

## Stainless Steel 1.4762

## Material Data Sheet

This data sheet applies to hot and cold rolled sheet and strip, semi-finished products, bars, rods and sections.

## Application

For construction parts, which should be resistant to scaling up to about 1150°C and extensively inured to the effects of sulphurous gases. The inclination to carbonisation in reduced gases is very low.

## Chemical Composition (heat analysis in %)

| Product Form | C      | Si          | Mn     | P       | S       | Cr            | Al          |
|--------------|--------|-------------|--------|---------|---------|---------------|-------------|
| C, H, P, L   | ≤ 0.12 | 0.70 - 1.40 | ≤ 1.00 | ≤ 0.040 | ≤ 0.015 | 23.00 - 26.00 | 1.20 - 1.70 |

C = cold-rolled strip H = hot-rolled strip P = hot rolled sheet L = semi-finished products, bars, rods and sections

## Mechanical Properties (at room temperature in annealed condition)

| Product Form | Thickness a or diameter d mm | HB max. <sup>1) 2) 3)</sup> | Proof Strength <sup>3)</sup>        |                                     | Tensile Strength                 | Elongation min. in %        |                    |                    |
|--------------|------------------------------|-----------------------------|-------------------------------------|-------------------------------------|----------------------------------|-----------------------------|--------------------|--------------------|
|              |                              |                             | R <sub>p0.2</sub> N/mm <sup>2</sup> | R <sub>p1.0</sub> N/mm <sup>2</sup> | R <sup>m</sup> N/mm <sup>2</sup> | Long Products <sup>3)</sup> | Flat Products      |                    |
|              |                              |                             |                                     |                                     |                                  |                             | 0.5 ≤ a/d < 3      | 3 ≤ a/d            |
| C, H, P      | a ≤ 12                       | 223                         | -                                   | 280                                 | 520 - 720                        | 10                          | 13 <sup>4)5)</sup> | 15 <sup>4)5)</sup> |
| L            | d ≤ 25                       |                             |                                     |                                     |                                  |                             |                    |                    |

<sup>1)</sup> The maximum HB values may be raised by 100 units or the maximum tensile strength value may be raised by 200 N/mm<sup>2</sup> and the minimum elongation value be lowered to 20% for cold worked sections and bars of ≤ 35mm thickness.

<sup>2)</sup> For guidance only.

<sup>3)</sup> For rod, only the tensile values apply.

<sup>4)</sup> Longitudinal test piece.

<sup>5)</sup> Transverse test piece

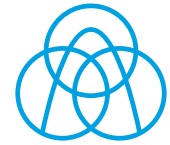
## Creep Properties (estimated average values about the long-term behaviour at elevated temperature\*)

| Temperature °C | 1% Elongation <sup>1)</sup> for |                            | Rupture <sup>2)</sup> for |                           |                             |
|----------------|---------------------------------|----------------------------|---------------------------|---------------------------|-----------------------------|
|                | 1,000 h N/mm <sup>2</sup>       | 10,000 h N/mm <sup>2</sup> | 1,000 h N/mm <sup>2</sup> | 10,00 h N/mm <sup>2</sup> | 100,000 h N/mm <sup>2</sup> |
| 500            | 80                              | 50                         | 160                       | 100                       | 55                          |
| 600            | 27.5                            | 17.5                       | 55                        | 35                        | 20                          |
| 700            | 8.5                             | 4.7                        | 17                        | 9.5                       | 5                           |
| 800            | 3.7                             | 2.1                        | 7.5                       | 4.3                       | 2.3                         |
| 900            | 1.8                             | 1.0                        | 3.6                       | 1.9                       | 1.0                         |

<sup>1)</sup> Stress related to the output cross section, which leads after 1,000 or 10,000 h to a permanent elongation of 1%.

<sup>2)</sup> Stress related to the output cross section, which leads after 1,000 or 10,000 or 100,000 h to breakage.

