(350)

ALLOY STEEL SPRING WIRE

SPECIFICATIONS

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GOST 14963-78

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Non-observance of Standard is prosecuted by law

Present standard pertains to alloy steel spring wire of circular section with and without specially finished surface intended for manufacturing springs, subjected to thermal treatment (hardening and tempering) after coiling.

TYPES, BASIC PARAMETERS AND DIMENSIONS

1.1. Wire should be subdivided:

a) As per manufacturing method and quality of surface finish into groups; Specially finished surface by removing surface layers A, Б, B, Г, E;

Without special surface finish - H;

b) As per manufacturing accuracy;

Normal accuracy;

higher accuracy - П;

B) According to designated purpose;

For springs of cold coiling - ХН;

For springs of hot coiling - ГН.

1.2. Nominal diameter of wire and limit deviations should be in compliance with those specified in table-1.

Table-1.

mm.

Nominal diameter of wire	Limit deviations: Normal accuracy	Higher accuracy	Nominal diameter of wire	Limit deviation Normal accuracy	Higher accuracy
0.50	±0.02	+0.015	3.20		
0.56		−0.01	3.50		
0.60			3.80		
			4.00		
0.63			4.20	±0.04	+0.03
0.71			4.50		−0.02
0.80	+0.03	+0.02	4.80		
0.90	−0.02	−0.01	5.00		
1.00			5.50		
			5.60		
1.10			6.00		
1.20					
1.25			6.20		
1.30			6.30		
1.40			6.50		
1.50			7.00		
1.60	±0.03	±0.02	7.10		
1.80			7.50	±0.05	±0.03
2.00			8.00		
2.20			8.50		
2.50			9.00		
2.80					
3.00			10.00		
			11.00		
			11.20		
			11.50		
			12.00	±0.06	+0.04
			12.50		−0.03
			13.00		
			14.00		

Note: Upon agreement between the manufacturer and the customer manufactured wire may have:

a) Intermediate dimensions with limit deviations along the nearest big diameter;

б) Minus limit deviation, equal to the sum of absolute value of two side deviations diameter, specified in table-1.

1.3. Limit deviations along wire diameter of the highest quality category should be in compliance with those specified in table-1 for higher accuracy.

1.4. Ovality of wire should not exceed half the limit deviations along diameter;

1.5. Wire of groups А, Б, В, Г, should be made with diameter of 1,0 - 14, mm wire of groups Е, Н - 0,5 - 14,0mm.

EXAMPLE OF DESIGNATION

Wire made from steel 51 x Ф А, with special surface finish polished, group А, of higher accuracy for cold spring coiling, with diameter of 1,80mm.

Wire 51 x Ф А-А-П-ХН-1,80, GOST 14963-78.

TECHNICAL REQUIREMENTS

2.1. Alloy steel spring wire should be manufactured in compliance with the requirements of the present standard.

2.2. Wire should be manufactured from steel 51 x ГА, 60С2А, 65 С2 ВА, 70С3А as per GOST 14959-79.

Upon agreement between the manufacturer and the customer, wire should be made of mentioned steel of electroslag remelting.

2.3. Quality of surface depending on wire group should be in compliance with specified in table-2.

Table-2.

Wire group	Characteristics of wire surface	Roughness of surface as per GOST 2789-73: Parameter Ra, μm max.	Roughness of surface as per GOST 2789-73: Sampling length, mm	Nomenclature of permissible defects	Maximum depth of bedding defects mm for wire. Quality of the highest category	Maximum depth of bedding defects mm for wire. Quality of the first category
A	Polished	0,32	0.25	Separate local defects of mechanical orgin in the form of dents, nicks, scratches, marks	Defects not allowed	
Б	Ground on polished	0,63	0.80			
B	Polished	1,25	0.80		0,5 total wize deviations	Limit deviation of diameter
Г	Polished	2,50	0.80			
Д	Drawn after grinding, turning or roughing.	Surface finish need not be standardized or checked				
H	Unpolished and unground (drawn)				0,5 sum of limit deviations of wires, diameter.	Sum of limit deviations of wire diameter

Note: By an agreement with the customer to separate local defects of mechanical origin in the form of dents, nicks, scratches and marks with a depth of 0,01mm for wire with diameter from 1,0 to 3,0 mm and 0,02 mm for wire with diameter from 3,2 to 14,0mm are allowed for the first category quality wire of groups A, Б, B.

