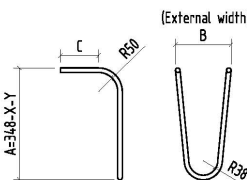
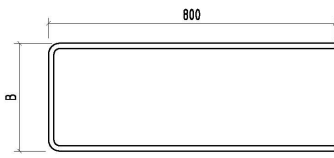
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## **EXAMPLE: BSF 225 - REINFORCEMENT IN BEAM END WITH MAXIMUM LOAD 225kN**



**Figure 1: Reinforcement in beam end.**

The basis for the illustrated reinforcement is found in the example calculations in Memo 521. The amount of reinforcement and final shape of several of the bars must be evaluated in each case. This can be done according to the procedures outlined in the Memo. Concrete quality C35 and beam dimension:  $W \times H = 300 \times 450$  is used in the example calculation. This corresponds to the approximate minimum cross section of the beam in order to utilize the full capacity of the unit.

| Pos.  | Ø   | No. pr. unit | Bar schedule  | Grade                        |
|-------|-----|--------------|---|------------------------------|
| P1    | Ø10 | 8            |  <p>X= CONCRETE COVER<br/>EXAMPLE CALCULATION:<br/>H-2X=450-2x30=390mm<br/>W-2X=300-2x30=240mm<br/>10Ø=100mm</p>   | 500C (EC2, Annex C)          |
| P2    | Ø10 | 5            |  <p>X= CONCRETE COVER<br/>EXAMPLE CALCULATION:<br/>H-2X=450-2x30=390mm<br/>W-2X=300-2x30=240mm<br/>5Ø=50mm</p>   | 500C (EC2, Annex C)          |
| P3a,b | Ø16 | 1+1          |  <p>EXAMPLE CALCULATION:<br/>P3a: A=360mm R=125mm L=950mm<br/>P3b: A=300mm B=215mm R=125mm L=950mm</p> <p>R=TO BE EVALUATED.<br/>L=TO BE EVALUATED.</p>  <p>(Internal width) TYPE a (External width) TYPE b</p> | 500C (EC2, Annex C)          |
| P4a,b | Ø10 | 1+1          |  <p>(External width) B</p> <p>EXAMPLE CALCULATION:<br/>P4a: A=275mm B=210mm C=200mm<br/>P4b: A=300mm B=145mm C=235mm</p> <p>X= CONCRETE COVER<br/>Y= TO BE DECIDED</p>   | 500C (EC2, Annex C)          |
| P5    | Ø12 |              |  <p>In beams with H&gt;550mm. Number to be decided.<br/>B to be decided.</p>   | 500C (EC2, Annex C)          |
| P6    | M12 | 2            | Threaded bar. Length = 650 mm<br>With plate 50x50x8 and 2 nuts, one on each side of plate.  | Thr. bar: 8.8<br>Plate: S355 |
| P7    | M16 | 1            | Threaded bar. Length = 350 mm<br>With plate 70x70x10 and 2 nuts, one on each side of plate.   | Thr. bar: 8.8<br>Plate: S355 |

**Table 1: List of reinforcement.**

| REVISION HISTORY |   |
|------------------|---|
| Date:            | Description:  |
| 17.04.2013       | First Edition (for ETA)   |
| 12.06.2013       | Updated before ETA. Corrected reinforcement quality notation from: B500C to 500C.   |
| 28.08.2013       | Included revision signature.  |
| 27.02.2015       | Included a nut on the front side of the steel plate anchoring the threaded bars. (To ensure correct position of the plate when casting the concrete). |
| 24.05.2016       | New template  |
| 13.11.2018       | Included threaded bars in list of reinforcement   |