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INDICATIVE DRAWING

Carbon steel spring wire

Technical specification

GOST 9389-75

FOR REFERENCE ONLY

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For GOST 9389-75. Carbon steel spring wire. Technical specifications.

In which places	Printed	Should be
Point 2.3. Table 3. Graph << ultimate tensile strength. Class 2, 2A >>. For diameter of wire		
1.40 mm	1960-2260 (195-230)	1910-2260 (195-230)
2.50 mm	1620-1660 (165-190)	1620-1860 (165-190)

(H/C No. 9 1997)

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INDICATIVE DRAWING

THE STATE STANDARD OF USSR

Carbon steel spring wire

GOST

Technical specification

9389-75

OKH 12 2100

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Effective period from 01.01.77

This standard pertains to cold-drawn carbon steel wire, to be used for manufacturing of spring, wound in cold condition and not subjected to hardening.

(Modified edition, modification No. 3).

1. TYPES AND BASIC DIMENSIONS

1.1. Wire is manufactured:

a) As per mechanical properties:

Grades A, B, B;

Classes 1, 2, 2A, 3.

Recommendations regarding the application of spring wire depend on the grades and classes, given in reference annexure 3.

b) As per manufacturing accuracy:

Normal accuracy;

Increased accuracy- II

Wire of classes 1, 2, 3 is manufactured with normal and increased accuracy, class 2A- increased accuracy.

(Modified edition, modification No. 3, 4).

1.2. Diameter of wire and maximum deviations with respect to it should correspond to those indicated in table 1.

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Reprinted (June 1990) with modification No. 1, 2, 3, 4, affirmed in February 1983, December 1984, December 1987, January 1990 (NYC 5-83, 3-85, 3-88, 4-90).

MM

Nominal diameter of wire	Maximum deviation according to the diameter of wire		Nominal diameter of wire	Maximum deviation according to the diameter of wire	
	Increased accuracy	Normal accuracy		Increased accuracy	Normal accuracy
0.14			0.90		
0.15			1.00		
0.16			1.10		
0.18			1.20		
0.20			1.30		
0.22	+0.005	+0.020	1.40	+0.015	±0.020
0.25	-0.003	-0.010	1.50	-0.013	
0.28			1.60		
0.30			1.70		
0.32			1.80		
0.36			1.90		
0.40					
0.45		±0.020	2.00		
0.50			2.10		
0.56	±0.010		2.20	±0.020	±0.030
0.60			2.30		
0.63			2.50		
0.70			2.80		
0.80			3.00		
3.20		±0.030	6.00		
3.50			6.30		
3.60			6.50	±0.030	
4.00	+0.030		6.70		±0.050
4.20	-0.020		7.00		
4.50		±0.040			
5.00			7.50	±0.040	
5.60			8.00		

Note:

1. Delivery of wire of intermediate diameter is permitted on the demand of user. During this maximum deviations along diameter should correspond to those set for nearer to maximum diameter.
2. Theoretical weight of wire is given in annexure.
(Modified edition, modification No. 3, 4).
- 1.3. Oval shape of wire should not exceed half of the tolerance range along diameter.

Examples of conventional codes:

Wires of grade A, class 1, increased accuracy, having diameter 1.20 mm.

Wires A- 1- II- 1.2 GOST 9389-75

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INDICATIVE DRAWING

Similarly, grade B, class 3, normal accuracy, with diameter 2.0 mm:

Wire B- 3- 2 GOST 9389-75

Similarly, grade B, class 2, increased accuracy, with diameter 1.20 mm:

Wire B- 2A- 1.2 GOST 9389-75

(Modified edition, modification No. 3, 4).

2. TECHNICAL REQUIREMENTS

2.1. Carbon steel spring wire should be manufactured in accordance with the requirement of this standard on technological regulations, approved in set order, made of carbon steel according to GOST 1050-88, GOST 14959-79, GOST 1435-90 or according to standard technical documents, and also made of steels of grades KT-2 and 3K-7, whose chemical composition is indicated in table 2 and other steels of special melting, manufactured according to standard-technical documents. During this wire of class 2A should be manufactured from steel with the mass fraction of sulphur not more than 0.030% and phosphorous not more than 0.035%. On the demand of user, wire is manufactured from the specific grade of steel.

