

30 YEARS INNOVATION IN ALUMINIUM

DEVELOPMENT | PRODUCTION | DISTRIBUTION OF IN HOUSE
PRODUCED HIGH PERFORMANCE ALUMINIUM CAST PLATES

G.AL® AL CAST PLATE –
PRECISION MILLED PLATE

G.AL® AL CAST PLATE –
MOULD PLATE


G.AL® AL CAST PLATE –
HIGH DENSITY PLATE

CUSTOMIZED COMPONENT
PROCESSING

The logo for GLEICH ALUMINIUM features a stylized blue 'G' icon to the left of the word 'GLEICH' in a bold, blue, sans-serif font. Below 'GLEICH' is the word 'ALUMINIUM' in a smaller, blue, sans-serif font.

GLEICH
ALUMINIUM

A FAMILY OWNED COMPANY



The GLEICH Group was established in 1980 in Kaltenkirchen, near Hamburg in the northern part of Germany, presently managed by the 2nd generation. Our core business are the in-house developed, produced and distributed extremely stress relieved and form stable AL Cast Plates G.AL® C250 and G.AL® C210R. Years ago, an unknown novelty – AL Cast Plates – started to be used in limited fields. Nowadays, 30 years later, these products are used in all branches of industry.



Today the GLEICH Group is one of the leading companies in the global market of Aluminium Cast Plates, distributing its products to customers in Europe, Asia, North and South America.

AN INTERNATIONAL LEADING PRODUCER

For 20 years the well known Al cast plates G.AL® C250 and G.AL® C210R have been produced. 5 years ago we introduced a unique Al cast plate with higher strength – G.AL® C330 and G.AL® C330R – again as precision milled cast plate and as a sawed plate for the moulding industry. Recently we have launched our own pore free, high density cast plates G.AL® PWT for moulds and challenging applications.

A MODERN COMPANY

With our headquarter and main production facilities in Kaltenkirchen, the GLEICH Group today consists of 3 independent Service-Centres, two in Germany and one in the Czech Republic, sales offices in Austria and Hong Kong and an affiliated R&D company.

Furthermore, our own CNC Machining-Centre was established in 2006 and completes the range of product services we are able to offer.

HIGHEST QUALITY STANDARDS

The „state of the art” production plant today includes a worldwide unique fully automated heat treatment facility, band saws, circular saws, plate milling machines, plate inspection and other auxiliary equipment, capable to saw plates and blocks up to a thickness of 1,060 mm.

These exceptional capacities supported by a fully automated high rack warehouse allow us to supply both small and very large orders within a short lead- time but still in superior quality. GLEICH is an ISO EN 9001:2008 and 14001:2005 certified company with a seal of quality for excellent operational safety. Our quality department surveys every production step starting from the casting process up to the finished product.

- ▶ Each batch is tested for chemical composition, porosity, grain size, density and strength.
- ▶ Each slab receives an ID number traceable to source and related test data.
- ▶ The in-house heat treatment guaranties continuous, constant material properties.
- ▶ All plates made from cast blocks receive a traceable ID number.
- ▶ All plates are measured regularly. Sawed plates (G.AL® C210R, G.AL® C330R) are measured for thickness, precision milled plates (G.AL® C250, G.AL® C330) for final thickness, flatness and surface roughness.
- ▶ All precision plates are PVC coated.
- ▶ For all GLEICH products 3.1 certificates can be generated.

WHY ALUMINIUM?

In many industrial branches and applications aluminium is used more and more as substitute for steel because of its added values.

