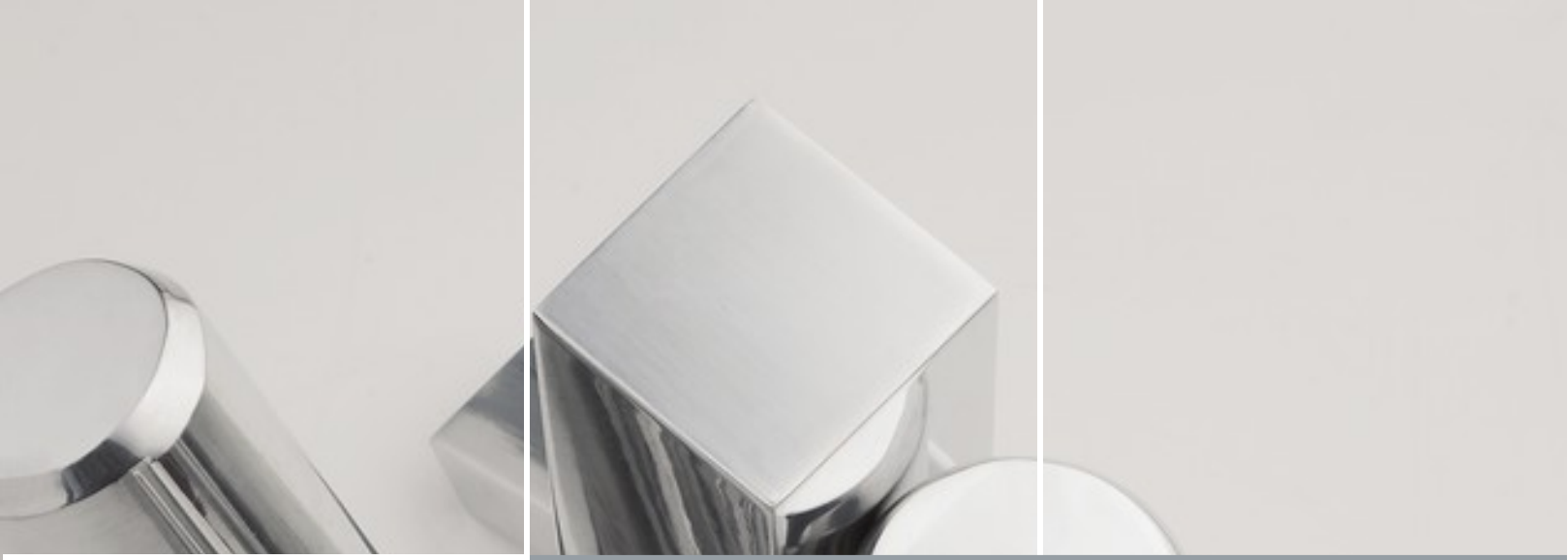
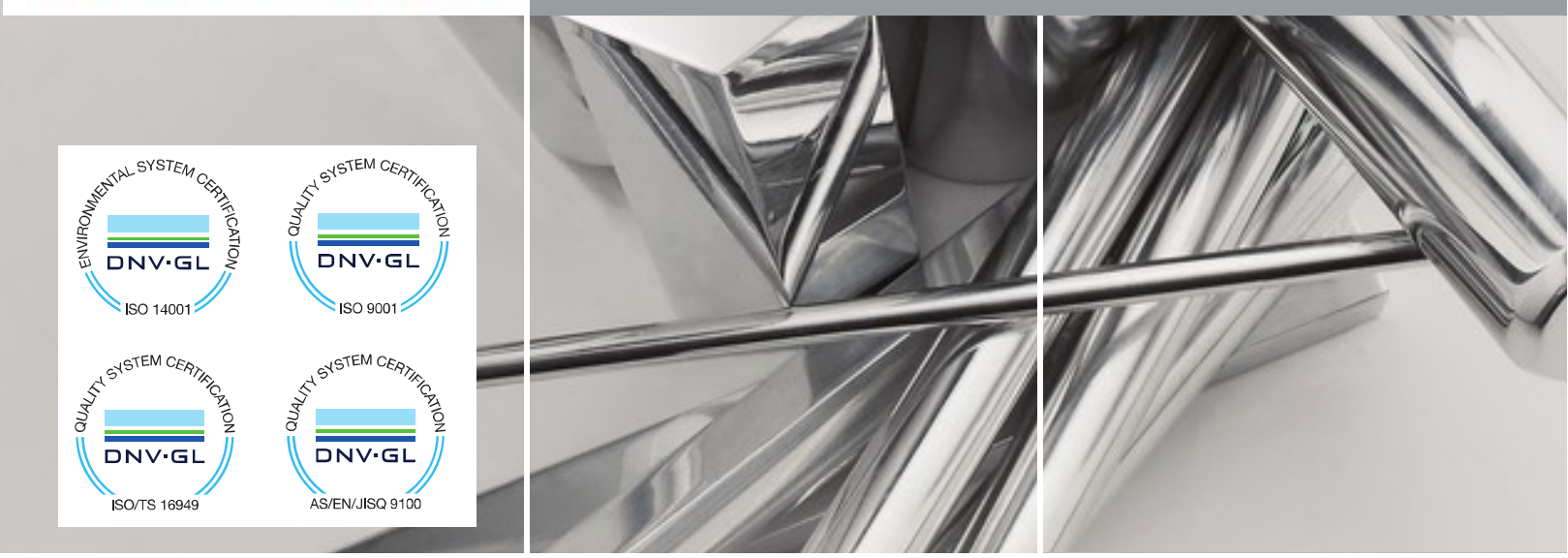


EURAL GNUTTI S.p.A.

Aluminum Bars



ENVIRONMENTAL SYSTEM CERTIFICATION DNV·GL ISO 14001

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

QUALITY SYSTEM CERTIFICATION DNV·GL ISO/TS 16949

QUALITY SYSTEM CERTIFICATION DNV·GL AS/EN/JISQ 9100

Dear Customer,

Since 1968, our company has manufactured semis in aluminum and occupied a position of worldwide leadership in bars and rods. Our production facilities include the foundry located in Pontevico, Brescia (Italy) and the extrusion plant in Rovato, Brescia (Italy). With a workforce of about 400 employees and built on an area covering a total of 4,305,000 sq.ft., Eural possesses the latest state-of-the-art foundry and extrusion equipment.

Our passion for our job pushes us to always achieve excellence for our products. We constantly invest in research and development and in the latest technologies so our customers receive the maximum for their applications.
The choice of the correct alloy is a crucial passage that might determine the success of a product. For this reason, we have produced this catalogue that gives you for each alloy a detailed technical sheet with all the parameters you need.
International standards leave the manufacturers too wide a margin of variability for creating each alloy. In practice this means that, for each alloy, you can face significant differences in mechanical properties, with not always acceptable results on your final products. In Eural we have generated a code that is more stringent than the international regulations and restricts further the oscillations within the same alloy, constantly guaranteeing you homogeneous products in the course of time, to always get the best mechanical properties.

We received in 2008 the certification ISO/TS 16949.2002 that guarantees an extremely high quality system, and we have already implemented a modern automatic system of ultrasonic tests that certifies the absolute integrity of each and every billet that we produce in our foundry, according to class “A” of SAE AMS-STD-2154 regulation. In Eural each production process is subject to quality controls, which go beyond standard requirements.