(Modified edition, modification No. 2, 3).

2.2. Cracks, flaws, overlaps, hairline cracks, cavity and rust should not be on the surface of wire. It is permitted, notches having depth not more than half of the tolerance range along diameter and also residues of technological coatings, applied to the surface of wires for preparation of metal for wire drawing.

Wires of class 2A for aviation industry should be without traces of technological copper plating of surface.

Table 2

Grade of steel	Chemical composition in %							
	Carbon	Manganese	Silicon	Sulphur	Phosphorous	Chromium	Nickel	Copper
KT-2	0.86-	0.20-	0.17-	0.020	0.020	0.05	0.05	0.10
	-0.91	-0.40	-0.37					
3K-7	0.68-	0.50-	0.17-	0.030	0.020	0.05	0.05	0.04
	-0.76	-0.80	-0.37					

(Modified edition, modification No. 3).

2.3. Mechanical properties of wire should correspond to norms, indicated in table 3.

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INDICATIVE DRAWING

Diameter of wire in mm	Ultimate tensile strength, N/mm ² (kgf/mm ²)		
	Class 1	Class 2, 2A	Class 3
0.14	2740—3090 (280—315)	2300—2740 (235—280)	1810—2300 (185—235)
0.15	2740—3090 (280—315)	2300—2740 (235—280)	1810—2300 (185—235)
0.16	2740—3090 (280—315)	2300—2740 (235—280)	1810—2300 (185—235)
0.18	2740—3090 (280—315)	2300—2740 (235—280)	1810—2300 (185—235)
0.20	2700—3040 (275—310)	2260—2700 (230—275)	1770—2260 (180—230)
0.22	2700—3040 (275—310)	2260—2700 (230—275)	1770—2260 (180—230)
0.25	2700—3040 (275—310)	2260—2700 (230—275)	1770—2260 (180—230)
0.28	2700—3040 (275—310)	2260—2700 (230—275)	1770—2260 (180—230)
0.30	2700—3040 (275—310)	2260—2700 (230—275)	1770—2260 (180—230)
0.32	2650—2990 (270—305)	2210—2650 (225—270)	1720—2210 (175—225)
0.36	2650—2990 (270—305)	2210—2650 (225—270)	1720—2210 (175—225)
0.40	2600—2940 (265—300)	2160—2600 (220—265)	1670—2160 (170—220)
0.45	2600—2940 (265—300)	2160—2600 (220—265)	1670—2160 (170—220)
0.50	2600—2940 (265—300)	2160—2600 (220—265)	1670—2160 (170—220)
0.56	2600—2940 (265—300)	2160—2600 (220—265)	1670—2160 (170—220)
0.60	2600—2940 (265—300)	2160—2600 (220—265)	1670—2160 (170—220)
0.63	2550—2890 (260—295)	2160—2550 (220—260)	1670—2160 (170—220)
0.70	2550—2890 (260—295)	2160—2550 (220—260)	1670—2160 (170—220)
0.80	2550—2890 (260—295)	2110—2550 (215—260)	1670—2110 (170—215)
0.90	2500—2790 (255—285)	2110—2500 (215—255)	1620—2110 (165—215)
1.00	2450—2740 (250—280)	2060—2450 (210—250)	1570—2060 (160—210)
1.10	2400—2700 (245—275)	2010—2400 (205—245)	1520—2010 (155—205)
1.20	2350—2650 (240—270)	1960—2350 (200—240)	1520—1960 (155—200)
1.30	2300—2600 (235—265)	1960—2300 (200—235)	1520—1960 (155—200)
1.40	2260—2550 (230—260)	1960—2260 (195—230)	1470—1960 (150—200)
1.50	2210—2500 (225—255)	1850—2210 (190—225)	1420—1860 (145—190)
1.60	2160—2450 (220—250)	1850—2160 (190—220)	1420—1860 (145—190)