\* For guidance only



## Reference data on some physical properties

| Density at 20°C<br>kg/dm <sup>3</sup> | Thermal Conductivity W/m K at |       | Specific Thermal<br>Capacity at 20°C J/kg K | Electrical<br>Resistivity at 20°C Ω mm <sup>2</sup> /m |
|---------------------------------------|-------------------------------|-------|---|--|
|                                       | 20°C                          | 500°C |   |  |
| 7.7                                   | 17                            | 23    | 500   | 1.13   |

| Coefficient of linear thermal expansion 10 <sup>-6</sup> K <sup>-1</sup> between 20°C and |       |       |       |        |
|---|-------|-------|-------|--------|
| 200°C   | 400°C | 600°C | 800°C | 1000°C |
| 10.5  | 11.5  | 12.0  | 12.0  | 13.5   |

## Guidelines on the temperature for hot forming and heat treatment

| Hot Forming    |                 | Heat Treatment +A (annealed), Microstructure |                               |                |
|----------------|-----------------|--|-------------------------------|----------------|
| Temperature °C | Type of Cooling | Temperature °C <sup>1)</sup>                 | Type of Cooling <sup>2)</sup> | Microstructure |
| 1100 - 900     | Air             | 800 - 860                                    | Air, Water                    | Ferrite        |

<sup>1)</sup> If heat treatment is carried out in a continuous furnace, the upper part of the range specified is usually preferred or even exceeded.

<sup>2)</sup> In special cases, furnace cooling is also permitted.

## Processing / Welding

Standard welding processes for this steel grade are:

- TIG-Welding
- MAG-Welding Solid Wire
- Arc Welding (E)
- Submerged Arc Welding (SAW)

| Process         | Filler Metal          |              |                                  |              |
|-----------------|-----------------------|--------------|----------------------------------|--------------|
|                 | Similar               |              | Higher Alloyed                   |              |
| TIG             | -                     |              | Thermanit D / 1.4829             |              |
| MAG Solid Wire  | Thermanit 17 / 1.4015 |              | Thermanit D / 1.4829; L / 1.4820 |              |
| Arc Welding (E) | Thermanit 17 / 1.4015 |              | Thermanit D / 1.4829; L / 1.4820 |              |
| SAW             | Wire                  | Powder       | Wire                             | Powder       |
|                 | Thermanit 17 / 1.4015 | Marathon 216 | Thermanit L / 1.4820             | Marathon 213 |

Ferritic chrome steels are heat sensitive. Therefore the steel 1.4762 should be welded with the lowest possible heat input by using thin electrode diameter, low current intensity and stringer bead welding.

For wall thicknesses under 3mm, it is not necessary to preheat 1.4762. For thicker construction parts (> 3mm) the preheating and interpass temperatures 200 - 300°C should not be under respectively over run.

1.4762 can be processed with similar or higher alloyed filler metals. With sulphurous atmospheres a ferritic top layer should be laid on the media side (Thermanit L 1.4820).

## Cold Forming

When cold forming 1.4762, certain preventative measures should be observed. Sheets up to 3mm thickness can be cold bent if necessary preheating with 200 - 300°C should be done.

Products with thicknesses > 3mm must be preheated up to 600 - 800°C, concerning machinability 1.4762 can be compared to a low carbon steel.



### Embrittlement

While heating 1.4762 over about 950°C embrittlement by grain growth occurs, which cant be removed anymore. A further embrittlement occurs in the temperature range between 400 and 550°C (475°C embrittlement). A longer abidance within this temperature range should be avoided. This loss of ductility can be corrected by a short heating up to 700 to 800°C.

In the temperature range of 600 to 900°C 1.4762 has the affinity to signma-phase-embrittlement, so that after longer application within this temperature range the ductile values are strongly reduced. The steel should not come into operation within this temperature range, if mechanical stress is existent.

### Note

The material is magnetizable.

### Editor

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### Important Note

Information given in this data sheet about the condition or usability of materials respectively products are no warranty for their properties, but act as a description.

The information, we give on for advice, comply to the experiences of the manufacturer as well as our own. We cannot give warranty for the results of processing and application of the products.