



INEX ULTRA ANODISED is the latest international trend in surface finishing.

A brilliant new anodising process that provides a smoother superior finish, while being relatively free of grain. It exhibits a more constant low- reflective lustre and gloss level, which is being requested for current world wide architectural finishes.

This very new German technology achieves a flatter etch than traditional anodising, as it leaves a smoother surface than mechanical finishes, with a similar low level of gloss.

Benefits.

- Smoother surface finish, means easier cleaning.
- No typical size restrictions , as experienced with machinery for mechanical finishes.
- More consistent finish.
- More eco friendly than alternative similar processes.
- A standard warranty period of 5 years applies to all micron levels.

SUPER SEAL

This incredible European seal technology has been developed to further enhance long term corrosion protection on anodising, offering more resistance to chemicals and more importantly to mortar based products. This makes it ideal for installation especially in architectural / construction based applications. Add this option to our current seal process, and Super Seal carries a greatly extended warranty.

- 25 micron anodising, 20 year warranty.
- 20 micron anodising, 15 year warranty.
- 12 micron anodising, 10 year warranty.

Anodising enhances the natural metal finish of aluminium while having the ability to add colour. On aluminium it provides a harder more durable finish than most other coatings as it controls the natural oxidation of bare aluminium.

Inex Metals offers an extensive range of popular colours, including Satin (clear), Bronze, Black and Champagne with various thicknesses from 12 micron to 25 micron.

TABLE 1 - MINIMUM COATING THICKNESS NZS3604 CORROSION ZONE

ZONE	DESCRIPTION	MINIMUM THICKNESS MICRONS	SUGGESTED THICKNESS MICRONS
Sea Spray	Typically within 500m of the sea or within 100m of tidal estuaries. Predominantly the west coast of the South Island and the west coast of the top half of the North Island. This zone also includes all offshore islands.	25 micron	25 microns
1	Coastal areas that are not deemed 'Sea Spray' but are still close to the coast, this includes most of Auckland	20 micron	25 microns
2	Inland coastal areas that would normally lie between coastal and hill country	12 micron	20 microns
3	Inland New Zealand, typically hill country where rainfall is plentiful.	12 micron	12 microns
4	Geothermal areas. Other areas to be included in this zone would be swimming pools, polluted and high corrosion risk areas.	25 micron	25 microns
Note			
1	All exterior black minimum 20 microns - application specific.	20 microns	25 application specific
2	All bright anodised maximum 20 micron to avoid dulling of finish.	12 microns	

POWDER COATING

Powder coating is an electrostatic process whereby electrically charged particles in the form of powder are sprayed onto the surface of pre treated aluminium. Once the paint is applied, the aluminium is baked, then oven cured and this achieves a highly durable, painted finish.

To obtain this quality an extensive pre-treatment process of eight stages is completed under very stringent controls.

One of the major benefits of powder coating is that it provides aluminium with a strong protective coating while offering an extensive range of colours.

Inex Metals powder coating can provide a quality finish for many applications on all shapes of aluminium extrusions as follows.

- Painting for industrial products.
- Painting of all architectural products.
- Heat resistant applications.
- Antibacterial surfaces.
- Wear resistant applications.

A selection of over 200 colours ex stock is available, with a wide range of warranties to suit all applications.

TIMBER FINISH

This is a heat bonded "wood grain" surface finish that can be supplied for a wide range of applications to satisfy various applications on aluminium extrusions.

Inex Metals can provide an extensive range of popular Natural Wood Grain Finishes to cover both domestic and industrial applications.

Not only does it feel like the real thing but it is a durable finish that provides low maintenance for this premium product with excellent warranties.



MATCHING PRODUCT TO AAMA SPECIFICATION

To achieve the standard	AAMA 2603	AAMA 2604	AAMA 2605
	Specify	Specify	Specify
Dulux Powder & Industrial Coatings	Duralloy	Duratec / Electro	Fluroset FP
Coating type	TGIC free extra Durable Polyester	High Durability Polyester	Super Durable Fluoropolymer
Product I.D. code	Line 915	Line 900/906	Line 964
Scope of Warranties Offered			
Film Integrity Warranty	10 years	20 years	30 years
Colour Integrity Warranty	10 years (fade)	15 years (fade & Chalk)	20 years (fade & Chalk)
It should be noted, that at the time of printing Fluoropolymer Chemistry (such as Fluroset FP) is the only products chemistry to meet the requirements of AAMA2605. N.B. Dulux Powder & Industrial Coatings must be applied by a Dulux Powder & Industrial Coatings. Registered Applicator to the Dulux Powder & Industrial Coatings specifications to attract these warranties.			
Powder Coating Features and Benefits			
Exterior durable	One coat hard wearing polyester	One coat hard wearing polyester	One coat hard wearing fluoropolymer
Clean & Green	Environmentally friendly	Environmentally friendly	Environmentally friendly
Colour range	Large stock colour range including exciting pearlescents	Good made to order colour range including exciting pearlescents	Highly durable made to order colour range including exciting pearlescents
High transfer efficiency	Excellent coating economies	Excellent coating economies	Excellent coating economies
Excellent flow	Smooth film appearance	Smooth film appearance	Smooth film appearance
Specifying powder coating that complies to one of the above AAMA standards removes all doubt for the joinery supplier, both the joinery supplier and the powder coater will be instantly aware of the standard of product demanded for the project since the standards spell out the level of both colour and film performance required.			

Specification - the correct product for each situation

Project	Environment	Project
Multistorey Prestigious	Marine	Fluroset FP®
Multistorey Prestigious	Standard	Fluroset FP® (or Duratec® /Electro™)
Multistorey Commercial or Industrial	Marine	Duratec®, Electro™ (or Fluroset FP®)
Multistorey Commercial or Industrial	Standard	Duratec®, Electro™ (or Fluroset FP®)
Multilevel Building under 3 Levels	Marine	Duratec®, Electro™ (or Fluroset FP®)
Multilevel Building under 3 Levels	Standard	Duratec®, Electro™ (or Duralloy®)
Educational-School single Level	Marine	Duratec®, Electro™ (or Fluroset FP®)
Educational-School single Level	Standard	Duralloy® (or Duratec® /Electro™)
Residential-Prestigious	Marine-Severe	Fluroset FP®
Residential	Marine	Duratec®, Electro™ (or Fluroset FP®)
Residential	Standard	Duralloy®

Prior to decision please confirm suitability for application.

DEFINITION OF TERMS : ALUMINIUM & ITS ALLOYS

The following basic terms are used in the text and in the various tables presented in this publication. Since complete understanding of these terms will enhance the usefulness of the information presented, accepted definitions of these terms are included.

STRESS

Stress is the intensity of force within a loaded body which resists a change in shape. It is measured in megapascals (MPa). Stress is normally calculated on the basis of the original cross-sectional dimensions. The three kinds of stresses are TENSILE, COMPRESSIVE and SHEARING. Flexure or bending involves a combination of tensile and compressive stress. Torsion involves shearing stress.

STRAIN

Strain is a measure of the change in size or shape of a body due to force, referred to its original size or shape. Tensile or compressive strain is the change due to force, per unit of length, in an original linear dimension in the direction of the force. It is usually measured as the change (in mm) per mm of length.

