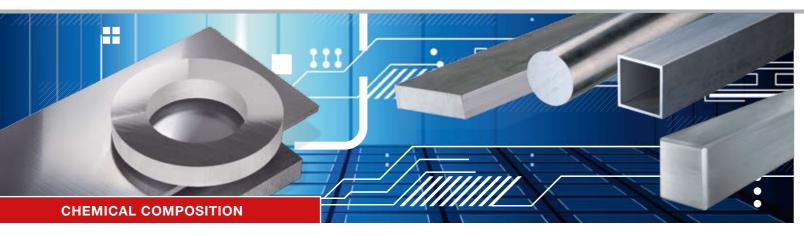
EN AW-2024



Aluminium and aluminium alloys

Alloy designation:

| EN AW | Al Cu4 Mg1 |
|-------------------------------|----------------------|
| Old designation | Al Cu Mg2 |
| Material no. according to DIN | 3.1355 |
| Great Britain BS | L97 |
| Italy UNI | 9002/4 |
| Spain | L-3140 |
| Sweden | |
| Norway | |
| France AFNOR | A-U4G1 |
| Colour code | RAL 2004 Pure Orange |

Typical physical properties:

| Density [g/cm³] | 2,77 | |
|---|--------------|------|
| Elastic modulus [GPa] | 73,0 | |
| Thermal conductivity [| 130 – 150 | |
| Thermal expansion coefficient[K-1*10-6] | -50°C – 20°C | 21,1 |
| | 20°C – 100°C | 22,9 |
| | 20°C – 200°C | 23,8 |
| | 20°C – 300°C | 24,7 |
| Specific heat J/(kg * K) | 875 | |
| Electrical conductivity | 18 – 21 | |
| Shear modulus [GPa] | 27,4 | |

Chemical composition^x (EN 573-3):

| Specifications in % Remainder: Aluminium | | | | | | | | | Othe | er | | | |
|--|--|-------------------|---------------------|-----------------|--------------------------|-----------|---------|------------|--------------------|---------|-----------------|------------------|------|
| Si | Fe | Cu | Mn | Mg | Mg Cr Zn Ni Ti Ga V Note | | | Individual | Total ² | | | | |
| 0,50 | 0,50 | 3,8 – 4,9 | 0,30 - 0,90 | 1,2 – 1,8 | 0,10 | 0,25 | - | 0,15 | - | - | 3 | 0,05 | 0,15 |
| X | X Chemical specifications as perc. of weight. If no ranges are specified, the alloy content has the maximum value. | | | | | | | | | | | | |
| 2 | ² Includes all items listed for which no limit values are specified. | | | | | | | | | | | | |
| 3 | Sum for Zr+Ti i | max. 0,20. This a | applies to forged o | or extruded pro | ducts wh | hen the v | alue ha | s been a | greed u | pon bet | ween the custom | er and supplier. | |

Special features of this material:

- Good machinability
- High strength
- Curable

Applications:

- Machine construction
- High-strength constructions
- Aerospace
- Military technology

Available forms:

Sheets · Plates · Cuttings · Circular blanks · Rings · Bars · Tubes · Wires · Parts from drawings

WORLD OF METALS

Heat treatment:

| Soft annealing / recrystallisation annealing | | | | | | |
|--|--|--|--|--|--|--|
| Annealing temperature | 380°C – 420°C | | | | | |
| Heating-up time | 2 – 3 hours | | | | | |
| Cooling conditions | Cooling conditions 30°C/h to 250°C, below 250°C in air | | | | | |

Hardening Solution annealing 495°C - 505°C Quenching water Natural ageing treatment 5 – 8 days 180 °C - 195 °C approx.

16 – 24 hours

Other data:

Processing / machinability

| Soft annealed | 3 |
|-----------------------|---|
| Work-hardened | - |
| Heat-treated | 2 |
| Dimensional stability | 4 |
| Erosion | 1 |

Surface treatment

| Anodising - (protective anodisation) | 2 |
|--|---|
| Special anodising quality (EQ) ^{EQ} | - |
| Anodising - decorative | 5 |
| Painting / coating | 3 |
| Polishing | 1 |
| | |

| Welding | | Filler meta |
|--------------------|---|-------------|
| Gas | 5 | |
| WIG | 5 | |
| MIG | 5 | |
| Resistance welding | 1 | |

Solder

| Brazing with flux | 5 |
|--------------------------|---|
| Brazing without flux | 5 |
| Abrasion soldering | 3 |
| Soft soldering with flux | 5 |

Corrosion resistance

Artificial ageing treatment

| In a normal atmosphere/ weather conditions | 4 – 5 |
|---|-------|
| Sea water atmosphere | 4 – 5 |

Metal forming

| Cold forming | | Delivery condition |
|--|-------|--------------------|
| Bending | 4 | 0 |
| Pressure forming | 3 | 0 |
| Deep drawing (condition-based) | 3 | 0 |
| Upsetting (condition-based) | 4 | 0 |
| Impact extrusion | 4 | 0 |
| Hot forming | | |
| Drop forging | 4 | |
| Extrusion moulding | 5 | |
| Hammer forging | 3 | |
| Upsetting (condition-based) Impact extrusion Hot forming Drop forging Extrusion moulding | 4 4 5 | 0 |

| Suitable for food industry according to DIN EN 602 |
|--|
|--|

Legend:

- 1 very good
- 2 good
- 3 moderate
- 4 poor
- 5 unsuited

EQ anodising quality must be ordered separately and confirmed

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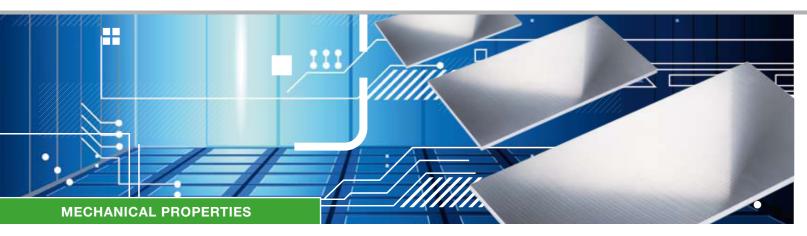
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Sheets/Plates