THE ADVANTAGES OF ALUMINIUM OVER STEEL

5 times higher cutting speed	<ul style="list-style-type: none"> ▸ significantly reduced processing times
3 times better electrical conductivity	<ul style="list-style-type: none"> ▸ faster machining of eroded components
4 times higher thermal conductivity	<ul style="list-style-type: none"> ▸ faster and consistent heating and cooling ▸ significant reduced deformation
obviously lower tool wear	<ul style="list-style-type: none"> ▸ longer life circles of tools ▸ less tooling costs ▸ less machine wear; less asset costs
1/3 of the weight	<ul style="list-style-type: none"> ▸ more simply and easier handling ▸ shorter cycle times
significantly better corrosion resistance	<ul style="list-style-type: none"> ▸ protective oxide layer works as surface protection ▸ no pitting (as in steel) ▸ the oxide layer improves the anodizing properties

In aluminium plates we differentiate between conventional AL rolled and innovative AL cast plates.

THE ADVANTAGES OF G.AL® CAST PLATES OVER AL ROLLED PLATES

	AL ROLLED PLATES		G.AL® CAST PLATES	
directional properties	longitudinally stretched microstructure ▸ shape distortion in machining		homogeneous microstructure ▸ no shape distortion in machining	
internal stress/tension	very high ▸ tendency of shape distortion during and after machining		none ▸ no tendency of shape distortion during and after machining	
working surfaces	tension induced rolled skin needs to be removed from both sides		G.AL® C250/C330 this step is not needed	G.AL® C210R/C330R single milling pass on one side
flatness thickness tolerance parallelism	very poor ▸ extensive machining and material consumption for gaining good flatness results		very good ▸ minor deviation in flatness, in thickness and in parallelism, additional processing step not needed	very good ▸ single thickness milling pass shows very good results in flatness, thickness tolerances and parallelism
drop in strength from plate outside edges to plate centre by plate thickness	< 80 mm	very little	< 80 - > 300 mm	very little
	> 80 - ~ 140 mm	medium – high		
	> 140- ~ 300 mm	high – very high		
	> 300 mm	extremely high		



The advantages of properties in Al Cast Plates have been named, but how does it affect the costs in further machining?

PRICE COMPARISON: STEEL - AL ROLLED - G.AL® CAST PLATES

Part description		Base plate			
Final dimension		60 x 400 x 1,000 mm			
		STEEL	ALUMINIUM		
Material		St 37 (new: S235JR)	rolled plate EN AW 7075	cast plate	
				G.AL® C210R	G.AL® C250
Start dimension	[mm]	65 x 404 x 1,004	70 x 404 x 1,004	65 x 404 x 1,004	60 x 404 x 1,004
Weight	[kg]	207	80	70	65
Machine cost per hour		90.00 €/h			
Machining time		4.86 h	2.75 h	1.48 h	1.02 h
Preparation costs		90.00 €	90.00 €	90.00 €	90.00 €
Machining costs		437.40 €	247.50 €	133.20 €	91.80 €
Production costs* - total		527.00 €	337.50 €	223.20 €	181.80 €
Cost savings over steel total			189.90 €	304.20 €	345.60 €
Cost savings over steel in %			36 %	57.7 %	65.5 %

SAMPLE APPLICATIONS FOR G.AL® PLATES



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© Roland Erdrich GmbH, CNC-Technik, Oppenau, Deutschland



