



Norm: UNI EN 1676 e 1706

Numeric designation: EN AB and AC - 45300

Symbolic designation: EN AB and AC - AISi5Cu1Mg

#### CHEMICAL COMPOSITION %

| ALLOY DESIGNATION           |     | ELEMENTS |      |     |      |      |      |      |      |      |      |      |            |             |
|-----------------------------|-----|----------|------|-----|------|------|------|------|------|------|------|------|------------|-------------|
|                             |     | Si       | Fe   | Cu  | Mn   | Mg   | Cr   | Ni   | Zn   | Pb   | Sn   | Ti   | Other each | Other total |
| EN AB 45300<br>EN 1676:2020 | Min | 4,5      | 0    | 1,0 | 0    | 0,40 | 0    | 0    | 0    | 0    | 0    | 0    | 0          | 0           |
|                             | Max | 5,5      | 0,55 | 1,5 | 0,55 | 0,65 | 0,05 | 0,25 | 0,15 | 0,1* | 0,05 | 0,20 | 0,05       | 0,15        |
| EN AC 45300<br>EN 1706:2020 | Min | 4,5      | 0    | 1,0 | 0    | 0,35 | 0    | 0    | 0    | 0    | 0    | 0    | 0          | 0           |
|                             | Max | 5,5      | 0,65 | 1,5 | 0,55 | 0,65 | 0,05 | 0,25 | 0,15 | 0,1* | 0,05 | 0,25 | 0,05       | 0,15        |

NOTE: Other each includes the limits of all elements unspecified in the grid.

#### MECHANICAL PROPERTIES

(Mechanical properties obtained from samples cast separately at +20°C room temperature)

| CASTING PROCESS<br>(condition) | TEMPER<br>DESIGNATION | Rm               | Rp02           | A            | HB               | R Fatigue*         |
|--------------------------------|-----------------------|------------------|----------------|--------------|------------------|--------------------|
|                                |                       | Tensile strength | Yield strength | Elongation   | Brinell hardness | Fatigue resistance |
|                                |                       | EN 1706:2020     | EN 1706:2020   | EN 1706:2020 | EN 1706:2020     | EN 1706:2020       |
|                                |                       | MPa              | MPa            | %            | HBW              | MPa                |
| SAND                           | T4                    | 170              | 120            | 2            | 80               | 70 - 100           |
| SAND                           | T6                    | 230              | 200            | < 1          | 100              | 70 - 100           |
| PERMANENT MOULD                | T4                    | 230              | 140            | 3            | 85               | 70 - 100           |
| PERMANENT MOULD                | T6                    | 280              | 210            | < 1          | 100              | 70 - 100           |

\*Values for tests under rotating bending conditions up to 10<sup>7</sup> cycles

#### PHYSICAL PROPERTIES

(The following properties are spoilt by the variation of the chemical composition, by its metallurgic structure, casting integrity and casting conditions, therefore these values are approximate)

|                              |                         |                                              |              |                        |
|------------------------------|-------------------------|----------------------------------------------|--------------|------------------------|
| SPECIFIC WEIGHT              | 2,67 Kg/dm <sup>3</sup> | ELECTRICAL CONDUCTIVITY                      | EN 1706:2020 | 19 - 23 MS/m           |
| SPECIFIC HEAT<br>(at 100 °C) | 0,92 J/gK               | THERMAL CONDUCTIVITY                         | EN 1706:2020 | 140 - 150 W/(m K)      |
| ELASTIC MODULUS              | 72 GPa                  | LINEAR THERMAL EXPANSION<br>(20 °C - 100 °C) | EN 1706:2020 | 22·10 <sup>-6</sup> /K |



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#### TECHNOLOGICAL FEATURES

(Quality indications excerpted from the norm EN 1706:2020)

|                                         |   |                                             |   |
|-----------------------------------------|---|---------------------------------------------|---|
| CASTABILITY                             | C | DECORATIVE ANODIZING                        | D |
| RESISTANCE TO HOT TEARING               | B | ABILITY TO BE WELDED                        | C |
| PRESSURE TIGHTNESS                      | C | ABILITY TO BE POLISHED                      | B |
| MACHINABILITY<br>(after cast)           | B | STRENGTH AT ROOM<br>TEMPERATURE             | B |
| MACHINABILITY<br>(after heat treatment) | B | STRENGTH AT ELEVATED<br>TEMPERATURE (200°C) | B |
| RESISTANCE TO CORROSION                 | D | DUCTILITY                                   | B |

A: EXCELLENT, B: GOOD, C: FAIR, D: POOR, E: NOT RECOMMENDED, F: UNSUITABLE

#### GUIDELINES FOR USE

The ingot re-melting process must be carried out as fast as possible and overheating must be avoided (maximum melting temperature 780°C). Iron tools that may be touched by the liquid metal must be specially painted to avoid spoiling the alloy. The best alloy purification results are achieved by treating the alloy with inert gases, such as nitrogen and/or argon, to remove dissolved hydrogen and any oxides in the liquid bath. A careful skimming of the bath is recommended. It is allowed to recycle sprues and casting appendages up to 40% out of the total charge weight.

**Heat Treatment** - The possible treatments and the properties to be potentially achieved are listed in the table "MECHANICAL PROPERTIES".

#### FURTHER FEATURES OF THE ALLOY

**Resistance to weathering and seawater** - Limited resistance to weathering; not suitable for applications directly touched by seawater.

**Notes** - Castability is excellent and makes it possible to use it a lot. The higher the content of Mg is, the more this alloy tends to hot tearing, even if this tendency is not well-defined. A refining treatment with TiB refiners is recommended to achieve compact components, while a modification treatment with Sodium (Na) or Strontium (Sr) is necessary to increase deformability.

#### USUAL APPLICATIONS

This alloy is suitable for sand or permanent mould castings which need high mechanical properties and pressure tightness and are to be treated with machining operations. It is used in the transport, hydraulics and compressed air industries (cylinders and engine bases, pump bodies, compressor pistons). This alloy **does not comply** with standard **EN 601**.