

Low-carbon steel wire

Raw materials and processing techniques

The raw material for high-tensile wire is wire rods or bars with a diameter range 5.0–10.0 mm, made from the following low-carbon steel grades:

- st0, 1kp, 1ps, 1sp, 2kp, 2ps, 2sp, 3kp, 3ps, 3sp to TU¹⁾ 14-1-5283-94 “Wire rods from quality carbon steel for wire drawing”;
- 05kp, 08kp, 08ps, 08, 10kp, 10, 20 to GOST 1050-88 “Cold-formed and cold-finished bars and rods with special surface finish from quality structural carbon steel”;
- SAE 1006, SAE 1008 by ASTM A 510M;
- Sv08, Sv08A, Sv08AA, Sv08GA, Sv10GA to TU 14-1-4760-89 “Wire rods from carbon steel for electrode-making and arc-welding wire production”;
- Sv08G2S to TU 14-1-2203-77 “Wire rods from alloy and high-alloy steel for arc-welding wire production”.

The chemical composition of the processed steel grades is given in Table 1.

Low-carbon steel wire is produced with a diameter range 0.25–8-8 mm, using multiple cold drawing and heat treatment technique. Alternation of these operations is defined by the requirements and specifications on the finished products.

Dimensions and tolerances are given in each standard for a specific wire type.

The wire is shipped in bundles with a weight of up to 120 kg, in super-sized bundles with a weight of up to 1300 kg, and in rosette coils with a weight of up to 1000 kg.

The overall dimensions and weight of wire bundles are given in Table 2.

Grades and chemical composition of the low-carbon steel

Table 1.

Steel grade	Elements mass percent, %							
	C	Mn	Si	Ph	S	Cr	Ni	Cu
				not exceeding				
St0	not exc. 0.23	–	–	0.070	0.060	–	–	–
St1kp	0.06–0.12	0.25–0.50	not exc. 0.05	0.040	0.050	0.30	0.30	0.30
St1ps	0.06–0.12	0.25–0.50	0.05–0.15	0.040	0.050	0.30	0.30	0.30
St1sp	0.06–0.12	0.25–0.50	0.15–0.30	0.040	0.050	0.30	0.30	0.30
St2kp	0.09–0.15	0.25–0.50	not exc. 0.05	0.040	0.050	0.30	0.30	0.30
St2ps	0.09–0.15	0.25–0.50	0.05–0.15	0.040	0.050	0.30	0.30	0.30
St2sp	0.09–0.15	0.25–0.50	0.15–0.30	0.040	0.050	0.30	0.30	0.30
St3kp	0.14–0.22	0.30–0.60	not exc. 0.05	0.040	0.050	0.30	0.30	0.30
St3ps	0.14–0.22	0.40–0.65	0.05–0.15	0.040	0.050	0.30	0.30	0.30
St3sp	0.14–0.22	0.40–0.65	0.15–0.30	0.040	0.050	0.30	0.30	0.30
St05kp	not exc. 0.06	not exc. 0.40	not exc. 0.03	0.035	0.040	0.10	0.30	0.30
St08kp	0.05–0.12	0.25–0.50	not exc. 0.03	0.035	0.040	0.10	0.30	0.30
St08ps	0.05–0.11	0.35–0.65	0.05–0.17	0.035	0.040	0.10	0.30	0.30
St08	0.05–0.12	0.35–0.65	0.17–0.37	0.035	0.040	0.10	0.30	0.30

Table 1 continues on the next page ►

¹⁾ TU = Technical Specification

Steel grade	Elements mass percent, %							
	C	Mn	Si	Ph	S	Cr	Ni	Cu
				not exceeding				
10kp	0.07–0.14	0.25–0.50	not exc. 0.07	0.035	0.040	0.15	0.30	0.30
10	0.07–0.14	0.35–0.65	0.17–0.37	0.035	0.040	0.35	0.30	0.30
20	0.17–0.24	0.35–0.65	0.17–0.37	0.035	0.040	0.35	0.30	0.30
T	not exc. 0.11	not exc. 0.50	not exc. 0.05	0.045	0.050	0.15	0.20	0.20
Sv08	not exc. 0.10	0.35–0.60	not exc. 0.03	0.040	0.040	0.15	0.30	0.25
Sv08A	not exc. 0.10	0.35–0.60	not exc. 0.03	0.030	0.030	0.12	0.25	0.25
Sv08AA	not exc. 0.10	0.35–0.60	not exc. 0.03	0.020	0.020	0.10	0.25	0.25
Sv08GA	not exc. 0.10	0.80–1.10	not exc. 0.06	0.030	0.025	0.10	0.25	0.25
Sv10GA	not exc. 0.12	1.10–1.40	not exc. 0.06	0.030	0.025	0.20	0.30	0.25
Sv8G2S	0.05–0.11	1.80–2.10	0.70–0.95	0.030	0.025	0.20	0.25	0.25

Wire bundle characteristics

Table 2.