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INDICATIVE DRAWING

Maximum out of ultimate tensile strength in batch, not more than kgf/mm^2					Number of twisting, not less than							
Grade A		Grade B			Grade A, B				Grade B			
Class					Class							
1	1, 2, 2A, 3	1	2, 2A	3	1	2	2 A	3	1	2	2 A	3
300(31)	300(31)	340(35)	440(45)	490(50)	35	35	35	35	35	35	35	35
300(31)	300(31)	340(35)	440(45)	490(50)	34	34	34	34	34	34	34	34
300(31)	300(31)	340(35)	440(45)	490(50)	33	33	33	33	33	33	33	33
300(31)	300(31)	340(35)	440(45)	490(50)	31	31	33	31	31	31	33	31
300(31)	300(31)	340(35)	440(45)	490(50)	30	30	32	30	30	30	32	30
300(31)	300(31)	340(35)	440(45)	490(50)	29	29	32	29	29	29	32	29
300(31)	300(31)	340(35)	440(45)	490(50)	27	27	32	27	27	27	32	27
290(30)	290(30)	340(35)	440(45)	490(50)	26	26	31	26	26	26	31	26
280(29)	280(29)	340(35)	440(45)	490(50)	23	23	31	23	23	23	31	23
270(28)	280(29)	340(35)	440(45)	490(50)	22	22	30	22	22	22	30	22
260(27)	280(29)	340(35)	440(45)	490(50)	22	22	30	22	22	22	30	22
250(25)	280(29)	340(35)	440(45)	490(50)	21	21	28	21	20	21	28	21
240(24)	260(27)	340(35)	440(45)	490(50)	20	20	28	20	17	20	28	20
230(23)	260(27)	340(35)	440(45)	490(50)	20	20	27	20	16	19	27	19
210(21)	260(27)	340(35)	440(45)	490(50)	20	20	27	20	16	19	27	19
200(20)	240(24)	340(35)	440(45)	490(50)	20	20	25	20	16	18	25	18
190(19)	240(24)	340(35)	390(40)	490(50)	20	20	25	20	16	18	25	18
180(18)	240(24)	340(35)	390(40)	490(50)	20	20	25	20	16	18	25	18
170(17)	230(23)	340(35)	440(45)	440(45)	20	20	25	20	16	17	24	17
160(16)	230(23)	290(30)	390(40)	490(50)	20	20	24	20	16	17	24	17
150(15)	220(22)	290(30)	390(40)	490(50)	20	20	24	20	16	17	24	17
150(15)	220(22)	290(30)	390(40)	490(50)	20	20	24	20	16	17	24	17
150(15)	210(21)	290(30)	390(40)	440(45)	20	20	24	20	16	17	24	17
150(15)	210(21)	290(30)	340(35)	440(45)	20	20	24	20	16	17	24	17
150(15)	200(20)	290(30)	340(35)	440(45)	20	20	24	20	16	17	24	17
150(15)	200(20)	290(30)	340(35)	440(45)	20	20	24	20	16	17	24	17
150(15)	200(20)	290(30)	290(30)	440(45)	20	20	24	20	16	17	24	17