We firmly believe that the dialogue with you, through our technical and commercial staff, is fundamental to support you in the choice of the aluminum alloy that best suits to your needs. You can always count on our experience and our availability.

Doct. Sergio Gnutti
President Eural Gnutti S.p.A.

EURAL GNUTTI S.p.A.

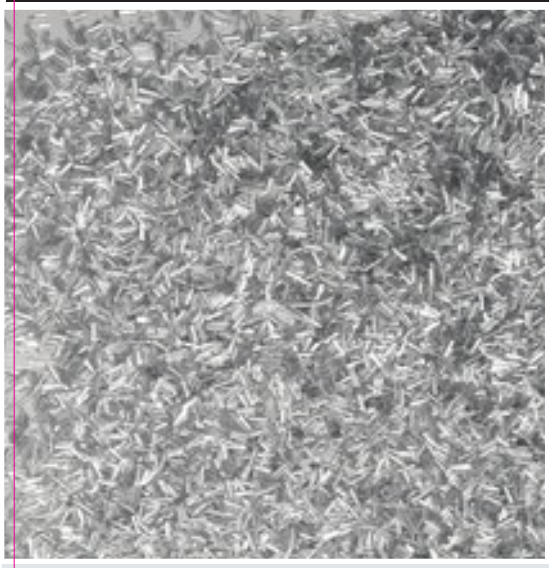
2011 by EURAL

Color code
brown

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.197 - 3	0.394 - 2.559	Thick. 0.472 - 2.165	0.394 - 2.5
Extruded	1.181 - 10	1.181 - 6.5	Thick. 1.181 - 5	-

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)



PRESENTATION

This alloy is the most often selected for high speed automatic lathes.
It offers the following advantages:
- easy machining with any equipment;
- cutting stress lower than most of other alloys;
- longer life of cutting tools;
- cutting area always clean due to very thin chip;
- high mechanical properties;
- possibility to anodize finished parts in several colors *.

Main applications: screws, bolts, nuts, threaded bars.

* To get an optimal surface finishing of anodized pieces, we suggest to use suitable lubricants during machining.

Samples of finished products made of Eural bars

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

Chemical composition

Si	≤ 0.40
Fe	≤ 0.70
Cu	5.00 - 6.00
Mn	
Mg	
Cr	
Ni	
Zn	≤ 0.30
Ti	
Pb	0.20 - 0.40
Bi	0.20 - 0.60
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties

Density	lb / in ^{3}	0.1022
Modulus of elasticity	ksi	10.152
Coeffi cient of thermal expansion	x10^{-6} / °F	12.7
Thermal conductivity at 68°F	Btu / ft h °F	T3: 86.7 T8: 98.2
Typical electrical resistivity at 68°F	Ω mm^2 / m	T3: 0.038 T8: 0.043

Minimum mechanical properties

	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T3	≤ 1.5	46.4	39.2	10	90
	T3	1.5 < D ≤ 2	43.5	36.3	10	90
	T3	2 < D ≤ 3	40.6	30.5	10	90
	T8	≤ 3	53.7	39.2	8	115
Extruded	T6	≤ 3	45.0	33.4	8	110
	T6	3 < D ≤ 8	42.8	28.3	6	110

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MD70201.02 US REV 07 03/03/17

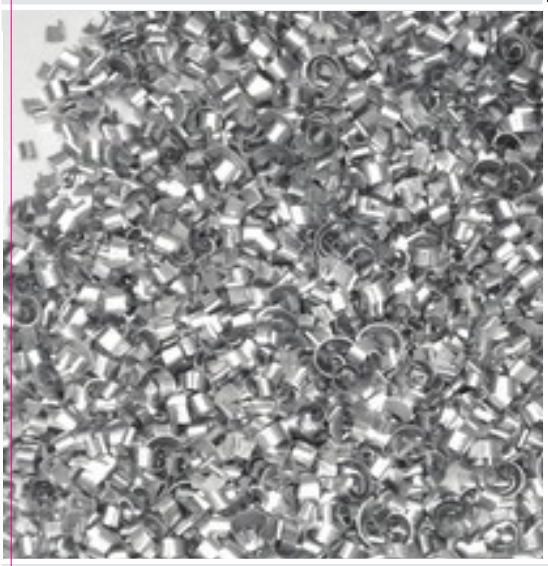
2007 by EURAL

Color code
black

EURAL GNUTTI S.p.A.

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.551 - 3	0.787 - 2.559	Thick. 0.472 - 2.165	0.787 - 2.5
Extruded	1.181 - 10	1.181 - 6.5	Thick. 1.181 - 5	-



PRESENTATION

Among aluminium alloys for high speed automatic lathes, 2030 and 2007 have the highest mechanical characteristics.
This alloy is the most often selected when it is required to have a good combination of machinability and high mechanical properties. It has low corrosion resistance.

Main applications: screws, bolts, nuts, threaded bars.

Samples of finished products made of Eural bars

Properties	T3/T4
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

Chemical composition	
Si	≤ 0.80
Fe	≤ 0.80
Cu	3.30 - 4.60
Mn	0.50 - 1.00
Mg	0.40 - 1.80
Cr	≤ 0.10
Ni	≤ 0.20
Zn	≤ 0.80
Ti	≤ 0.20
Pb	0.80 - 1.00
Bi	≤ 0.20
Sn	≤ 0.20
Others	Each 0.10 Total 0.30
Al	Remainder

Physical properties		
Density	$\frac{lb}{in^3}$	0.103
Modulus of elasticity	ksi	10,298
Coeffi cient of thermal expansion	$\frac{x10^{-6}}{°F}$	13.1
Thermal conductivity at 68°F	$\frac{Btu}{ft\ h\ °F}$	80.4
Typical electrical resistivity at 68°F	$\frac{\Omega\ mm^2}{m}$	0.057

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Minimum mechanical properties						
	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T3	≤ 1.2	53.7	34.8	7	95
	T3	1.2 < D ≤ 3	49.3	31.9	6	95
	T351	≤ 3	53.7	34.8	5	95
Extruded	T4, T4510, T4511	≤ 3	53.7	36.3	8	95
	T4, T4510, T4511	3 < D ≤ 8	49.3	31.9	8	95
	T4, T4510, T4511	8 < D ≤ 10	47.9	30.5	7	95

MD70201.02 US REV 07 03/03/17

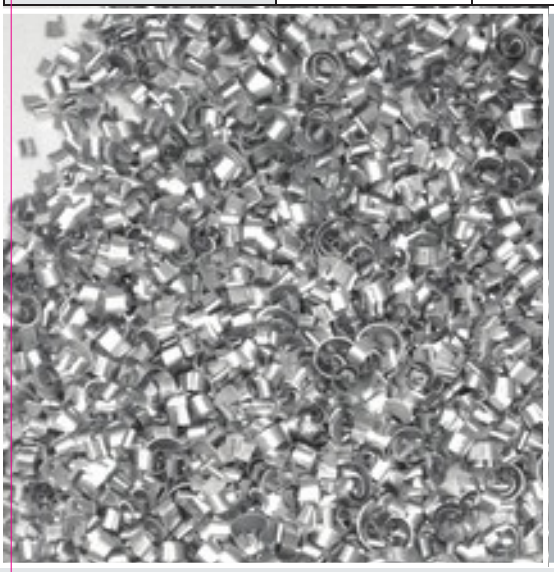
EURAL GNUTTI S.p.A.