PRODUCT OVERVIEW

		AL CAST PLATES precision milled plate		AL CAST PLATES sawed mould plate	
TRADEMARK		G.AL® C250	G.AL® C330	G.AL® C210R	G.AL® C330R
Alloy	EN AW Chem. Symbol	5083 AlMg4.5Mn0.7	7021 AlZn5.5Mg1.5	5083 AlMg4.5Mn0,7	7021 AlZn5.5Mg1.5
Temper	Type	non heat treatable	heat treatable	non heat treatable	heat treatable
Surface	Texture Roughness R _a	homogenized stress relieved precision milled 0.4 µm	solution heat treated quenched artificially aged precision milled 0.4 µm	homogenized stress relieved sawed 15 µm	solution heat treated quenched artificially aged sawed 15 µm
Mechanical Properties¹					
Yield strength R _{p0.2}	[MPa]	110-130	310-340	110-130	310-340
Ultimate strength R _m	[MPa]	230-290	350-380	230-290	350-380
Elongation A	[%]	10-15	2.5-4.5	10-15	2.5-4.5
Hardness HBW	[2.5/62.5]	68-75	110-120	68-75	110-120
Physical Properties¹					
Density	[g/cm ³]	2.66	2.80	2.66	2.80
Module of elasticity	[GPa]	70	70	70	70
Electrical conductivity	[m/Ω · mm ²]	16-18	21-24	16-18	21-24
Coefficient of thermal expansion	[K ⁻¹ · 10 ⁻⁶]	23.3	23.0	23.3	23.0
Thermal conductivity	[W/m · K]	110-130	125-155	110-130	125-155
Specific heat capacity	[J/kg · K]	900	875	900	875
Processing Characteristics³					
Form stability		1	2	1	2
Machining		2	1-2	2	1-2
Welding (Gas / TIG / MIG / resistance / EB)		4/2/2/2/1	6/2/1/6/1	4/2/2/2/1	6/2/1/6/1
Corrosion resistance (seawater / weather / stress cracking)		1/1/3	4/3/4	1/1/3	4/3/4
Use at temperature (max. °C long / short term)		180 / 280 ⁴	120 / 160 ⁴	180 / 280 ⁴	120 / 160 ⁴
Anodizing ⁶ (technical / decorative / hard)		2/6/2	3/6/2	2/6/2	3/6/2
Polishing		2-3	1-2	2-3	1-2
Etching		4-5	2-3	4-5	2-3
Contact with food (DIN EN 602)		yes	no	yes	no

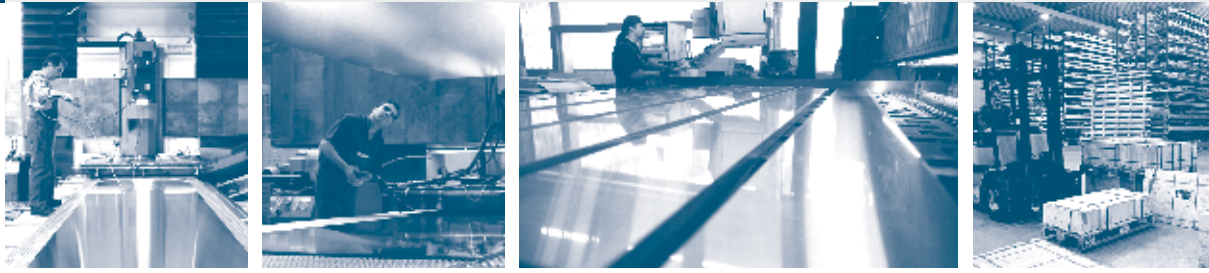
1) at room temperature

2) A₅₀

3) LEGEND (1) = very good
(6) = inapplicable

4) without loss of strength after cooling

5) under dynamic load: 70/90 °C



AL CAST PLATES high density plate			AL ROLLED PLATES selected qualities			
G.AL® C210 PWT	G.AL® C330 PWT	G.AL® C360 PWT	G.AL® 7075GF	EN AW 5083	EN AW 7075	CERTAL®/SPC
5083 AlMg4.5Mn0.7 non heat treatable homogenized stress relieved PWT treated sawed 15 µm	7021 AlZn5.5Mg1.5 heat treatable solution heat treated quenched & PWT artificially aged sawed 15 µm	2XXX heat treatable solution heat treated quenched & PWT artificially aged sawed 15 µm	7075 AlZn5.5MgCu heat treatable T651 precision milled 0.4 µm	5083 AlMg4.5Mn0.7 non heat treatable H111 rolled	7075 AlZn5.5MgCu heat treatable T6/T651/T7351 rolled	7022 AlZn5Mg3Cu heat treatable T651/T652 rolled
110-125 240-280 15-22 70-75	290-330 350-370 5-8 110-115	295-320 360-390 2.5-4.5 118-125	460-470 530-540 5-6 ² 158-161	125 275 17 ² 70	390-490 480-540 2-6 ² 130-160	470-495 540-555 6-9 ² 160-170
2.66 70 16-18	2.80 70 21-24	2.84 72 25-28	2.80 71 19-23	2.66 70 16-19	2.80 71 19-23	2.76 72 18-22
23.3 110-130 900	23.0 125-155 875	22.5 120-140 865	23.4 130-160 862	24.2 110-140 900	23.4 130-160 862	23.6 120-150 862
1 1-2 4/2/2/2/1 1/1/3 180 / 280 ⁴ 2/6/2 2 3-4 yes	2 1 6/2/1/6/1 4/3/4 120 / 160 ⁴ 3/6/2 1 2 no	4 1 6/6/6/2/1 6/5/3 250 / 320 ⁴ 5/6/5 1 1 no	5-6 1 6/6/6/2/5 5/5/5 90 / 120 ⁴ 4/6/2 1 1 no	3-4 2 4/2/2/2/1 1/1/6 120 / 180 ^{4/5} 2/5/1 1-2 4 yes	5-6 1 6/6/6/2/5 5/5/5 90 / 120 ⁴ 4/6/2 1 1 no	3-4 1 6/6/6/2/4 5/5/4 90 / 120 ⁴ 3/6/2 1 2 no