Aluminium and aluminium alloys

EN AW-2024 AI Cu4 Mg1

EN 485-2 Mechanical properties:

| Delivery condition ⁵ | Nominal thickness mm | | Tensile strength R_m MPa | | Elastic limit $R_{\rho 0.2}$ MPa | | Elongation % min. | | Bending radius ⁹ | | Hardness ⁹ HBW |
|---------------------------------|----------------------|----------------|----------------------------|---------------|----------------------------------|---------------|----------------------|----|-----------------------------|--------------------|------------------------------|
| | over | to | min. | max. | min. | max. | A50 mm | Α | 180° | 90° | |
| | ≥ 0,4 | 1,5 | 435 | - | 290 | - | 12 | - | 4,0 t ⁸ | 4,0 t ⁸ | 123 |
| | 1,5 | 3,0 | 435 | - | 290 | - | 14 | - | 4,0 t ⁸ | 4,0 t ⁸ | 123 |
| | 3,0 | 6,0 | 440 | - | 290 | - | 14 | - | 5,0 t ⁸ | 5,0 t ⁸ | 124 |
| T351 | 6,0 | 12,5 | 440 | - | 290 | - | 13 | - | - | 8,0 t ⁸ | 124 |
| 1331 | 12,5 | 40,0 | 430 | - | 290 | - | - | 11 | - | - | 122 |
| | 40,0 | 80,0 | 420 | - | 290 | - | - | 8 | - | - | 120 |
| | 80,0 | 100,0 | 400 | - | 285 | - | - | 7 | - | - | 115 |
| | 100,0 | 120,0 | 380 | - | 270 | - | - | 5 | - | - | 110 |
| | 120,0 | 150,0 | 360 | - | 250 | - | - | 5 | - | - | 104 |
| 5 | Other pos | sible delivery | conditions for | this alloy: (| O · T3 · T4 · | T42 ·T62 ·T | 8 · T851 | | | | |
| 8 | Considera | bly lower ber | nding radii can | be obtained | d immediately | v after solut | ion annealing | 1. | | | |
| 9 | For inform | ation only | | | | | | | | | |

We supply aluminium sheets and plates of alloy EN AW-2024 · Al Cu4 Mg Si(A) in the following dimensions:

| | Length x Width mm | Length x Width mm | Length x Width mm |
|---------------------------|-------------------|-------------------|-------------------|
| Standard plates | 2.000 x 1.000 | 2.500 x 1.250 | 3.020 x 1.520 |
| Super formats: on request | 4.000 x 2.000 | 6.000 x 2.000 | 8.000 x 2.000 |

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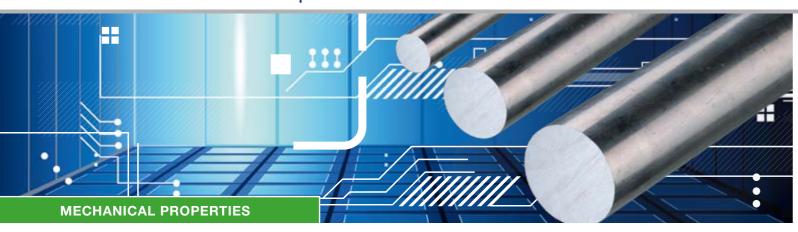


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Bars - round drawn · pressed



Aluminium and aluminium alloys

EN AW-2024 AI Cu4 Mg1

EN 754-2 Mechanical properties: round bars - drawn

| Delivery condition ⁵ | Dia. mm | Tensile strength $R_{_m}$ MPa | | Elastic limit R _{p0.2} MPa | | Elongation % min. | | Hardness ⁹ HBW |
|---------------------------------|--|-------------------------------|------|--|------|-------------------|----|------------------------------|
| | | min. | max. | min. | max. | A50 mm | А | |
| Т3 | ≤ 10 | 425 | - | 310 | - | 8 | 10 | 120 |
| 13 | > 10 to ≤ 80 | 425 | - | 290 | - | 7 | 9 | 120 |
| T351 | ≤ 80 | 425 | - | 310 | - | 6 | 8 | 120 |
| 5 | Other possible delivery conditions for this alloy: 0, H111, T6, T651, T8, T851 | | | | | | | |
| 9 | For information only | | | | | | | |

EN 755-2 Mechanical properties: round bars - pressed

| Delivery condition ⁵ | Dia. mm | Tensile strength $R_{\scriptscriptstyle m}$ MPa | | Elastic limit R _{p0.2} MPa | | Elongation % min. | | Hardness ⁹ HBW |
|---------------------------------|---|---|------|--|------|-------------------|---|------------------------------|
| | | min. | max. | min. | max. | A50 mm | А | |
| T3 T3510 T3511 | ≤ 50 | 450 | ÷ | 310 | - | 6 | 8 | 120 |
| | > 50 to ≤ 100 | 440 | - | 300 | - | - | 8 | 120 |
| | > 100 to ≤ 200 | 420 | - | 280 | - | - | 8 | 120 |
| | > 200 to ≤ 250 | 400 | - | 270 | - | - | 8 | 120 |
| 5 | ⁵ Other possible delivery conditions for this alloy: 0, H111, T6, T651, T8, T851 | | | | | | | |
| 9 | For information only | | | | | | | |

We supply aluminium round bars of alloy 2024 in the following dimensions:

| Thickness mm | drawn: 2 - 18 | pressed: 12 -350 |
|----------------|----------------|------------------|
| THICKIESS THIT | diawii. 2 - 10 | pressed. 12 -000 |





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$\textbf{Bars square/flat/hexagonal} \ \text{drawn} \cdot \text{pressed}$



