

# DATA SHEETS

## Aluminium



New Material:

# FORMODAL<sup>®</sup> 019 elox

Precision milled or rough sawn aluminium cast plates

Applications:

- Electronics and laser industry
- Packaging technology
- Optical industry
- Medical technology
- Display, semiconductor and solar systems



ALUMINIUM

COPPER

BRASS

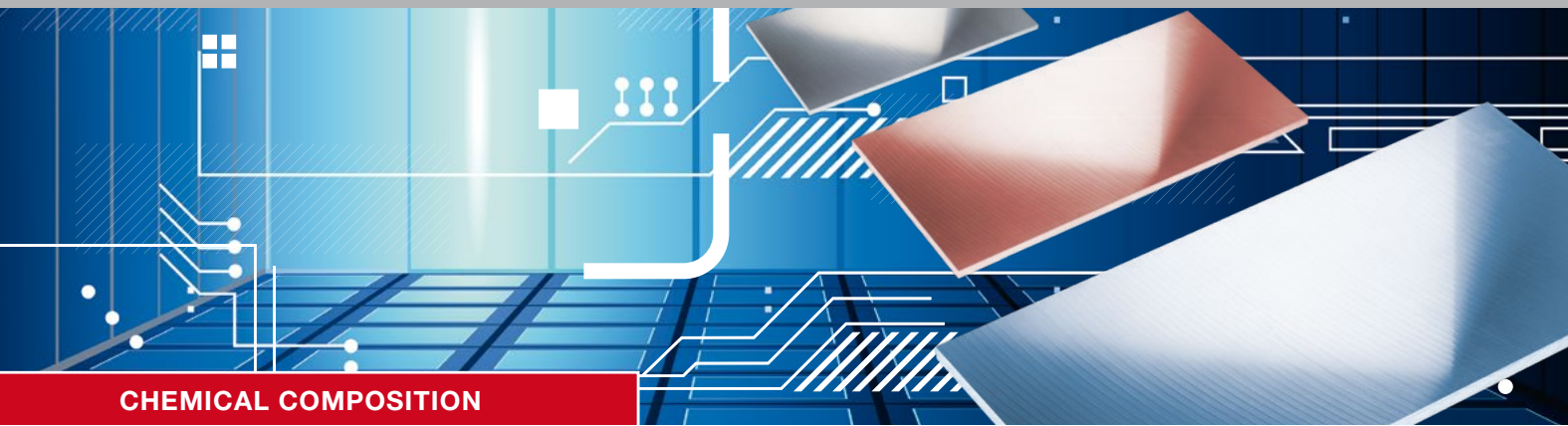
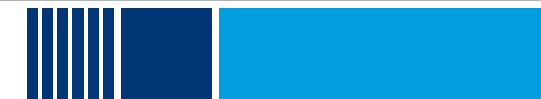
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**BIKAR**  
**METALLE**



## CHEMICAL COMPOSITION

### Aluminium and aluminium alloys

Precision milled or rough sawn aluminium cast plates  
Special alloy with improved anodising ability



#### Alloy designation:

|              |         |
|--------------|---------|
| Special type | AA 5754 |
| Special type | Al Mg3  |

#### Typical physical properties:

|  |              |      |
|--|--------------|------|
| Density [g/cm³]  | 2,67         |      |
| Elastic modulus [GPa]  | 70           |      |
| Thermal conductivity [W/m*K]                                       | 130 - 160    |      |
| Thermal expansion coefficient [K <sup>-1</sup> *10 <sup>-6</sup> ] | -50°C – 20°C |      |
|  | 20°C – 100°C | 23,9 |
|  | 20°C – 200°C |      |
|  | 20°C – 300°C |      |
| Specific heat J/(kg * K)   | 900          |      |
| Electrical conductivity [m/Ω*mm²]                                  | 20 - 23      |      |

#### Chemical composition\* (EN 573-3):

| Specifications in % |      |      |      |           |      |    |      |      |    |   | Remainder: Aluminium |                    | Other |  |
|---------------------|------|------|------|-----------|------|----|------|------|----|---|----------------------|--------------------|-------|--|
| Si                  | Fe   | Cu   | Mn   | Mg        | Cr   | Ni | Zn   | Ti   | Ga | V | Individual           | Total <sup>2</sup> |       |  |
| 0,40                | 0,40 | 0,10 | 0,50 | 2,6 - 3,6 | 0,30 | -  | 0,20 | 0,15 | -  | - | 0,05                 | 0,15               |       |  |

<sup>x</sup> Chemical specifications as perc. of weight. If no ranges are specified, the alloy content has the maximum value.

