2077 by EURAL
LEAD FREE

According to:
EU directives RoHS II, ELV, REACH

FREE CUTTING
Aluminum alloy

EURAL
GNUTTI S.p.A.

Applications
2077 LEAD FREE by EURAL is a free-cutting aluminum alloy with the best machinability within the hard alloys and with extremely high mechanical properties. It has been developed by Eural Gnutti and can overperform alloys as 2017, 2017A, 2014, 2014A, 2024, 7020 and 7022 and can compete with 7075 alloy.
Its excellent machinability, a guarantee of high yield/productivity, has no comparison within the hard aluminum alloys.

Green choice
For many years RoHS II regulations permit, with an exception, a maximum lead content in aluminum alloys up to 0.4% by weight. Such limit is under discussion for a further reduction.
REACH recently included lead in SVHC list as highly toxic element for human health.
2077 LEAD FREE by EURAL is ready in anticipation of any possible future scenario because it is free of lead.

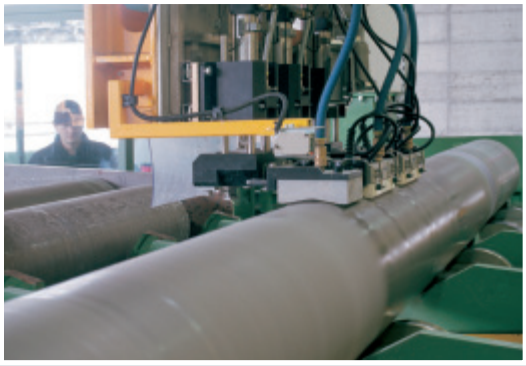
Alloy with high recycled aluminum content.

2077 LEAD FREE by EURAL is member of free-cutting alloys, lead free, developed by the Eural Research & Development department and born thanks to the never-ending vision of the Gnutti family.
It's an alloy which was missing until today, an alloy that mixes very high mechanical properties and excellent machinability.

High Machinability
2077 LEAD FREE by EURAL has been specifically developed to be machined on high speed automatic lathes thanks to its thin chip formation.

No tin
Today there are several 2000 series alloys with contain tin (Sn) which is well known to cause weakness and cracking of machined parts when submitted to stress or high temperatures (> 320°F).
Tin, due to its brittle nature, has the dangerous tendency to break without significant previous deformation (strain).
2077 LEAD FREE by EURAL does not contain tin.

Ultrasonic tested billets
All semi-finished products in 2077 LEAD FREE by EURAL are made by Class A ultrasonic tested billets (SAE AMS-STD-2154).



Production range
2077 LEAD FREE by EURAL is available both as drawn and extruded condition.
Drawn round bars Ø 0.394-3.15"
Temper T6
Extruded round bars Ø 1.181 – 10"mm
Temper T6 and T4

Available also in square, rectangular and hexagonal bars.
A wide range of drawn bars are also available in h9 tolerance.

Alternative alloy to:
2077 LEAD FREE by EURAL is the best alternative option to many hard alloys such as 2017, 2017A, 2014, 2014A, 2024, 7020, 7022 and 7075.
Furthermore, thanks to a very high yield strength (YTS), it can be an option to replace, depending on the final application, certain stainless steel (AISI 303/4/4L/316/L), cast iron (GH 350/500) and brass (CW608N R360).

RoHS & REACH and other metals
The imminent restrictions about the maximum lead content allowed will affect all products obtained by mechanical processing, including steel, cast iron and brass. These metals, without the lead which was a guarantee of good or acceptable machinability, will not be allowed anymore. For all these cases, the only option in terms of machinability is aluminum and the best choice available today is 2077 LEAD FREE by EURAL.

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EURAL GNUTTI S.p.A.

2077 by EURAL LEAD FREE

Colour code EU sand

PRODUCTION PROGRAM

Unit: in.	●	■	▬	⬢
Drawn	0.394 - 3	To be defined	To be defined	To be defined
Extruded	1.181 - 10	1.181 - 6.5	Thick. 1.181 - 5	-

According to EU directives:
2000/53/EU - 2011/65/EU (RoHS II)
Ready to imminent restrictions on lead content because LEAD FREE

PRESENTATION

This alloy has very high mechanical properties, high fatigue strength, good forging attitude and excellent machinability on high-speed lathes.
Eural alloy 2077 is the first and only hard alloy with superior characteristics to 2024, which guarantees a chip formation comparable to 2011 and 2033, thus very high productivity, tighter tolerances, better surface roughness and longer tool life.
Eural 2077 is the best alternative to alloys 2017, 2017A, 2014, 2014A, 2024, 7020, 7022, 7075.
Due to its high mechanical properties and excellent machinability, it can replace certain types of steel and cast iron.

Main applications: valves, bolts and nuts, threaded bars, structural and high resistance components.

Properties	T6	T4
Machinability	■■■■■	■■■■■
Protective anodizing	■■□□□	■■□□□
Decorative anodizing	■■□□□	■■□□□
Hard anodizing	■■□□□	■■□□□
Resistance to atmospheric corrosion	■■□□□	■■□□□
Resistance to marine corrosion	■□□□□	■□□□□
MIG-TIG weldability	■■□□□	■■□□□
Resistance weldability	■■■□□	■■■□□
Brazing weldability	■□□□□	■□□□□
Plastic formability when cold	■■□□□	■□□□□
Plastic formability when hot	■■□□□	■■■□□

Legend

■■■■■ Excellent ■■□□□ Good ■□□□□ Acceptable ■□□□□ Not recommended

Samples of finished products made of Eural bars

Chemical composition	
Si	0.40 - 1.00
Fe	≤ 0.70
Cu	4.00 - 5.00
Mn	0.60 - 1.20
Mg	0.60 - 1.20
Cr	≤ 0.20
Ni	≤ 0.20
Zn	≤ 0.25
Ti	≤ 0.15
Ag, Li, Zr	Each ≤ 0.15
Bi	0.20 - 0.90
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	lb / in³	0.1015
Modulus of elasticity	ksi	11,168
Coefficient of thermal expansion	x10⁻⁶ / °F	12.7
Thermal conductivity at 68°F	Btu / ft h °F	T6: 86.7 / T4: 98.2
Typical electrical resistivity at 68°F	Ω mm² / m	T6: 0.045 / T4: 0.052

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Minimum mechanical properties

	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T6/T651	≤ 3.15	69.6	58.0	5	130
Extruded	T4/T4511	≤ 3	58.0	39.2	10	105
	T4/T4511	3 < D ≤ 6	56.6	37.7	9	105
	T4/T4511	6 < D ≤ 8	53.7	34.8	8	105
	T4/T4511	8 < D ≤ 10	52.2	31.9	7	105
	T6/T6511	≤ 6	66.0	55.1	5	130
	T6/T6511	6 < D ≤ 8	60.9	40.6	8	120
	T6/T6511	8 < D ≤ 10	58.0	39.2	8	110

*HBW only for indicative purposes

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