2030 by EURAL

Color code
black

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.551 - 3	0.787 - 2.559	Thick. 0.472 - 2.165	0.787 - 2.5
Extruded	1.181 - 10	1.181 - 6.5	Thick. 1.181 - 5	-



PRESENTATION

Among aluminium alloys for high speed automatic lathes, 2030 and 2007 have the highest mechanical characteristics.
This alloy is the most often selected when it is required to have a good combination of machinability and high mechanical properties. It has low corrosion resistance.

Main applications: screws, bolts, nuts, threaded bars.

Samples of finished products made of Eural bars

Properties	T3/T4
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

Chemical composition	
Si	≤ 0.80
Fe	≤ 0.70
Cu	3.30 - 4.50
Mn	0.20 - 1.00
Mg	0.50 - 1.30
Cr	≤ 0.10
Ni	
Zn	≤ 0.50
Ti	≤ 0.20
Pb	0.80 - 1.00
Bi	≤ 0.20
Sn	
Others	Each 0.10 Total 0.30
Al	Remainder

Physical properties		
Density	lb / in ^{3}	0.103
Modulus of elasticity	ksi	10,298
Coeffi cient of thermal expansion	x10^{-6} / °F	13.1
Thermal conductivity at 68°F	Btu / ft h °F	80.4
Typical electrical resistivity at 68°F	Ω mm^2 / m	0.057

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Minimum mechanical properties						
	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T3	≤ 1.2	53.7	34.8	7	115
	T3	1.2 < D ≤ 3	49.3	31.9	6	115
	T351	≤ 3	53.7	34.8	5	115
Extruded	T4, T4510, T4511	≤ 3	53.7	36.3	8	115
	T4, T4510, T4511	3 < D ≤ 8	49.3	31.9	8	115
	T4, T4510, T4511	8 < D ≤ 10	47.9	30.5	7	115

MD70201.02 US REV 07 03/03/17

2017A by EURAL

Color code
green

EURAL GNUTTI S.p.A.

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.551 - 3	0.787 - 2.559	Thick. 0.472 - 2.165	0.787 - 2.5
Extruded	1.181 - 10	1.181 - 6.5	Thick. 1.181 - 5	-

PRESENTATION

This alloy has high mechanical properties and excellent resistance to fatigue. During machining, it creates quite long chips, therefore it is not well suited for automatic lathes.
It can be replaced by 2030, which has the same mechanical properties but has better machinability, allowing higher productivity.

Main applications: screws and bolts, high structural resistance components for aviation and defense.

Samples of finished products made of Eural bars

Properties	T3/T4
Machinability	Excellent
Protective anodizing	Excellent
Decorative anodizing	Acceptable
Hard anodizing	Acceptable
Resistance to atmospheric corrosion	Excellent
Resistance to marine corrosion	Acceptable
MIG-TIG weldability	Excellent
At resistance weldability	Good
Brazing weldability	Acceptable
Plastic formability when cold	Acceptable
Plastic formability when hot	Excellent

Legend

Excellent | Good | Acceptable | Not recommended

Chemical composition	
Si	0.20 - 0.80
Fe	≤ 0.70
Cu	3.50 - 4.50
Mn	0.40 - 1.00
Mg	0.40 - 1.00
Cr	≤ 0.10
Ni	
Zn	≤ 0.25
Zr+Ti	≤ 0.25
Pb	
Bi	
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	lb / in ^{3}	0.1008
Modulus of elasticity	ksi	10,878
Coeffi cient of thermal expansion	x10^{-6} / °F	13.1
Thermal conductivity at 68°F	Btu / ft h °F	77.0
Typical electrical resistivity at 68°F	Ω mm^2 / m	0.051

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Minimum mechanical properties						
	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T3	≤ 3	58.0	36.3	10	105
	T351	≤ 3	58.0	36.3	8	105
Extruded	T4, T4510, T4511	≤ 3	58.0	39.2	10	105
	T4, T4510, T4511	3 < D ≤ 6	56.6	37.7	9	105
	T4, T4510, T4511	6 < D ≤ 8	53.7	34.8	8	105
	T4, T4510, T4511	8 < D ≤ 10	52.2	31.9	7	105

MD70201.02 US REV 07 03/03/17

2024 by EURAL

Color code
red

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬣
Drawn	0.787 - 3	-	-	-
Extruded	1.181 - 10	2 - 6.5	Thick. 1.181 - 5	-

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRESENTATION

This alloy has high mechanical properties and excellent resistance to fatigue. During machining, it creates quite long chips, therefore it is not well suited for automatic lathes.

Main applications: screws and bolts, high structural resistance components for aviation and defense.

Samples of finished products made of Eural bars

Properties	T3
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

Chemical composition	
Si	≤ 0.50
Fe	≤ 0.50
Cu	3.80 - 4.90
Mn	0.30 - 0.90
Mg	1.20 - 1.80
Cr	≤ 0.10
Ni	
Zn	≤ 0.25
Ti	≤ 0.15
Pb	
Bi	
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	lb / in ^{3}	0.1008
Modulus of elasticity	ksi	10,153
Coeffi cient of thermal expansion	x10^{-6} / °F	12.8
Thermal conductivity at 68°F	Btu / ft h °F	68.9
Typical electrical resistivity at 68°F	Ω mm^2 / m	0.057

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Minimum mechanical properties

	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T3	≤ 3	61.6	42.1	9	120
	T351	≤ 3	61.6	45	8	120
	T6	≤ 3	61.6	45.7	5	125
	T651	≤ 3	61.6	45.7	4	125
	T8	≤ 3	66	58	4	130
	T851	≤ 3	66	58	3	130
Extruded	T3, T3510, T3511	≤ 2	65.3	45	8	120
	T3, T3510, T3511	2 < D ≤ 4	63.8	43.5	8	120
	T3, T3510, T3511	4 < D ≤8	60.9	40.6	8	120
	T3, T3510, T3511	8 < D ≤ 10	58	39.2	8	120
	T8, T8510, T8511	≤ 6	66	55.1	5	130

MD70201.02 US REV 7 03/03/17

2014 by EURAL

Color code
Gray

EURAL GNUTTI S.p.A.

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.551 - 3	0.787 - 2.559	Thick. 0.472 - 2.165	0.787 - 2.5
Extruded	1.181 - 10	1.181 - 6.5	Thick. 1.181 - 5	-

PRESENTATION

This alloy has high mechanical properties, excellent resistance to fatigue, good attitude to forging and a fair machinability.

Main applications: high structural resistance components for aircraft and defense.

