

GARBA 177 PREMIUM

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Precipitation hardenable stainless spring wire. Shaved and EC-tested *)
For applications demanding high fatigue properties

GARBA 177 Premium is a semi-austenitic precipitation-hardenable stainless steel with high relaxation resistance at elevated temperatures and excellent fatigue properties. This material has good formability and good form stability during the precipitation hardening heat treatment and a moderate level of corrosion resistance. The shaved surface improves the fatigue resistance as compared to GARBA 177PH.

CHEMICAL COMPOSITION

C (%)	Si (%)	Mn (%)	P max. (%)	S max. (%)	Cr (%)	Ni (%)	Al (%)
0.09	0.70	1.00	0.040	0.015	16.00 - 18.00	6.50 - 7.80	0.70 - 1.50

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MECHANICAL PROPERTIES

FOR ROUND WIRE

Diameter (mm)	Tolerance (\pm mm)	Tensile Strength (N/mm ²)	Tensile strength after heat treatment 480C 1h (N/mm ²)
0.30 - 0.40	0.005	1885 - 2165	2205 - 2525
0.41 - 0.50	0.008	1860 - 2130	2180 - 2490
0.51 - 0.65	0.008	1810 - 2070	2130 - 2430
0.66 - 0.80	0.010	1810 - 2060	2130 - 2430
0.81 - 1.00	0.010	1780 - 2030	2100 - 2390
1.01 - 1.25	0.015	1720 - 1960	2040 - 2310
1.26 - 1.50	0.015	1670 - 1910	1990 - 2260
1.51 - 1.75	0.015	1610 - 1850	1910 - 2180
1.76 - 2.00	0.015	1570 - 1800	1900 - 2160
2.01 - 2.50	0.015	1540 - 1770	1860 - 2120
2.51 - 3.00	0.020	1500 - 1710	1820 - 2060
3.01 - 3.50	0.020	1400 - 1600	1660 - 1940
3.51 - 4.25	0.020	1350 - 1550	1620 - 1920
4.26 - 5.00	0.025	1310 - 1500	1580 - 1800
5.01 - 5.60	0.025	1300 - 1490	1550 - 1790

SURFACE CONDITIONS

Surface performance

AC-surface 0.30-5.60 mm \emptyset . The AC-coating can be removed before heat treatment by using a 10-20% nitric acid pickle at room temperature.

SURFACE CONDITION

Surface condition - non-destructive testing

In the standard size range 2.00-5,60 mm the wire can be tested continuously in Eddy Current equipment to a surface level of >40 microns.

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PHYSICAL PROPERTIES

E AND G MODULUS OF ELASTICITY

Abt. 190 kN/mm² in drawn condition.
Abt. 200 kN/mm² after heat treatment.

E AND G MODULUS OF SHEAR

Abt. 73 kN/mm² in drawn condition.
Abt. 78 kN/mm² after heat treatment.
Density: 7.90 kg/dm³.

HEAT CONDUCTIVITY

Temperature °C	20	100	300
W/(m* °C)	15.0	15.5	19.0

LINEAR EXPANSION

Pro °C	30-100	30-200	30-300
x10 ⁻⁶	13.0	13.5	14.0

STANDARDS

NEAREST EQUIVALENT STEEL GRADES

EN/DIN 1.4568, AISI/SAE 631, JIS SUS 631

NEAREST EQUIVALENT STANDARDS

EN 10270-3, ASTM A313, AMS 5678, BS 2056 301 S81, JIS G4314

RECOMMENDATIONS

HEAT TREATMENT

Normal procedure for precipitation hardening is heat treatment at 480°C (896°F) for 1 hour and then air cooling. This should be done as soon as possible after spring coiling. The tensile strength of the wire before and after this treatment is given in the table in previous page.

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.

For further technical support, please contact Suzuki Garphyttan or visit www.suzuki-garphyttan.com for more information



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