

MEMO 522c

BSF 450

EXAMPLE: REINFORCEMENT IN BEAM

END WITH MAXIMUM LOAD 450kN

DESIGN

Date: 17.04.2013

Last rev.: 13.11.2018

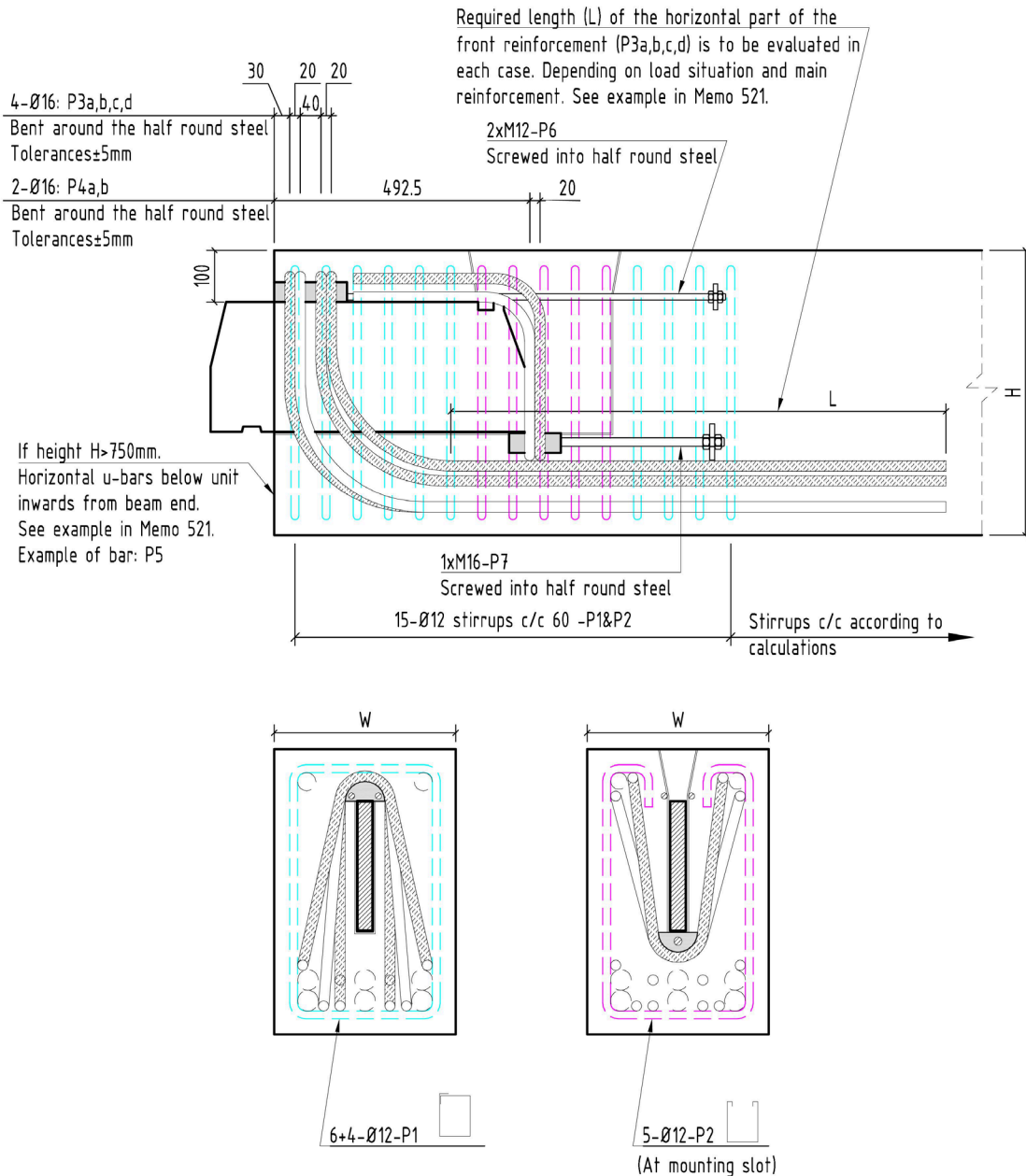
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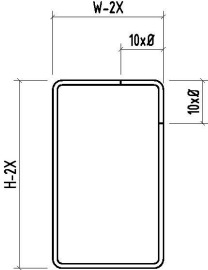
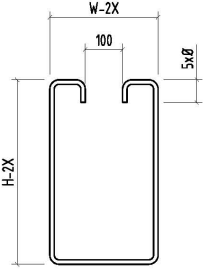
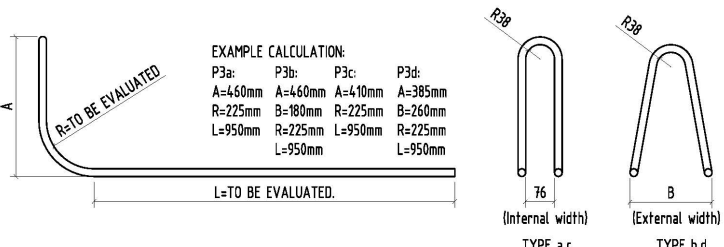
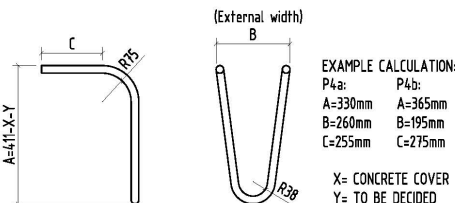
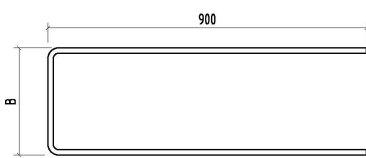
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## **EXAMPLE: BSF 450 - REINFORCEMENT IN BEAM END WITH MAXIMUM LOAD 450kN**