TENSILE STRENGTH

Ultimate tensile strength is the maximum tensile stress which a material is capable of developing under a gradual and uniformly applied strain.

Tensile strength is calculated from the maximum applied load during a tension test and the original cross-sectional area of the specimen.

YIELD STRENGTH

Yield strength is the stress at which a material exhibits a specified permanent set after being strained beyond the elastic limit. The value of set used for aluminium and its alloys is 0.002mm per mm (0.2%). The term yield strength used in this publication is synonymous with the term 0.2% proof stress used in BS specifications. For the aluminium alloys the yield strength in tension and compression are approximately equal.

COMPRESSIVE YIELD

Compressive yield is the compressive stress which produces a specified permanent set in a material. In aluminium alloys, the value of permanent set is taken as 0.2% of the initial gauge length, the same as in tensile yield.

ELONGATION

Elongation is the increase in distance between two gauge marks which results from stressing the specimen in tension to fracture. Original gauge length is usually 50mm for flat specimens or 5.65 times the square root of the cross-sectional area for round specimens. Elongation values depend to some extent upon size and form of the test specimens. For example, the values obtained from flat specimens will be lower for thin material than for thick material.

SHEAR STRENGTH

Shear strength is the maximum shearing stress which a material is capable of developing. In practice it is considered to be the maximum average stress computed by dividing the ultimate load in the plane of shear by the original area subject to shear. Shear strength is usually determined by inserting a cylindrical specimen through round holes in three hardened steel blocks, the centre of which is pulled (or pushed) between the other two so as to shear the specimen on two planes.

The maximum load divided by the combined cross-sectional area of the two planes is the shear strength.

HARDNESS

Hardness is a measure of resistance to indentation. Common scales used for aluminium alloys are the Brinell (HB), Vickers (HV) and Rockwell B (HRB) scales.

ENDURANCE LIMIT

Endurance limit (fatigue strength) is the limiting stress below which a material will withstand an indefinitely large number of cycles of stress. In the case of aluminium alloys, endurance limits are based on 500,000,000 cycles of completely reversed stress, using the rotating-beam type of machine and specimen.

MODULUS OF ELASTICITY

Modulus of elasticity is the ratio of stress to corresponding strain throughout the range where they are proportional in an elastic material. As there are three kinds of stresses, so are there three kinds of moduli of elasticity for any material - modulus in tension, in compression and in shear.

MODULUS OF RIGIDITY

Modulus of rigidity is the same as modulus of elasticity in shear.

ELECTRICAL RESISTIVITY

Electrical resistivity is the electrical resistance of a body of unit length and unit cross-sectional area. This is expressed in microhm-metre, at 20°C.

ELECTRICAL CONDUCTIVITY

Electrical conductivity is the capacity of a material to conduct or allow the flow of an electric current. Conductivity values for aluminium are expressed in MS/m, at 20°C.

THERMAL CONDUCTIVITY

The rate at which a material can remove heat from a high temperature zone and transmit it to a low temperature zone. The rate depends also on the cross-sectional area, length and temperature difference pertaining to a given material section.

TEMPER DESIGNATION SYSTEM : ALUMINIUM & ITS ALLOYS

The temper designation system is used for all forms of wrought aluminium and aluminium alloys. It is based on the sequences of basic treatments usually used to produce the various tempers. The temper designation follows the alloy designation, the two being separated by a dash.

Basic temper designations consist of letters. Subdivisions of the basic tempers, where required, are indicated by one or more digits following the letter. These designate specific sequences of basic treatments, but only operations recognized as significantly influencing the characteristics of the product are indicated. Should some other variation of the same sequence of basic operations be applied to the same alloy, resulting in difference characteristics, then additional digits are added to the designation.

The basic temper designations and subdivisions are as follows:

F: As fabricated

Applies to products which acquire some temper from shaping processes not having

special control over the amount of strain-hardening or thermal treatment. For wrought products, there are no mechanical property limits.

O: Annealed, recrystallised

Applies to the softest temper of wrought products.

H: Strain-hardened

Applied to products which have their strength increased by strain-hardening with or without supplementary thermal treatments to produce partial softening. The H is always followed by two or more digits. The first digit indicated the specific combination of basic operations as follows:

H1: Strain-hardened only

Applies to products which are strain-hardened to obtain the desired mechanical properties without supplementary thermal treatment. The number following this designation indicates the degree of strain-hardening.

H2: Strain-hardened and then partially annealed

Applies to products which are strain-hardened more than the desired final amount, then reduced in strength to the desired level by partial annealing. For alloys that age-soften at room temperature, the H2 tempers have approximately the same ultimate strength as the corresponding H1 tempers and slightly higher elongations. The number following this designation indicated the degree of strain-hardening remaining after the product has been partially annealed.

H3: Strain-hardened and then stabilized

Applies to products which are strain-hardened and then stabilized by a low-temperature heating to slightly lower their strength and increase ductility. This designation applies only to the magnesium-containing alloys which, unless stabilized, slightly age-soften at room temperature. The number following this designation indicates the degree of strain-hardening remaining after the product has been strain-hardened a specific amount and then stabilized.

The final degree of strain-hardening is designated as follows. Numeral 8 has been assigned to indicate tempers having a final degree of strain-hardening equivalent to that resulting from approximately 75% reduction of area. Tempers between 0 (annealed) and 8 (fully-hard) are designated by the numerals 1 through 7. Material having an ultimate strength about midway between that of the 0 temper and that of the 8 temper is designated by the number 4 (half-hard), between 0 and 4 by the numeral 2 (quarter-hard), between 4 and 8 by the numeral 6 (three-quarter-hard) and so on for the numerals 1, 3, 5 and 7. Numeral 9 designated extra hard tempers.

The third digit, when used, indicated a variation of a two-digit H temper. It is used when the degree of control of temper or the mechanical properties are different from, but close to, those for the two-digit H temper designation to which it is added. For this purpose numerals 1 to 9 may be arbitrarily assigned and registered with the Aluminium Development Council

for an alloy and product to indicate a specific degree of control of temper or specific mechanical property limits.

The following three-digit H temper designations have been assigned for wrought products in all alloys:

H111

Applied to products which are strain-hardened less than the amount required for a controlled H11 temper.

H112

Applies to products not having special control over the amount of strain-hardening or thermal treatment but which acquire some temper incidental to the shaping processes and for which there are mechanical property limits or mechanical property testing is required.

H121

Applies to products which are strain-hardened less than the amount required for a controlled H12 temper.

H311

Applies to products which are strain-hardened less than the amount required for a controlled H31 temper.

H321

Applies to products which are strain-hardened less than the amount required for a controlled H32 temper. It is specially fabricated to have acceptable resistance to stress-corrosion cracking and exfoliation attack. The H116 temper is also used for this application.

The following three-digit H temper designations have been assigned for wrought products in alloys containing over 4% magnesium:

H323 and H343

Apply to products that are specially fabricated to have acceptable resistance to stress-corrosion cracking and exfoliation attack.