Wire diameter, mm	Parameters of bundle, rosette coil				Packing
	Weight, kg, not exceeding	Outer diameter, mm	Inner diameter, mm	Height, mm	
Bright wire (without coating)					
0.25–0.45	10		200		Corrugated cardboard box
0.40–0.80	20		250		
0.90–1.40	60		350		
1.40–6.00	120		550		Soft containers: paper, fabric, nonwoven fabric, film, polypropylene
0.90–1.40	1300	630–810	350	560	
1.78–2.45	1300	630–810	400		
2.45–6.00	1300	630–810	410, 450, 500, 550	500	
Zinc-coated wire					
0.40–0.80	15	240–260	170–190		Corrugated cardboard box
0.90–1.60	50		380–420		Soft containers: paper, fabric, nonwoven fabric, film, polypropylene
	not less than 250	500–550	360 (cardboard spool)	800–1100	
exceeding 1.60	80	680–720	480–520		
	500–1000	800–900	360, 480 (cardboard spool) 360, 450 (without cardboard spool)	800–1100	

Low-carbon general purpose steel wire

GOST¹⁾ 3282-74



Application area:

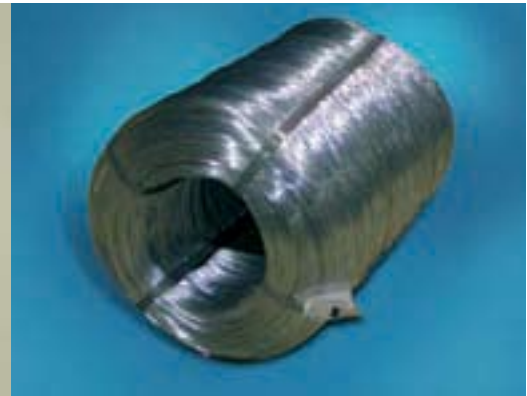
The wire is intended for nails, bailing, fencing and other domestic products manufacture.

The wire is classified depending on:

- treatment: heat-treated or not heat-treated;
- coating: without coating or zinc-coated.

Characteristics:

Mechanical properties are given in Table 3 on the next page. Steel grades should be selected with respect to a diameter of the finished wire, see Table 4 on the next page.



¹⁾ GOST = Russian State Standard

Wire diameter, mm	Tolerance on diameter, mm	Tensile strength, N/mm ²				Elongation δ_{100}° %, not less than, for heat-treated wire	
		not heat-treated		heat-treated			
		group I	group II	without coating	with coating	without coating	with coating
0.25	-0.02	690–1370	690–1370	290-490	340–540	15	12
from 0.28 up to 0.36 incl.	-0.03	690–1370	690–1370	290–490	340–540	15	12
« 0.36 « 0.45 «	-0.04	690–1370	690–1370	290–490	340–540	15	12
« 0.45 « 0.60 «	-0.04	690–1270	690–1180	290–490	340–540	15	12
« 0.60 « 1.00 «	-0.05	690–1270	690–1180	290–490	340–540	15	12
« 1.00 « 1.20 «	-0.06	590–1270	690–1180	290–490	340–540	15	12
« 1.20 « 2.00 «	-0.10	590–1180	690–980	290–490	340–540	15	12
« 2.00 « 2.50 «	-0.12	590–1180	690–980	290–490	340–540	15	12
« 2.50 « 3.20 «	-0.12	540–1080	640–930	290–490	340–540	20	18
« 3.20 « 3.60 «	-0.16	440–930	640–930	290–490	340–540	20	18
« 3.60 « 4.50 «	-0.16	440–930	590–880	290–490	340–540	20	18
« 4.50 « 6.00 «	-0.16	390–830	490–780	290–490	340–540	20	18
« 6.00 « 7.50 «	-0.20	390–830	490–780	290–490	340–540	20	–
8.00	-0.20	390–780	490–780	290–490	340–540	20	–
from 8.00 up to 8.80 incl.	-0.20	390–690	440–690	290–490	340–540	20	–

Recommendations on steel grades selection

Table 4.