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INDICATIVE DRAWING

Diameter of wire in mm.	Ultimate tensile strength in N/mm ² (kgf/mm ²)		
	Class 1	Class 2, 2A	Class 3
1.70	2060-2350 (210-240)	1770-2060 (180-210)	1370-1770 (140-180)
1.80	2060-2350 (210-240)	1770-2060 (180-210)	1370-1770 (140-180)
1.90	2010-2300 (205-235)	1770-2010 (180-205)	1370-1770 (140-180)
2.00	2010-2260 (205-230)	1770-2010 (180-205)	1370-1770 (140-180)
2.10	1960-2210 (200-225)	1720-1960 (175-200)	1370-1720 (140-175)
2.20	1910-2160 (195-220)	1670-1910 (170-195)	1320-1670 (135-170)
2.30	1910-2160 (195-220)	1670-1910 (170-195)	1320-1670 (135-170)
2.50	1810-2060 (185-210)	1620-1660 (165-190)	1270-1620 (130-165)
2.80	1770-2010 (180-205)	1620-1860 (165-190)	1270-1620 (130-165)
3.00	1720-1960 (175-200)	1620-1860 (165-190)	1270-1620 (130-165)
3.20	1720-1960 (175-200)	1520-1770 (155-180)	1230-1520 (125-155)
3.50	1670-1910 (170-195)	1520-1770 (155-180)	1230-1520 (125-155)
3.60	1670-1910 (170-195)	1520-1770 (155-180)	1230-1520 (125-155)
4.00	1620-1860 (165-190)	1470-1720 (150-175)	1180-1470 (120-150)
4.20	1570-1810 (160-185)	1420-1670 (145-170)	1130-1420 (115-145)
4.50	1520-1770 (155-180)	1370-1620 (140-165)	1130-1370 (115-140)
5.00	1470-1720 (150-175)	1370-1620 (140-165)	1030-1370 (115-140)
5.60	1420-1670 (145-170)	1320-1570 (135-160)	1080-1320 (110-135)
6.00	1420-1670 (145-170)	1320-1570 (135-160)	1080-1320 (110-135)
6.30	-	1230-1420 (125-145)	1030-1230 (105-125)
6.50	-	1230-1420 (125-145)	1030-1230 (105-125)
6.70	-	1230-1420 (125-145)	1030-1230 (105-125)
7.00	-	1230-1420 (125-145)	1030-1230 (105-125)
7.50	-	1230-1420 (125-145)	1030-1230 (105-125)
8.00	-	1230-1420 (125-145)	1030-1230 (105-125)

Note:

- The ultimate tensile strength of wire in coils (spools) with weight up to 250 kg of grade A and B, classes 1, 2, 2A should not be more than 100 N/mm² (10 kgf/mm²); grade B class 3 and grade B of all classes for wire having diameter 1.6 mm and minimum- 200 N/mm² (20 kgf/mm²) and for wire having diameter more than 1.6 mm- 150 N/mm² (15 kgf/mm²). The ultimate tensile strength of wire in coils (spools) with weight more than 250 kg should correspond to values of table 3.
- If during the determination of ultimate tensile strength on ends of coil, results of tests relate to two classes, the belonging of coil to one of the classes is set as per minimum values.

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Maximum out of ultimate tensile strength in batch, not more than N/mm^2 (kgf/mm^2)					Number of twisting, not less than															
Grade A		Grade B		Grade B			Grade A, B				Grade B									
Class					Class															
1, 2, 2A, 3		1	2, 2A		3		1	2		2		3		1	2		2A		3	
										A										
150 (15)	200 (20)	290 (30)	290 (30)	390 (40)	20	20	24	20	15	17	24	17								
150 (15)	200 (20)	290 (30)	290 (30)	390 (40)	20	20	23	20	15	17	24	17								
150 (15)	200 (20)	290 (30)	250 (25)	390 (40)	20	20	23	20	14	16	23	16								
150 (15)	200 (20)	250 (25)	250 (25)	390 (40)	15	16	23	16	14	16	23	16								
130 (15)	200 (20)	250 (25)	250 (25)	340 (35)	15	16	22	16	14	16	22	16								
150 (15)	200 (20)	250 (25)	250 (25)	340 (35)	15	15	22	15	13	15	22	15								
160 (15)	200 (20)	250 (25)	250 (25)	340 (35)	15	16	21	15	13	15	21	15								
150 (15)	200 (20)	250 (25)	250 (25)	340 (35)	15	15	21	15	12	15	21	15								
150 (15)	200 (20)	250 (25)	250 (25)	340 (35)	15	15	19	15	11	14	19	14								
150 (15)	200 (20)	250 (25)	250 (25)	340 (35)	15	15	18	15	10	13	18	13								
150 (15)	200 (20)	250 (25)	250 (25)	290 (30)	15	15	18	15	10	13	18	13								
150 (15)	200 (20)	250 (25)	250 (25)	290 (30)	15	15	18	15	8	13	18	13								
150 (15)	200 (20)	250 (25)	250 (25)	290 (30)	15	15	18	15	7	13	18	13								
150 (15)	200 (20)	250 (25)	250 (25)	290 (30)	15	15	18	15	6	13	18	13								
160 (15)	200 (20)	250 (25)	250 (25)	290 (30)	15	15	16	15	6	12	16	12								
160 (15)	200 (20)	250 (25)	250 (25)	290 (30)	15	15	16	15	6	12	16	12								
150 (15)	200 (20)	250 (25)	250 (25)	250 (25)	15	15	15	15	4	9	13	9								
150 (15)	200 (20)	250 (25)	250 (25)	250 (25)	15	15	15	15	4	6	8	6								
150 (15)	200 (20)	250 (25)	250 (25)	250 (25)	15	15	15	15	2	4	6	4								
—	200 (20)	—	210 (21)	200 (20)	—	—	—	—	—	—	—	—								
—	200 (20)	—	200 (20)	200 (20)	—	—	—	—	—	—	—	—								
—	200 (20)	—	200 (20)	200 (20)	—	—	—	—	—	—	—	—								
—	200 (20)	—	200 (20)	200 (20)	—	—	—	—	—	—	—	—								
—	200 (20)	—	200 (20)	200 (20)	—	—	—	—	—	—	—	—								
—	200 (20)	—	200 (20)	200 (20)	—	—	—	—	—	—	—	—								
—	200 (20)	—	200 (20)	200 (20)	—	—	—	—	—	—	—	—								