TEMPER DESIGNATION SYSTEM : ALUMINIUM & ITS ALLOYS

T

Thermally treated to produce stable tempers other than F, O or H. Applies to products which are thermally treated, with or without supplementary strain-hardening, to produce stable tempers. The T is always followed by one or more digits. Numbers 1 through 9 have been assigned to indicate specific sequences of basic treatments. A period of natural ageing at room temperature may occur between or after the operations listed for tempers T3 to T9. Control of this period is exercised when it is metallurgically important. Solution heat-treated as applied to tempers T3, T4, T6, T7, T8 or T9 can also be applied to rapid cooling from an elevated temperature working process.

The significance of the digits following the T is as follows:

T1

Cooled from an elevated temperature shaping process and naturally aged to a substantially stable condition. Applies to products for which the rate of cooling from an elevated temperature shaping process, such as extrusion, is such that their strength is increased by room temperature ageing.

T3

Solution heat-treated or cooled from an elevated temperature shaping process and then cold-worked and naturally aged to a substantially stable condition. Applies to products which are cold worked to improve strength, or in which the effect of cold work in flattening or straightening is recognized in applicable specifications.

T4

Solution heat-treated or cooled from an elevated temperature shaping process and naturally aged to a substantially stable condition. Applies to products which are not cold worked after solution heat-treatment, or in which the effect of cold work in flattening or straightening may not be recognized in applicable specifications.

T5

Cooled from an elevated temperature shaping process and then artificially aged. Applies to products which are cooled from an elevated temperature shaping process, such as casting or extrusion and then artificially aged to improve mechanical properties or dimensional stability or both.

T6

Solution heat-treated or cooled from an elevated temperature shaping process and then artificially aged. Applies to products which are not cold worked after solution heat treatment, or in which the effect of cold work in flattening or straightening may not be recognized in applicable specifications.

T7

Solution heat-treated or cooled from an elevated temperature shaping process and then stabilized. Applies to products which are stabilized to carry them beyond the point of maximum strength to provide control of some special characteristics.

T8

Solution heat-treated or cooled from an elevated temperature shaping process, cold worked and then artificially aged. Applies to products which are cold worked to improve strength, or in which the effect of cold work in flattening or straightening is recognized in applicable specifications.

T9

Solution heat-treated or cooled from an elevated temperature shaping process, artificially aged and then cold worked. Applies to products which are cold worked to improve strength.

Additional digits

May be added to designations T1 through T9 to indicate a variation in treatment which significantly alters the characteristics of the product. The following two-digit temper designations have been assigned for wrought products heat-treated from the O or F temper to demonstrate response to heat-treatment:

T42

Solution heat-treated or cooled from an elevated temperature shaping process from the O or F temper to demonstrate response to heat-treatment and naturally aged to a substantially stable condition.

T62

Solution heat-treated or cooled from an elevated temperature shaping process from the O or F temper to demonstrate response to heat-treatment and artificially aged.

Temper designations T42 and T62 may also be applied to wrought products heat-treated from any temper by the user when such heat-treatment results in the mechanical properties applicable to these tempers.

T591 & T595

A variation of T5 Temper. Designed to combine good bending properties with intermediate strength. Between T4 and T5 and is stable.

T891

6063 alloy drawn tube temper suitable for end flattening.

T893

Drawn tube temper with higher properties than T83 in alloy 6106.

STRESS RELIEVED BY STRETCHING

T51 Applies to plate and rolled or cold-finished rod and bar when stretched the indicated amounts after solution heat-treatment or after cooling from an elevated temperature shaping process. The products receive no further straightening after stretching.

Plate: 1.5 - 3% permanent set.

Rolled or cold-finished rod and bar: 1 - 3% permanent set.

T510 Applies to extruded rod, bar, shapes and tube and to drawn tube when stretched the indicated amounts after solution heat-treatment or after cooling from an elevated temperature shaping process. The products receive no further straightening after stretching.

Extruded rod, bar, shapes and tube: 1 - 3% permanent set.

Drawn tube: 0 - 3% permanent set.

T511

Applies to extruded rod, bar, shapes and tube and to drawn tube when stretched the indicated amounts after solution heat-treatment or after cooling from an elevated temperature shaping process. The products may receive minor straightening after stretching to comply with standard tolerances.

Extruded rod, bar, shapes and tube: 1 - 3% permanent set.

Drawn tube: 0.5 - 3% permanent set.

MECHANICAL PROPERTY LIMITS : EXTRUDED PRODUCTS

The values given are deemed to be a general guide. No implication for end use is confirmed for design. For confirmation please contact your closest Inex Metals office.						
ALLOY	TEMPER	Thickness (mm)		Tensile Strength (MPa)		Elongation (% min in 50mm or 5.65 \sqrt{A})
		Over	Up to	Ultimate Min	Yield Max	
1350	- H112	All thicknesses		60		23
2011	- T4	All thicknesses		275	125	14
2011	- T6	-	25.0	350	220	8
		25.0	75.0	345	220	8
		75.0	-	340	200	8
2014	- T4	-	10.0	370	240	15
		10.0	100.0	385	245	13
		100.0	150.0	385	245	10
		150.0	200.0	370	240	10
2014	- T6	-	10.0	430	385	8
		10.0	25.0	465	415	6
		25.0	100.0	495	450	6
		100.0	150.0	465	415	6
6351	- T4	-	150.0	185	115	16
6351	- T5	All thicknesses		260	240	8
6351	- T54	-	12.5	205	140	10
6351	- T6	-	150.0	295	255	8
6082	- T4	-	150.0	190	120	14
		150.0	200.0	170	110	11
6082	- T5	-	6.0	270	230	8
6082	- T6	-	20.0	295	255	7
		20.0	150.0	310	270	7
		150.0	200.0	280	240	5
6061	- O ³	All thicknesses		150	110	14
6061	- T1	-	12.5	180	95	16
6061	- T4	All thicknesses		180	110	14
6061	- T42	All thicknesses		180	85	14
6061	- T51	-	16.0	240	205	8
6061	- T6	All thicknesses		260	240	8
6262	- T6	All thicknesses		260	240	8
6060	- O	All thicknesses		130		16
6060	- T1	-	12.0	115	60	12
		12.0	25.0	110	55	10
6060	- T4			120	60	14
6060	- T591		12.0	150	205	8
6060	- T5	-	12.0	150	110	6
		12.0	25.0	145	105	
6060	- T52	-	12.0	150	205	8
SF6060	- T6			205	170	8
6063	- O	All thicknesses		130		16
6063	- T1	-	12.0	115	60	12
		12.0	25.0	110	55	10
6063	- T4	-	150.0	130	70	12