Aluminium and aluminium alloys

EN AW-2024 AI Cu4 Mg1

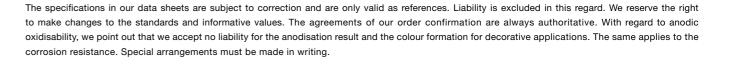
EN 754-2 Mechanical properties: Bars - drawn square · flat · hexagonal

| Delivery condition ⁵ | Thickness for flat 4 + 6 pt: wrench size | Tensile strength $R_{_m}$ MPa | | Elastic limit $R_{_{p0.2}}$ MPa | | Elongation % min. | | Hardness ⁹ HBW |
|---------------------------------|--|-------------------------------|------|---------------------------------|------|-------------------|----|------------------------------|
| | | min. | max. | min. | max. | A50 mm | А | |
| Т3 | ≤ 10 | 425 | - | 310 | - | 8 | 10 | 120 |
| 13 | > 10 to ≤ 80 | 425 | - | 290 | - | 7 | 9 | 120 |
| T351 | ≤ 80 | 425 | - | 310 | - | 6 | 8 | 120 |
| 5 | Other possible delivery conditions for this alloy: O, H111, T6, T651, T8, T851 | | | | | | | |
| 9 | For information only | | | | | | | |

EN 755-2 Mechanical properties: Bars – pressed square · flat · hexagonal

| Delivery condition ⁵ | Thickness for flat 4 + 6 pt: wrench size | Tensile strength $R_{_m}$ MPa | | Elastic limit $R_{_{p0.2}}$ MPa | | Elongation % min. | | Hardness ⁹ HBW |
|---------------------------------|--|-------------------------------|------|---------------------------------|------|-------------------|---|------------------------------|
| | | min. | max. | min. | max. | A50 mm | А | |
| | ≤ 50 | 450 | - | 310 | - | 6 | 8 | 120 |
| T3 T3510 | > 50 to ≤ 100 | 440 | - | 300 | - | - | 8 | 120 |
| T3510 | > 100 to \le 200 | 420 | - | 280 | - | - | 8 | 120 |
| | > 200 to ≤ 250 | 400 | - | 270 | - | - | 8 | 120 |
| 5 | Other possible delivery conditions for this alloy: O, H111, T8, T8510, T8511 | | | | | | | |
| 9 | For information only | For information only | | | | | | |



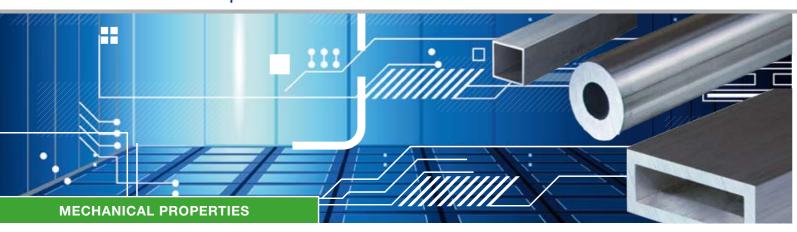


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Tubes drawn · pressed



Aluminium and aluminium alloys

EN AW-2024 AI Cu4 Mg1

EN 754-2 Mechanical properties: tubes - drawn

| Delivery condition ⁵ | Wall thickness mm | Tensile strength $R_{_m}$ MPa | | Elastic limit R _{p0.2} MPa | | Elongation % min. | | Hardness ⁹ HBW |
|---------------------------------|--|-------------------------------|------|--|------|-------------------|----|------------------------------|
| | | min. | max. | min. | max. | A50 mm | А | |
| Т3 | ≤ 5 | 440 | - | 290 | - | 8 | 10 | 120 |
| | > 5 to ≤ 20 | 420 | - | 270 | - | 8 | 10 | 120 |
| 5 | Other possible delivery conditions for this alloy: O, H111, T3510, T3511 | | | | | | | |
| 9 For information only | | | | | | | | |

EN 755-2 Mechanical properties: tubes - pressed

| Delivery condition ⁵ | Wall thickness mm | Tensile strength $R_{_m}$ MPa | | | Elastic limit $R_{\rho 0.2}$ Elongation MPa % min. | | | Hardness ⁹ HBW |
|---------------------------------|--|-------------------------------|------|------|--|--------|---|------------------------------|
| | | min. | max. | min. | max. | A50 mm | А | |
| T3 T3510/T3511 | ≤ 30 | 420 | - | 290 | - | 6 | 8 | 120 |
| 5 | Other possible delivery conditions for this alloy: O, H111, T8, T8510, T8511 | | | | | | | |
| 9 | For information only | For information only | | | | | | |



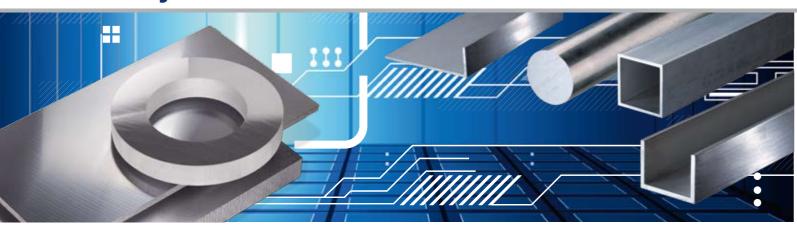
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Delivery conditions