6) no warranty towards optical demands



The precision plates will be finished on both sides on in-house portal milling machines covering the entire surface with a uniform milling pattern.

G.AL® C250

Special features:

- excellent flatness
- highly stress relieved
- high strength
- very good homogeneity
- very good corrosion resistance
- very small tolerances in flatness, thickness and parallelism

Main fields of application:

- components requiring a lot of machining
- all kinds of side and back boards
- all kinds of base and table plates
- transfer- and indexing plates
- components requiring high strength values combined with very low residual stresses
- all kind of gauges
- displays for screens

G.AL® C250GS (ground)

Also available with wideband ground surface. G.AL® C250GS was specially developed for optical application. Compared to the precision milled plate it has a far more harmonious surface with grinding direction along the length. Applications are similar to those of G.AL® C250.

G.AL® C330

Special features:

- highly stress relieved
- good form stability
- very high strength
- good homogeneity

Main fields of application:

- highly stressed machine components
- components requiring a lot of machining
- all kind of base and table plates
- transfer- and indexing plates
- components requiring high strength values combined with very low residual stresses
- tool holders

TRADEMARK		G.AL® C250	G.AL® C250GS	G.AL® C330
Alloy	EN AW Chem. Symbol	5083 AlMg4.5Mn0.7	5083 AlMg4.5Mn0.7	7021 AlZn5.5Mg1.5
Temper	Type	non heat treatable homogenized stress relieved	non heat treatable homogenized stress relieved	heat treatable solution heat treated quenched artificially aged
Surface	Texture Roughness R _a	precision milled 0.4 µm	ground 0.8 µm	precision milled 0.4 µm
Mechanical Properties¹				
Yield strength R _{p0.2}	[MPa]	110-130	110-130	310-340
Ultimate strength R _m	[MPa]	230-290	230-290	350-380
Elongation A	[%]	10-15	10-15	2.5-4.5
Hardness HBW	[2.5/62.5]	68-75	68-75	110-120
Physical Properties¹				
Density	[g/cm ³]	2.66	2.66	2.80
Module of elasticity	[GPa]	70	70	70
Electrical conductivity	[m/Ω · mm ²]	16-18	16-18	21-24
Coefficient of thermal expansion	[K ⁻¹ · 10 ⁻⁶]	23.3	23.3	23.0
Thermal conductivity	[W/m · K]	110-130	110-130	125-155
Specific heat capacity	[J/kg · K]	900	900	875
Processing Characteristics²				
Form stability		1	2	2
Machining		2	2	1-2
Welding (Gas / TIG / MIG / resistance / EB)		4/2/2/2/1	4/2/2/2/1	6/2/1/6/1
Corrosion resistance (seawater / weather / stress cracking)		1/1/3	1/1/3	4/3/4
Use at temperature (max. °C long / short term)		180 / 280 ³	180 / 280 ³	120 / 160 ³
Anodizing ⁴ (technical / decorative / hard)		2/6/2	2/6/2	3/6/2
Polishing		2-3	2-3	1-2
Etching		4-5	4-5	2-3
Contact with food (DIN EN 602)		yes	yes	no
Tolerances				
Thickness	[mm]	+/- 0.10	+/- 0.20	+/- 0.10
Flatness	[mm]	plates 5 mm: ≤ 0.80 plates 6-12.7 mm: ≤ 0.40 plates > 12.7 mm: ≤ 0.13	plates ≤ 15 mm: 0.50 plates > 15 mm: 0.30	plates ≤ 15 mm: 0.40 plates > 15 mm: 0.25
Sawing in length/width	[mm]	-0/+6		
Standard Stock Sizes®				
Plate Dimension	[mm]	1,540 x 3,048 1,570 x 3,670 2,160 x 4,000	1,500 x 3,600	1,540 x 3,000
Plate Thickness	[mm]	6 8 12 16 18 5 - 65 in 5 mm steps 70 -100 in 10 mm steps 6.53 7.93 9.53 12.70 15.88 19.05 22.23 25.40 31.75 38.10 44.45 50.80	10 15 20 25 30	10 12 15 20 25 30 35 40 50

