70 KD

Oil tempered SiCr-alloyed clutch and transmission spring wire

70 KD is especially intended for the manufacture of clutch and transmission springs and similar moderately high fatigue stressed springs. 70 KD S is a shaved version of 70 KD intended for applications with higher surface requirements. The material has good relaxation properties. The wire is manufactured in sizes from Ø 0.50 to 7.00 mm. Sizes from Ø 7.00 to 15.00 mm is manufactured in unshaved version. Other wire sizes and shapes on request.

Chemical composition

Element	Weight %
C	0.50% - 0.60%
Si	1.20% - 1.60%
Mn	0.50% - 0.80%
P max.	0.025%
S max.	0.020%
Cr	0.50% - 0.80%

Cleanliness in steel

Non-metallic inclusions:
Max. level 2 according to DIN 50602-M.
Corresponding standard: ASTM E-45-A.

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Mechanical properties

Table definitions

Diameter: Other wire sizes on request.
Tolerance: Ovality, i. e. the difference between the largest and smallest dimension of a cross section, is maximum half the tolerance range.
Tensile strength: Conversion from tensile strength to hardness values can be calculated in standard ISO EN 18265. The tensile strength Rm within one coil does not vary more than 60 N/mm^2.
Torsions: Torsion test is carried out at ≤ 6.0 mm for assessing deformability. The fracture of the torsion test piece shall be smooth and perpendicular to the wire axis. The rupture shall show no longitudinal cracks.

For round wire

Diameter (mm)	Tolerance (mm)	Tensile Strength (N/mm^2)	Torsions (l=300 mm, min. revs)	Reduct. of area (min. %)
0.50 - 0.80	±0.010	2080 - 2210	6	
0.81 - 1.30	±0.015	2080 - 2210	5	50
1.31 - 1.40	±0.015	2080 - 2210	5	50
1.41 - 1.60	±0.020	2080 - 2210	5	50
1.61 - 2.00	±0.020	2010 - 2160	5	50
2.01 - 2.50	±0.020	1960 - 2060	5	50
2.51 - 3.00	±0.020	1910 - 2010	4	50
3.01 - 3.20	±0.020	1910 - 2010	4	45

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Diameter (mm)	Tolerance (mm)	Tensile Strength (N/mm^2)	Torsions (l=300 mm, min. revs)	Reduct. of area (min. %)
3.21 - 3.50	±0.025	1910 - 2010	4	45
3.51 - 4.50	±0.025	1860 - 1960	4	45
4.51 - 5.00	±0.025	1810 - 1910	3	45
5.01 - 5.60	±0.030	1810 - 1910	3	40
5.61 - 6.00	±0.035	1760 - 1860	3	40
6.01 - 6.50	±0.035	1760 - 1860		40
6.51 - 7.00	±0.040	1710 - 1810		30
7.01 - 8.00	±0.045	1710 - 1810		30
8.01 - 9.00	±0.045	1660 - 1760		30
9.01 - 10.00	±0.050	1660 - 1760		30
10.01 - 12.00	±0.060	1610 - 1760		30
12.01 - 15.00	±0.060	1610 - 1760		30

Yield point

The proof stress $R_{p0.2}$ is min. 0.9 x tensile strength of the wire.

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Surface conditions

Surface condition

Surface condition – non-destructive testing
In the standard size range 2.00 - 6.00 mm the wire is tested continuously in Eddy Current equipment ; for 70 KD a level of 60 microns and for 70 KD S of 40 microns.

Surface condition – end sample test
The wire is end sample tested by means of etch testing and binocular inspection as well as microscopical inspection of the material structure. Max. permissible depth of partial surface decarburization and surface defects, 1.3% x wire diameter. No complete decarburization allowed.

Technical specification

Property	Value
E modulus of elasticity	206 kN/mm^2
G modulus of shear	79.5 kN/mm^2

Steel grades and product standards

Nearest equivalent product standards	ASTM A1000 A	BS 2803 685A55ND
Nearest equivalent steel grades	EN TDSiCr	SIS 142090-05

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Recommendations

Heat treatment

As soon as possible after coiling, the springs should be stress relieved.

Hot presetting

After shot peening, the springs should be hot preset or stress relieved. In order to reach optimum fatigue and relaxation properties, the springs must be preset at an appropriate stress.

Shot peening

In order to obtain optimum fatigue properties, the process time should be adjusted to get a complete treatment. Size of shots should be adapted to wire dimension, pitch and shot peening equipment. Shot peening of the inside of the spring coils is particularly critical.

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