During this maximum value should not exceed the upper limit of normalized ultimate tensile strength for that class, to which the coil pertains, more than to 50 (5) N/mm^2 (kgf/mm^2). This note is not considered, if wire pertains to the grades A and B of class 2A of all diameters and class 2 of diameter 2.5 mm and more.

- On the requirement of furniture industry, wire having diameter 2.2 mm, increased accuracy, grade B, is manufactured with the ultimate tensile strength 1570-1770 N/mm^2 (160-180 kgf/mm^2).

(Modified edition, modification No. 3, 4).

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INDICATIVE DRAWING

Mechanical properties of wire of intermediate diameters should correspond to norms, set for nearest maximum diameter (refer to table 3).

2.4. Complete decarbonization of wire is not permitted.

Degree of partial carbonization should not exceed on wire of grade A class 1 and grade B class 1, 2A-1.5 % from nominal diameter, grade B class 2-2.5 %, grade B class 3-3 %.

2.5. On the demand of user, wire of grades A and B should not break or burst during winding or bend. Wire having diameter up to 3.0 mm should be subjected to winding on round cylindrical core, equal to the wire diameter and with diameter 3.0 mm and more should be subjected either bend at 180° or winding.

During this << diameter of cylinder core should be equal to two times wire diameter for wire from 3.0 to 6.0 mm and three times wire diameters for wire more than 6.0 mm cylindrical core of minimum diameter is permitted.

Number of turns during winding should not be less than eight.

2.4, 2.5. (Modified edition, modification No. 3, 4).

2.5a. On the demand of user, wire of grades A and B should not be stratified into layers during torsion test.

Cracks are considered under stratification, which go along helix on the surface of sample.

Basic break should be equal and perpendicular to the axis of wire.

2.5b. Undulation of wire is not permitted.

Periodic change in diameter or periodic bend of wire resulting in undulation, which may remain during application of the sample of wire with operating length 200 ± 0.5 mm with load, which does not exceed 0.3 of tensile stress of wire.

2.5a, 2.5b. (Introduced additionally, modification No.3).

2.6. Wire should be manufactured in coils or in on spools.

Winding of wire should be carried out without intermingling of turns and ensure the free winding of wire in spools and coils. During the release of coils from windings, wire should not be entangle in form of << eight >>.

Coil should consist of one section of wire.

Three sections of wire is permitted on spools or on coil having weight more than 250 kg.

Packing should be placed at the places of separation of sections. It is permitted to take and fasten the ends of section on the face of spool instead of marking dividing places.

Winding of ends of sections of wire is not permitted.