1) at room temperature

2) LEGEND (1) = very good
(6) = inapplicable

3) without loss of strength after cooling
4) no warranty towards optical demands

OTHER DIMENSION UPON REQUEST



G.AL® C210R

Special features:

- highly stress relieved
- very good form stability
- very good corrosion resistance
- 6 sides sawed

Main fields of application:

- injection moulds for plastic parts
- deep drawing and casting moulds
- blow and foaming moulds
- all kinds of moulds
- components requiring a lot of machining

G.AL® C210E (one side milled)

Also available with one side precision milled and the other side sawed. The processing time will be reduced significantly because of the pre-milled reference faces.

G.AL® C330R

Special features:

- highly stress relieved
- good form stability
- very high strength
- very good machinability

Main fields of application:

- injection moulds for plastic parts
- deep drawing and casting moulds for the plastic industry
- blow and foaming moulds
- tool changing equipment
- bearing blocks and fittings for higher loads

TRADEMARK		G.AL® C210R	G.AL® C210E	G.AL® C330R
Alloy	EN AW Chem. Symbol	5083 AlMg4.5Mn0.7	5083 AlMg4.5Mn0.7	7021 AlZn5.5Mg1.5
Temper	Type	non heat treatable homogenized stress relieved	non heat treatable homogenized stress relieved	heat treatable solution heat treated quenched artificially aged
Surface	Texture Roughness R _a	sawed 15 µm	sawed/milled 15 µm / 0.4 µm	sawed 15 µm
Mechanical Properties¹				
Yield strength R _{p0.2}	[MPa]	110-130	110-130	310-340
Ultimate strength R _m	[MPa]	230-290	230-290	350-380
Elongation A	[%]	10-15	10-15	2.5-4.5
Hardness HBW	[2.5/62.5]	68-75	68-75	110-120
Physical Properties¹				
Density	[g/cm ³]	2.66	2.66	2.80
Module of elasticity	[GPa]	70	70	70
Electrical conductivity	[m/Ω · mm ²]	16-18	16-18	21-24
Coefficient of thermal expansion	[K ⁻¹ · 10 ⁻⁶]	23.3	23.3	23.0
Thermal conductivity	[W/m · K]	110-130	110-130	125-155
Specific heat capacity	[J/kg · K]	900	900	875
Processing Characteristics²				
Form stability		1	1	2
Machining		2	2	1-2
Welding (Gas / TIG / MIG / resistance / EB)		4/2/2/2/1	4/2/2/2/1	6/2/1/6/1
Corrosion resistance (seawater / weather / stress cracking)		1/1/3	1/1/3	4/3/4
Use at temperature (max. °C long / short term)		180 / 280 ³	180 / 280 ³	120 / 160 ³
Anodizing ⁴ (technical / decorative / hard)		2/6/2	2/6/2	3/6/2
Polishing		2-3	2-3	1-2
Etching		4-5	4-5	2-3
Contact with food (DIN EN 602)		yes	yes	no
Tolerances				
Thickness	[mm]	plates ≤ 150: -0/+2.5 plates > 150: -0/+5	plates ≤ 100: -0/+1.5	plates ≤ 150: -0/+2.5 plates > 150: -0/+5
Sawing in length/width	[mm]	- 0/+6		
Standard Stock Sizes[®]				
Plate Dimension	[mm]	1,540 x 3,048 1,570 x 3,670 2,160 x 4,000	1,570 x 3,670	1,540 x 3,000
Plate Thickness	[mm]	20 - 150 in 5 mm steps 160 - 220 in 10 mm steps 220 - 1,060 upon request	20 30 40 50 60 70 80 90 100	20 - 150 in 5 mm steps 160 - 220 in 10 mm steps 220 - 480 upon request
Slab dimension (maximum dimensions)	[mm]	thickness 1,060 width 2,160 length 6,000		thickness 480 width 1,540 length 3,800