| H111 Annealed and slightly work-hardened by subsequent operations, e.g. stretching or adjustment (less than H11). H112 Stightly work-hardened by hot forming or limited cold forming (with defined limit values of the mechanical properties). H118 Applies to aluminium-magnesium alloys with a magnesium content > = 4% for which the limit values of the mechanical properties and the resistance to exholation corrosion are defined. H12 Work-hardened - 1/4 hard. H14 Work-hardened - 1/4 hard. H16 Work-hardened - 3/4 hard. H17 Work-hardened - 4/4 hard (fully through-hardened). H19 Work-hardened - 4/4 hard (fully through-hardened). H19 Work-hardened and re-annealed - 1/4 hard. H22 Work-hardened and re-annealed - 1/2 hard. H23 Work-hardened and re-annealed - 1/2 hard. H24 Work-hardened and re-annealed - 1/2 hard. H28 Work-hardened and re-annealed - 4/4 hard (fully through-hardened). H39 Work-hardened and stabilised - 1/4 hard. H34 Work-hardened and stabilised - 1/4 hard. H35 Work-hardened and stabilised - 1/4 hard. H36 Work-hardened and stabilised - 1/4 hard. H37 Work-hardened and stabilised - 1/4 hard. H38 Work-hardened and stabilised - 1/4 hard. H39 Work-hardened and enamelled - 1/4 hard. H40 Work-hardened and enamelled - 1/4 hard. H41 Work-hardened and enamelled - 1/4 hard. H42 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 4/4 hard. H48 Work-hardened and enamelled - 4/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). Hxxx Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O Thermotenchancally reated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. 71 Quenched from the hot forming temperature and naturally aged. 72 Solution annealed, about 1% cold formed and n | F | Production state (no limit values for mechanical properties defined). |
|--|------|--|
| Applies to aluminium-magnesium alloys with a magnesium content > = 4% for which the limit values of the mechanical properties and the resistance to exfoliation corrosion are defined. H12 Work-hardened - 1/4 hard. H14 Work-hardened - 1/2 hard. H16 Work-hardened - 3/4 hard. H18 Work-hardened - 4/4 hard (fully through-hardened). H19 Work-hardened - extra hard. H22 Work-hardened and re-annealed - 1/2 hard. H24 Work-hardened and re-annealed - 1/2 hard. H26 Work-hardened and re-annealed - 1/2 hard. H27 Work-hardened and re-annealed - 3/4 hard. H28 Work-hardened and re-annealed - 4/4 hard (fully through-hardened). H39 Work-hardened and stabilised - 1/4 hard. H30 Work-hardened and stabilised - 1/2 hard. H31 Work-hardened and stabilised - 1/2 hard. H32 Work-hardened and stabilised - 1/2 hard. H38 Work-hardened and stabilised - 3/4 hard. H39 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H40 Work-hardened and enamelled - 1/2 hard. H41 Work-hardened and enamelled - 1/2 hard. H42 Work-hardened and enamelled - 1/2 hard. H43 Work-hardened and enamelled - 1/2 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 1/2 hard. H47 Work-hardened and enamelled - 1/2 hard. H48 Work-hardened and enamelled - 1/2 hard. H49 Work-hardened and enamelled - 1/2 hard. H40 Work-hardened and enamelled - 1/2 hard. H41 Work-hardened and enamelled - 1/2 hard. H42 Work-hardened and enamelled - 1/2 hard. H43 Work-hardened and enamelled - 1/2 hard. H44 Work-hardened and enamelled - 1/2 hard. H45 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 1/2 hard. H47 Work-hardened and enamelled - 1/2 hard. H48 Work-hardened and enamelled - 1/2 hard. H49 Work-hardened and enamelled - 1/2 hard. H40 Work-hardened and enamelled - 1/2 hard. H41 Work-hardened enamelled - 1/2 hard. H42 Work-hardened enamelled - 1/2 hard. H44 Work-hardened enamelled - 1/2 hard. H45 Work-hardened enamelled - 1/2 hard. H46 Work-hardened enamelled - 1/2 hard. H47 Work-harde | H111 | Annealed and slightly work-hardened by subsequent operations, e.g. stretching or adjustment (less than H11). |
| H116 and the resistance to exfoliation corrosion are defined. H12 Work-hardened - 1/4 hard. H14 Work-hardened - 1/2 hard. H16 Work-hardened - 1/2 hard. H17 Work-hardened - 4/4 hard (fully through-hardened). H19 Work-hardened - 4/4 hard (fully through-hardened). H19 Work-hardened and re-annealed - 1/4 hard. H22 Work-hardened and re-annealed - 1/2 hard. H26 Work-hardened and re-annealed - 4/4 hard. H27 Work-hardened and re-annealed - 4/4 hard. H28 Work-hardened and re-annealed - 4/4 hard. H39 Work-hardened and stabilised - 1/2 hard. H30 Work-hardened and stabilised - 1/2 hard. H31 Work-hardened and stabilised - 1/2 hard. H32 Work-hardened and stabilised - 1/2 hard. H33 Work-hardened and stabilised - 1/2 hard. H34 Work-hardened and enamelled - 1/2 hard. H44 Work-hardened and enamelled - 1/2 hard. H44 Work-hardened and enamelled - 1/2 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 1/2 hard. H47 Work-hardened and enamelled - 1/2 hard. H48 Work-hardened and enamelled - 1/2 hard. H49 Work-hardened and enamelled - 1/2 hard. H40 Work-hardened and enamelled - 1/2 hard. H410 Work-hardened and enamelled - 1/2 hard. H42 Work-hardened and enamelled - 1/2 hard. H43 Work-hardened and enamelled - 1/2 hard. H44 Work-hardened and enamelled - 1/2 hard. H45 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 1/2 hard. H47 Work-hardened and enamelled - 1/2 hard. H48 Work-hardened and enamelled - 1/2 hard. H49 Work-hardened and enamelled - 1/2 hard. H40 Work-hardened and enamelled - 1/2 hard. H410 Work-hardened and enamelled - 1/2 har | H112 | Slightly work-hardened by hot forming or limited cold forming (with defined limit values of the mechanical properties). |
| H14 Work-hardened - 1/2 hard. H18 Work-hardened - 3/4 hard. H19 Work-hardened - 4/4 hard (fully through-hardened). H19 Work-hardened and re-annealed - 1/4 hard. H22 Work-hardened and re-annealed - 1/2 hard. H24 Work-hardened and re-annealed - 1/2 hard. H25 Work-hardened and re-annealed - 1/2 hard. H26 Work-hardened and re-annealed - 3/4 hard. H27 Work-hardened and re-annealed - 3/4 hard. H28 Work-hardened and stabilised - 1/4 hard. H39 Work-hardened and stabilised - 1/4 hard. H30 Work-hardened and stabilised - 1/2 hard. H31 Work-hardened and stabilised - 1/2 hard. H32 Work-hardened and stabilised - 1/2 hard. H33 Work-hardened and stabilised - 1/4 hard. H34 Work-hardened and stabilised - 1/4 hard. H35 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 1/4 hard. H45 Work-hardened and enamelled - 1/4 hard. H46 Work-hardened and enamelled - 1/4 hard. H47 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 3/4 hard. H49 Work-hardened and enamelled - 3/4 hard. H40 Work-hardened and enamelled - 3/4 hard. H410 Work-hardened and enamelled - 3/4 hard. H410 Work-hardened and enamelled - 3/4 hard. H410 Work-hardened and enamelled - 3/4 hard. H411 Work-hardened and enamelled - 3/4 hard. H412 Work-hardened and enamelled - 3/4 hard. H413 Work-hardened and enamelled - 3/4 hard. H414 Work-hardened and enamelled - 3/4 hard. H415 Work-hardened and enamelled - 3/4 hard. H416 Work-hardened and enamelled - 3/4 hard. H417 Work-hardened and enamelled - 3/4 hard. H418 Work-hardened and enamelled - 3/4 hard. H420 Work-hardened and enamelled - 3/4 hard. H430 Work-hardened and enamelled - 3/4 hard. H440 Work-hardened and enamelled - 3/4 hard. H450 Work-hardened and enamelled - 3/4 hard. H470 Work-hardened and enamelled - 3/4 hard. H480 Work-hardened and enamelled - 3/4 hard. H490 Work-hardened and enamelled - 3/4 hard | H116 | |