2.4. On wire surface of groups A, Б, B, Г traces of previous machining are allowed provided surface finish corresponds to standards of roughness traces, left by technological lubricant and copper plating are allowed on wire surfaces of groups Д and H.

2.5. Decarbonization of wire surface for groups А, Б, В, Г is not allowed.

Depth of total decarburization of wire surface for group Е should not exceed 1% from actual diameter of wire to each side.

Decarburization of surface of wire of the highest category of quality of groups А, Б, В, Г, Е is not allowed.

2.6. Wire for springs of cold coiling with diameter upto 6,0mm inclusive should not crack on segregate after coiling of five turns around the bar with diameter equal to: one diameter of test wire – for wire with diameter upto 4,0mm inclusive – Double diameter of test wire–for wire with diameter over 4,0mm.

2.7. Ultimate srupture strength of wire for cold coiling springs should not exceed 105kgf/mm^2 (10295 МПа).

By customer's demand ultimate rupture strength should not be more than 80kgf/mm^2 (784 МПа) for wire made of steel 51ХФА.

– Wire ultimate rupture strength tolerance in batch should not exceed 35 Kgf/mm^2 (343 МПа).

Ultimate rupture strength tolerance of wire of the highest category of quality in batch not to exceed 20 Kgf/mm^2.

2.8. Mechanical properties of wire from steel 51ХФА for the thermal treated samples should be in compliance with:

Ultimate rupture strength, kgf/mm^2, not less than – 150.

Reduction of area after rupture, %, not less than–40.

2.9. Wire of groups А, Б, В, Г should be made in bars. Length of bar should correspond to requirements of GOST 14955–77. Upon agreement with customer, bars of bigger length may be manufactured.

Bars of wire should be straight lo-cal curvature of bars should not exceed 0,5 mm per 1mm of bar length.

2.10. Wire of groups Е, Н should be made in bundles. Each wire

bundle should be made from one section. Man of wire section in bundle should be in compliance with those specified in table-3.

Upon agreement between the customer and the manufacturer wire of groups E, H should be made in bars.

Table-3.

Wire diameter, mm	Mass of wire section kg, not less than
0.50	0.25
Over 0.50 upto 1,00	2.50
Over 1.00 upto 3.00	5.00
Over 3.00	7.50

3. Acceptance rules

3.1. Wire should be accepted in batches. Batch should be made of wire of the same grade, the same melting, the same diameter, the same group of surface finish and the same accuracy of manufacture and the same purpose.

3.2. Check of dimensions and quality of wire surface should be made for each bar and bundle.

3.3. Wire batch accepted as per para 3.2 is subjected for checking of roughness, decarbonization, ultimate strength and coiling test.

3.4. Checking of mechanical properties of wire from steel 51 ⌀ A should be carried out for each melting.

3.5. If the test results are unsatisfactory even though one parameter, repeated tests should be carried out double quantity of samples, for the parameter, failed to meet the requirements.

Results of repeated tests are applicable to all batch.

4. Test Procedure

4.1. One sample from 200 kg of wire but not less than four samples from batch should be taken for checking the roughness, decarbonization, ultimate strength and test for coiling and for checking of mechanical properties of wire-five samples from melting.

4.2. Wire diameter and ovality should be measured by micrometer or other measuring instruments with error upto 0,01 mm in two mutually perpendicular directions and of the same section not less than in three places of each bar or bundle.

