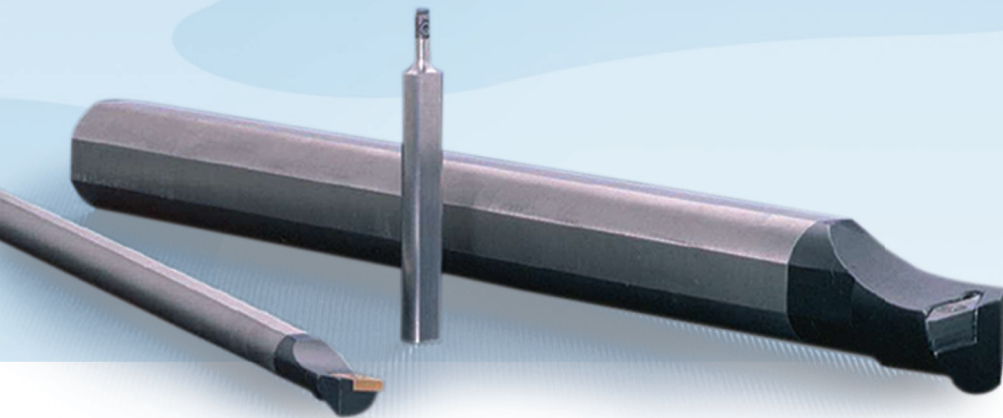


High Performance Material for
Anti-Vibration Boring Bars

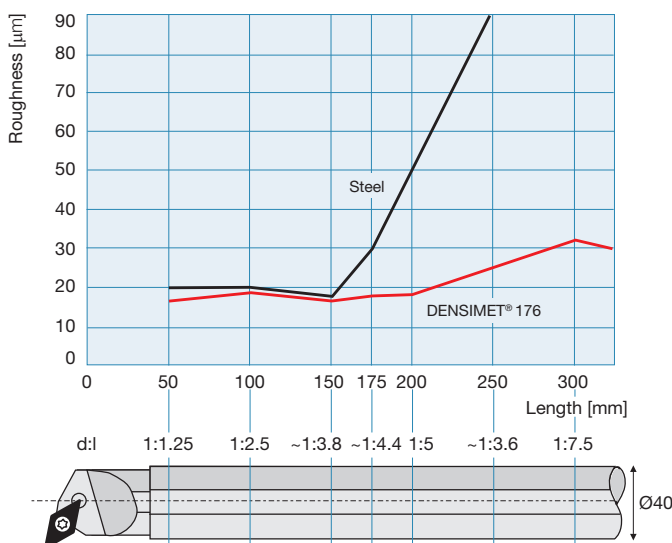
DENSIMET® 176



A Step ahead in Technology.

PLANSEE is the world's leading manufacturer of powder metallurgically processed refractory and special metals. DENSIMET® composite materials are heavy metals with a high tungsten content (93%) and a NiFe or a NiCu binder phase. They are distinguished by their particularly high density, high mechanical resistance and excellent strength and ductility.

Thanks to the combination of a high density and a high young's modulus, DENSIMET® 176 is the perfect resolution for the absorption of vibrations on overhangs up to 15 times the shaft diameter.



Surface finish comparison of fine-turned test bars

Material properties

Properties	Unit	DENSIMET® 176
% Tungsten ± 0.5	%	93 %
Binder	-	Ni + Fe
Density ± 0.2	-	17.6
Hardness	HV 30	305
UTS (1)	MPa	900
Yield Strength (1)	MPa	700
Elongation (1)	%	> 10
Modulus of elasticity	10 ³ MPa	350

Delivery program

Ø (mm)	Length (mm)	Ø (mm)	Length (mm)	Ø (mm)	Length (mm)
3 +0.20 / +0.40	240 +0 / +5	16 +0.20 / +0.40	250 +0 / +5	30 +0.30 / +0.60	500 +0 / +5
4 +0.20 / +0.40	240 +0 / +5	18 +0.25 / +0.50	500 +0 / +5	32 +0.30 / +0.60	500 +0 / +5
6 +0.20 / +0.40	240 +0 / +5	20 +0.25 / +0.50	500 +0 / +5	37 +0.30 / +0.60	500 +0 / +5
8 +0.20 / +0.40	240 +0 / +5	22 +0.30 / +0.60	500 +0 / +5	42 +0.30 / +0.60	500 +0 / +5
10 +0.20 / +0.40	250 +0 / +5	24 +0.30 / +0.60	500 +0 / +5	47 +0.30 / +0.70	500 +0 / +5
12 +0.20 / +0.40	250 +0 / +5	26 +0.30 / +0.60	500 +0 / +5	52 +0.30 / +0.70	500 +0 / +5
14 +0.20 / +0.40	250 +0 / +5	28 +0.30 / +0.60	500 +0 / +5	57 +0.30 / +0.70	500 +0 / +5

Recommendations for machining

Grinding

Circular	Surface
Rough machining: carborundum wheel 4C 60k AJ10 Finishing: carborundum wheel 4C 80l AJ10 Speed: 25 m/s, copious cooling liquid.	Rough machining: carborundum wheel 37C 36l AJ5 Finishing: carborundum wheel 37C 36l AJ8 Speed: 20m/s, copious cooling liquid.

Machining (Turning & Milling)

Carbide tipped tool. Grade Iso K05 to K20 Grinding taper 0° to 15°, rake angle 5°	Feed: from 0.1 to 0.4 mm/rev. Cutting speed from 75 to 120 m/min.
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Drilling

High speed drill, high Co content.

Tapping

High speed steel taps, high quality material alternate threading.

Brazing

Quaternary silver or copper based brazing alloy.
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Directions for shrink fitting

Conical, hardened steel. Ring diameter: 2 times the shaft diameter. Cone length 1.5 times the DENSIMET 176S shaft diameter.	Shrinking temperature: 250 °C (yellow to yellow brown). Caution, both the rod and the ring must be machined exactly to the same cone specification (test with engineers blue).
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Details about quality and recommendations about the use of materials and products are for descriptive purposes. They are based on the results of our research and development work and on practical experiences. Statements about certain properties are made to the best of our knowledge but are offered without guarantee. Statements on these matters shall always require specific agreement in writing.