| H16 Work-hardened - 3/4 hard. H18 Work-hardened - 4/4 hard (fully through-hardened). H19 Work-hardened - extra hard. H22 Work-hardened and re-annealed - 1/4 hard. H24 Work-hardened and re-annealed - 1/2 hard. H26 Work-hardened and re-annealed - 3/4 hard. H27 Work-hardened and re-annealed - 3/4 hard. H28 Work-hardened and re-annealed - 3/4 hard. H29 Work-hardened and re-annealed - 4/4 hard (fully through-hardened). H30 Work-hardened and stabilised - 1/2 hard. H31 Work-hardened and stabilised - 1/2 hard. H32 Work-hardened and stabilised - 1/2 hard. H33 Work-hardened and stabilised - 3/4 hard. H34 Work-hardened and stabilised - 1/4 hard (fully through-hardened). H42 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 1/4 hard. H45 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H50 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H50 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H50 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H50 Work-hardened and enamelled - 1/2 hard. H61 Work-hardened and enamelled - 1/2 hard. H72 Work-hardened and enamelled - 1/2 hard. H73 Work-hardened and enamelled - 1/2 hard. H74 H75 Work-hardened and enamelled - 1/2 hard. H75 Work-hardened and enamelled - 1/2 hard. H76 Work-hardened and enamelled - 1/2 hard. H77 Work-hardened and enamelled - 1/2 hard. H78 Work-hardened and enamelled - 1/2 hard. H79 Work-hardened and enamelled - 1/2 hard. H79 Work-hardened and enamelled - 1/2 hard. H70 Work-hardened and enamelled - 1/2 hard. H77 Work-hardened and enamelled - 1/2 hard. H78 Work-hardened and enamelled - 1/2 hard. H78 Work-hardened and enamelled - 1/2 hard. H79 Work-hardened enamelled - 1/2 hard. H70 Work-hardened enamelled - 1/2 hard. H79 Work-hardened | H12 | Work-hardened - 1/4 hard. |
| H18 Work-hardened - 4/4 hard (fully through-hardened). H19 Work-hardened - extra hard. H22 Work-hardened and re-annealed - 1/4 hard. H24 Work-hardened and re-annealed - 1/2 hard. H26 Work-hardened and re-annealed - 3/4 hard. H28 Work-hardened and re-annealed - 3/4 hard. H28 Work-hardened and stabilised - 1/4 hard. H32 Work-hardened and stabilised - 1/4 hard. H34 Work-hardened and stabilised - 1/2 hard. H35 Work-hardened and stabilised - 1/2 hard. H36 Work-hardened and stabilised - 3/4 hard. H37 Work-hardened and stabilised - 1/2 hard. H38 Work-hardened and enamelled - 1/2 hard. H39 Work-hardened and enamelled - 1/2 hard. H40 Work-hardened and enamelled - 1/2 hard. H41 Work-hardened and enamelled - 1/2 hard. H42 Work-hardened and enamelled - 1/2 hard. H43 Work-hardened and enamelled - 3/4 hard. H44 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H50 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H50 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H50 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formery known as 141). O2 Thermomechanically reated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature and naturally aged. | H14 | Work-hardened - 1/2 hard. |
| H19 Work-hardened - extra hard. H22 Work-hardened and re-annealed - 1/4 hard. H24 Work-hardened and re-annealed - 1/2 hard. H26 Work-hardened and re-annealed - 3/4 hard. H27 Work-hardened and re-annealed - 4/4 hard (fully through-hardened). H28 Work-hardened and stabilised - 1/4 hard. H39 Work-hardened and stabilised - 1/2 hard. H30 Work-hardened and stabilised - 1/2 hard. H31 Work-hardened and stabilised - 1/2 hard. H32 Work-hardened and stabilised - 1/2 hard. H33 Work-hardened and stabilised - 1/4 hard. H34 Work-hardened and enamelled - 1/2 hard. H35 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 1/2 hard. H47 Work-hardened and enamelled - 1/2 hard. H48 Work-hardened and enamelled - 1/2 hard. H49 Work-hardened and enamelled - 1/2 hard. H40 Work-hardened and enamelled - 1/2 hard. H410 Work-hardened and enamelled - 1/2 hard. H411 Work-hardened and enamelled - 1/2 hard. H40 Work-hardened and enamelled - 1/2 hard. H40 Work-hardened - 1/2 hard. H410 Work-hardened - 1/2 hard. H411 Work-hardened - 1/2 hard. H412 Work-hardened - 1/2 hard. H413 Work-hardened - 1/2 hard. H414 Work-hardened - 1/2 hard. H415 Work-hardened - 1/2 hard. H416 Work-hardened - 1/2 hard. H417 Work-hardened - 1/2 hard. H418 Work-hardened - 1/2 hard. H419 Work-hardened - 1/2 hard. H420 Work-hardened - 1/2 hard. H430 Work-hardened - 1/2 hard. H44 Work-hardened - 1/2 hard. H45 Work-hardened - 1/2 hard. H47 Work-hardened - 1/2 hard. H48 Work-hardened - 1/2 hard. H49 Work-hardened - 1/2 hard. H40 Work-hardened - 1/2 hard. H418 Work-hardened - 1/2 hard. H419 Work-hardened - 1/2 hard. H410 Work-hardened - | H16 | Work-hardened - 3/4 hard. |
| H22 Work-hardened and re-annealed - 1/4 hard. H24 Work-hardened and re-annealed - 1/2 hard. H26 Work-hardened and re-annealed - 3/4 hard. H27 Work-hardened and re-annealed - 4/4 hard (fully through-hardened). H28 Work-hardened and stabilised - 1/4 hard. H39 Work-hardened and stabilised - 1/2 hard. H30 Work-hardened and stabilised - 1/2 hard. H31 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H32 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H38 Work-hardened and enamelled - 1/4 hard. H39 Work-hardened and enamelled - 1/4 hard. H40 Work-hardened and enamelled - 1/2 hard. H41 Work-hardened and enamelled - 1/2 hard. H42 Work-hardened and enamelled - 3/4 hard. H43 Work-hardened and enamelled - 3/4 hard. H44 Work-hardened and enamelled - 3/4 hard. H45 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H44 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H45 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. | H18 | Work-hardened - 4/4 hard (fully through-hardened). |