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2.7. Weight of section of wire in coil or on spools should correspond to those indicated in table 5.

Table 5*

Diameter of wire in mm	Weight of section of wire in kg, not less than	Diameter of wire in mm	Weight of section of wire in kg, not less than
Up to 0.25 inclusively	0.3	Above 1.00 up to 1.50	10.0
Above 0.25 up to 0.50 inclusively	1.0	Above 1.50 up to 3.00	20.0
Above 0.50 up to 1.00 inclusively	5.0	Above 3.00	30.0

Table 4. Deleted (Modified edition, modification No. 3).

Weight of sections of wire for minimum 50% indicated in table 5 in quantity not more than 10% of total weight of wire in batch is permitted.

On the demand of user, weight of coil (spools) should not exceed 1 tons.

2.6, 2.7. (Modified edition, modification No. 3).

3. ACCEPTANCE RULES

3.1. Wire accepted in batches. Batch should consist of coils or spools of wire of same diameter, same class and same manufacturing accuracy and should be drawn up with document about quality, which contains:

Trademark or name and trademark of manufacturing plant;

Conventional code of wire;

Batch No.;

Number of cargo container;

Net weight;

Grade of steel;

Date of acceptance.

(Modified edition, modification No. 2).

3.2. Each coils or batch of spools is checked according to the dimension and external view.

3.3. During the appearance of differences in the estimation of this indices, select 10% of coils or 20 % of spools, but not less than five coils or spools and for checking of de-carbonization of 2 % coils or spools but not less than three, for checking of mechanical properties and undulation.

(Modified edition, modification No. 3).

3.4. While obtaining unsatisfactory results of testing at least on one of indices, carry out repeated testing of this indices in doubled quantity of coils (spools), taken from number of those not passed testing.

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Results of repeated testing pertains to whole batch. While obtaining unsatisfactory results of repeated testing according to indices << undulation >> of wire- manufacturer carries out current inspection as per this indices.

(Modified edition, modification No. 1, 3).

4. METHODS FOR TESTING

4.1. For each type of tests, select on one sample each from two ends of coils or one sample each from each spool to be checked.

(Modified edition, modification No. 1).

4.2. Diameter and ovality of wire is measured by micrometer according to GOST 6507-90 and GOST 4381-87 in two mutually perpendicular direction of one section of wire or by other measuring tool, which ensures the necessary accuracy of measurement.

(Modified edition, modification No. 3).

4.3. Inspection of surface of wire is carried out visually and in questionable cases- with the application of 5^x magnifying glass. Depth of defect of wire should be determined by its removal by dressing with subsequent comparative measurement of wire in cleaned and uncleaned places. During the impossibility of determination of depth of defects by dressing determination of depth and nature of defects is carried out by micro examination.

4.4. Testing of wire for ultimate strength with sub- assembly is carried out according to GOST 10446-80.

4.5. Carry out bend test of wire around the cylindrical core up to the parallelism of sides in accordance with the requirement of point 2.5.

(Modified edition, modification No. 4).

4.6. Carry out torsion test according to GOST 1545-80. Carry out torsion test for non- exfoliation property up to the complete damage of sample.

Inspection of breaks is carried out by naked eye. It is permitted to use 5^x magnifying glass for wire having diameter less than 0.8 mm.

Note. Before 01.01.90. Testing of wire for non- exfoliation property was changed according to the agreement of manufacturer with user.

(Modified edition, modification No. 3).

4.7. Determination of depth of de-carbonization is carried out according to the method M GOST 1763-68.

4.8. Wire testing for winding is carried out according to GOST 10447-80.

INDICATIVE DRAWING

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These drawings are only for reference. Actual drawings may be different and shall be issued at the time for procurement.

During the appearance of differences in the evaluation of quality of wire according to point 2.5, bend test is carried out instead of winding test.

(Modified edition, modification No. 3).

4.9. Absence of undulation is ensured by the technology of manufacturing.

During the appearance of differences in the evaluation of undulation, it is determined on the samples of an operating length (200±0.5) mm by micrometer as per GOST 6507-90, equipped with special anvil/pivot (indicated in annexure 2) on 10 measurements in two mutually perpendicular directions at the length of sample.