4.3. Quality of wire surface should be checked by naked eye and if necessary by loupe of five power depth of defect is determined by dressing place of defect should be dressed by emery paper or fill with subsequent comparing measurement of wire in conditioned or unconditioned places. In case, if it is impossible to determine the depth of defects by dressing determination of depth and character of defect should be carried out by metallo-graphic method check of surface quality may be carried out by nondestructive testing or other methods, established upon agreement with customer.

Quality of wire surface at a length of 50mm from bar ends or bundle not to be checked.

4.4. Roughness of wire surface should be checked by profilometer, profilographs or optical devices.

4.5. Depth of decarbanized layer is to be determined by method M, GOST 1763-68.

4.6. For tension wire is tested as per GOST 10446-63. For wire from steels 51XФA with diameter upto 2,000 mm reduction of area after rupture for thermal-treated samples not to be defined

checking of mechanical properties of wire from steel 5t ХФ А for heat-treated samples, may be carried out on rod.

Thermal treatment of wire samples should be carried out in the following way: Hardening at 840-860°C, cooling in oil. tempering at 370-420°C for 30 minutes.

Cooling in oil or hot-water.

For wire with diameter less than 2,80 mm reduction of tempering temprature upto 360°C is allowed.

4.7. Testing of wire for coiling is carried out as per GOST 10447-63, wire for spring of cold coiling with diameter above 6.0 upto 10,0 mm inclusive should be subjected to test for coiling upon agreement with customer.

4.8. Bar curvature is determined in the following way:

Bars are placed on even surface (table) and rolled along table surface. In this case, clearance seen with the naked eye or run out of the ends should be observed between bars along the whole length of the bar.

4.9. Chemical composition of wire should be certified by accompaning document of steel manufacturer . On consumer's demand chemical composition of wire should be checked as per GOST 12344-78, GOST 12345-66, GOST 12346-78, GOST 12347-77, GOST 12348-78, GOST 12349-66, GOST 12350-78, GOST 12351-66, GOST 12352-66, GOST 12355-66 for are sample from batch.

5. Packing, Marking, Transportation and Storage.

5.1. Sections of wire should be tied into packs. Sections of wire up to 50mm long and more should be tied in bundles. Bundles of wire the same grade, the same diameter, the same group of surface finish the same accuracy of manufacture and the same purpose, may be bundled coils.

5.2. Packs, Bundles (coils) of wire should be bound with smooth wire or twine not less than in three equal spaced places along the length or circumference.

5.3. Packs, Bundles (Coils) of wire should be lubricated with corrosian and adhesion preventive compound..

5.4. Packs, Bundles (Coils) of wire should be wrapped with packaging paper water proof paper as per GOST 8828-75 or paraffined as per GOST 9569-79, or paper ОД,П as per GOST 16711-79 or other paper as per technical documentations, approved in established order.

Packs, Bundles (coils) of wire, wrapped with paper, should be packed with sack cloth or bast mat or polymer film or in regid container.

Wire sections with diameter less than 3.00mm should be packed in rigid containers.

When using packing machines, wire may be packed with polymer film without wrapping with paper.

Packs, Bundles (coils) of wire, backed in sack cloth or bast mat or polymer film should be bound with soft wire or other means, for protecting the packages from un-coiling.

Other materials and methods, protecting wire against mechanical injuries and corrosion during transportation may be used.

5.5. On consumer's demand mass of one packing place should not be more than 80kg.

5.6. A tag should be fastened to each package including the following name or trade mark of the manufacturing plant;

Wire conventional designation; number of melting QID stamp.

5.7. Each batch of wire should be accompanied by quality document certifing the compliance of batch with the requirements of the

present standard, and containing following.

- name or trade mark of the manufacturing plant;
- Conventional designation of wire.
- Test results;
- Chemical composition of steel;
- quantity of packing places
- Net mass of batch.

5.9. Transportation of wire should be carried out by all kind of transports, protecting from the influence of moisture, corrosive mediums, dirt or package rapture. Wire may be transported in containers. During transportation of wire in containers it should be packed in sack cloths bast mat or polymer film.

5.10. Wire should be stored in dry rooms in conditions, excluding the effect of moisture and corrosive mediums.