MECHANICAL PROPERTY LIMITS : EXTRUDED PRODUCTS

The values given are deemed to be a general guide. No implication for end use is confirmed for design. For confirmation please contact your closest Inex Metals office.								
ALLOY	TEMPER	Thickness (mm)		Tensile Strength (MPa)				Elongation (% min in 50mm or 5.65 √A)
		Over	Up to	Ultimate Min	Max	Yield Min	Max	
6063	- T5	-	12.0	150		110		8
		12.0	25.0	145		105		6
6063	- T52	-	12.0	150	205	110		8
6063	- T6	-	25.0	205		170		8
		25.0	150.0	185		160		10
6063	- H112	All thicknesses		110				13
6106	- T4	-	150.0	130		70		12
6106	- T6	-	10.0	235		210		8
		10.0	25.0	205		170		8
		25.0	150.0	185		160		10
6463A	- T1	-	12.0	115		60		12
6463A	- T5	-	12.0	150		110		8
6463A	- T6	-	3.0	205		170		8
		3.0	12.0	205		170		10
6005A	- T4	-	12.0	180		110		14
6005A	- T5	All thicknesses		260		240		8
6261	- T1	All thicknesses		190		115		14
6261	- T5	-	5.0	295		255		7
		5.0	10.0	280		240		7
6261	- T6	All thicknesses		295		255		7
7005	- T53	-	20.0	350		300		10

MECHANICAL PROPERTY LIMITS : SHEET & PLATE

The following typical mechanical properties are averages which take into account the variations introduced by the type of wrought product, size, shape and method of manufacture.								
ALLOY	TEMPER	Thickness (mm)		Tensile Strength (MPa)				Elongation (% min in 50mm or 5.65 √A)
		Over	Up to	Ultimate		Yield		
				Min	Max	Min	Max	
1050	- O	0.15	0.50		95			15
		0.50	0.80		95			20
		0.80	1.30		95			25
		1.30	6.00		95			30
1050	- H12	0.25	0.50	80	110			4
		0.50	0.80	80	110			5
		0.80	1.30	80	110			6
		1.30	2.60	80	110			8
		2.60	6.00	80	110			12
1050	- H14	0.25	0.30	100	125			2
		0.30	0.50	100	125			3
		0.50	0.80	100	125			4
		0.80	1.30	100	125			5
		1.30	2.60	100	125			6
		2.60	12.00	100	125			8
1050	- H16	0.15	0.50	115	140			2
		0.50	0.80	115	140			3
		0.80	1.30	115	140			4
		1.30	4.00	115	140			5
1050	- H18	0.15	0.50	130				1
		0.50	0.80	130				2
		0.80	1.30	130				3
		1.30	1.60	130				4
		1.60	3.25	130				5
1050	- H112	6.00	25.00	60				30
1100	- O	0.15	0.50	75	105	25		15
		0.50	0.80	75	105	25		20
		0.80	1.30	75	105	25		25
		1.30	6.00	75	105	25		30
		6.00	75.00	75	105	25		26
1100	- H12	0.40	0.50	95	130	75		3
		0.50	0.80	95	130	75		4
		0.80	1.30	95	130	75		6
		1.30	3.00	95	130	75		8
		3.00	6.00	95	130	75		9
		6.00	12.00	95	130	75		9
		12.00	50.00	95	130	75		10
1100	- H14	0.25	0.30	110	145			1
		0.30	0.50	110	145	95		2
		0.50	0.80	110	145	95		3
		0.80	1.30	110	145	95		4
		1.30	3.00	110	145	95		5
		3.00	6.00	110	145	95		6
		6.00	12.00	110	145	95		6
		12.00	25.00	110	145	95		8
1100	- H16	0.15	0.50	130	165	115		1
		0.50	0.80	130	165	115		2
		0.80	1.30	130	165	115		3
		1.30	4.00	130	165	115		4
1100	- H18	0.15	0.50	150				1
		0.50	0.80	150				2
		0.80	1.30	150				3
		1.30	3.25	150				4

MECHANICAL PROPERTY LIMITS : SHEET & PLATE

The following typical mechanical properties are averages which take into account the variations introduced by the type of wrought product, size, shape and method of manufacture.								
ALLOY	TEMPER	Thickness (mm)		Tensile Strength (MPa)				Elongation (% min in 50mm or 5.65 √A)
		Over	Up to	Ultimate		Yield		
				Min	Max	Min	Max	
1100	- H18	0.15	0.50	150				1
		0.50	0.80	150				2
		0.80	1.30	150				3
		1.30	3.25	150				4
1100	- H112	6.00	12.00	90		50		9
		12.00	50.00	85		35		13
		50.00	75.00	80		30		18
1200	- O	0.15	0.50		105	25		15
		0.50	0.80		105	25		20
		0.80	1.30		105	25		25
		1.30	6.00		105	25		30
		6.00	75.00	75	105	25		26
1200	- H12	0.40	0.50	95	130	75		3
		0.50	0.80	95	130	75		4
		0.80	1.30	95	130	75		6
		3.00	1.30	95	130	75		8
		6.00	3.00	95	130	75		9
		12.00	6.00	95	130	75		9
		50.00	12.00	95	130	75		10
1200	- H14	0.25	0.30	110	145			1
		0.30	0.50	110	145	95		2
		0.50	0.80	110	145	95		3
		0.80	1.30	110	145	95		4
		3.00	3.00	110	145	95		5
		6.00	6.00	110	145	95		6
		12.00	12.00	110	145	95		6
		25.00	25.00	110	145	95		8
1200	- H16	0.15	0.50	130	165	115		1
		0.50	0.80	130	165	115		2
		0.80	1.30	130	165	115		3
		1.30	4.00	130	165	115		4
1200	- H18	0.15	0.50	150				1
		0.50	0.80	150				2
		0.80	1.30	150				3
		1.30	3.25	150				4
1200	- H112	6.00	12.00	90		50		9
		12.00	50.00	85		35		12
		50.00	75.00	80		30		18
3003	- O	0.15	0.20	95	130			14
		0.20	0.30	95	130			18
		0.30	0.80	95	130	35		20
		0.80	1.30	95	130	35		23
		1.30	6.00	95	130	35		25
		6.00	75.00	95	130	35		21
3003	- H12	0.40	0.50	115	160	80		3
		0.50	0.80	115	160	80		4
		0.80	1.30	115	160	80		5
		1.30	3.00	115	160	80		6
		3.00	4.00	115	160	80		7
		4.00	6.00	115	160	80		8
		6.00	12.00	115	160	80		9
		12.00	50.00	115	160	80		8