**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 has to be evaluated in each case. This can be done according to the procedures outlined in the Memo. Concrete quality C35 and beam dimension:  $W \times H = 350 \times 550$  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	Ø12	10	 <p>X= CONCRETE COVER EXAMPLE CALCULATION: H-2X=550-2x30=490mm W-2X=350-2x30=290mm 10Ø=120mm</p>	500C (EC2, Annex C)																				
P2	Ø12	5	 <p>X= CONCRETE COVER EXAMPLE CALCULATION: H-2X=550-2x30=490mm W-2X=350-2x30=290mm 5Ø=60mm</p>	500C (EC2, Annex C)																				
P3a,b,c,d	Ø16	1+1+1+1	 <p>EXAMPLE CALCULATION:</p> <table border="1"> <tr> <td>P3a:</td> <td>P3b:</td> <td>P3c:</td> <td>P3d:</td> </tr> <tr> <td>A=460mm</td> <td>A=460mm</td> <td>A=410mm</td> <td>A=385mm</td> </tr> <tr> <td>R=225mm</td> <td>B=180mm</td> <td>R=225mm</td> <td>B=260mm</td> </tr> <tr> <td>L=950mm</td> <td>R=225mm</td> <td>L=950mm</td> <td>R=225mm</td> </tr> <tr> <td></td> <td>L=950mm</td> <td>L=950mm</td> <td>L=950mm</td> </tr> </table> <p>L=TO BE EVALUATED.</p> <p>(Internal width) 76 TYPE a,c (External width) B TYPE b,d</p>	P3a:	P3b:	P3c:	P3d:	A=460mm	A=460mm	A=410mm	A=385mm	R=225mm	B=180mm	R=225mm	B=260mm	L=950mm	R=225mm	L=950mm	R=225mm		L=950mm	L=950mm	L=950mm	500C (EC2, Annex C)
P3a:	P3b:	P3c:	P3d:																					
A=460mm	A=460mm	A=410mm	A=385mm																					
R=225mm	B=180mm	R=225mm	B=260mm																					
L=950mm	R=225mm	L=950mm	R=225mm																					
	L=950mm	L=950mm	L=950mm																					
P4a,b	Ø16	1+1	 <p>(External width) B</p> <p>EXAMPLE CALCULATION:</p> <table border="1"> <tr> <td>P4a:</td> <td>P4b:</td> </tr> <tr> <td>A=330mm</td> <td>A=365mm</td> </tr> <tr> <td>B=260mm</td> <td>B=195mm</td> </tr> <tr> <td>C=255mm</td> <td>C=275mm</td> </tr> </table> <p>X= CONCRETE COVER Y= TO BE DECIDED</p>	P4a:	P4b:	A=330mm	A=365mm	B=260mm	B=195mm	C=255mm	C=275mm	500C (EC2, Annex C)												
P4a:	P4b:																							
A=330mm	A=365mm																							
B=260mm	B=195mm																							
C=255mm	C=275mm																							
P5	Ø12		 <p>In beams with H&gt;750mm. Number to be decided.</p>	500C (EC2, Annex C)																				
P6	M12	2	Threaded bar. Length = 750 mm With plate 50x50x8 and 2 nuts, one on each side of plate.	Thr. bar: 8.8 Plate: S355																				
P7	M16	1	Threaded bar. Length = 350 mm With plate 70x70x10 and 2 nuts, one on each side of plate.	Thr. bar: 8.8 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