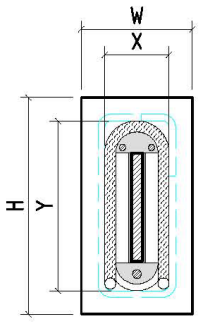
MEMO 501

MEMO 501 BSF - NOMINAL CAPACITIES AND APPROXIMATE MINIMUM BEAM AND COLUMN DIMENSIONS PLANNING	Dato: Siste rev.: Dok. nr.:	17.04.2013 14.02.2020 K4-10/501E	Sign.: Sign.: Kontr.:	sss sss ps

BSF - NOMINAL CAPACITIES AND APPROXIMATE MINIMUM BEAM AND COLUMN DIMENSIONS

Table 1: Nominal capacities and approximate minimum beam dimensions

UNIT	MAX VERTICAL ULTIMATE LIMIT LOAD ON UNIT, SEE NOTE [1] [kN]	APPROXIMATE ABSOLUTE MINIMUM BEAM DIMENSION TO ALLOW FOR SPACE OF THE UNIT, SEE NOTE [2]		
		W×H [MM]	X [MM]	Y [MM]
BSF225	225	190×370	≈116mm	≈306mm
BSF300	300	190×420	≈116mm	≈349mm
BSF450	450	190×440	≈116mm	≈369mm
BSF700	700	310×500	≈239mm	≈424mm
BSF1100	1100	310x590	≈239mm	≈518mm



The absolute minimum beam dimension to allow for space of the unit is found as:

$W = X + 2\times Ø_{strirrup} + 2\times$ Concrete cover.

Where; $X = Ø_{Half\ round\ steel\ in\ front} + 2\times Ø_{anchoring\ bar\ in\ front}$

$H = Y + 2\times Ø_{strirrup} + 2\times$ Concrete cover.

Where; $Y = Ø_{anchoring\ bar\ in\ front} + Ø_{Half\ round\ steel\ in\ front}/2 + h_{knife}$ + Clearance + $Ø_{Half\ round\ steel\ at\ back}$ + $Ø_{anchoring\ bar\ at\ back}$

Note: The shape of the half round steel on the BSF700 and BSF1100 units is optimized around the knife. Thus, the formula for calculation of "H" will somewhat differ.

Assumed:

- Concrete cover: 20mm
- BSF225: $Ø_{stirrup}$=10mm
- BSF300/450/700/1100: $Ø_{stirrup}$=12mm

[1] The given values represent the capacity of the steel units calculated with use of the following National Determined Parameters:

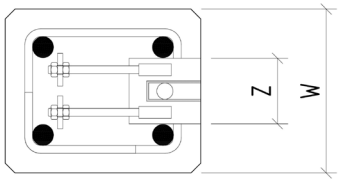
NDPs in EN 1993-1-1	γ_{M0}	γ_{M1}	γ_{M2}
Value	1,1	1,1	1,25

NDPs in EN 1992-1-1	γ_C	γ_S	α_{cc}	α_{ct}
Value	1,5	1,15	0,85	0,85

[2] Capacity of the beam will limit the allowable load on the unit. The standard suspension reinforcement will not fit into a beam with the minimum dimension. A final evaluation of beam dimensions, reinforcement and capacity shall be done by qualified engineer in each case. Appropriate reinforcement in the beam end may be found by following the guidelines in the memos. A spreadsheet for help in these evaluations can be downloaded for free use from: www.invisibleconnections.no.

APPROXIMATE MINIMUM COLUMN DIMENSIONS

Table 2: Approximate minimum column dimensions

UNIT	Z [MM]	APPROXIMATE ABSOLUTE MINIMUM COLUMN WIDTH TO ALLOW FOR SPACE OF THE UNIT, SEE NOTE [3] W [MM]
BSF225	110	240
BSF300	150	280
BSF450	180	330
BSF700	200	350
BSF1100	250	400
	The minimum column width (W) to allow for space of the unit is found as: $W=Z+2\times Ø_{stirrup}+2\times Ø_{main}+2\times$Concrete cover. *Assumed:* • Concrete cover: 20mm • BSF225/300/450/700: $Ø_{stirrup}$=10mm • BSF1100: $Ø_{stirrup}$=12mm • BSF225/300: $Ø_{main}$=25mm • BSF450/700/1100: $Ø_{main}$=32mm	

[3] The capacity of the column itself is not evaluated. The given values are only informative, as the size of the main reinforcement, stirrups and concrete cover will vary.

REVISION HISTORY	
Date:	**Description:**
17.04.2013	First Edition (for ETA)
Not dated	Updated before ETA. Updated text in footnotes, among other included a table of NDP's.
19.09.2013	Increased font on references to footnotes. Included revision date and signature.
05.11.2013	Updated – included comments from external review. Included X,Y and Z values.
30.04.2014	Recommended minimum beam dimension for utilization of the unit removed.
26.06.2014	Values for BSF700 changed due to change of half round steel. Formula for Y updated.
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).
23.05.2016	New template
01.11.2018	Included BSF1100
14.02.2020	Column unit changed. Allowing for increased tolerances