MECHANICAL PROPERTY LIMITS : SHEET & PLATE

The following typical mechanical properties are averages which take into account the variations introduced by the type of wrought product, size, shape and method of manufacture.								
ALLOY	TEMPER	Thickness (mm)		Tensile Strength (MPa)				Elongation (% min in 50mm or 5.65 √A)
		Over	Up to	Ultimate Min	Max	Yield Min	Max	
3003	- H14	0.25	0.30	135	180	115		1
		0.30	0.50	135	180	115		2
		0.50	0.80	135	180	115		3
		0.80	1.30	135	180	115		4
		1.30	3.00	135	180	115		5
		3.00	4.00	135	180	115		6
		4.00	6.00	135	180	115		7
		6.00	12.00	135	180	115		8
		12.00	25.00	135	180	115		8
3003	- H16	0.15	0.50	165	205	145		1
		0.50	0.80	165	205	145		2
		0.80	1.30	165	205	145		3
		1.30	4.00	165	205	145		4
3003	- H18	0.15	0.50	185		165		1
		0.50	0.80	185		165		2
		0.80	1.30	185		165		3
		1.30	3.25	185		165		4
3003	- H112	6.00	12.00	115		70		8
		12.00	50.00	105		40		10
		50.00	75.00	100		40		16
5005	- O	0.15	0.20	105	145			12
		0.20	0.30	105	145			14
		0.30	0.50	105	145	35		16
		0.50	0.80	105	145	35		18
		0.80	1.30	105	145	35		20
		1.30	3.00	105	145	35		21
		3.00	6.00	105	145	35		22
5005	- H12	0.40	0.50	125	165	95		2
		0.50	0.80	125	165	95		3
		0.80	1.30	125	165	95		4
		1.30	3.00	125	165	95		6
		3.00	4.00	125	165	95		7
		4.00	6.00	125	165	95		8
5005	- H14	0.25	0.80	145	185	115		1
		0.80	1.30	145	185	115		2
		1.30	3.00	145	185	115		3
		3.00	4.00	145	185	115		5
		4.00	6.00	145	185	115		6
5005	- H16	0.15	0.80	165	205	135		1
		0.80	1.30	165	205	135		2
		1.30	4.00	165	205	135		3
5005	- H18	0.15	0.80	185				1
		0.80	1.30	185				2
		1.30	3.25	185				3
5005	- H19	0.15	1.00	195				1
5005	- H32	0.40	0.50	115	160	85		3
		0.50	0.80	115	160	85		4
		0.80	1.30	115	160	85		5
		1.30	3.00	115	160	85		7
		3.00	4.00	115	160	85		8
		4.00	6.00	115	160	85		9
5005	- H34	0.25	0.30	135	180			2
		0.30	0.80	135	180	105		3
		0.80	1.30	135	180	105		4
		1.30	3.00	135	180	105		5
		3.00	4.00	135	180	105		6
		4.00	6.00	135	180	105		7

MECHANICAL PROPERTY LIMITS : SHEET & PLATE

The following typical mechanical properties are averages which take into account the variations introduced by the type of wrought product, size, shape and method of manufacture.

ALLOY	TEMPER	Thickness (mm)		Tensile Strength (MPa)				Elongation (% min in 50mm or 5.65 √A)
		Over	Up to	Ultimate Min	Max	Yield Min	Max	
5005	- H36			180		165		6
5005	- H38	0.15	0.30	180				1
		0.30	0.50	180				2
		0.50	0.80	180				3
		0.80	3.25	180				4
5052	- O	0.15	0.20	170	215			-
		0.20	0.30	170	215			14
		0.30	0.50	170	215	65		15
		0.50	0.80	170	215	65		16
		0.80	1.30	170	215	65		18
		1.30	3.00	170	215	65		19
		3.00	6.00	170	215	65		20
		6.00	75.00	170	215	65		16
5052	- H32	0.40	0.50	215	265	160		4
		0.50	1.30	215	265	160		5
		1.30	3.00	215	265	160		7
		3.00	6.00	215	265	160		9
		6.00	12.00	215	265	160		11
		12.00	50.00	215	265	160		10
5052	- H34	0.25	0.50	235	285	180		3
		0.50	1.30	235	285	180		4
		1.30	3.00	235	285	180		6
		3.00	6.00	235	285	180		7
		6.00	25.00	235	285	180		8
5052	- H36	0.15	0.20	255	305			2
		0.20	0.80	255	305	200		3
		0.80	4.00	255	305	200		4
5052	- H38	0.15	0.20	270				2
		0.20	0.80	270		220		3
		0.80	3.25	270		220		4
5052	- H39I	0.15	2.00	290		240		3
5052	- H112	6.00	12.00	195		110		7
		12.00	50.00	170		65		10
		50.00	75.00	170		65		14
5251	Mechanical properties are almost identical to 5052							
5454	- O	0.50	0.80	215	285	80		12
		0.80	1.30	215	285	80		14
		1.30	3.00	215	285	80		16
		3.00	75.00	215	285	80		16
5454	- H32	0.50	1.30	250	305	180		5
		1.30	6.00	250	305	180		8
		6.00	50.00	250	305	180		10
5454	- H34	0.50	1.30	270	325	200		4
		1.30	4.00	270	325	200		6
		4.00	6.00	270	325	200		7
		6.00	25.00	270	325	200		8
5454	- H112	6.00	12.00	220		125		8
		12.00	50.00	215		80		9
		50.00	75.00	215		80		13
5083	- O	1.30	40.00	275	350	125	200	14
		40.00	75.00	270	345	115	200	14
5083	- H111	6.00	40.00	290	350	170	285	12
5083	- H121	6.00	50.00	305	385	215	295	10

MECHANICAL PROPERTY LIMITS : SHEET & PLATE

The following typical mechanical properties are averages which take into account the variations introduced by the type of wrought product, size, shape and method of manufacture.								
ALLOY	TEMPER	Thickness (mm)		Tensile Strength (MPa)				Elongation (% min in 50mm or 5.65 √A)
		Over	Up to	Ultimate Min	Max	Yield Min	Max	
5083	- H311	6.00	40.00	290	350	170	285	14
5083	- H321	5.00 40.00	40.00 75.00	305 280	385 385	215 200	295 295	10 10
5083	- H323	1.30 3.20	3.20 6.00	310 310	375 375	235 235	305 305	8 10
5083	- H343	1.30 3.20	3.20 6.00	345 345	405 405	270 270	340 340	6 8
5083	- H112	6.00 40.00	40.00 75.00	275 270		125 115		10 10
5083	- H115	20.00 50.00	50.00 70.00	310 305		255 240		7 7
5083	- H116	3.00 6.00	6.00 30.00	305 305		215 215		10 10
6061	- O	0.25 0.50 3.25 12.00	0.50 3.25 12.00 25.00		150 150 150 150		85 85 85	14 16 18 16
6061	- T4	0.25 0.50 6.00	0.50 6.00 25.00	205 205 205		115 115 115		14 16 16
6061	- T42	0.25 0.50 6.00	0.50 6.00 25.00	205 205 205		95 95 95		14 16 16
6061	- T6 & T62	0.25 0.50 12.00	0.50 12.00 25.00	290 290 290		240 240 240		8 10 7
7075	- T6 /T651			570		505		11
8011	- O	0.15 0.30 0.80 1.30	0.30 0.80 1.30 5.00	75 75 75 75	105 105 105 105			16 20 25 30
8011	- H12	0.20 0.50 0.80 1.30 3.00	0.50 0.80 1.30 3.00 6.00	100 100 100 100 100	135 135 135 135 135			3 4 6 8 9
8011	- H14	0.20 0.50 0.80 1.30 3.00	0.50 0.80 1.30 3.00 6.00	115 115 115 115 115	150 150 150 150 150			2 3 4 5 7
8011	- H16	0.20 0.50 0.80 1.30 3.00	0.50 0.80 1.30 3.00 6.00	140 140 140 140 140	170 170 170 170 170			1 2 3 4 5
8011	- H18	0.20 0.50 0.80 1.30	0.50 0.80 1.30 3.00	160 160 160 160				1 2 3 4

