



# GÜNTHER<sup>GmbH</sup>

## Temperaturmesstechnik



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**Product category 30-WTE**  
**Angled Thermocouple Assemblies**  
**with Threaded Elbow Tubing**



### 30-WTE

#### Angular Thermocouple Assemblies with Threaded Elbow Tubing

Angular thermocouple assemblies with threaded elbow tubing (30-WTE) 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/smelt in order to avoid direct exposure to high temperatures and aggressive vapours.

Angular thermocouple assemblies with threaded elbow tubing offer the advantages of an exchangeable immersion tube and the possibility of using more economic material for the supporting tube due to reduced ambient stress factors.

GÜNTHER GmbH has all prevalent angular thermocouples used in smelting and foundry technology. Standard assemblies with immersion tubes made of steel, pure iron, heat-resistant steels and special alloys are applied, as well as silicon nitride, graphite, SiC or special metal ceramics.

Optionally, these thermocouple assemblies may be fitted with an internal ceramic tube, which significantly increases the long-term stability and electrical insulation in many application scenarios.

As an alternative to the installed thermocouple, numerous angular thermocouple assemblies may be fitted with a mineral-insulated gauge slide, which yields several crucial advantages, such as optimal protection of the inner conductors from corrosion, oxidation, physical damage, and chemical contamination due to the enclosed structure of the outer insulation.

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.

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





**1 Connection Head**

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

**2 Supporting Tube (Materials)**

|         |
|---------|
| ST 35.8 |
| 1.4571  |

**3 Insertion Tube**

|   |             |
|---|-------------|
| Pure Iron (Techn. Pure) with Prot. Sleeve |             |
| Steel SL 25                               | Tapered Tip |
| Cast Iron GG-22                           |             |
| Graphite                                  |             |
| Titanium                                  |             |
| Enamelled Steel                           |             |

**Materials:**

|                       |        |
|-----------------------|--------|
| High-Grade Steel      | 1.4541 |
| X10CrAl24             | 1.4762 |
| X15CrNiSi 25 20       | 1.4841 |
| Inconel               | 2.4816 |
| SiN (Silicon Nitride) |        |
| SiC (Silicon Carbide) |        |
| Metal-Ceramic         |        |
| Quartz Glass          |        |

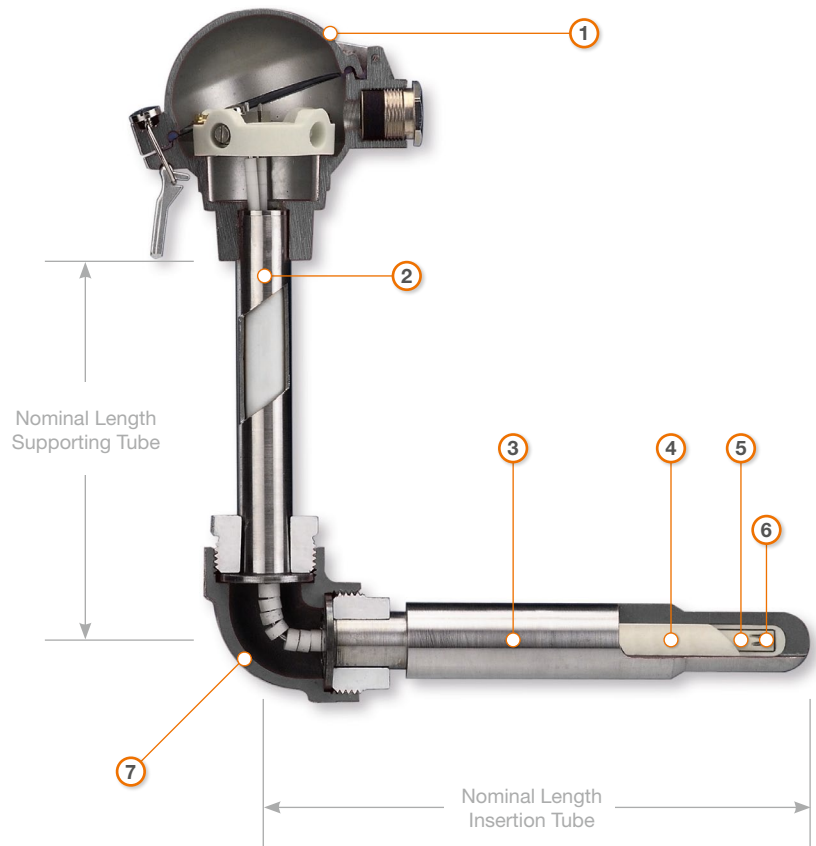
**4 Inner Tube**

|      |
|------|
| C610 |
| C799 |

**5 Mineral-Insulated Gauge Slide**

|                  |              |
|------------------|--------------|
| NiCr-Ni          | Typ KI       |
| Fe-CuNi          | Typ LV       |
| Fe-CuNi          | Typ JV       |
| Nicrosil-Nisil   | Typ NI       |
| Mantle Diameter: | 3,0 - 8,0 mm |
| Single or Double |              |

**Example of a common implementation in this product line**



**6 Ceramic Insulated Thermocouple**

|                  |
|------------------|
| NiCr-Ni/K        |
| Fe-CuNi/L        |
| Fe-CuNi/J        |
| Nicrosil-Nisil/N |
| PtRh10-Pt/S      |
| PtRh13-Pt/R      |
| PtRh30-PtRh6/B   |
| Single or Double |

**7 Angular Section**

|            |        |
|------------|--------|
| Elbow Pipe | 3/4"   |
|            | 3/8"   |
|            | 1 1/4" |
|            | 1/2"   |