| H24 Work-hardened and re-annealed - 1/2 hard. H26 Work-hardened and re-annealed - 3/4 hard. H28 Work-hardened and re-annealed - 4/4 hard (fully through-hardened). H32 Work-hardened and stabilised - 1/4 hard. H34 Work-hardened and stabilised - 1/2 hard. H36 Work-hardened and stabilised - 3/4 hard. H38 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H42 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H44 Work-hardened and enamelled - 1/2 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H48 Work-hardened - Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. Hxx5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. | H19 | Work-hardened - extra hard. |
| H26 Work-hardened and re-annealed - 3/4 hard. H28 Work-hardened and re-annealed - 4/4 hard (fully through-hardened). H32 Work-hardened and stabilised - 1/2 hard. H34 Work-hardened and stabilised - 1/2 hard. H36 Work-hardened and stabilised - 3/4 hard. H38 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H42 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H47 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H48 Work-hardened - Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. H4x5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. | H22 | Work-hardened and re-annealed - 1/4 hard. |
| H28 Work-hardened and re-annealed - 4/4 hard (fully through-hardened). H32 Work-hardened and stabilised - 1/4 hard. H34 Work-hardened and stabilised - 1/2 hard. H36 Work-hardened and stabilised - 3/4 hard. H38 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H42 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H48 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. H48 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | H24 | Work-hardened and re-annealed - 1/2 hard. |
| H32 Work-hardened and stabilised - 1/4 hard. H34 Work-hardened and stabilised - 1/2 hard. H36 Work-hardened and stabilised - 3/4 hard. H38 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H42 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H47 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H48 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. H48 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. | H26 | Work-hardened and re-annealed - 3/4 hard. |
| H34 Work-hardened and stabilised - 1/2 hard. H38 Work-hardened and stabilised - 3/4 hard. H38 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H42 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). Hxx4 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. Hxx5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | H28 | Work-hardened and re-annealed - 4/4 hard (fully through-hardened). |
| H36 Work-hardened and stabilised - 3/4 hard. H38 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H42 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). Hxx4 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. Hxx5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature, cold formed and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | H32 | Work-hardened and stabilised - 1/4 hard. |
| H38 Work-hardened and stabilised - 4/4 hard (fully through-hardened). H42 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). Hxx4 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. Hxx5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | H34 | Work-hardened and stabilised - 1/2 hard. |
| H42 Work-hardened and enamelled - 1/4 hard. H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). H24 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. H25 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | H36 | Work-hardened and stabilised - 3/4 hard. |
| H44 Work-hardened and enamelled - 1/2 hard. H46 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). Hxx4 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. Hxx5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | H38 | Work-hardened and stabilised - 4/4 hard (fully through-hardened). |
| H46 Work-hardened and enamelled - 3/4 hard. H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). Hxx4 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. Hxx5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | H42 | Work-hardened and enamelled - 1/4 hard. |
| H48 Work-hardened and enamelled - 4/4 hard (fully through-hardened). Hxx4 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. Hxx5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | H44 | Work-hardened and enamelled - 1/2 hard. |
| Hxx4 Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. Hxx5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot formed and naturally aged. Solution annealed, cold formed and naturally aged. | H46 | Work-hardened and enamelled - 3/4 hard. |
| Hxx5 Work-hardened - Applies for welded tubes. O Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. Solution annealed, cold formed and naturally aged. | H48 | Work-hardened and enamelled - 4/4 hard (fully through-hardened). |
| Soft annealed - With the O state, products can be designated for which the required properties for the soft annealed state are achieved by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. Solution annealed, cold formed and naturally aged. | Hxx4 | Applies to embossed or stamped metal sheets or strips, which are produced from the corresponding Hxx state. |
| by the hot-forming process. O1 Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). O2 Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. Solution annealed, cold formed and naturally aged. | Hxx5 | Work-hardened - Applies for welded tubes. |
| Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. Homogenised. Quenched from the hot forming temperature and naturally aged. Quenched from the hot forming temperature, cold formed and naturally aged. Solution annealed, cold formed and naturally aged. | Ο | |
| O3 Homogenised. T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | 01 | Thermally treated almost at the solution annealing temperature and time and cooled slowly to room temperature (formerly known as T41). |
| T1 Quenched from the hot forming temperature and naturally aged. T2 Quenched from the hot forming temperature, cold formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | 02 | Thermomechanically treated to improve formability as required for Superplastic Forming (SPF), for example. |
| T2 Quenched from the hot forming temperature, cold formed and naturally aged. T3 Solution annealed, cold formed and naturally aged. | O3 | Homogenised. |
| T3 Solution annealed, cold formed and naturally aged. | T1 | Quenched from the hot forming temperature and naturally aged. |
| | T2 | Quenched from the hot forming temperature, cold formed and naturally aged. |
| T31 Solution annealed, about 1% cold formed and naturally aged. | ТЗ | Solution annealed, cold formed and naturally aged. |
| | T31 | Solution annealed, about 1% cold formed and naturally aged. |