TYPICAL FABRICATION CHARACTERISTICS : ALUMINIUM & ITS ALLOYS

TYPICAL FABRICATION CHARACTERISTICS AND APPLICATION DATA												
ALLOY	Nominal Composition (%)	Commercial Forms ¹	Typical Applications 2*	Characteristics ²				Weldability			Heat Treat	
				Corrosion Resistance	Machining	Anodising ³	Brazing	Cold Forming	Gas Weld	Inert Gas Weld	Resistance Spot Weld	
1199	Al 99.99 min	F	Electrical and electronic foil use.	A,A	D,C	B,B	A	A,D	A	A	B,A	No
1080A	Al 99.80 min	S,P,T,E,B,F	Chemical and process plant and equipment.	A,A	D,C	B,B	A	A,D	A	A	B,A	No
1070	Al 99.70 min	F,S,P	Electrical and electronic foil use.	A,A	D,C	B,B	A	A,D	A	A	B,A	No
1050	Al 99.50 min	S,P,T,E,B,F	Chemical and process plant and equipment.	A,A	D,C	B,B	A	A,D	A	A	B,A	No
1145	Al 99.45 min	F	Foil use.	A,A	D,C	B,B	A	A,D	A	A	B,A	No
1150	Al 99.85 min Cu 0.12	S	Sheet metal components requiring decorative finishing.	A,A	D,C	A,A	NR	A,D	NR	NR	B,C	No
1100	Al 99.80 min Cu 0.12	F,S,P,B	Spinnings, hollowware and general sheet metal work.	A,A	D,C	B,B	A	A,C	A	A	B,A	No
1200	Al 99.00 min	F,S,P,T,W,B	Spinnings, hollowware and general sheet metal work.	A,A	D,C	B,B	A	A,C	A	A	B,A	No
1235	Al 99.35	F,T	Deep Drawing, Forming	A,A	D,C	B,B	A	A,C	A	A	B,A	No
1350	Al 99.50 min	S,P,T,E,W,B	Electrical conductors.	A,A	D,C	B,B	A	A,D	A	A	B,A	No
2011	Cu 5.5 Pb 0.5 Bi 0.5	W,B	Screw machine products not requiring decorative anodising.	D,D	A,A	D,D	D	C,D	D	D	D	Yes
2014 2014A	Si 0.8 Cu 4.4 Mn 0.8 Mg 0.6	T,E,B	Aircraft structures, forgings, heavy duty structural applications.	D,D	B,B	D,D	D	C,D	D	C	B	Yes
2024	Cu 4.5 Mn 0.6 Mg 1.5	S	Aircraft sheeting.	D,D	B,B	D,D	D	C,D	D	C	B	Yes
3003	Mn 1.2 Cu 0.12	F,S,P	Chemical equipment, sheet metal work, rigid foil containers, closures.	A,A	D,C	B,B	A	A,C	A	A	B,A	No
3203	Mn 1.2	F,S,P,T,W	Sheet metal work, high-strength foil, deep drawing, chemical equipment.	A,A	D,C	B,B	A	A,C	A	A	B,A	No
3004	Mn 1.2 Mg 1.0	S,P	Sheet metal work, car bodies, seam welded tubing, roofing sheet.	A,A	D,C	B,B	B,B	A,C	B	A	B,A	No
3004A	Mn 1.15 Mg 1.15	S,P	Sheet metal work, seam welded tube, roofing sheet, can body stock.	A,A	D,C	B,B	B,B	A,C	B	A	B,A	No

TYPICAL FABRICATION CHARACTERISTICS : ALUMINIUM & ITS ALLOYS

TYPICAL FABRICATION CHARACTERISTICS AND APPLICATION DATA												
ALLOY	Nominal Composition (%)	Com- mercial Forms ¹	Typical Applications 2*	Characteristics ²				Weldability			Heat Treat	
				Corrosion Resis- tance	Machining	Anodising ³	Brazing	Cold Forming	Gas Weld	Inert Gas Weld		Resis- tance Spot Weld
3005	Mn 1.2 Mg 0.35	FS	High-strength foil.	A,A	D,C	B,B	B,B	A,C	B	A	B,A	No
3105	Mn 0.5 Mg 0.5	FS	Painted sheet products.	A,A	D,C	B,B	B,B	A,C	B	A	B,A	No
5005	Mg 0.8	FS,P	Appliances and utensils, general sheet metal work and high-strength foil.	A,A	D,C	B,B	B	A,C	A	A	B,A	No
5050A	Mg 1.4	FS,T,P	Refrigerator trim, painted sheet.	A,A	D,C	B,B	B	A,C	A	A	B,A	No
5052	Mg 2.5 Cr 0.25	S,P	Sheet metal work, appliances, marine applications.	A,A	C,B	C,C	C	A,C	A	A	B,A	No
5251	Mg 2.0	S,P,T,FW	Sheet metal work, appliances, small boats, hydraulic tube, high-strength foil.	A,A	C,B	C,C	C	A,C	A	A	B,A	No
5252	Mg 2.5	S	High strength automobile trim.	A,A	C,B	A,A	NR	A,C	NR	NR	B,C	No
5154A	Mg 3.5 Cr 0.25	S,E,B	Welded structures, storage tanks, pressure vessels, marine applications.	A,A	C,B	C,C	D	A,C	C	A	B,A	No
5182	Mn 0.3 Mg 4.5	S,P	Unfired pressure vessels, marine cryogenic, drilling rigs, can end stock. Should not be used at temperatures above 65°C.	A,C	C,B	C,C	D	A,C	C	A	B,A	No
5454	Mg 2.7 Mn 0.8 Cr 0.1	S,P	Welded structures, pressure vessels to use at elevated temperatures.	A,A	C,B	C,C	D	A,C	C	A	B,A	No
5056	Mg 5.2 Mn 0.1 Mg 0.1	W,S	Aircraft structures, forgings, heavy duty structural applications.	A,C	B,B	D,D	D	C,D	D	C	B	Yes
5457	Mg 1.0 Mn 0.2 Cu 0.1	S	Automobile trim.	A,A	C,C	A,A	NR	A,C	NR	NR	B,C	No
5557	Mg 0.6 Mn 0.2 Cu 0.1	S	Automobile trim.	A,A	C,C	A,A	NR	A,C	NR	NR	B,C	No