Samples of fi nished products made of Eural bars

Properties	T3/T4/T6
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	

Legenda

Excellent | Good | Acceptable | Not recommended

Chemical composition	
Si	0.50 - 1.20
Fe	≤ 0.70
Cu	3.90 - 5.00
Mn	0.40 - 1.20
Mg	0.20 - 0.80
Cr	≤ 0.10
Ni	
Zn	≤ 0.25
Ti	≤ 0.15
Pb	
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	lb / in ^{3}	0.1012
Modulus of elasticity	ksi	10,500
Coeffi cient of thermal expansion	x10^{-6} / °F	12.8
Thermal conductivity at 68°F	Btu / ft h °F	T4: 77.0 T6: 89
Typical electrical resistivity at 68°F	Ω mm^2 / m	T4: 0.051 T6: 0.043

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Minimum mechanical properties

	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T3	≤ 3	55.1	42.1	8	110
	T351	≤ 3	55.1	42.1	6	110
	T4	≤ 3	55.1	31.9	12	110
	T451	≤ 3	55.1	31.9	10	110
	T6	≤ 3	65.3	55.1	8	140
	T651	≤ 3	65.3	55.1	6	140
Extruded	T4, T4510, T4511	≤ 3	59.5	39,2	12	110
	T4, T4510, T4511	3 < D ≤ 6	56.5	36.3	10	110
	T4, T4510, T4511	6 < D ≤ 8	50.8	33.4	8	110
	T6, T6510, T6511	≤ 3	66.7	60.2	7	140
	T6, T6510, T6511	3 < D ≤ 6	67.4	60.9	7	140
	T6, T6510, T6511	6 < D ≤ 8	62.4	50.8	6	140
	T6, T6510, T6511	8 < D ≤ 10	60.9	46.4	5	140

MD70201.02 US REV 07 03/03/17

2014A by EURAL

Colour code
Brown

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.551 - 3	0.787 - 2.559	Thick. 0.472 - 2.165	0.787 - 2.5
Extruded	1.181 - 10	1.181 - 6.5	Thick. 1.181 - 5	-

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRESENTATION

This alloy has high mechanical properties, excellent resistance to fatigue, good attitude to forging and a fair machinability.

2014A by Eural can also be made according to aerospace BS L168 standard, which requires higher mechanical properties compared to traditional EN standards. This version is available only for extruded bars in T6511 temper, from diameter 1.181 in up to 6 in.

Main applications: High structural resistance components for aircraft and defense.

Samples of finished products made of Eural bars

Properties	T3/T4/T6
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	■□□□

Legenda

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

Chemical composition	
Si	0.50 - 0.90
Fe	≤ 0.50
Cu	3.90 - 5.00
Mn	0.40 - 1.20
Mg	0.20 - 0.80
Cr	≤ 0.10
Ni	≤ 0.10
Zn	≤ 0.25
Ti	≤ 0.15
Pb	
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	lb / in ^{3}	0.1012
Modulus of elasticity	ksi	10,500
Coeffi cient of thermal expansion	x10^{-6} / °F	12.8
Thermal conductivity at 68°F	Btu / ft h °F	T6: 89
Typical electrical resistivity at 68°F	Ω mm^2 / m	T6: 0.043

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Minimum mechanical properties

	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T3	≤ 3	55.1	42.1	8	110
	T351	≤ 3	55.1	42.1	6	110
	T4	≤ 3	55.1	31.9	12	110
	T451	≤ 3	55.1	31.9	10	110
	T6	≤ 3	65.3	55.1	8	140
	T651	≤ 3	65.3	55.1	6	140
Extruded	T4, T4510, T4511	≤ 3	59.5	39.2	12	110
	T4, T4510, T4511	3 < D ≤ 6	56.6	36.3	10	110
	T4, T4510, T4511	6 < D ≤ 8	50.8	33.4	8	110
	T6, T6510, T6511	≤ 3	66.7	60.2	7	140
	T6, T6510, T6511	3 < D ≤ 6	67.4	60.9	7	140
	T6, T6510, T6511	6 < D ≤ 8	62,4	50.8	6	140
	T6, T6510, T6511	8 < D ≤ 10	60.9	46.4	5	140
BSL168 Extruded	T6, T6510, T6511	≤ 3	71.1	63.8	7	-
	T6, T6510, T6511	3 < D ≤ 6	69.6	63.1	7	-
	T6, T6510, T6511	6 < D ≤ 8	67.4	60.9	7	-
	T6, T6510, T6511	8 < D ≤ 10	63.1	56.6	7	-

MD70201.02 US REV 07 03/03/17

6026LF by EURAL Lead Free

Aluminum alloy

According to
RoHS II, ELV, REACH directives
actual and future revisions

Application fields
6026LF by EURAL is extremely versatile, due to its medium-high mechanical properties, good attitude to anodizing, good weldability, good attitude to forging, good corrosion resistance.
6026LF by EURAL is suitable for components used in several industries as automotive, electric and electronic, valves, oleohydraulic, pneumatic, defence.

Ecological choice
Since many years, the European Community is working on reducing the content of hazardous substances.
Actual revisions of RoHS, ELV, REACH directives limit the content of Pb to max 0.40% on aluminum alloys, and the tendency for the future is to revise this limit to be lead free.
Eural Gnutti has anticipated the future restrictions of such directives creating the 6026LF by EURAL Lead Free.

The birth of 6026LF by EURAL
6026LF by EURAL is an innovative alloy designed and developed by Eural Gnutti S.p.A. R&D laboratories in order to meet the strictest requirements in critical automotive applications such as brake systems.

High machinability
6026LF by EURAL is particularly suitable for being machined on high speed automatic lathes due to extremely good chip

No tin
On many alloys of 6000 series lead (Pb) has been replaced with tin (Sn) which, as it has been proved, causes weakness and cracking of the machined parts when submitted to stress and high temperature (284°F).
Due to its brittle nature, tin has the dangerous tendency to suddenly break without significant previous deformation (strain).
6026LF by EURAL does not contain tin.

Ultrasonic tested billets
All semi-finished products in 6026LF by EURAL are made of 100% ultrasonic tested billets according to **SAE AMS-STD-2154 class A.**

Production program
6026LF by EURAL is available in drawn or extruded conditions.
Drawn round bars from 0.236 to 3 in, temper T6, T8 or T9.
Extruded round bars from 1.181 to 10 in, temper T6.
Square, rectangular, hexagonal bars are available.
A wide range of drawn bars are also available in h9 tolerance.

Alternative to:
6026LF by EURAL is the best alternative to several aluminum alloys such as 2007, 2011, 2015, 2028, 2030, 2044, 6012, 6012A, 6020, 6021, 6023, 6028, 6033, 6040, 6041, 6042, 6061, 6065, 6082, 6262, 6064A, 6262A, 6351, 7020.
6026LF by EURAL is an excellent replacement of brass, due to its good machinability, good attitude to forging, medium-high mechanical properties. Moreover, since 6026LF by EURAL has a specific gravity of 1/3 compared to brass, it results extremely convenient costwise.

Compatibility in drawings
6026 by EURAL was born on 2002, and it has been registered to the Aluminum Association and to EN standards with a lead content of Pb ≤ 0.40.
Therefore, 6026LF by EURAL does not need any variations in drawings where 6026 by EURAL is already indicated.

Lead (Pb) and tin (Sn) can be present as traces, within the limit of 0.05%, as prescribed by international regulations.

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MD70201.02 US REV 07 03/03/17

6026LF by EURAL Lead Free

Color code
EU white

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.236 - 3	0.394 - 2.559	Thick. 0.472 - 2.165	0.394 - 2.5
Extruded	1.181 - 10	2 - 6.5	Thick. 1.181 - 5	-

PRESENTATION

This innovative alloy has been conceived and developed in Eural Gnutti SpA's research laboratories, in order to meet the most recent standards for the protection of the environment, removing lead. It is particularly suitable for being machined on high speed automatic lathes. It has good resistance to corrosion, medium-high mechanical properties, good suitability for decorative and industrial hard anodizing. It is also used for hot forging purposes.
Eural 6026LF alloy does not contain tin (Sn) which, as it has been proved, causes weakness and cracking of the machined parts when submitted to stress and high temperature.
Due to its brittle nature, tin has the dangerous tendency to suddenly break without signifi cant previous deformation (strain).
It can replace 2007, 2011, 2015, 2028, 2030, 2044, 6012, 6012A, 6020, 6021, 6023, 6028, 6033, 6040, 6041, 6042, 6061, 6065, 6082, 6262, 6064A, 6262A, 6351, 7020 alloys.