Samples should be fastened in the clamps of tensile testing machine according to GOST 7855-84 or another machine as per standard- technical documents, which makes it possible to place the necessary load.

Wire is considered undulated, if number of deviations from constant diameter, measured in one of the planes consists of 3 and more than measurements.

Value of deviations should not be more than error in the measuring tool.

4.10. Application of methods of statical and non-destructive inspection is permitted for determining the mechanical properties according to the method, approved in set order.

4.9, 4.10. (Introduced additionally, modification No.3).

5. PACKING, MARKING, TRANSPORTATION AND STORAGE

5.1. Each coil should be tightly tied up by soft wire according to standard technical documents not less than in three places, equally situated on circumference.

Winding of wire having diameter 0.60 mm and minimum can be tied by the wound wire or twine according to GOST 17308-88 or other standard technical documents.

Coil of same class, group and diameter can be wound in bundles.

End of upper section of wire on spools should be fastened on the face of spools.

5.2. Wire should be covered with conservation oils (lubricant) of type HF-203A or HF- 203B according OST 38.01436-87 or K-17 according to GOST 10877-76.

It is permitted to use other oil (lubricant), which ensure corrosion protection. Un lubricated wire can be placed on spools.

5.1, 5.2. (Modified edition, modification No. 3).

5.3. Wire having diameter less than 0.20 mm should be wound in spool by wrapping with the layer of paper and placed in wooden box according to GOST 18617-83 or by other standard technical documents or in metallic container, manufactured according to standard technical documents, packed by water proof paper.

Coil, spools or wire having diameter 0.20 mm and more should be wrapped with the layer of paper, or by the layer of polymer film or non-woven materials or synthetic fiber cloths. During mechanized packing, coil of wire should be wrapped with the layer of cable crepe paper according to GOST 10396 – 84 or paper of grade KMB – 170 or other by crepe paper, equivalent according to the protective properties, or polymer film with fixed packing by wire according to GOST 3282-74 or by other wire.

According to the agreement of manufacturer with user, it is permitted not to pack and not to lubricate the wire.

Following are used as packing materials:

Wax paper according to GOST 9569-79 (two layered packing paper is permitted to use according to GOST 8828-89 or oiled packing paper according to GOST 8273-75 of grad A, or other paper, which ensures corrosion protections);

Polymer film according to GOST 10354-82, GOST 16272-79 or other polymer film;

Pierced cloth packing or glued cloth, stitched tape from the wastage of textile industry or cloth made of synthetic fibers according to the standard technical documents.

Wire, to be sent to regions of extreme north and almost inaccessible regions, is packed in accordance with GOST 15846-79.

(Modified edition, modification No. 1, 3).

5.3a. Weight of one cargo container should not be more than 1500 kg.

Consolidation of cargo containers in transport packets should be carried out according to GOST 21650-76, GOST 21929-76; GOST 24597-81.

(Introduced additionally, modification No.3).

5.4. Label should be reliably fastened to the each spools, coil or bundle, on which following are indicated:

Trademark or name and factory sign of manufacturing plant;

Conventional code of wire;

Stamp of quality control;

Batch number.

(Modified edition, modification No. 1, 3).

5.5. **(Deleted, modification No. 2).**

5.6. Wire is transported by all type of transports in accordance with the rules of transportation of loads, which is applied in the field of transportation of this form. Displacement and fastening of load in transportation means should corresponds to the technical specifications for loading and fastening of loads, approved by the MIIC of USSR.

Transportation of wire is carried out by railway or by carload, small or low- tonnage sending.

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It is permitted to transport the wire in universal containers according to GOST 15102-75, GOST 20435-75 and GOST 22225-76.

Transportation condition should correspond to the storage condition 5 GOST 15150-69.

5.7. Storage of wire - according to storage condition 3 GOST 15150-69.

5.6, 5.7. (Modified edition, modification No. 3).