TYPICAL FABRICATION CHARACTERISTICS : ALUMINIUM & ITS ALLOYS

TYPICAL FABRICATION CHARACTERISTICS AND APPLICATION DATA												
ALLOY	Nominal Composition (%)	Com- mercial Forms ¹	Typical Applications 2*	Characteristics ²				Weldability				Heat Treat
				Corrosion Resis- tance	Machining	Anodising ³	Brazing	Cold Forming	Gas Weld	Inert Gas Weld	Resis- tance Spot Weld	
5083	Mg 4.5 Mn 0.7 Cr 0.15	S,P,T,E,B	Unfired welded pressure vessels, marine, air- craft, cryogenics, TV towers, drilling rigs, trans- portation equipment, missile components. Should not be used at temps above 65°C.	A,C	C,B	C,C	D	A,C	C	A	B,A	No
5086	Mg 4.0 Mn 0.5 Cr 0.15	S,P	As for 5083.	A,C	C,B	C,C	D	A,C	C	A	B,A	No
SF 6060	Si 0.45 Mg 0.5	E,T,W,B	Architectural extrusions, general purpose extrusions.	A,A	C,C	A,A	A	A,C	A	A	B,A	Yes
6060	Si 0.45 Mg 0.5	E,T,W,B	Architectural extrusions, general purpose extrusions.	A,A	C,C	A,A	A	A,C	A	A	B,A	Yes
6063	Mg 0.7 Si 0.4	T,E,W,B	Furniture, architectural extrusions, general purpose extrusions.	A,A	C,C	A,A	A	A,C	A	A	B,A	Yes
6463A	Mg 0.7 Si 0.4	EB	Trim extrusions requiring decorative finish- ing.	A,A	C,C	A,A	A	A,C	A	A	B,A	Yes
6101	Mg 0.6 Si 0.5	T,E,B,P	Electrical conductors.	A,B	B,C	A,A	A	A,C	A	A	B,A	Yes
6201A	Mg 0.7 Si 0.6	W,B	Electrical conductors.	A,B	B,C	A,A	A	A,C	A	A	B,A	Yes
6106	Si 0.45 Mn 0.12 Mg 0.6	T,E,W,B	General purpose extrusions, light structural applications.	A,A	C,C	A,A	A	A,C	A	A	B,A	Yes
6103	Si 0.65 Cu 0.25 Mg 1.1	T,E,W,B	Structural applications, transport, marine.	B,B	B,C	B,B	A	A,C	A	A	B,A	Yes
6261	Si 0.55 Cu 0.25 Mn 0.25 Mg 0.85	T,E,W,B	Structural applications, transport, marine.	B,B	B,C	B,B	A	A,C	A	A	B,A	Yes
6005A	Si 0.7 Mg 0.55	T,E,W,B	Structural applications, transport, marine.	A,A	B,C	B,B	A	A,C	A	A	B,A	Yes
6351	Mg 0.6 Si 10. Mn 0.6	T,E,B,P	Heavy-duty structures where corrosion resistance is needed. Transport applications and marine.	A,B	B,C	B,B	A	A,C	A	A	B,A	Yes

TYPICAL FABRICATION CHARACTERISTICS : ALUMINIUM & ITS ALLOYS

TYPICAL FABRICATION CHARACTERISTICS AND APPLICATION DATA										
ALLOY	Nominal Composition (%)	Commercial Forms ¹	Typical Applications 2*	Characteristics ²				Weldability		
				Corrosion Resistance	Machining	Anodising ³	Brazing	Cold Forming	Gas Weld	Inert Gas Weld
6061	Mg 1.0 Si 0.6 Cu 0.25 Cr 0.2	S,P,T,E, W/B	Structural applications where corrosion resistance is needed. Transport, marine, aircraft landing mats.	B,B	C,B	B,B	A	A,C	A	A
6262	Mg 1.0 Si 0.6 Cu 0.25 Cr 0.1 Bi 0.6 Pb 0.6	W/B	Screw machine products suitable for decorative anodising.	B,B	A,A	B,B	A	A,C	A	A
7005	Zn 4.5 Mg 1.4	E	High-strength welded structures. For specific corrosive environments, contact material supplier.	C,D	B,B	B,B	NR	NR	NR	A
8006	Fe 1.5 Mn 0.5	S,F	Heat exchanger fins, foil, rectangular pressings.	A,A	D,C	B,B	A	A	A	A
8011	Fe 0.8 Si 0.7	S	Bottle closures, general sheet, fin stock, foil.	A,A	D,C	C,C	A	A,C	A	A

¹ F = Foil, S = Sheet, P = Plate, T = Tube, E = Extrusion, B = Bar or Rod, W = Wire. Inclusion of a form/alloy combination in this table does not necessarily indicate a ready availability.

² Relative ratings in decreasing order of merit = A, B, C, D. NR = Not recommended. These ratings are relative ONLY to the TYPICAL APPLICATIONS identified above.... And not to be compared with other alloys where applications differ.

For example: 1200 alloy may show a rating of AA for the application of spinning while, 5083 shows a rating of AC for marine applications. However on comparison under the same application 5083 alloy is generally more corrosive resistant than 1200 alloy.

Where Applicable, ratings for both annealed and hardest temper are provided. Inex supply 5083 in either H321 or H116 temper. This has been specifically fabricated to have acceptable resistance to corrosion, stress, cracking and exfoliation attack.

³ Rating indicates suitability of alloy for decorative quality anodising; all aluminium alloys can be anodised for increased corrosion and wear resistance.

PLEASE NOTE ALL VALUES INDICATED IN THE ALUMINIUM ALLOY DATA ARE CONSIDERED TO BE A GENERAL GUIDE ONLY. SUITABILITY FOR A PARTICULAR END USE IS IMPLIED AND DATA SHOULD NOT BE USED FOR DESIGN. IF YOU REQUIRE DETAILS FOR SPECIFIC CONDITIONS NOT SUPPLIED IN THESE TABLES PLEASE CONTACT INEX METALS LIMITED.

USEFUL FORMULAE & MASS CONVERSION FACTORS

USEFUL FORMULAE	
Useful formulae for the calculation of coiled sheet density and the calculation of mass per unit area or per unit length, are given below. The formulae assume an alloy density of $2.71 \times 10^3 \text{ kg/m}^3$ (Mass Conversion Factor - 1,000). The calculated result should be multiplied by the appropriate Mass Conversion Factor (see Table below) when the formulae are applied to alloys of other density.	
Coiled Sheet	Sections
Coil density (kg per mm of width)	Mass per metre (kg)
$= 2.13 (D + d) (D - d) \div 1,000,000$	$= 2.71 A \div 1,000$
Sheet	Tube
Mass per square metre (kg)	Mass per metre (kg)
$= 2.71 t$	$= 8.51 t (D - t) \div 1,000$
Circles	Round Bar and Wire
Mass per square metre (kg)	Mass per metre (kg)
$= 2.13 D \times D \div 1,000,000$	$= 2.13 D \times D \div 1,000$
Where	
D = outside diameter (mm) d = inside diameter (mm) t = thickness (mm) A = cross-sectional area (mm ²)	

MASS CONVERSION FACTOR

ALLOY	DENSITY (kg/m ³ × 10 ³)	MASS CONVERSION FACTOR
1050 / 1150	2.70	0.996
1350	2.70	0.996
1100 / 1200	2.71	1.000
2024	2.77	1.022
3003 / 3005	2.73	1.007
3203	2.73	1.007
3004	2.72	1.004
5005	2.70	0.996
5050A	2.69	0.993
5052 / 5252	2.68	0.989
5251	2.69	0.993
5154A	2.66	0.982
5454	2.68	0.989
5457	2.70	0.996
5083 / 5086	2.66	0.982
6060 / 6061	2.70	0.996
8011	2.71	1.000

CONVERSION MADE EASY - this example, the mass conversion is 2.7, Alloy 5005.

Sheet / Plate Calculations - Length (in metres) × Width (in metres) × Thickness (in mm) × Mass Conversion.

Typical Example - 2400 x 1200 x 3mm 5005

2.4 length x 1.2 Width x 3mm Thickness x 2.7 Mass Conversion = 23.32kgs.