1) at room temperature

2) LEGEND (1) = very good
(6) = inapplicable

3) without loss of strength after cooling
4) no warranty towards optical demands

® OTHER DIMENSION UPON REQUEST



The PWT process is submitting the cast material to a combination of heat and pressure which helps the material to achieve an unprecedented density (reduced pores size) and completely directional-free grain structure (almost isotropic properties). The specific PWT - treatment leads to full integration of all alloy elements into the material structure, unique to any comparable material, which makes our PWT products far superior to comparable cast, rolled or forged materials. Meant for applications where absolute neutral microstructures are required. The excellent damping properties of G.AL® PWT – products provide stable static and dynamic conditions in many applications also in oscillating components and bearing blocks.

G.AL® C210 PWT

This modification of the G.AL® C210 was especially developed for components in the sensitive field of vacuum and laser technique. The good damping properties make it ideally suited for applications under dynamic loads.

Typical fields of application:

- Vacuum technique
- Pneumatic
- X-ray- and medical technology
- Laser technique
- Tool holder (Revolver)
- Mould making (low pressure)

G.AL® C330 PWT

G.AL® C330 with elevated strength values has been PWT modified for components being exposed to high dynamic loads. There are no comparable materials combining high strength and very low residual stresses in very high machining (up to 95 % material removal).

Typical fields of application:

- Gear boxes
- Pneumatic & hydraulic
- Vacuum technique
- Tool holders & carriers
- Mould making (low and medium pressure)

G.AL® C360 PWT

G.AL® C360 PWT is meant for applications in high temperature combined with high pressure as it can be exposed to 250 °C without any mutation of the microstructure. The excellent stability at high temperature and it's almost isotropic properties make it ideally for applications in the field of military technique as well as mould making and machine building.

Typical fields of application:

- Turbine technique
- Hydraulic
- Tool holders
- Components for satellites
- Swing bearing (military technology)
- Mould making (low and medium pressure)

