2033 by EURAL
LEAD FREE

FREE CUTTING
Aluminium alloy

EURAL
GNUTTI S.p.A.

According to:
RoHS II, ELV, REACH directives

Applications
2033 LEAD FREE by EURAL is an alloy of multiple potential applications; it gives an excellent machinability thanks to a very thin chip forming, high mechanical properties, better anodizing and weldability attitude if compared to alloys such as 2011, 2007, 2030.

2033 LEAD FREE by EURAL is a good alternative to alloys 2011, 2007, 2030 after latest RoHS/REACH restrictions (Pb ≤ 0,1%).

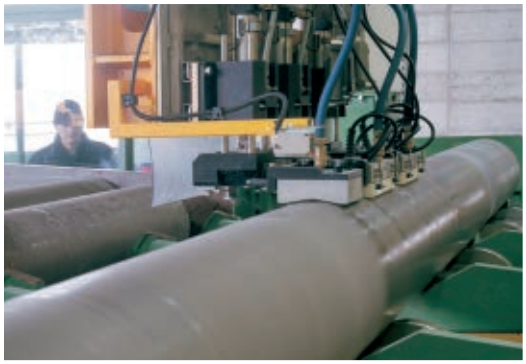
RoHS and REACH
The latest RoHS directive (2018/740/EU) fixes the limit of lead allowed in aluminium alloys for machining purposes to 0,1% starting from 18/05/2021.
REACH has recently mentioned lead in SVHC list as toxic element for human health and subject to specific authorization whenever its presence is more than 0,1%.
EURAL Gnutti SpA is ready with alloy 2033 LEAD FREE by EURAL.

2033 LEAD FREE by EURAL is the result of long and accurate work by EURAL Research & Development Department in order to make available an aluminium alloy with high machinability and having better features than those today in the market.

High Machinability
2033 LEAD FREE by EURAL has been developed specifically for being machined on high-speed automatic lathes thanks to its excellent chip forming performance.

No tin
Today there are several alloys from 2000 series aluminium + tin (Sn) which, as well known, causes weakness and cracking of machined parts when submitted to stress, low or high temperatures (< 13°C o > 160°C).
Tin, due to its brittle nature, has the dangerous tendency to suddenly break without significant previous deformation (strain).
2033 LEAD FREE by EURAL does not contain tin.

Ultrasonic tested billets
All semi-finished products in 2033 LEAD FREE by EURAL are made by Class A ultrasonic tested billets (SAE AMS STD 2154).



Production range
2033 LEAD FREE by EURAL is available both as drawn and extruded condition.
Drawn round bars Ø 5 - 76,2mm
Tempers T3, T351 and T8.
Extruded round bars Ø 30 - 254mm
Tempers T6

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

Alternative alloy to:
2033 LEAD FREE by EURAL is the best alternative to several alloys such as 2007, 2030, 2011, 2028A, 2041, 2044, 7020.

RoHS and other metals - Pb ≤ 0,1%
The latest restrictions on lead (RoHS Pb ≤ 0,1%) concern also those products made from machining of steel and brass.
Steel from Pb ≤ 0,35% down to Pb ≤ 0,1%
Brass from Pb ≤ 4% down to Pb ≤ 0,1%
For these metals today the only alternative for machinability is aluminium and a good option is 2033 LEAD FREE by EURAL

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2033 by EURAL
LEAD FREE

Colour code
EU pink

PRODUCTION PROGRAM

Unit: mm	●	■	▬	⬢
Drawn	5 ÷ 76,2	10 ÷ 65	Thick. 12 ÷ 55	10 ÷ 63,5
Extruded	30 ÷ 254	30 ÷ 165	Thick. 30 ÷ 127	-

According to EU directives:
2000/53/EU (ELV) - 2018/740/EU (RoHS II)

PRESENTATION

This alloy has been developed by EURAL and it is one of the best for high speed automatic lathes. It gives the following advantages:

- Easy machining with any tool
- Excellent chip forming performance (thin chip)
- Longer tool life
- High mechanical properties
- Better anodizing and weldability attitude compared to alloys 2011, 2007, 2030.

This alloy does not contain neither lead nor tin and therefore it is a good solution for the production of parts under the latest restriction on this topic (2018/740/EU RoHS: **Pb ≤ 0,1** starting from 18/05/2021).

Main applications: automotive industry, electric and electronic industry, precision machining, defense, forging, screws, bolts, nuts, threaded parts of thin thickness.

Properties	T3/T6	T8
Machinability	●●●●●	●●●●●
Protective anodizing	●●○○○	●●○○○
Decorative anodizing	●●○○○	●●○○○
Hard anodizing	●●○○○	●●○○○
Resistance to atmospheric corrosion	●●○○○	●●○○○
Resistance to marine corrosion	●○○○○	●○○○○
MIG-TIG weldability	●○○○○	●○○○○
At 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	0,10 ÷ 1,20
Fe	≤ 0,70
Cu	2,20 ÷ 2,70
Mn	0,40 ÷ 1,00
Mg	0,20 ÷ 0,60
Cr	≤ 0,15
Ni	≤ 0,15
Zn	≤ 0,50
Ti	≤ 0,10
Bi	0,05 ÷ 0,80
Others	Each 0,05 Total 0,15
Al	Remainder

Physical properties		
Density	Kg/dm³	2,77
Modulus of elasticity	MPa	70.000
Coefficient of thermal expansion	x10⁻⁶/°C	22,9
Thermal conductivity at 20°C	W/mk	T3: 151 T8: 173
Typical electrical resistivity at 20°C	Ω mm²/m	T3: 0,046 T8: 0,046

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Minimum mechanical properties

	Temper	Diam. mm	Rm MPa	Rp0,2 MPa	A%	HBW Typical
Drawn	T3	≤ 30	370	240	7	100
	T3	30 < D ≤ 80	340	220	7	100
	T351	≤ 80	370	240	5	100
	T8	≤ 80	370	270	8	100
Extruded	T6	≤ 80	370	250	8	100
	T6	80 < D ≤ 250	340	220	8	100

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