BENDING DATA - SHEET & PLATE

Recommended Minimum Inside Bending Radii for 90 Degree Cold Forming of Sheet and Plate ¹²³ (bending transverse to rolling direction)									
ALLOY	TEMPER	RADII FOR VARIOUS THICKNESSES EXPRESSED IN TERMS OF THICKNESS t							
		$t=0.4\text{mm}$	$t=0.8\text{mm}$	$t=1.6\text{mm}$	$t=3.0\text{mm}$	$t=4.0\text{mm}$	$t=6.0\text{mm}$	$t=10$	$t=12$
1080A	- O	0.0 t	0.0 t	0.0 t	0.0 t	0.0 t	0.5 t	0.5 t	1.0 t
1050	- H12	0.0 t	0.0 t	0.0 t	0.0 t	0.0 t	0.5 t	1.0 t	1.5 t
1350	- H14	0.0 t	0.0 t	0.0 t	0.5 t	0.5 t	1.0 t	1.5 t	2.0 t
1150	- H16	0.0 t	0.0 t	0.5 t	1.0 t				
	- H18	0.5 t	1.0 t	1.5 t	2.0 t				
1100	- O	0.0 t	0.0 t	0.0 t	0.0 t	0.0 t	0.5 t	1.0 t	1.5 t
1200	- H12	0.0 t	0.0 t	0.0 t	0.5 t	1.0 t	1.0 t	1.5 t	2.0 t
	- H14	0.0 t	0.0 t	0.0 t	1.0 t	1.0 t	1.5 t	2.0 t	2.5 t
	- H16	0.0 t	0.5 t	1.0 t	1.5 t				
	- H18	1.0 t	1.5 t	2.0 t	3.0 t				
2024 ²	- O	0.0 t	1.0 t	1.0 t	1.0 t	1.0 t	1.0 t	2.5 t	4.0 t
	- T42	2.5 t	3.0 t	4.0 t	5.0 t	5.0 t	6.0 t	7.0 t	8.0 t
3003	- O	0.0 t	0.0 t	0.0 t	0.0 t	0.5 t	1.0 t	1.0 t	1.5 t
3203	- H12/H32	0.0 t	0.0 t	0.0 t	0.5 t	1.0 t	1.0 t	1.5 t	2.0 t
3005	- H14/H34	0.0 t	0.0 t	0.0 t	1.0 t	1.0 t	1.5 t	2.0 t	2.5 t
5005	- H16/H36	0.5 t	1.0 t	1.0 t	1.5 t				
	- H18/H38	1.0 t	1.5 t	2.0 t	3.0 t				
3004	- O	0.0 t	0.0 t	0.0 t	0.5 t	1.0 t	1.0 t		
	- H32	0.0 t	0.0 t	0.5 t	1.0 t	1.0 t	1.5 t		
	- H34	0.0 t	1.0 t	1.0 t	1.5 t	1.5 t	2.5 t		
	- H36	1.0 t	1.0 t	1.5 t	2.5 t				
	- H38	1.0 t	1.5 t	2.5 t	3.0 t				
5050A	- O	0.0 t	0.0 t	0.0 t	0.5 t	1.0 t	1.0 t		
	- H32	0.0 t	0.0 t	0.0 t	1.0 t	1.0 t	1.5 t		
	- H34	0.0 t	0.0 t	1.0 t	1.5 t	1.5 t	2.0 t		
	- H36	1.0 t	1.0 t	1.5 t	2.0 t				
	- H38	1.0 t	1.5 t	2.5 t	3.0 t				
5052	- O	0.0 t	0.0 t	0.0 t	0.5 t	1.0 t	1.0 t	1.5 t	1.5 t
5251	- H32	0.0 t	0.0 t	1.0 t	1.5 t	1.5 t	1.5 t	1.5 t	2.0 t
	- H34	0.0 t	1.0 t	1.5 t	2.0 t	2.0 t	2.5 t	2.5 t	3.0 t
	- H36	1.0 t	1.0 t	1.5 t	2.5 t				
	- H38	1.0 t	1.5 t	2.5 t	3.0 t				
5154A	- O	0.0 t	0.0 t	0.5 t	1.0 t	1.0 t	1.0 t	1.5 t	1.5 t
5454	- H32	0.0 t	0.5 t	1.0 t	1.5 t	1.5 t	2.0 t	2.5 t	3.5 t
	- H34	0.5 t	1.0 t	1.5 t	2.0 t	2.5 t	3.0 t	3.5 t	4.0 t
	- H112						2.0 t	2.5 t	3.0 t
5083	- O	0.5 t	1.0 t	1.0 t	1.5 t	1.5 t	2.0 t	2.5 t	2.5 t
	- H321		2.0 t	2.0 t	2.5 t	2.5 t	4.0 t	4.0 t	4.0 t
	- H116		2.0 t	2.0 t	2.5 t	2.5 t	4.0 t	4.0 t	4.0 t
5086	- O	0.0 t	0.0 t	0.5 t	1.0 t	1.0 t	1.0 t	1.5 t	1.5 t
	- H32	0.0 t	1.5 t	1.5 t	2.0 t	2.0 t	2.0 t	2.5 t	3.0 t
	- H34	0.5 t	1.0 t	1.5 t	2.0 t	2.5 t	3.0 t	3.5 t	4.0 t
	- H36				3.0 t	3.5 t			
	- H112					1.5 t	2.0 t	2.0 t	2.5 t
6061 ²	- O	0.0 t	0.0 t	0.0 t	1.0 t	1.0 t	1.0 t	1.5 t	2.0 t
	- T4 & T42	0.0 t	0.5 t	1.0 t	1.5 t	2.5 t	3.0 t	3.5 t	4.0 t
	- T6 & T62	1.0 t	1.0 t	1.5 t	2.5 t	3.0 t	4.0 t	4.5 t	5.0 t

¹ The radii listed are the minimum recommended for bending sheets and plates without fracturing in a standard press brake with air bend dies. Other types of bending operations may require larger radii or permit smaller radii. The minimum permissible radii will also vary with the design and condition of tooling.

² Heat-treatable alloys can be formed over appreciably smaller radii immediately after solution heat treatment.

³ The H112 temper (applicable to non-heat-treatable alloys) is supplied in the as-fabricated condition without special property control, but usually can be formed over radii applicable to the H14 (or H34) temper or smaller.

GAUGE	THICKNESS MM
3	6.073
4	5.695
5	5.314
6	4.935
7	4.554
8	4.176
9	3.797
10	3.416
11	3.038
12	2.657
13	2.278
14	1.897
15	1.709
16	1.519
17	1.367
18	1.214
19	1.062
20	0.912
21	0.836
22	0.759

INCHES	MM
1/8	3.175
1/4	6.350
3/8	9.525
1/2	12.700
5/8	15.875
3/4	19.050
7/8	22.225
1	25.400
1 1/8	28.575
1 1/4	31.750
1 3/8	34.925
1 1/2	38.100
1 5/8	41.275
1 3/4	44.450
1 7/8	47.625
2	50.800
2 1/8	53.975
2 1/4	57.150
2 3/8	60.325
2 1/2	63.500
2 5/8	66.675
2 3/4	69.850
2 7/8	73.025
3	76.200

POUNDS TO KILOGRAM CONVERSION

1 pound (lb) is equal to 0.45359237 kilograms (kg).