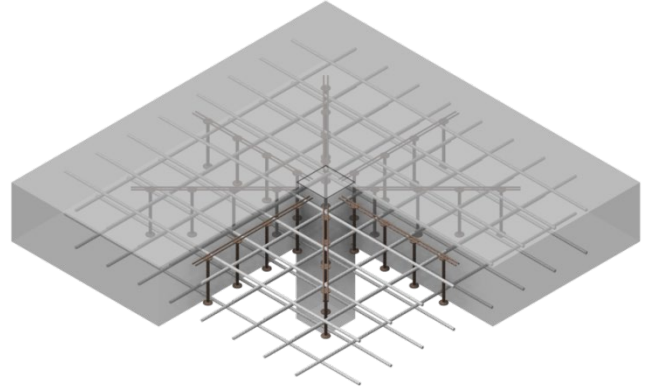




## TECHNICAL DATA SHEET

### FBD PUNCHING SHEAR REINFORCEMENT



#### PRODUCT DESCRIPTION

FBD steel bolts take the form of steel rods with plate-like endings. The rods are made of ribbed steel rods, with a diameter of  $\varnothing 10 \text{ mm} \pm \varnothing 32 \text{ mm}$ , with a specific yield strength of  $f_{yk} \geq 500 \text{ MPa}$  and a specific tensile strength of  $f_{uk} \geq 550 \text{ MPa}$ , ductility classes B or C. The mounting rods have diameters between  $\varnothing 4 \pm \varnothing 10$  and are made of smooth or ribbed steel, with a specific yield strength  $f_{yk} \geq 235 \text{ MPa}$ . The installation battens/ profiles are made of steel, with a specific yield strength of  $f_{yk} \geq 235 \text{ MPa}$  and are dimensioned at  $(25+50) \times (3+5) \text{ mm}$ .

#### APPLICATION

FBD rods are foreseen for application as components of rebar transferring shear forces in reinforced concrete ceiling plate, reinforced concrete foundation plates and in spot foundations, at point support spots in order to increase punching shear strength. FBD steel rods can be used in reinforced concrete ceiling plates and reinforced concrete foundation plates with thicknesses not below 18 cm, made of C20/25+C50/60 concrete per PN-EN 206+A2:2021.

#### MODE OF INSTALLATION/ USAGE

The components have to be installed considering their distribution in the execution design. It is possible to install the sets 'from above' after completion of the full reinforcement mesh. It is also possible to rest the punching shear reinforcement in reverse – on plastic or concrete spacers. Before concreting, the rods must be tied to the rebar mesh with tie wire.

#### STORAGE / TRANSPORT

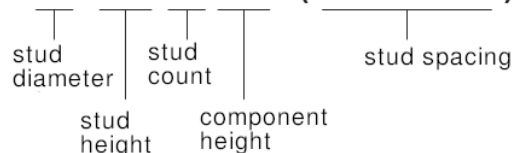
The steel bolts are packed in bulk split by type, protected against damage, stabilised and loaded onto pallets or wooden crates.

#### REFERENCE DOCUMENTS

- Catalogue: *Concrete reinforcement systems*
- Polish National Technical Assessment of the Polish Institute of Building Technology
- Polish Declaration of Performance of the Polish Institute of Building Technology.

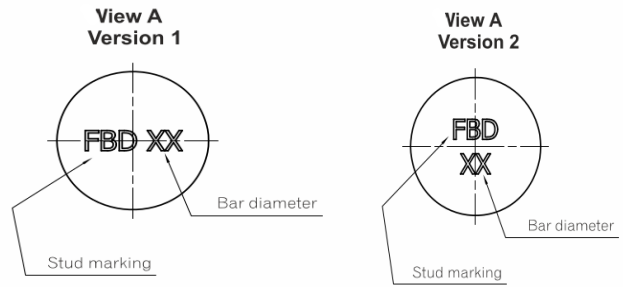
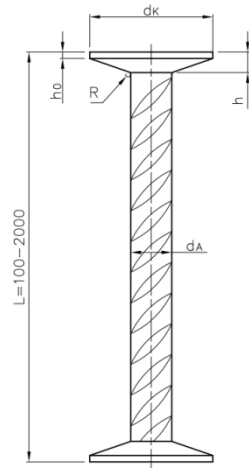
#### Example designation

