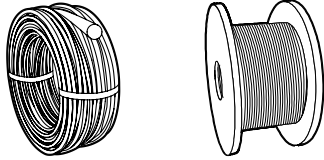


STAINLESS WIRE FREE-CUTTING WIRE



ZAPP IS CERTIFIED TO ISO 9001



HIGH-PERFORMANCE WIRE MATERIALS

Free-cutting steels for CNC machines and automatic lathes. The Zapp program of free-machining steels includes carbon steel in size range 0.49-12 mm (0.0192-0.472 in.) and stainless steel in size range 0.50-80 mm (0.0196-3.15 in.).

Our free-cutting steels are characterized by excellent machinability and surface finish and have tight and consistent tolerances. This contributes to increased cutting speeds, reduced tool wear and shorter set-up times.

NEW LEAD-FREE FREE-CUTTING STEEL

Finemac™, our latest development within free-cutting steel, is an environmentally friendly, lead-free material offering a wider hardening window than other free-cutting steel grades.

MATERIALS

| Carbon steel | Description | Typical applications |
|--------------------------|--|--|
| Finemac | A lead-free, hardenable, free-cutting carbon steel characterized by excellent machinability, high hardness, high wear resistance and exceptional dimensional stability after hardening. | Watch parts, ABS brake components, shafts, test probes, automotive dashboard components |
| 20AP | A hardenable, free-cutting carbon steel characterized by excellent machinability, high hardness, high wear resistance and exceptional dimensional stability after hardening. | Watch parts, ABS brake components, shafts, test probes, automotive dashboard components |
| Stainless steel | Description | Typical applications |
| 4C27A (ASTM 420F mod) | A hardenable stainless chromium steel characterized by very good machinability, adequate hardness, high wear resistance and good corrosion resistance. | Watch parts, shafts, various precision instruments, surgical needles, medical and dental tools |
| 1802 | A ferritic, soft magnetic, stainless steel combining superior corrosion properties with excellent machinability at high cutting speed (preferably 200 m/min or higher). It also exhibits good weldability and very good cold heading properties. | Watch cases, couplings, inspection glass, pump components, measuring instruments, various types of valves, e.g. in solenoids |

SIZES AND TOLERANCES

Zapp's free-cutting steels have tight and consistent tolerances, reducing machine set-up times and facilitating trouble-free production.

| Drawn condition | | | | | |
|--------------------|---------|---------|---------|---------|-------------------|
| Diameter tolerance | | | | | |
| Diameter, mm | D1 ± mm | D2 ± mm | D3 ± mm | D4 ± mm | Ovality for D4 mm |
| 0.05 – 0.125 | 0.007 | 0.004 | 0.002 | - | - |
| > 0.125 – 0.25 | 0.009 | 0.005 | 0.003 | - | - |
| > 0.25 – 0.50 | 0.011 | 0.007 | 0.004 | 0.003 | 0.002 |
| > 0.50 – 1.00 | 0.014 | 0.009 | 0.005 | 0.003 | 0.002 |
| > 1.00 – 1.60 | 0.018 | 0.011 | 0.006 | 0.004 | 0.002 |
| > 1.60 – 2.50 | 0.023 | 0.014 | 0.008 | 0.005 | 0.003 |
| > 2.50 – 4.00 | 0.030 | 0.018 | 0.010 | - | - |
| > 4.0 – 6.30 | 0.038 | 0.022 | 0.013 | - | - |
| > 6.30 – 10.00 | 0.048 | 0.028 | - | - | - |
| > 10.00 – 16.00 | 0.060 | - | - | - | - |

| Ground condition | | | | | |
|--------------------|-----------|-----------|-----------|-----------|-----------|
| Diameter tolerance | | | | | |
| Diameter, mm | h7 mm | h8 mm | h9 mm | h10 mm | h11 mm |
| > 1 - 3 | +0/-0.010 | +0/-0.014 | +0/-0.025 | +0/-0.040 | +0/-0.066 |
| > 3 - 6 | +0/-0.012 | +0/-0.018 | +0/-0.030 | +0/-0.048 | +0/-0.075 |
| > 6 - 10 | +0/-0.015 | +0/-0.022 | +0/-0.036 | +0/-0.058 | +0/-0.090 |
| > 10 - 18 | +0/-0.018 | +0/-0.027 | +0/-0.043 | +0/-0.070 | +0/-0.110 |
| > 18 - 30 | +0/-0.021 | +0/-0.033 | +0/-0.052 | +0/-0.084 | +0/-0.130 |
| > 30 - 50 | +0/-0.025 | +0/-0.039 | +0/-0.062 | +0/-0.100 | +0/-0.160 |
| > 50 - 70 | +0/-0.030 | +0/-0.046 | +0/-0.074 | +0/-0.120 | +0/-0.190 |

* Ground material is delivered with ISO tolerance class h7, h8 or h9 for diameters up to 13 mm, depending on steel grade. Refer to the material data sheet for each specific steel grade.

SURFACES AND DELIVERY FORMS

Zapp's free-cutting steel can be delivered with a variety of surfaces, such as bright-drawn, CWC-drawn, CuSn-coated and ground surface. Delivery forms available are:

COILS

- _ Spool 28 (one-way plastic spool, OD 460 mm, ID 305 mm, W 105 mm)
- _ Spool 17 (returnable metallic spool, OD 750 mm, ID 406 mm, W 285 mm)

SURFACES PER GRADE AND SIZE RANGE

| Grade | Drawn condition (1*, 2, 3, 4) | CuSn coated (1*, 2, 3) | Ground surface (1*) |
|---------|-------------------------------|------------------------|---------------------|
| Finemac | 0.49 – 3.0 mm | 0.50 – 3.2 mm | 0.90 – 3.0 mm |
| 20 AP | 0.49 – 12.7 mm | 0.50 – 3.2 mm | 0.90 – 12.7 mm |
| 14 AP | 0.49 – 12.7 mm | 0.50 – 3.2 mm | 0.90 – 12.7 mm |
| 1802 | 1.0 – 11.0 mm | - | 2.0 – 70 mm |
| 4C27A | 0.40 – 10.0 mm | - | 0.90 – 10.0 mm |

* Minimum diameter for straightened lengths is 0.60 mm (2.0 mm for 1802).

Zapp Precision Metals (Sweden) AB
PRECISION WIRE
Jernverksleden 8
811 34 Sandviken
Sweden
Phone +46 26 265467
precisionmetals-sweden@zapp.com
www.zapp.com

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