

Technical data sheet

Steel fibers with hooked ends



Steel fibers with hooked ends are filaments of steel wire for reinforcement of concrete and mortar. For manufacturing wire fibers are using wires of different diameters deformed and cut to lengths.

Steel fibers reinforcement is widely used as the main and unique reinforcing for industrial concrete floor slabs, shotcrete, prefabricated concrete products, slabs on piles, tunnel segments, concrete cellars, foundation slabs, and shear reinforcement in prestressed elements.

Steel fibers improve the mechanical properties concrete and materials such as ductility, durability, energy absorption, fatigue, and toughness. This fiber helps to controls plastic shrinkage cracking in concrete; helps reduce or eliminate need for conventional reinforcement.

Designation	Length (mm)	Diameter (mm)	Aspect ratio L/d	Cross section	Tensile strength of drawn wire
ZS/N 0.60 x 35	35 ± 5%	0.60 ± 5%	58	round	1100- 1400 N/mm ²

PERFORMANCE

ZS/N 0.60 x 35	Class	C20/25		C25/30		C30/37		C32/40		C35/45		C40/50		C45/55		
		$f_{ctm,fl}$	3.5	4.1		4.6		4.8		5.1		5.6		6.1		
Dosage [kg/m ³]	$R_{e,3}$ %	$R_{10,30}$ %	$f_{e,3}$ [Mpa]	$f_{10,30}$ [Mpa]	$f_{e,3}$ [Mpa]	$f_{10,30}$ [Mpa]	$f_{e,3}$ [Mpa]	$f_{10,30}$ [Mpa]	$f_{e,3}$ [Mpa]	$f_{10,30}$ [Mpa]	$f_{e,3}$ [Mpa]	$f_{10,30}$ [Mpa]	$f_{e,3}$ [Mpa]	$f_{10,30}$ [Mpa]	$f_{e,3}$ [Mpa]	$f_{10,30}$ [Mpa]
15	30	33	1.1	1.2	1.2	1.4	1.4	1.5	1.4	1.6	1.5	1.7	1.7	1.9	1.8	2.0
20	38	42	1.3	1.5	1.5	1.7	1.7	1.9	1.8	2.0	1.9	2.1	2.1	2.3	2.3	2.5
25	45	49	1.6	1.7	1.8	2.0	2.1	2.3	2.2	2.4	2.3	2.5	2.5	2.8	2.7	3.0
30	52	57	1.8	2.0	2.1	2.3	2.4	2.6	2.5	2.8	2.7	2.9	2.9	3.2	3.2	3.5
35	58	63	2.1	2.2	2.4	2.6	2.7	2.9	2.8	3.1	3.0	3.2	3.3	3.5	3.5	3.8
40	63	69	2.2	2.4	2.6	2.8	2.9	3.2	3.1	3.3	3.3	3.5	3.6	3.9	3.8	4.2
45	69	75	2.5	2.7	2.9	3.1	3.2	3.5	3.4	3.6	3.6	3.9	3.9	4.2	4.2	4.6
50	74	80	2.6	2.8	3.0	3.3	3.4	3.7	3.6	3.9	3.8	4.1	4.2	4.5	4.5	4.8

For concrete compressive strengths not exceeding $f_c' = 45 \text{ MPa}$ (concrete class C45/55)

$f_{ctm,fl}$ - mean flexural tensile strength of plain concrete to EN 1992-1-1

$R_{e,3}$ - equivalent flexural ratio at total deflection of 3mm to JSCE

$f_{e,3}$ - equivalent flexural strength to JSCE, [$f_{e,3} = f_{ctm,fl} \cdot R_{e,3} / 100$]

$R_{10,30}$ - toughness ratio of toughness indices I_{10} and I_{30} to ASTM C1018, [$R_{10,30} = 100 \cdot (I_{30} - I_{10})_{SFR} / (I_{30} - I_{10})_{EP}$]

$f_{10,30}$ - mean flexural stress between 5.5 δ and 15.5 δ deflections to ASTM C1018, [$f_{10,30} = f_{ctm,fl} \cdot R_{10,30} / 100$]

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DOSAGE

Recommended dosage of steel fiber is 25 kg per 1m³ of concrete for 0,5 CMOD.

PACKING

Steel fibers with hooked ends are available in paper sacks of 20 kg. Pallet weight 1000 kg or 2000 kg. Palettes are wrapped in PVC foil.

COMPLIANCE

Steel fibers conform to EN 14889-1:2006.
Product certificated by Tsus, certificate No. 1301 – CPR- 0662

The above-mentioned values are indicative and are provided without any guarantee. Tornado Plus does not assume any responsibility resulting from the applications of these data. All reports are available for consultations.

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