**FBD 10/175-2/260 (65/130/65)**



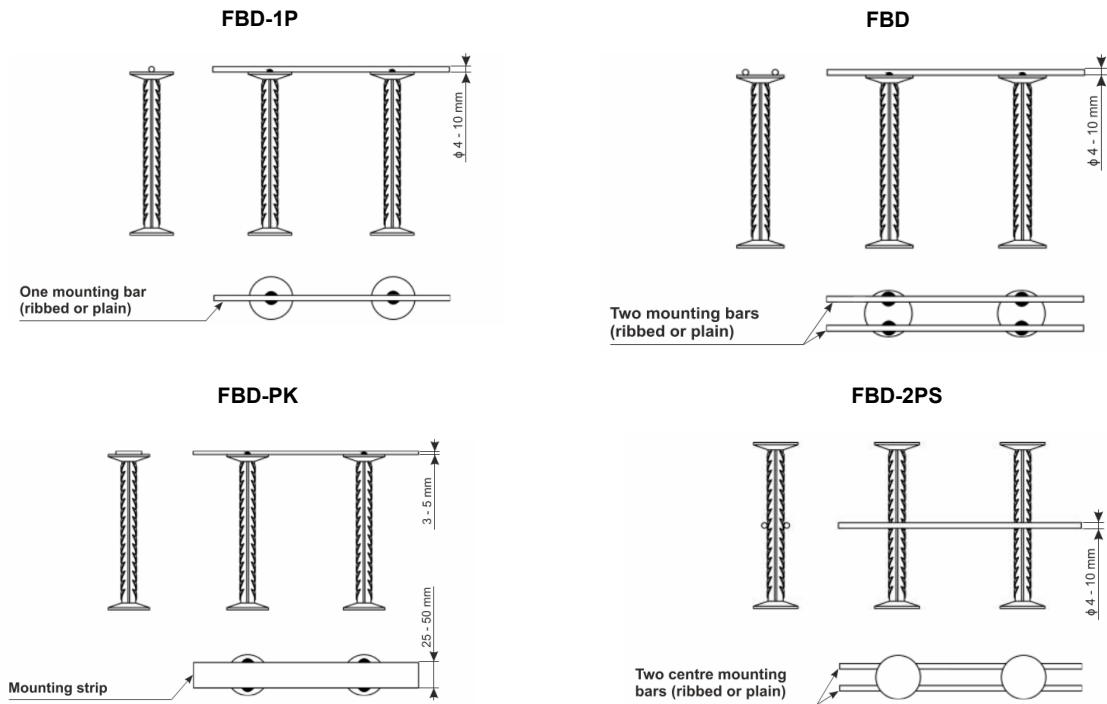
### TECHNICAL AND RETAIL DATA

No.	Fundamental properties	Usable properties	Assessment method
1	Yield strength $R_e$ , MPa	$\geq 500$	PN-EN ISO 6892-1:2016
2	Tensile strength $R_m$ , MPa	$\geq 550$	
3	$R_m/R_e$ ratio	$\geq 1.05$	
4	Total elongation at maximum elongation force $A_{gt}$ , %	$\geq 2.5$	
5	Fire reaction class	A1	PN-EN 13501-1:2019 European Commission Decision 96/603/EC (as amended)



No.	Stud diameter $\varnothing d_A$ , mm	Head diameter $\varnothing d_K$ , mm	Head height $h$ , mm	Head height $h_0$ , mm	Stud diameter $A$ , mm <sup>2</sup>	Load $F_{Rd}$ , kN (safety 1.15)
1	10	30 (+ 2 / - 1)	5 (+ 1)	2 (+ 1)	78.54	34.1
2	12	36 (+ 2 / - 1)	6 (+ 1.5)	2.5 (+ 1.5)	113.10	49.2
3	14	42 (+ 3 / - 1)	7 (+ 2.5)	3 (+ 2)	153.94	66.9
4	16	48 (+ 3 / - 1)	8 (+ 2.5)	3 (+ 2.5)	201.06	87.4
5	18	54 (+ 3 / - 1)	8,5 (+ 3)	3 (+ 3)	254.47	110.6
6	20	60 (+ 3 / - 1)	10 (+ 3)	3 (+ 3)	314.16	136.6
7	22	66 (+ 4 / - 1)	11 (+ 3.5)	3 (+ 3)	380.13	165.3
8	25	75 (+ 4 / - 1)	12 (+ 3.5)	3.5 (+ 3.5)	490.87	213.4
9	28	84 (+ 5 / - 1)	16 (+ 4)	4 (+ 4)	615.75	267.7
10	32	96 (+ 5 / - 1)	17 (+ 4)	4.5 (+ 4)	804.25	349.7

Length tolerance  $L: \pm 5$  mm  
 $d_K = 3 \cdot d_A$



2022.07.07/130

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