



GÜNTHER^{GmbH}

Temperaturmesstechnik



**Product category 35-WGG
Angular Thermocouple Assemblies
with Bent or Welded Protection Tube**

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Angular thermocouple assemblies with bent or welded protection tube (35-WGG) are primarily used for temperature measurement in metal smelting and salt baths.

The angular shape allows for placement of the connector head away from the actual bath/melt in order to avoid direct exposure to high temperatures and aggressive vapours.

As an alternative to the installed thermocouple, numerous angular thermocouple assemblies may be fitted with a mineral-insulated gauge slide, which can have several crucial advantages:

- Optimal protection of the inner conductors from corrosion, oxidation, physical damage, and chemical contamination due to the enclosed structure of the outer insulation.
- Increased stability of the electrical insulation compared to ceramic insulated thermocouples.

In order to ensure functionality of the thermocouple assembly during a suitable timeframe, careful consideration should be used when selecting the materials for thermocouple and protective tube depending on the operating conditions.

Thermoelectric voltages and tolerances of our thermocouples and mineral-insulated gauge slides are pursuant to DIN EN 60584, class 1, for thermocouples and mineral-insulated gauge slides of type L pursuant to DIN 43710.

Further technical information for this product line is available on our website:

<http://www.guenther.eu/en/products/thermocouples/35-wgg/angle-thermometers-with-curved-or-welded-pipe>

Recommended Protection Tube Materials in Salt Baths

| Smelter | Maximum Temperature | Materials |
|---|---------------------|-------------|
| Tenifer® | 600°C | Titanium NT |
| Saltpetre-, Chloride- & Cyanogen containing | 1000°C | Pure Iron |
| Annealing, Tempering and Hardening Baths | 1300°C | 1.4821 |

Recommended Protection Tube Materials in Metal Smelting:

| | | |
|---------------------------|--------|----------------------------|
| Aluminium | 700°C | SiN SiC |
| Magnesium Al/Mg-Alloys | 700°C | Pure Iron SiN |
| Lead | 600°C | SiN |
| Zinc | 600°C | Pure Iron / Steel / SiN |
| Copper | 1200°C | 1.4762 Graphite |
| Brass | 900°C | 1.4762 / Graphite / SiN |



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① Connection Head

| | |
|------|------|
| A | B |
| AUS | BUS |
| AUZ | BUZ |
| AUZH | BUZH |
| AUSH | BBK |

② Protection Tube/Supporting Tube (Materials)

| | |
|-----------------------|--------|
| High-Grade Steel | 1.4571 |
| | 1.4541 |
| | 1.4404 |
| Heat-Resistant Steels | 1.4762 |
| | 1.4841 |
| | 1.4893 |
| | 1.4749 |
| Pure Iron | |

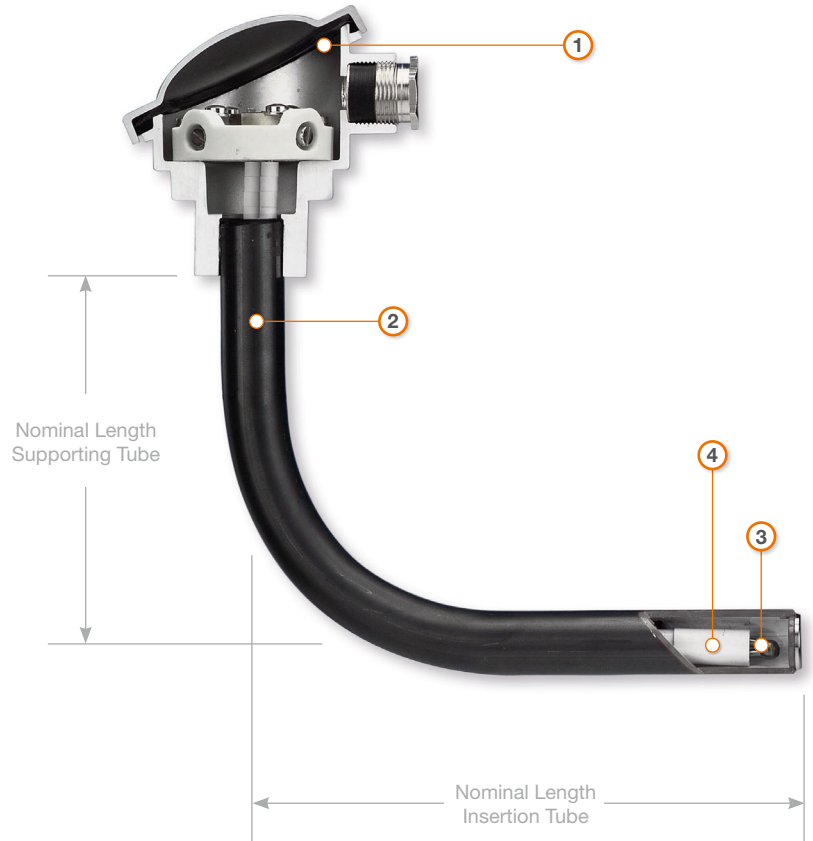
③ Ceramic Insulated Thermocouple

| |
|------------------|
| NiCr-Ni/K |
| Fe-CuNi/L |
| Fe-CuNi/J |
| Nicrosil-Nisil/N |
| Single or Double |