<sup>2</sup> Includes all items listed for which no limit value are specified

#### Special features of this material:

- Display, semiconductor and solar systems
- Improved anodising ability
- Excellent corrosion resistance
- Low stress and dimensionally stable
- Good welding properties

#### Applications:

- Electronics and laser industry
- Packaging technology
- Optical industry
- Medical technology
- Display, semiconductor and solar systems

#### Available forms:

**Sheets · Plates · Cuttings · Circular blanks · Rings · Parts from drawings**

#### Heat treatment:

| Soft annealing / recrystallisation annealing |       |
|--|-------|
| Annealing temperature                        | 345°C |
| Heating-up time                              | -     |
| Cooling conditions                           | -     |

#### Hardening

|                             |   |
|-----------------------------|---|
| Solution annealing          | - |
| Quenching                   | - |
| Natural ageing treatment    | - |
| Artificial ageing treatment | - |

#### Other data:

##### Processing / machinability

|                                 |   |
|---------------------------------|---|
| Homogenised and stress relieved | 1 |
| Dimensional stability           | 1 |
| Erosion                         | 2 |

##### Surface treatment

|                                      |   |
|--------------------------------------|---|
| Anodising - (protective anodisation) | 1 |
| Anodising - decorative               | 2 |
| Painting / coating                   | 3 |
| Polishing                            | 2 |

##### Welding

|                    | Filler metal |
|--------------------|--------------|
| Gas                | 2            |
| WIG                | 1            |
| MIG                | 1            |
| Resistance welding | 3            |

##### Solder

|                          |   |
|--------------------------|---|
| Brazing with flux        | 5 |
| Brazing without flux     | 4 |
| Abrasion soldering       | 3 |
| Soft soldering with flux | 5 |

#### Corrosion resistance

|   |       |
|---|-------|
| In a normal atmosphere/<br>weather conditions | 1     |
| Sea water atmosphere                          | 1 - 2 |

#### Metal forming

| Cold forming                   |       | Delivery condition |
|--------------------------------|-------|--------------------|
| Bending                        | 4     |                    |
| Pressure forming               | 4     |                    |
| Deep drawing (condition-based) | 5     |                    |
| Upsetting (condition-based)    | 4     |                    |
| Impact extrusion               | 4     |                    |
| Hot forming                    |       |                    |
| Drop forging                   | 1 - 2 |                    |
| Extrusion moulding             | 1 - 2 |                    |
| Hammer forging                 | 1     |                    |