# 30-WTE

## Product Number Code

### 30 - WTE // Angle thermocouples with a bolted central angle

Metal protection tube + thermocouple **3 0** -           -      x

|                                |         |          |    |          |
|--------------------------------|---------|----------|----|----------|
| <b>Carrier tube</b>            | St 35.8 | 15 x 2   | mm | <b>1</b> |
| <b>(material / dimensions)</b> | St 35.8 | 17 x 2.5 | mm | <b>2</b> |
|                                | 1.4571  | 15 x 2   | mm | <b>3</b> |
|                                | 1.4571  | 17 x 3   | mm | <b>4</b> |
|                                | St 35.8 | 22 x 2   | mm | <b>5</b> |
|                                | 1.4571  | 22 x 2   | mm | <b>6</b> |

|             |      |          |      |          |
|-------------|------|----------|------|----------|
| <b>Head</b> | A    | <b>1</b> | B    | <b>6</b> |
|             | AUS  | <b>2</b> | BUS  | <b>7</b> |
|             | AUZ  | <b>3</b> | BUZ  | <b>8</b> |
|             | AUZH | <b>4</b> | BUZH | <b>9</b> |
|             | AUSH | <b>5</b> | BBK  | <b>0</b> |

| Thermocouple with ceramic insulation |          | Sheath measurement insert |        |           |           |           |           |           |           |                |           |
|--------------------------------------|----------|---------------------------|--------|-----------|-----------|-----------|-----------|-----------|-----------|----------------|-----------|
|                                      | Standard | Double                    | ø / mm | NiCr-Ni   |           | Fe-CuNi   |           | Fe-CuNi   |           | Nicrosil-Nisil |           |
|                                      |          |                           |        | Type KI   | Type LV   | Type JV   | Type NI   |           |           |                |           |
| NiCr-Ni/K                            | 11       | 21                        |        |           |           |           |           |           |           |                |           |
| Fe-CuNi/J                            | 12       | 22                        |        |           |           |           |           |           |           |                |           |
| Fe-CuNi/L                            | 13       | 23                        |        |           |           |           |           |           |           |                |           |
| Nicrosil-Nisil/N                     | 14       | 24                        | 3.0    | <b>31</b> | <b>41</b> | <b>51</b> | <b>61</b> | <b>71</b> | <b>81</b> | <b>91</b>      | <b>94</b> |
| PtRh10-Pt/S                          | 15       | 25                        | 4.5    | <b>32</b> | <b>42</b> | <b>52</b> | <b>62</b> | <b>72</b> | <b>82</b> | <b>92</b>      | <b>95</b> |
| PtRh13-Pt/R                          | 16       | 26                        | 6.0    | <b>33</b> | <b>43</b> | <b>53</b> | <b>63</b> | <b>73</b> | <b>83</b> | <b>93</b>      | <b>96</b> |
| PtRh30-PtRh6/B                       | 17       | 27                        | 8.0    | <b>34</b> | <b>44</b> | -         | -         | -         | -         | -              | -         |

|   |            |
|---|------------|
| <b>Dip tube (material / dimensions)</b>                           |            |
| None, thermocouples freely protruding                             | <b>0 0</b> |
| Pure iron (techn. pure), ø = 22 x 5 mm, seamless                  | <b>1 1</b> |
| Pure iron (techn. pure), ø = 22 x 5 mm, with a protection sleeve  | <b>1 2</b> |
| Steel SL 25 ø = 30 x 9 mm; point tapered (ø = 24) to 50 mm length | <b>1 3</b> |
| Grey cast iron GG-22, ø = 30 x 6 mm                               | <b>1 4</b> |
| Graphite ø = 40 x 11 mm   | <b>1 5</b> |
| Graphite ø = 50 x 25 mm   | <b>1 6</b> |
| Titanium ø = 18 x 1.5 mm pressed and welded                       | <b>1 7</b> |
| Titanium ø = 18 x 1.0 mm, with a welded round base                | <b>1 8</b> |
| Glassed steel ø = 22 x 2 mm                                       | <b>1 9</b> |

| Material        | Number | Dimensions in mm |            |            |            |            |
|-----------------|--------|------------------|------------|------------|------------|------------|
|                 |        | 15 x 2           | 17 x 2     | 22 x 2     | 22 x 2.5   | 22 x 4     |
| Stainless steel | 1.4541 | -                | <b>3 1</b> | <b>4 1</b> | -          | -          |
| Stainless steel | 1.4571 | <b>2 2</b>       | <b>3 2</b> | <b>4 2</b> | <b>5 2</b> | <b>6 2</b> |
| X10CrAl 24      | 1.4762 | <b>2 3</b>       | <b>3 3</b> | <b>4 3</b> | -          | -          |
| X15CrNiSi 25 20 | 1.4841 | <b>2 4</b>       | <b>3 4</b> | <b>4 4</b> | -          | -          |
| Alloy 600       | 2.4816 | <b>2 5</b>       | <b>3 5</b> | <b>4 5</b> | -          | -          |

|                   |                  |          |
|-------------------|------------------|----------|
| <b>Inner tube</b> |                  |          |
| None              | <b>0</b>         |          |
| C610              | gastight ceramic | <b>1</b> |
| C799              | Aluminium oxide  | <b>2</b> |

|               |        |          |
|---------------|--------|----------|
| <b>Elbow:</b> |        |          |
| Curved angle  | 3/4"   | <b>1</b> |
| Curved angle  | 3/8"   | <b>2</b> |
| Curved angle  | 1 1/4" | <b>3</b> |
| Curved angle  | 1/2"   | <b>4</b> |

Nominal length Carrier tube (mm)      Nominal length Dip tube (mm)



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Custom designs: **3 0** -             -      x

Consecutive no.      Nominal length Carrier tube (mm)      Nominal length Dip tube (mm)