Main applications: automotive industry, electric and electronic industry, hot forging, screws, bolts, nuts, threaded parts.

Samples of finished products made of Eural bars

Properties	T6	T8/T9
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	■■■□	■■■□

Legenda

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

Chemical composition	
Si	0.60 - 1.40
Fe	≤ 0.70
Cu	0.20 - 0.50
Mn	0.20 - 1.00
Mg	0.60 - 1.20
Cr	≤ 0.30
Ni	
Zn	≤ 0.30
Ti	≤ 0.20
Sn	≤ 0.05
Pb	≤ 0.05* (traces)
Bi	0.50 - 1.50
Others	Each 0.05 Total 0.15
Al	Remainder

**6026 is registered with Pb ≤ 0.40*

Physical properties		
Density	$\frac{lb}{in^3}$	0.0983
Modulus of elasticity	ksi	10,008
Coeffi cient of thermal expansion	$\frac{x10^{-6}}{°F}$	13.0
Thermal conductivity at 68°F	$\frac{Btu}{ft\ h\ °F}$	98.8
Typical electrical resistivity at 68°F	$\frac{\Omega\ mm^2}{m}$	0.039

Minimum mechanical properties

	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T6	≤ 3	53.7	43.5	8	95
	T8	≤ 3	50.0	45.7	4	95
	T9	≤ 3	52.2	47.9	4	95
Extruded	T6	≤ 5.5	53.7	43.5	8	95
	T6	5.5 < D ≤ 8	49.3	36.3	8	90
	T6	8 < D ≤ 10	43.5	29	8	90

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MD70201.02 US REV 07 03/03/17

6026 by EURAL

Colur code
EU orange

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRODUCTION PROGRAM

Unit: mm	●	■	▬	⬣
Drawn	0.236 - 3	0.394 - 2.559	Thick. 0.472 - 2.165	0.394 - 2.5
Extruded	1.181 - 10	2 - 6.5	Thick. 1.181 - 5	-

PRESENTATION

This innovative alloy has been conceived and developed in Eural Gnutti SpA's research laboratories, in order to meet the most recent standards for the protection of the environment. It is particularly suitable for being machined on high speed automatic lathes. It has good resistance to corrosion, medium-high mechanical properties, good suitability for decorative and industrial hard anodizing. It is also used for hot forging purposes. Eural 6026 alloy does not contain tin (Sn) which, as it has been proved, causes weakness and cracking of the machined parts when submitted to stress and high temperature. It can replace 6061, 6082, 6064A, 6042, 6262, 6012, 2007, 2030 alloys.

Main applications: automotive industry, electric and electronic industry, hot forging, screws, bolts, nuts, threaded parts.

Samples of finished products made of Eural bars

Properties	T6	T8/T9
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

Chemical composition	
Si	0.60 - 1.40
Fe	≤ 0.70
Cu	0.20 - 0.50
Mn	0.20 - 1.00
Mg	0.60 - 1.20
Cr	≤ 0.30
Ni	
Zn	≤ 0.30
Ti	≤ 0.20
Sn	≤ 0.05
Pb	≤ 0.40
Bi	0.50 - 1.50
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	lb / in^3	0.0983
Modulus of elasticity	ksi	10,008
Coeffi cient of thermal expansion	x10^{-6} / °F	13.0
Thermal conductivity at 68°F	Btu / ft h °F	98.8
Typical electrical resistivity at 68°F	Ω mm^2 / m	0.039

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Minimum mechanical properties						
	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T6	≤ 3	53.7	43.5	8	95
	T8	≤ 3	50.0	45.7	4	95
	T9	≤ 3	52.2	47.9	4	95
Extruded	T6	≤ 5.5	53.7	43.5	8	95
	T6	5.5 < D ≤ 8	49.3	36.3	8	90
	T6	8 < D ≤ 10	43.5	29	8	90

MD70201.02 US REV 07 03/03/17

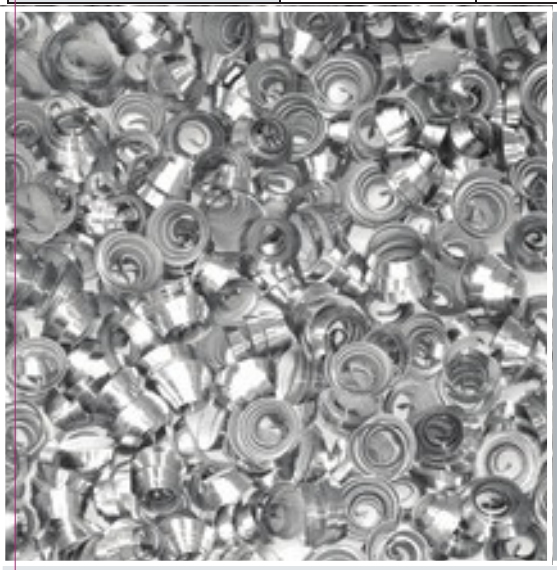
6064A by EURAL

Color code
orange

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.236 - 3	0.394 - 2.559	Thick. 0.472 - 2.165	0.394 - 2.5
Extruded	1.181 - 10	2 - 6.5	Thick. 1.181 - 5	-

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)



PRESENTATION

This alloy has good machinability and high mechanical properties. Moreover it has good resistance to corrosion and suitability to hard, protective and decorative anodizing.

Main applications: particulars for braking systems for automotive, structural components for civil constructions, railroad and heavy street vehicles.

Samples of finished products made of Eural bars

Properties	T6	T8/T9
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

Chemical composition	
Si	0.40 - 0.80
Fe	≤ 0.70
Cu	0.15 - 0.40
Mn	≤ 0.15
Mg	0.80 - 1.20
Cr	0.04 - 0.14
Ni	
Zn	≤ 0.25
Ti	≤ 0.15
Pb	0.20 - 0.40
Bi	0.40 - 0.80
Others	Each 0,05 Total 0,15
Al	Remainder

Physical properties		
Density	lb / in^3	0.0983
Modulus of elasticity	ksi	10,008
Coeffi cient of thermal expansion	x10^{-6} / °F	13.0
Thermal conductivity at 68°F	Btu / ft h °F	98.8
Typical electrical resistivity at 68°F	Ω mm^2 / m	0.039

Minimum mechanical properties

	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T6	≤ 3	45.0	37.7	8	95
	T8	≤ 3	50.0	45.7	4	95
	T9	≤ 3	52.2	47.1	4	95
Extruded	T6, T6510, T6511	≤ 5.5	45.0	37.7	8	95
	T6, T6510, T6511	5.5 < D ≤ 10	37.7	34.8	8	90

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MD70201.02 US REV 07 03/03/17

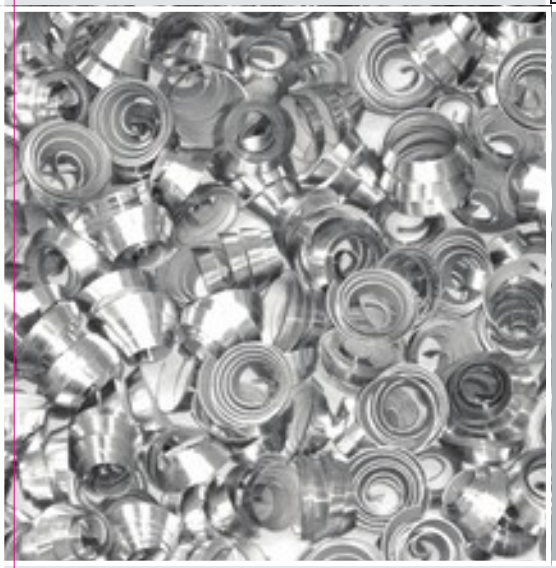
6262 by EURAL

Color code
orange

EURAL GNUTTI S.p.A.