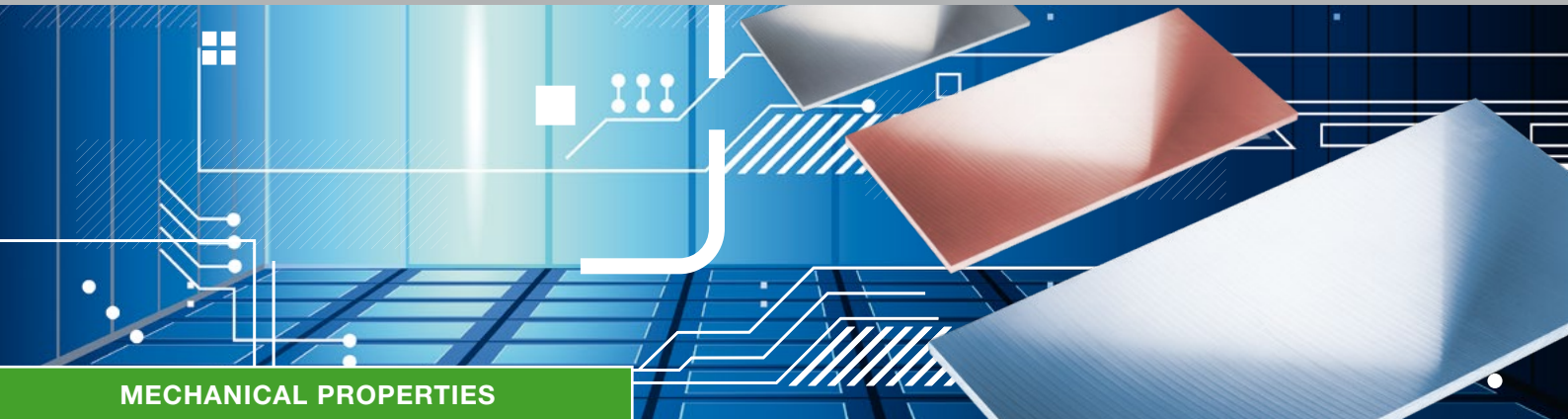
|   |     |
|---|-----|
| Suitable for food industry<br>according to DIN EN 602 | yes |
|---|-----|

#### Legend:

- 1 very good
  - 2 good
  - 3 moderate
  - 4 poor
  - 5 unsuited
- EQ anodising quality must be ordered separately and confirmed.

The specifications in our data sheets are subject to correction and are only valid as references. Liability is excluded in this regard. We reserve the right to make changes to the standards and informative values. The agreements of our order confirmation are always authoritative. With regard to anodic oxidisability, we point out that we accept no liability for the anodisation result and the colour formation for decorative applications. The same applies to the corrosion resistance. Special arrangements must be made in writing.

# FORMODAL® 019 elox



## MECHANICAL PROPERTIES

### Aluminium and aluminium alloys

Precision milled or rough sawn aluminium cast plates  
Special alloy with improved anodising ability



#### Typical mechanical properties:

| Delivery condition | Nominal thickness mm |     | Tensile strength $R_m$ MPa | Elastic limit $R_{p0.2}$ MPa | Elongation % min. | Hardness <sup>9</sup> HBW |
|--------------------|----------------------|-----|----------------------------|------------------------------|-------------------|---------------------------|
|                    | over                 | to  | min.                       | typical                      | A50               |                           |
| O3                 | 6                    | 610 | 190                        | 80                           | 16                | 52                        |

<sup>9</sup>

For information only

#### We supply aluminium sheets and plates of alloy FORMODAL® 019 in the following dimensions:

| Thickness mm | Length x Width mm |
|--------------|-------------------|
| 6 - 160      | 3.020 x 1.520     |
| 6 - 160      | 3.670 x 1.570     |
| 10 - 160     | 4.000 x 2.160     |
| 10 - 85      | 6.000 x 2.160     |
| 10 - 120     | 6.100 x 1.520     |
| 6 - 610*     | 3.670 x 1.600     |

\*Only as rough sawn plates

#### Tolerances:

| Cut to size by band saw |                          | Plates                  |
|-------------------------|--------------------------|-------------------------|
| Thickness: -0/+3 mm     | Length x Width: -0/+3 mm | Length x Width: ± 20 mm |

#### Machined plates:

| Thickness mm | flatness tolerance mm/m <sup>1</sup> | thickness tolerance mm |
|--------------|--------------------------------------|------------------------|
| > 10 - 13    | ≤ 0,44                               | ± 0,1                  |
| > 13         | ≤ 0,14                               | ± 0,1                  |

Other dimensions on request.

<sup>1</sup> This specification refers to the total area; not only to sections of a plate or a pre-cut part.  
By dividing the surface, the flatness is not reduced proportionately.

- The milled plates are PVC coated on both sides!
- Casting alloys can contain micro pores, which particularly appear during coloured surface treatment or polishing.  
This is especially true for dark colours.

|                    |                         |
|--------------------|-------------------------|
| Surface roughness: | $R_a < 0,4 \mu\text{m}$ |
|--------------------|-------------------------|