Wire diameter, mm	Steel grade
0.25–2.2	05kp, 08kp, Sv08, T, SAE 1006, SAE 1008
2.5–4.0	1kp, 1ks, 1sp, 2kp, St0, T, 3kp, 3ps
4.5–8.8	1kp, 1ps, 2kp, 2ps, 3kp, 3ps, St0



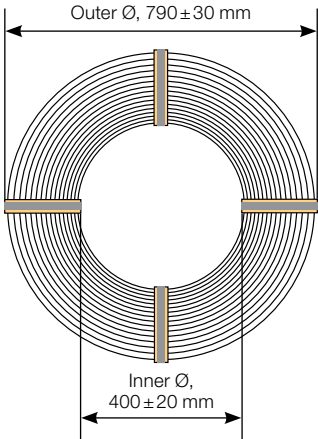
Annealed wire in rosette coils

GOST ¹⁾ 3282-74 heat-treated, uncoated

Application area:

For the wrapping of recycled materials (paper, plastic, aluminum cans).

Wire dimensions and mechanical properties are given in Table 5.



Wire mechanical properties

Table 5.

Wire size, mm	Extreme deviation from wire size, mm	Tensile Stength, N/mm ²	Elongation, %, no less than	Rosette coils weight, kg	Inner diameter, mm	Outer diameter, mm
1.60 – 2.00	-0.10	300 – 490	15	250 – 800 (averaged 600)	400	790
2.00 – 2.50	-0.12		15			
2.50 – 3.20	-0.12		20			
3.20 – 3.60	-0.16		20			
3.60 – 4.00	-0.16		20			

Packing: baling bands are used at 4 points, shipping rings are possible.

Shipping package: doubled rosette coils (two rosette coils weighing 250 – 350 kg each), baling bands are used at 4 points, shipping rings are possible.

¹⁾ GOST = Russian State Standard

Polygraphic wire

GOST ¹⁾ 7480-73

Application area:

The wire is intended for stitching up polygraphic, fair and cardboard products.

Two types of polygraphic wire are available:

- without coating
- zinc-coated.

Wire dimensions and mechanical properties are given in Table 6.

Wire mechanical properties

Table 6.

Wire diameter, mm	Tensile strength, N/mm ²	Fold test	
		Bead diameter, mm	Number of folds, not less than
0.50	690–880	3.50	6
0.56		3.50	
0.60		3.50	
0.70		3.50	
0.80		5.00	
0.90		5.00	
1.20		7.50	10

Packing:

The wire is shipped in bundles or spools of a weight of 15–20 kg, packed in a corrugated cardboard box with a total weight of up to 1000 kg.

¹⁾ GOST = Russian State Standard

Quality low-carbon wire

GOST ¹⁾ 792-67

Application area:

The wire is intended for manufacture of machine parts and elements; it can be also used as a cable lead.

Two types of wire are available:

- without coating;
- zinc-coated.

Wire dimensions and mechanical properties are given in Table 7.

Wire mechanical properties

Table 7.

Wire diameter, mm	Tensile strength, N/mm ² , not less than		Beads diameter (for the fold test), mm	Number of folds on 180°, not less than	Number of twists on 360°
	Without coating	Zinc-coated			
1.0	390	360	5	9	25
1.2				7	

¹⁾ GOST = Russian State Standard

Low-carbon zinc-coated wire for muzzle (muselet) manufacture

TU ¹⁾ 14-4-1128-81

Application area:

The wire is intended for muzzle manufacture (wire bridle on the corks of champagne bottles) using cold-bending technique. The finished wire is heat-treated and hot-dip galvanized.

Wire dimensions and mechanical properties are given in Table 8.



Wire mechanical properties

Table 8.

Wire diameter, mm	Tolerance on diameter, mm	Tensile strength, N/mm ² , not exceeding	Elongation δ_{100} %, not less than
1.0	+/- 0.02	290–470	15

Packing:

The wire is shipped in bundles of a weight of 45 kg, which are packed into a corrugated cardboard box with a total weight of up to 1000 kg.

¹⁾ TU = Technical Specification