WORLD OF METALS



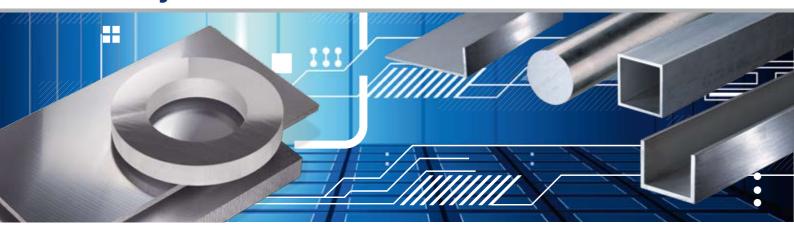
| | T351 | Solution annealed, stress relief by controlled stretching (stretching degree: 0.5% to 3% for sheets, 1.5% to 3% for plates, 1% to 3% for rolled or cold reshaped bars, 1% to 5% for forgings or forged and rolled rings) and naturally aged. The products are not readjusted after stretching. |
|---|-------|---|
| | T3510 | Solution annealed, stress relief by controlled stretching (stretching degree 1% to 3 % for extruded bars, profiles and tubes, 0.5% to 3 % for drawn tubes) and naturally aged. The products are not readjusted after stretching. |
| | T3511 | As T3510, but slight subsequent readjustment to comply with the specified limits of size allowed. |
| | T352 | Solution annealed, stress relief by 1% to 5% permanent upsetting and naturally aged. |
| | T354 | Solution annealed, stress relief by cold readjustment in the finisher and naturally aged. |
| | T36 | Solution annealed, about 6% cold formed and naturally aged. |
| J | T37 | Solution annealed, about 7% cold formed and naturally aged. |
| | T39 | Solution annealed and a certain degree of cold forming to achieve the specified mechanical properties. Cold forming can be done before or after the natural ageing treatment. |
| | T4 | Solution annealed and naturally aged. |
| | T42 | Solution annealed and naturally aged. Applies to test materials that are heat-treated from the soft annealed or F state or for products that are heat-treated from any state by the consumer. |
| | T451 | Solution annealed, stress relief by controlled stretching (stretching degree: 0.5% to 3% for sheets, 1.5% to 3% for plates, 1% to 3% for rolled or cold reshaped bars, 1% to 5% for forgings or forged and rolled rings) and naturally aged. The products are not readjusted after stretching. |
| | T4510 | Solution annealed, stress relief by controlled stretching (stretching degree: 1% to 3 % for extruded bars, profiles and tubes, 0.5% to 3 % for drawn tubes) and naturally aged. The products are not readjusted after stretching. |
| ı | T4511 | As T4510, but slight subsequent readjustment to comply with the specified limits of size allowed. |
| | T452 | Solution annealed, stress relief by 1% to 5% permanent upsetting and naturally aged. |
| | T454 | Solution annealed, stress relief by cold readjustment in the finisher and naturally aged. |
| | T5 | Quenched from the hot forming temperature and artificially aged. |
| | T51 | Quenched from the hot forming temperature and not fully artificially aged to improve malleability. |
| ı | T56 | Quenched from the hot forming temperature and artificially aged - better mechanical properties than T5 by special process control (alloy of 6000 series). |
| | T6 | Solution annealed and artificially aged. |
| | T61 | Solution annealed and not fully artificially aged to improve malleability. |
| | T6151 | Solution annealed, stress relief by controlled stretching (stretching degree: 0.5% to 3% for sheets, 1.5% to 3% for plates) and then not fully artificially aged to improve malleability. The products are not readjusted after stretching. |
| | T62 | Solution annealed and artificially aged. Applies to test materials that are heat-treated from the soft annealed or F state or for products that are heat-treated from any state by the consumer. |
| | T64 | Solution annealed and then not fully artificially aged to improve malleability (between T6 and T61). |
| | T651 | Solution annealed, stress relief by controlled stretching (stretching degree: 0.5% to 3% for sheets, 1.5% to 3% for plates, 1% to 3% for rolled or cold reshaped bars, 1% to 5% for forgings or forged and rolled rings) and artificially aged. The products are not readjusted after stretching. |
| | T6510 | Solution annealed, stress relief by controlled stretching (stretching degree 1% to 3 % for extruded bars, profiles and tubes, 0.5% to 3 % for drawn tubes) and artificially aged. The products are not readjusted after stretching. |
| | T6511 | As T6510, but slight subsequent readjustment to comply with the specified limits of size allowed. |
| | T652 | Solution annealed, stress relief by 1% to 5% permanent upsetting and artificially aged. |
| | T654 | Solution annealed, stress relief by cold readjustment in the finisher and artificially aged. |
| | | |

BIKAR-METALLE GmbH

Industriestrasse • D-57319 Bad Berleburg

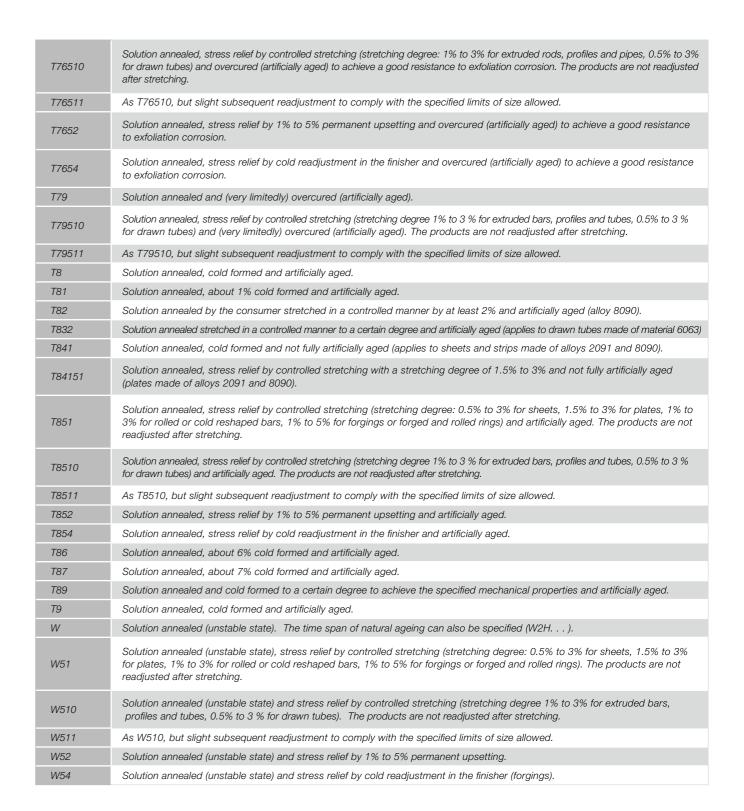
e-mail:info@bikar.com web: www.bikar.com