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.236 - 3	0.394 - 2.559	Thick. 0.472 - 2.165	0.394 - 2.5
Extruded	1.181 - 10	2 - 6.5	Thick. 1.181 - 5	-



PRESENTATION

This alloy has good machinability and high mechanical characteristics. Moreover, it has good resistance to corrosion and suitability to hard, protective and decorative anodizing.

Main applications: structural components for civil constructions, railroad and street heavy vehicles.

Samples of finished products made of Eural bars

Properties	T6	T8/T9
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

Chemical composition	
Si	0.40 - 0.80
Fe	≤ 0.70
Cu	0.15 - 0.40
Mn	≤ 0.15
Mg	0.80 - 1.20
Cr	0.04 - 0.14
Ni	
Zn	≤ 0.25
Ti	≤ 0.15
Pb	0.40 - 0.70
Bi	0.40 - 0.70
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	$\frac{lb}{in^3}$	0.0983
Modulus of elasticity	ksi	10,008
Coeffi cient of thermal expansion	$\frac{x10^{-6}}{°F}$	13.0
Thermal conductivity at 68°F	$\frac{Btu}{ft\ h\ °F}$	98.8
Typical electrical resistivity at 68°F	$\frac{\Omega\ mm^2}{m}$	0.038

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Minimum mechanical properties						
	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T6	≤ 3	42.1	34.8	10	85
	T8	≤ 2	50.0	45.7	4	-
	T9	≤ 2	52.2	47.9	4	-
Extruded	T6	≤ 8	37.7	34.8	10	75

MD70201.02 US REV 07 03/03/17

6262A by EURAL

Color code
green

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.236 - 3	0.394 - 2.559	Thick. 0.472 - 2.165	0.394 - 2.5
Extruded	1.181 - 10	2 - 6.5	Thick. 1.181 - 5	-

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRESENTATION

This is an ecologic alloy, it does not have lead, it has good machinability and high mechanical characteristics. Moreover, it has a good resistance to corrosion and suitability to hard, protective and decorative anodizing.
It is an alternative to 6012, 6262, 6020, 6023 alloys.

Main applications: machining on high-speed automatic lathes, particulars for automotive applications, automatic transmission shafts, valves and clutches, hydraulic parts.

NOTE: it is particularly suitable for the realization of parts not subject to extreme heat solicitations (max 284°F) and therefore it is appropriate for automotive parts as automatic transmission valves. For higher temperatures, we suggest to use other Eural alloys, as 6026LF, 6026 or 6064A.

Samples of finished products made of Eural bars

Properties	T6	T8/T9
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

Chemical composition	
Si	0.40 - 0.80
Fe	≤ 0.70
Cu	0.15 - 0.40
Mn	≤ 0.15
Mg	0.80 - 1.20
Cr	0.04 - 0.14
Ni	
Zn	≤ 0.25
Ti	≤ 0.10
Bi	0.40 - 0.90
Sn	0.40 - 1.00
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	$\frac{lb}{in^3}$	0.0983
Modulus of elasticity	ksi	10,008
Coefficient of thermal expansion	$\frac{x10^{-6}}{°F}$	13.0
Thermal conductivity at 68°F	$\frac{Btu}{ft\ h\ °F}$	98.8
Typical electrical resistivity at 68°F	$\frac{\Omega\ mm^2}{m}$	0.039

Minimum mechanical properties

	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T6	≤ 3	42.1	34.8	10	-
	T8	≤ 2	50.0	45.7	4	-
	T9	≤ 2	52.2	47.9	4	-
Extruded	T6	≤ 8	37.7	34.8	10	-

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MD70201.02 US REV 07 03/03/17

6082 by EURAL

Color code
turquoise

EURAL GNUTTI S.p.A.

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.236 - 3	0.394 - 2.559	Thick. 0.472 - 2.165	0.394 - 2.5
Extruded	1.181 - 10	2 - 6.5	Thick. 1.181 - 5	-

PRESENTATION

This alloy has medium mechanical properties, but high resistance to corrosion and excellent attitude to weldability, hot forging and anodizing.

Main applications: highly stressed structural parts for ground and nautical means of transport, anti-impact lateral bars, door frame, space frame and sub frame for cars, hydraulic systems, stairs and scaffoldings, platforms, screws and rivets, particulars for nuclear plants, food industry.

Samples of finished products made of Eural bars

Properties	T6
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

Chemical composition	
Si	0.70 - 1.30
Fe	≤ 0.50
Cu	≤ 0.10
Mn	0.40 - 1.00
Mg	0.60 - 1.20
Cr	≤ 0.25
Ni	
Zn	≤ 0.20
Ti	≤ 0.10
Pb	
Bi	
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	lb / in^3	0.0979
Modulus of elasticity	ksi	10,008
Coeffi cient of thermal expansion	x10^{-6} / °F	13.3
Thermal conductivity at 68°F	Btu / ft h °F	95.9
Typical electrical resistivity at 68°F	Ω mm^2 / m	0.037

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Minimum mechanical properties						
	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T6	≤ 3	45.0	37.0	10	95
Extruded	T6	≤ 6	45.0	37.7	8	95
	T6	6 < D ≤ 8	40.6	34.8	6	95
	T6	8 < D ≤ 10	39.2	29.0	6	95

MD70201.02 US REV 07 03/03/17

6061 by EURAL

Colour code
EU blue

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.236 - 3	0.394 - 2.559	Thick. 0.472 - 2.165	0.394 - 2.5
Extruded	1.181 - 10	2 - 6.5	Thick. 1.181 - 5	-

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRESENTATION

This alloy has medium mechanical properties, but high resistance to corrosion and excellent attitude to weldability, hot forging and anodizing.

Main applications: highly stressed structural parts for ground and nautical means of transport, anti-impact lateral bars, door frame, space frame and sub frame for cars, hydraulic systems, stairs and scaffoldings, platforms, screws and rivets, particulars for nuclear plants, food industry.

Samples of finished products made of Eural bars

Properties	T6
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

Chemical composition	
Si	0.40 - 0.80
Fe	≤ 0.70
Cu	0.15 - 0.40
Mn	≤ 0.15
Mg	0.80 - 1.20
Cr	0.04 - 0.35
Ni	
Zn	≤ 0.25
Ti	≤ 0.15
Pb	
Bi	
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	lb / in^3	0.0979
Modulus of elasticity	ksi	10,008
Coefficient of thermal expansion	x10^{-6} / °F	13.1
Thermal conductivity at 68°F	Btu / ft h °F	99.4
Typical electrical resistivity at 68°F	Ω mm^2 / m	0.037

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Minimum mechanical properties						
	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T6	≤ 3	42.1	34.8	10	95
Extruded	T6	≤ 8	37.7	34.8	8	95

MD70201.02 US REV 07 03/03/17

7075 by EURAL

Color code
black

EURAL GNUTTI S.p.A.