④ Mineral insulated Gauge Slide

| | |
|------------------|--------------|
| NiCr-Ni | |
| Fe-CuNi | |
| Fe-CuNi | |
| Nicrosil-Nisil | |
| Mantle Diameter: | 3,0 - 8,0 mm |
| Single or Double | |

Example of a common implementation in this product line



Individual Solutions such as, for example materials, process connectors, accessories, etc. not listed here, are often viable.

Please contact us for further information!

35 - WGG // Angle thermocouples curved out of one segment
Angle thermocouples with welded together dip and carrier tube

Article number

3 5 - [] [] [] [] [] [] [] [] [] [] [] [] x [] [] [] [] [] [] [] []

Protection tube curved at a right angle, with a connection head

| | | |
|--|-----|-----|
| Protection tube 15 x 2 mm / mat. no.1.4571 / with connection head Type B | 811 | 100 |
| Protection tube 15 x 2 mm / mat. no.1.0305 / with connection head Type B | 811 | 200 |
| Protection tube 22 x 2 mm / mat. no.1.4571 / with connection head Type A | 812 | 100 |
| Protection tube 22 x 2 mm / mat. no.1.0305 / with connection head Type A | 812 | 200 |
| Protection tube 22 x 5 mm / pure iron / with connection head Type A | 813 | 300 |

Protection tube welded at a right angle, with a connection head

| | | |
|--|-----|-----|
| Protection tube 15 x 2 mm / mat. no.1.4571 / with connection head Type B | 821 | 100 |
| Protection tube 15 x 2 mm / mat. no.1.0305 / with connection head Type B | 821 | 200 |
| Protection tube 22 x 2 mm / mat. no.1.4571 / with connection head Type A | 822 | 100 |
| Protection tube 22 x 2 mm / mat. no.1.0305 / with connection head Type A | 822 | 200 |
| Protection tube 22 x 5 mm / pure iron / with connection head Type A | 823 | 300 |

The last two digits are replaced with "xx" for models without a connection head

Welded thermowell

| Dimensions in [mm] | Material | | | | |
|--------------------|----------|---------|---------|---------|---------|
| | 1.0305 | 1.4571 | 1.4762 | 1.4841 | 2.4816 |
| 12 x 1 | 11 xxxx | 12 xxxx | 13 xxxx | 14 xxxx | 15 xxxx |
| 12 x 1.5 | 21 xxxx | 22 xxxx | 23 xxxx | 24 xxxx | 25 xxxx |
| 15 x 2 | 31 xxxx | 32 xxxx | 33 xxxx | 34 xxxx | 35 xxxx |
| 15 x 3 | 41 xxxx | 42 xxxx | 43 xxxx | 44 xxxx | 45 xxxx |
| 16 x 2 | 51 xxxx | 52 xxxx | 53 xxxx | 54 xxxx | 55 xxxx |
| 22 x 2 | 61 xxxx | 62 xxxx | 63 xxxx | 64 xxxx | 65 xxxx |

(xxxx = length of the compensation cable in mm)

Thermocouple (type / number)

Ceramic insulation

| | Standard | Double |
|------------------|----------|--------|
| NiCr-Ni/K | 11 | 21 |
| Fe-CuNi/J | 12 | 22 |
| Fe-CuNi/L | 13 | 23 |
| Nicrosil-Nisil/N | 14 | 24 |

Sheath measurement insert

| ø / mm | NiCr-Ni | | Fe-CuNi | | Fe-CuNi | | Nicrosil-Nisil | |
|--------|----------|--------|----------|--------|----------|--------|----------------|--------|
| | Type KI | | Type LV | | Type JV | | Type NI | |
| | Standard | Double | Standard | Double | Standard | Double | Standard | Double |
| 3.0 | 31 | 41 | 51 | 61 | 71 | 81 | 91 | 94 |
| 4.5 | 32 | 42 | 52 | 62 | 72 | 82 | 92 | 95 |
| 6.0 | 33 | 43 | 53 | 63 | 73 | 83 | 93 | 96 |
| 8.0 | 34 | 44 | - | - | - | - | - | - |

Carrier tube nominal length (mm)

Dip tube nominal length (mm)



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Consecutive no.

Carrier tube nominal length (mm)

Dip tube nominal length (mm)