

# GARBA 178MO

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Stainless spring wire. Similar to EN 1.4310 with increased tensile strength

GARBA 178Mo is a general-purpose austenitic stainless steel that is used for springs and other components requiring good fatigue resistance and good resistance against atmospheric corrosion. Addition of molybdenum increases the tensile strength as compared to GARBA 188 and also increases the resistance against localised and general corrosion.

## CHEMICAL COMPOSITION

| C (%)       | Si (%) | Mn (%) | P max. (%) | S max. (%) | Cr (%)        | Ni (%)      | Mo (%) |
|-------------|--------|--------|------------|------------|---------------|-------------|--------|
| 0.05 - 0.15 | 2.00   | 2.00   | 0.045      | 0.015      | 16.00 - 19.00 | 6.00 - 9.50 | 0.80   |

## MECHANICAL PROPERTIES

### FOR ROUND WIRE

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| Diameter (mm) | Tolerance ( $\pm$ mm) | Tensile Strength (N/mm <sup>2</sup> ) |
|---------------|-----------------------|---------------------------------------|
| 0.30 - 0.65   | 0.008                 | -                                     |
| 0.66 - 1.01   | 0.010                 | -                                     |
| 1.02 - 2.26   | 0.015                 | -                                     |
| 2.27 - 4.01   | 0.020                 | -                                     |
| 4.02 - 6.26   | 0.025                 | -                                     |
| 6.27 - 8.00   | 0.030                 | -                                     |
| 0.30 - 0.40   |                       | 2250 - 2590                           |
| 0.41 - 0.50   |                       | 2200 - 2530                           |
| 0.51 - 0.65   |                       | 2150 - 2470                           |
| 0.66 - 0.80   |                       | 2100 - 2420                           |
| 0.81 - 1.00   |                       | 2050 - 2360                           |
| 1.01 - 1.25   |                       | 2000 - 2300                           |
| 1.26 - 1.50   |                       | 1950 - 2240                           |
| 1.51 - 1.75   |                       | 1900 - 2190                           |
| 1.76 - 2.00   |                       | 1850 - 2130                           |
| 2.01 - 2.50   |                       | 1750 - 2010                           |
| 2.51 - 3.00   |                       | 1700 - 1960                           |
| 3.01 - 3.50   |                       | 1650 - 1900                           |
| 3.51 - 4.25   |                       | 1600 - 1840                           |
| 4.26 - 5.00   |                       | 1550 - 1780                           |
| 5.01 - 6.00   |                       | 1500 - 1730                           |
| 6.01 - 7.00   |                       | 1450 - 1670                           |
| 7.01 - 8.00   |                       | 1400 - 1610                           |

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## SURFACE CONDITIONS

### Surface performance

AC-surface 0.30–8.00 mm Ø. The AC-coating can be removed before heat treatment by using a 10-20% nitric acid pickle at room temperature.

## PHYSICAL PROPERTIES

### E AND G MODULUS OF ELASTICITY

Abt. 180 kN/mm<sup>2</sup> in drawn condition.  
Abt. 185 kN/mm<sup>2</sup> after heat treatment.

### E AND G MODULUS OF SHEAR

Abt. 70 kN/mm<sup>2</sup> in drawn condition.  
Abt. 73 kN/mm<sup>2</sup> after heat treatment.

### HEAT CONDUCTIVITY

| Temperature °C | 20   | 100  | 200  | 400  |
|----------------|------|------|------|------|
| W/(m*°C)       | 15.0 | 16.0 | 18.0 | 20.0 |

### RESISTIVITY

| Temperature °C | 20  | 100 | 200 | 300 |
|----------------|-----|-----|-----|-----|
| nΩm            | 700 | 750 | 800 | 950 |

### LINEAR EXPANSION

| Pro °C            | 30–100 | 30–200 | 30–400 |
|-------------------|--------|--------|--------|
| x10 <sup>-6</sup> | 17.0   | 17.5   | 18.5   |

### SPECIFIC HEAT CAPACITY

| Temperature °C | 20  | 100 | 200 | 400 |
|----------------|-----|-----|-----|-----|
| J/(kg*°C)      | 440 | 480 | 520 | 560 |

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## STANDARDS

### NEAREST EQUIVALENT STEEL GRADES

EN/DIN 1.4310, AISI/SAE 302

### NEAREST EQUIVALENT STANDARDS

EN 10270-3, ASTM A313, BS 2056 302 S26

## RECOMMENDATIONS

### HEAT TREATMENT

As soon as possible after coiling, the springs should be stress relieved.  
Recommended temperature for compression springs or tension springs without initial tension is approx. 420 °C for 0.5 - 4 hours.