# HEATING CONDUCTOR ALLOY

# 1.4765 (CrAl 25 5)

Excellence in Specialty Steel

## Material Designation

1.4765 DIN

## Standards

DIN 17470
ASTM B 603
(Class I, chem. analysis and electrical resistivity only)

## Chemical Composition

| | Cr | Al | Fe |
|---|---|---|---|
| Alloying Content[1] [wt.-%] | 22.0 – 25.0 | min. 5.0 | Bal. |

## Properties

1.4765 (CrAl 25 5) is a ferritic iron-chromium-aluminum alloy (FeCrAl) that is particularly suitable for use in high-temperature applications above 1000 °C due to the formation of a stable $Al_2O_3$ layer. The material is characterized by high scale resistance, high electrical resistivity, and excellent corrosion resistance in chemically demanding environments with oxidizing, sulfur-containing, or carburizing atmospheres. 1.4765 is magnetic up to approx. 600 °C and is suitable for applications with operating temperatures up to 1400 °C[2].

## Area of Application and Typical Applications Examples

1.4765 is used as a heating element in high-temperature or sintering furnaces, particularly at high operating temperatures. Typical areas of application are electric furnaces for industrial heat treatment, the glass and ceramics industry, and the chemical industry.

## Delivery Conditions

- Wire annealed or annealed, pre-oxidized (coils, barrels, on spools up to 3.0 mm possible)
- Straightened bars
- Alternative delivery conditions on request

## Physical Properties

| | |
|---|---|
| Melting Temperature [°C] | 1500 |
| Max. Operating Temperature [°C] | 1400[2] |

| Properties at Room Temperature | |
|---|---|
| Electrical Resistivity [Ω mm²/m] | 1.44 |
| Thermal Conductivity [W/m·K] | 13 |
| Specific Heat Capacity [kJ/kg·K] | 0.46 |
| Density [g/cm³] | 7.1 |

[1] In accordance with DIN 17470 and ASTM B 603, additional alloying elements are permitted to optimize the physical and technological properties.
[2] Temperature valid for wire > 2.0 mm in air.



## Quality

- ISO 9001
- ISO 14001
- ISO 50001
- Approvals acc. to standards like ABS, BV, DNV ...
- Customer specific approval certificates

## Innovation

- Fully automated phased-array-ultrasonic testing up to dia. 1000 mm
- $CO_2$-reduction by innovative heat treatment solutions

## Flexibility

- Product range from fine wire to forging
- Directly from stock close at hand

## Individuality

- Dimensions
- Tolerances
- Surface qualities
- Delivery conditions

## Your personal contact:

**BGH Edelstahlwerke GmbH**

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01705 Freital
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## Physical Properties

Temperature Coefficient of Electrical Resistivity[3]

| Temperature [°C] | 20 | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 |
|---|---|---|---|---|---|---|---|---|
| Temperature Coefficient | 1.00 | 1.00 | 1.01 | 1.01 | 1.03 | 1.03 | 1.04 | 1.05 |

Average Value of Thermal Expansion Coefficient[3]

| Temperature [°C] | 20-400 | 20-800 | 20-1000 |
|---|---|---|---|
| Thermal Expansion Coefficient x [$10^{-6}$/K] | 12 | 14 | 15 |

## Mechanical Properties room temperature, annealed condition, nominal values

| Dimension [mm] | Tensile Strength [MPa] | Elongation [%] | Hardness HV[4] |
|---|---|---|---|
| 0.060 – 0.125 | 780 | 8 | 240 |
| > 0.125 – 1.00 | 750 | 10 | 235 |
| > 1.00 | 730 | 15 | 230 |
| > 2.50 | 680 | 16 | 210 |

Creep Strength 1%-1000h reference values[3]

| Temperature [°C] | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|---|---|---|---|---|---|---|---|
| Creep Strength [MPa] | 40 | 15 | 6.0 | 2.5 | 1.0 | 0.3 | 0.1 |

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[3] In accordance with DIN 17470
[4] Calculated from tensile strength, rounded values