According to EU directives:
2000/53/EU (ELV) – 2011/65/EU (RoHS II)

PRODUCTION PROGRAM

Unit: in	●	■	▬	⬢
Drawn	0.75 - 3	-	-	-
Extruded	0.181 - 10	2 - 6.5	Thick. 1.181 - 5	-

PRESENTATION

This alloy has extremely high mechanical properties and high resistance to fatigue. Moreover, it has good resistance to corrosion and attitude to hard, protective and decorative anodizing.

Main applications: high resistance structural parts for mechanical industry, aviation, defense, motorbike and automotive.

Samples of finished products made of Eural bars

Properties	T6
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

Chemical composition	
Si	≤ 0.40
Fe	≤ 0.50
Cu	1.20 - 2.00
Mn	≤ 0.30
Mg	2.10 - 2.90
Cr	0.18 - 0.28
Ni	
Zn	5.10 ÷ 6.10
Ti	≤ 0.20
Pb	
Bi	
Others	Each 0.05 Total 0.15
Al	Remainder

Physical properties		
Density	$\frac{lb}{in^3}$	0.1012
Modulus of elasticity	ksi	10,443
Coefficient of thermal expansion	$\frac{x10^{-6}}{°F}$	13.1
Thermal conductivity at 68°F	$\frac{Btu}{ft\ h\ °F}$	74.7
Typical electrical resistivity at 68°F	$\frac{\Omega\ mm^2}{m}$	0.052

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Minimum mechanical properties						
	Temper	Diam. in	UTS ksi	YTS ksi	A%	HBW Typical
Drawn	T6	≤ 3	78.3	70.3	7	150
	T651	≤ 3	78,3	70.3	5	150
	T73	≤ 3	66.0	55.8	10	135
	T7351	≤ 3	66.0	55.8	8	135
Extruded	T6, T6510, T6511	≤ 4	81.2	72.5	7	150
	T6, T6510, T6511	4 < D ≤ 6	79.8	63.8	5	150
	T6, T6510, T6511	6 < D ≤ 8	63.8	58.0	5	150
	T73, T73510, T73511	≤ 3	68.9	58.7	7	135
	T73, T73510, T73511	3 < D ≤ 4	68.2	56.6	6	135
	T73, T73510, T73511	4 < D ≤ 6	63.8	52.2	6	135

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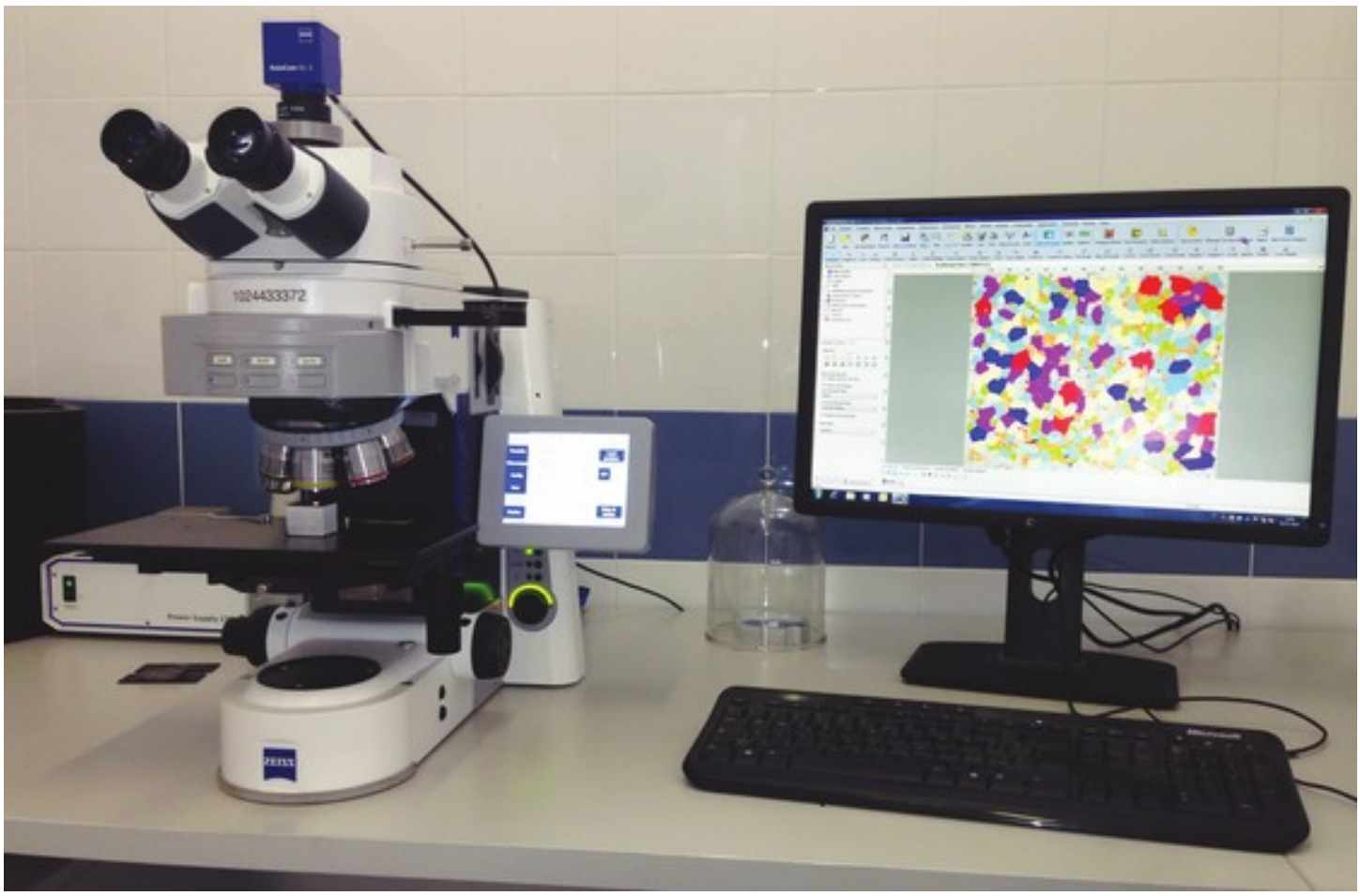
5500-MT Indirect extrusion press

Billets extraction in foundry

Particular of rods and bars warehouse

Automatic ultrasonic control system for the entire length of the billet according to class “A” of SAE AMS-STD-2154