5.8. Transportation marking according to GOST14192-77.

(Introduced additionally, modification No.3).

INDICATIVE DRAWING

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Theoretical weights of 1000 m of wire

Diameter of wire in mm	Area of transverse section in mm ²	Weight of 1000 m in kg	Diameter of wire in mm	Area of transverse section in mm ²	Weight of 1000 m in kg
0.1	0.0154	0.1208	2.00	3.14	24.65
0.15	0.0177	0.1387	2.10	3.76	27.19
0.16	0.0201	0.1578	2.20	3.80	29.83
0.18	0.0254	0.1994	2.30	4.15	32.58
0.20	0.0314	0.2465	2.50	4.91	38.54
0.22	0.0380	0.298	2.80	6.16	48.36
0.25	0.0491	0.385	3.00	7.07	55.50
0.28	0.0616	0.484	3.20	8.04	63.11
0.30	0.0707	0.555	3.40	9.08	71.28
0.32	0.0804	0.631	3.50	9.62	75.52
0.36	0.1018	0.80	3.60	10.18	79.9
0.40	0.1257	0.99	4.00	12.57	98.7
0.45	0.159	1.25	4.20	13.85	108.7
0.50	0.196	1.54	4.50	15.90	124.8
0.56	0.246	1.93	5.00	19.63	154.2
0.60	0.283	2.22	5.60	24.63	193.3
0.63	0.312	2.45	6.00	28.3	221.9
0.70	0.385	3.02	6.30	31.7	244.4
0.75	0.442	3.47	6.50	33.2	260.5
0.80	0.503	3.95	6.70	35.3	276.8
0.85	0.567	4.45	7.00	38.5	302.1
0.90	0.636	4.99	7.50	44.2	346.8
1.00	0.785	6.17	8.00	50.3	394.6
1.10	0.950	7.46			
1.20	1.131	8.88			
1.30	1.327	10.42			
1.40	1.539	12.08			
1.50	1.767	13.87			
1.60	2.01	15.78			
1.70	2.27	17.82			
1.80	2.54	19.94			
1.90	2.84	22.26			

INDICATIVE DRAWING

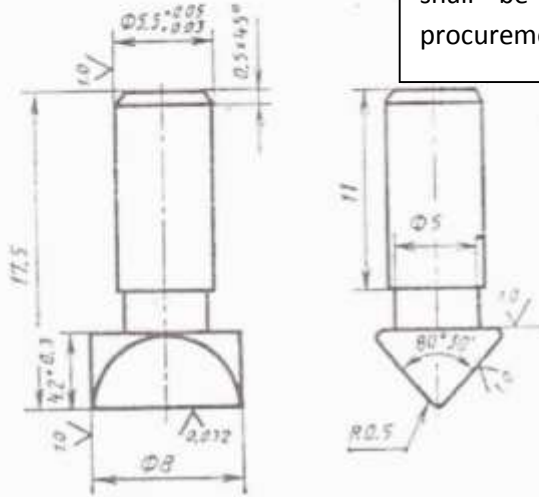
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Special anvil / pin micrometer type MK as per GOST 9389-75 for determination of undulation of wire

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INDICATIVE DRAWING



Material- steel IIIIX-15, Y10A, Y12A. Hardness – HRC 48-50.

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Recommendations for application of spring wire

Grade of wire	Class of strength of wire	Application conditions
A	1	For spring with the calculated value in relation to the index of max. strength / min strength K, not more than 0.10
✓ B	1, 2, 2A, 3	For spring with the calculated value in relation to the index of max. strength / min strength K, not more than 0.17
B	1, 2, 2A, 3	For spring with the calculated value in relation to the index of max. strength / min strength K, not more than 0.30

Relative index of max. of strength is calculated according to the formula:

$$K = \frac{\Delta\sigma_B}{\sigma_B}$$

Where, $\Delta\sigma_B$ – max. of ultimate tensile strength in batch, N/mm²;

σ_B – Minimum value of ultimate tensile strength in class, N/mm².

Annexure 2, 3 (Introduced additionally, modification No.3).

INDICATIVE DRAWING