



Kanthal (Sweden) – Wire Kanthal A1 - Data Sheet

Kanthal A-1 is a ferritic iron-chromium-aluminium alloy (FeCrAl alloy) which is characterized by high resistivity and very good oxidation resistance.

Typical applications for Kanthal A-1 are electrical heating elements in high-temperature furnaces for heat treatment, ceramics, glass, steel, and electronics industries.

Shape: Round
Heat Treatment: Annealed (soft)
Max. operating temp.: 1400° C



Chemical Composition:

| | C % | Si % | Mn % | Cr % | Al % | Fe % |
|----------------------------|------|------|------|------|------|---------|
| Nominal Composition | | | | | 5.8 | Balance |
| Min. | - | - | - | 20.5 | - | |
| Max. | 0.08 | 0.7 | 0.4 | 23.5 | - | |

Density: 7.10 g/cm³

Thermal Conductivity:

| 50°C | 600°C | 800°C | 1000°C | 1200° | 1400° |
|--------|--------|--------|--------|--------|--------|
| 11W/mK | 20W/mK | 22W/mK | 26W/mK | 27W/mK | 35W/mK |

Mechanical Properties:
 (at wire size Ø 1 mm)

| Tensile Strength | Yield Point | Elongation | Hardness |
|-----------------------|-----------------------|------------|----------|
| 760 N/mm ² | 545 N/mm ² | 20% | 240 Hv |

Mechanical Properties:
 (at elevated temperature)

| 900°C | 1000°C | 1100°C | 1200°C | 1300°C |
|---------------------|---------------------|---------------------|---------------------|---------------------|
| 34N/mm ² | 18N/mm ² | 10N/mm ² | 6 N/mm ² | 4 N/mm ² |



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Emissivity: 0.7%
(full oxidized condition)

Coefficient of Thermal Expansion:

| | | | |
|----------|----------|----------|-----------|
| 20-250°C | 20-500°C | 20-700°C | 20-1000°C |
| 11 | 12 | 14 | 15 |

Creep Strength:
(1% Elongation in 1000 h)

800°C → 1.2 N/mm²
1000°C → 0.5 N/mm²

Technical Data Conversion Table:

| ∅ mm | Ω/m 20°C | cm ² /m | m/kg | g/m |
|------|----------|--------------------|--------|--------|
| 1.00 | 1.8460 | 31.42 | 179.30 | 5.576 |
| 1.10 | 1.5260 | 34.56 | 148.20 | 6.747 |
| 1.20 | 1.2820 | 37.70 | 124.50 | 8.030 |
| 1.30 | 1.0920 | 40.84 | 106.10 | 9.424 |
| 1.50 | 0.8205 | 47.12 | 79.70 | 12.550 |
| 1.80 | 0.5698 | 56.55 | 55.35 | 18.070 |
| 2.00 | 0.4616 | 62.83 | 44.83 | 22.310 |
| 2.20 | 0.3815 | 69.12 | 37.05 | 26.990 |
| 2.50 | 0.2954 | 78.54 | 28.69 | 34.850 |
| 2.80 | 0.2355 | 87.97 | 22.87 | 43.720 |
| 3.00 | 0.2051 | 94.25 | 19.93 | 50.190 |
| 3.25 | 0.1748 | 102.10 | 16.98 | 58.900 |
| 3.50 | 0.1507 | 110.00 | 14.64 | 68.310 |
| 3.75 | 0.1313 | 117.80 | 12.75 | 78.420 |
| 4.00 | 0.1154 | 125.70 | 11.21 | 89.220 |

Temperature Factor of Resistivity:

| °C | 20 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1350 | 1375 |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Ct | 1.000 | 1.000 | 1.001 | 1.002 | 1.005 | 1.010 | 1.017 | 1.023 | 1.028 | 1.032 | 1.036 | 1.038 | 1.040 | 1.042 | 1.043 | 1.044 |