Delivery conditions



| T66 | Solution annealed and artificially aged - better mechanical properties than T6 by special control of the process (alloy of 6000 series). |
|--------|---|
| T7 | Solution annealed and overcured (artificially aged). |
| T73 | Solution annealed and overcured (artificially aged) to achieve an optimum resistance to stress corrosion cracking. |
| T732 | Solution annealed and overcured (artificially aged) to achieve an optimum resistance to stress corrosion cracking. Applies to test materials that are heat-treated from the soft annealed or F state or for products that are heat-treated from any state by the consumer. |
| T7351 | Solution annealed, stress relief by controlled stretching (stretching degree: 0.5% to 3% for sheets, 1.5% to 3% for plates, 1% to 3% for rolled or cold reshaped bars, 1% to 5% for forgings or forged and rolled rings) and overcured (artificially aged) to achieve an optimum resistance to stress corrosion cracking. The products are not readjusted after stretching. |
| T73510 | Solution annealed by stress relief by controlled stretching (stretching degree: 1% to 3% for extruded rods, profiles and pipes, 0.5% to 3% for drawn tubes) and overcured (artificially aged) to achieve an optimum resistance to stress corrosion cracking. The products are not readjusted after stretching. |
| T73511 | As T73510, but slight subsequent readjustment to comply with the specified limits of size allowed. |
| T7352 | Solution annealed, stress relief by 1% to 5% permanent upsetting and overcured (artificially aged) to achieve an optimum resistance to stress corrosion cracking. |
| T7354 | Solution annealed, stress relief by cold readjustment in the finisher and overcured (artificially aged) to achieve an optimum resistance to stress corrosion cracking. |
| T74 | Solution annealed and overcured (artificially aged) (between T73 and T76). |
| T7451 | Solution annealed, stress relief by controlled stretching (stretching degree: 0.5% to 3% for sheets, 1.5% to 3% for plates, 1% to 3% for rolled or cold reshaped bars, 1% to 5% for forgings or forged and rolled rings) and overcured (artificially aged) (between T73 and T76). The products are not readjusted after stretching. |
| T74510 | Solution annealed, stress relief by controlled stretching (stretching degree; 1% to 3 % for extruded bars, profiles and tubes, 0.5% to 3 % for drawn tubes) and overcured (artificially aged) (between T73 and T76). The products are not readjusted after stretching. |
| T74511 | As T74510, but slight subsequent readjustment to comply with the specified limits of size allowed. |
| T7452 | Solution annealed, stress relief by 1% to 5% permanent upsetting and overcured (artificially aged) (between T73 and T76). |
| T7454 | Solution annealed, stress relief by cold readjustment in finisher and overcured (artificially aged) (between T73 and T76). |
| T76 | Solution annealed and overcured (artificially aged) to achieve a good resistance to exfoliation corrosion. |
| T761 | Solution annealed and overcured (artificially aged) to achieve a good resistance to exfoliation corrosion (applies to sheets and strips made of material 7475). |
| T762 | Solution annealed and overcured (artificially aged) to achieve a good resistance to exfoliation corrosion. Applies to test materials that are heat-treated from the soft annealed or F state or for products that are heat-treated from any state by the consumer. |
| T7651 | Solution annealed, stress relief by controlled stretching (stretching degree: 0.5% to 3% for sheets, 1.5% to 3% for plates, 1% to 3% for rolled or cold reshaped bars, 1% to 5% for forgings or forged and rolled rings) and overcured (artificially aged) to achieve a good resistance to exfoliation corrosion. The products are not readjusted after stretching. |

WORLD OF METALS



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BIKAR METALLE

A COMPANY THAT CAN SIMPLY DO MORE!

Modern technologies make us powerful, flexible and allow us to provide the best quality!

Computer-controlled high bay warehouse for

- Standard plates: Capacity 1,000 containers at 5,000 kg
- Super formats and plain milled plates: Capacity 800 containers at 3,500 kg

Band saws

- Horizontal up to sizes of 6,020 x 3,020 x 1,150 mm
- Vertical up to sizes of 4,020 x 2,300 x 1,150 mm

Buzz saws

• Up to sizes of 6,050 x 6,050 x 170 mm

Blank saws and ring saws

• Up to a diameter of 2,500 mm

Deep hole drilling

- Up to 1,100 mm depth
- Thread up to dia 70 mm

Milling

- Precision surface cutter (portal milling machine) cutter head dia 2.700 mm
- Up to 6000 x 2,500 x 5-150 mm
- Surface cutter for individual depth up to 1,000 x 800 x 300 mm

Chamfering

• 45° up to about 4 mm chamfer

Usual sawing tolerances

- Band saws (sawing tolerance: +2 to 3/-0 mm)
- Circular blanks according to drawing (sawing tolerance: +8 to 10/-0 mm) depending on the type of pre-cut part
- Precision circular saws (sawing tolerance according to thickness: +-0.2 to +-0.5 mm) up to max. cutting height of 170 mm

Other tolerances by arrangement

OUR DELIVERY PROGRAM

DIVERSITY FROM A SINGLE SOURCE

BIKAR has learned over many decades to adapt to the needs of its customers. And that's reflected in the diversity of our stocked and available products. You can only win with a strong partner.











ALUMINIUM

- Plates
- Sheets
- Bars
- Circular blanks
- Rings
- Profiles
- Cuttings
- Parts from drawings

COPPER

- Plates
- Sheets
- Bars
- Circular blanks
- Rings
- Profiles
- Cuttings
- Parts from drawings

BRASS

- Plates
- Sheets
- Bars
- Circular blanks
- Rings
- Profiles
- Cuttings
- Parts from drawings

BRONZE

- Bars
- Tubes
- Bushings
- Rings
- Circular blanks
- Cuttings
- Parts from drawings

PLASTICS

- Bars
- Tubes
- Bushings
- Cuttings