TRADEMARK		G.AL® C210 PWT	G.AL® C330 PWT	G.AL® C360 PWT
Alloy	EN AW Chem. Symbol	5083 AlMg4.5Mn0.7	7021 AlZn5.5Mg1.5	2XXX
Temper	Type	non heat treatable	heat treatable	heat treatable
		homogenized stress relieved PWT-treated	solution heat treated quenched & PWT-treated artificially aged	solution heat treated quenched & PWT-treated artificially aged
Surface	Texture Roughness R _a	sawed 15 µm	sawed 15 µm	sawed 15 µm
Mechanical Properties¹				
Yield strength R _{p0.2}	[MPa]	110-125	290-330	295-320
Ultimate strength R _m	[MPa]	240-280	350-370	360-390
Elongation A	[%]	15-22	5-8	2.5-4.5
Hardness HBW	[2.5/62.5]	70-75	110-115	118-125
Physical Properties¹				
Density	[g/cm ³]	2.66	2.80	2.84
Module of Elasticity	[GPa]	70	70	72
Electrical conductivity	[m/Ω · mm ²]	16-18	21-24	25-28
Coefficient of thermal expansion	[K ⁻¹ · 10 ⁻⁶]	23.3	23.0	22.5
Thermal conductivity	[W/m · K]	110-130	125-155	120-140
Specific heat capacity	[J/kg · K]	900	875	865
Processing Characteristics²				
Form stability		1	2	4
Machining		1-2	1	1
Welding (Gas / TIG / MIG / resistance / EB)		4/2/2/2/1	6/2/1/6/1	6/6/6/2/1
Corrosion resistance (seawater / weather / stress cracking)		1/1/3	4/3/4	6/5/3
Use at temperature (max. °C long / short term)		180 / 280 ³	120 / 160 ³	250 / 320 ³
Anodizing ⁴ (technical / decorative / hard)		2/6/2	3/6/2	5/6/5
Polishing		2	1	1
Etching		3-4	2	1
Contact with food (DIN EN 602)		yes	no	no
Tolerances				
Thickness	[mm]	plates ≤ 150 mm: -0/+2.5 plates >150 mm: -0/+5		
Sawing in length/width	[mm]	-0/+6		
Standard Stock Sizes[®]				
Block dimension (maximum)	[mm]	420 x 1,000 x 1,270		
Plate dimension		cut to size		

1) at room temperature

2) LEGEND (1) = very good
(6) = inapplicable

3) without loss of strength after cooling
4) no warranty towards optical demands

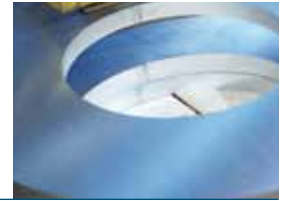
Ⓜ OTHER DIMENSION UPON REQUEST



We offer an advanced all-in-one-hand service:
from blocks to plates to customized single or serial parts.

DISCS AND RINGS

- up to \varnothing of 1,500 mm
band sawing
- up to \varnothing of 2,160 mm
water jet cutting



CONTOUR CUTTING PARTS

- water jet cutting up to
220 x 2,160 x 4,000 mm or
220 x 1,570 x 6,000 mm
- laser cutting up to
10 x 2,160 x 4,000 mm



PRE-MACHINING

- cutting/sawing of plates
and blocks
- processing of clamp slots,
grooves and transport threads
- assembling of components



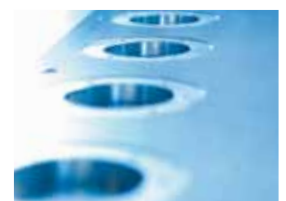
MILLING

- 5-axis CNC milling
- 4- and 5- axis simultaneous
machining
- 3D- free form surfaces



DEEP HOLE DRILLING

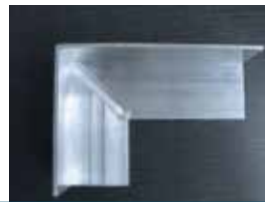
- up to \varnothing of 380 mm and
6,000 mm length





WELDING

- MAG / MIG / TIG
for all conventional Al wrought materials up to 20 mm
- EB welding
- friction stir welding



SURFACE TREATMENT

- hard anodizing up to 1,800 x 2,800 mm
- anodizing up to 2,000 x 6,000 mm
- chrome plating up to 2,000 x 6,000 mm
- nickel plating up to 800 x 1,400 mm
- polishing
- sand- & glass-beads blasting
- powder and wet paint coating
- engraving conventional and laser engraving



TECHNICAL SUPPORT

- construction
- processing and surface treatment
- use and applications



SPECIAL SERVICES

- ultrasonic testing
- material analysis
- authorization for proper remarking
- certificate of compliance with the order and inspection certificate 3.1 for all materials available



GLEICH GROUP

EXPORT SALES

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