Imprint of Eural logo, alloy code and batch number on all extruded bars



Particular of the research and development laboratory

Eural Gnutti extrusion plant in Rovato (Brescia), Italy

Eural Gnutti foundry plant in Pontevico (Brescia), Italy

National and Company Alloy Designations

ALLOY	AA	EN	EN (CS)	ASTM	BS	BS(OLD)	DIN	WNR	JIS	JIS(OLD)	NF	NF(OLD)	SFS
	Intl.	Intl.	Intl.	USA	GB	GB	DE	DE	JP	JP	FR	FR	FI
2011	2011	2011	Al Cu6BiPb	2011	2011	FC1	AlCuBiPb	3.1655	A2011		2011	A-U5PbBi	
2030	2030	2030	Al Cu4PbMg	\			~AlCuMgPb				2030	A-U4Pb	
2007	2007	2007	Al Cu4PbMgMn	\			AlCuMgPb	3.1645				~ A-U4Pb	
2017A	2017A	2017A	Al Cu4MgSi(A)	~2017	2017A		AlCuMg1	3.1325	~A2017	A3x2	2017A	A-U4G	
2024	2024	2024	Al Cu4Mg1	2024	2024	2L97	AlCuMg2	3.1355	A2024	A3x4	2024	A-U4G1	
6026	6026	6026	Al MgSiBi	\									
6064A	6064A	6064A	Al Mg1SiBi	\									
6061	6061	6061	Al Mg1SiCu	6061	6061	H20	AlMg1SiCu	3.3211	A6061	A2x4	6061	A-GSUC	
6082	6082	6082	Al Si1MgMn		6082	H30	AlMgSi1	3.2315			6082	A-GSM0.7	2593
6262	6262	6262	Al Mg1SiPb	6262									
6262A	6262A	6262A	Al Mg1SiSn	\									
7075	7075	7075	Al Zn5,5MgCu	7075	7075	2L95	AlZnMgCu1,5	3.4365	A7075	A34x6	7075	A-Z5GU	

ALLOY	SNCH	SS	UNI	UNI(OLD)	UNS	NS	UNE	ASV	ALUSUISSE	CSA(OLD)	GOST(OLD)
	CH	SE	IT	IT							
2011	AlCu6BiPb	4355	9002/5	6362	A92011		L-3192		2500	CB60	
2030	AlCu4MgPb				A92030						
2007	AlCu4MgPb	4335	9002/8				L-3121		2118		
2017A			9002/2	3579	~A92017		L-3120		2100	CM41	D1/V65
2024	AlCu4Mg1,5		9002/4	3583	A92024		L-3140		2150	CG42	D16
6026											
6064A											
6061			9006/2	6170	A96061		L-3420	2079	6061	GS11N	AD33/AV
6082	AlMgSi1Mn	4212	~9006/4	3571		17305	L-3451	2005	6112	SG11R	AD35
6262											
6262A											
7075	AlZn6MgCu1,5		9007/2	3735	A97075		L-3710	2082	7215	ZG62	B95(V95)

Bundles of Eural Gnutti drawn (cold finish) bars

EURAL GNUTTI S.p.A.

Weight of aluminium bars in lbs/ft

Calculated on the Absolute Gravity (0.101 lbs/in^3)

in	●	■	⬣
0,20	0,038	0,048	0,042
0,24	0,055	0,070	0,060
0,28	0,075	0,095	0,082
0,32	0,097	0,124	0,107
0,36	0,123	0,157	0,136
0,40	0,152	0,194	0,168
0,44	0,184	0,235	0,203
0,48	0,219	0,279	0,242
0,52	0,257	0,328	0,284
0,56	0,299	0,380	0,329
0,60	0,343	0,436	0,378
0,64	0,390	0,496	0,430
0,68	0,440	0,560	0,485
0,72	0,493	0,628	0,544
0,76	0,550	0,700	0,606
0,80	0,609	0,776	0,672
0,84	0,672	0,855	0,741
0,88	0,737	0,939	0,813
0,92	0,806	1,026	0,888
0,96	0,877	1,117	0,967
1,00	0,952	1,212	1,050
1,04	1,030	1,311	1,135
1,08	1,110	1,414	1,224
1,12	1,194	1,520	1,317
1,16	1,281	1,631	1,412
1,20	1,371	1,745	1,511
1,24	1,464	1,864	1,614
1,28	1,560	1,986	1,720
1,32	1,659	2,112	1,829
1,36	1,761	2,242	1,941
1,40	1,866	2,376	2,057
1,44	1,974	2,513	2,176
1,48	2,085	2,655	2,299
1,52	2,199	2,800	2,425
1,56	2,317	2,950	2,554
1,60	2,437	3,103	2,687
1,64	2,560	3,260	2,823
1,68	2,687	3,421	2,962
1,72	2,816	3,586	3,105
1,76	2,949	3,754	3,251
1,80	3,084	3,927	3,401
1,84	3,223	4,103	3,553
1,88	3,364	4,284	3,710
1,92	3,509	4,468	3,869
1,96	3,657	4,656	4,032
2,00	3,808	4,848	4,198
2,04	3,961	5,044	4,368
2,08	4,118	5,244	4,541
2,12	4,278	5,447	4,717
2,16	4,441	5,655	4,897
2,20	4,607	5,866	5,080
2,24	4,776	6,081	5,266
2,28	4,948	6,300	5,456
2,32	5,123	6,523	5,649
2,36	5,302	6,750	5,846
2,40	5,483	6,981	6,046
2,44	5,667	7,216	6,249
2,48	5,854	7,454	6,455
2,52	6,045	7,697	6,665
2,56	6,238	7,943	6,879
2,60	6,435	8,193	7,095
2,64	6,634	8,447	7,315
2,68	6,837	8,705	7,539
2,72	7,042	8,967	7,765
2,76	7,251	9,233	7,995
2,80	7,463	9,502	8,229
2,84	7,678	9,776	8,466
2,88	7,895	10,053	8,706
2,92	8,116	10,334	8,949
2,96	8,340	10,619	9,196
3,00	8,567	10,908	9,446
3,04	8,797	11,201	9,700
3,08	9,030	11,498	9,957
3,12	9,266	11,798	10,217
3,16	9,505	12,103	10,481
3,20	9,747	12,411	10,748
3,24	9,992	12,723	11,018
3,28	10,241	13,039	11,292
3,32	10,492	13,359	11,569
3,36	10,746	13,683	11,849
3,40	11,004	14,011	12,133
3,44	11,264	14,342	12,420
3,48	11,528	14,678	12,711
3,52	11,794	15,017	13,005
3,56	12,064	15,360	13,302
3,60	12,336	15,708	13,603
3,64	12,612	16,059	13,907
3,68	12,891	16,413	14,214
3,72	13,173	16,772	14,525
3,76	13,457	17,135	14,839
3,80	13,745	17,501	15,156
3,84	14,036	17,872	15,477
3,88	14,330	18,246	15,801
3,92	14,627	18,624	16,128
3,96	14,927	19,006	16,459
4,00	15,230	19,392	16,793
4,20	16,791	21,380	18,515
4,40	18,428	23,464	20,320
4,60	20,142	25,646	22,209
4,80	21,931	27,924	24,183
5,00	23,797	30,300	26,240
5,20	25,739	32,772	28,381
5,40	27,757	35,342	30,606
5,60	29,851	38,008	32,915
5,80	32,021	40,772	35,308
6,00	34,268	43,632	37,785
6,20	36,590	46,589	40,346
6,40	38,989	49,644	42,991
6,60	41,464	52,795	45,720
6,80	44,015	56,043	48,533
7,00	46,642	59,388	51,430
7,20	49,346	62,830	54,411
7,60	54,981	70,005	60,624
8,00	60,921	77,568	67,174
8,40	67,165	85,519	74,059
8,80	73,714	93,857	81,280
9,20	80,567	102,584	88,837
9,60	87,726	111,698	96,730
10,00	95,188	121,200	104,959

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ENVIRONMENTAL SYSTEM CERTIFICATION DNV·GL ISO 14001
QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001
QUALITY SYSTEM CERTIFICATION DNV·GL ISO/TS 16949
QUALITY SYSTEM CERTIFICATION DNV·GL AS/EN/JISQ 9100

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