# Thermo-Sensor

FT S 70-E-8.20

RÜEGER
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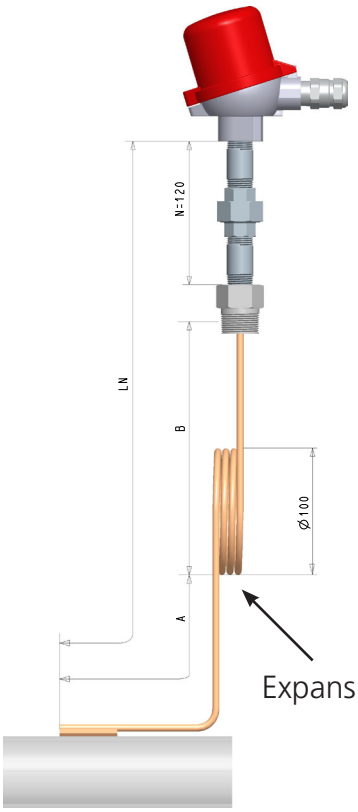
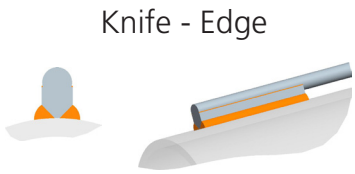
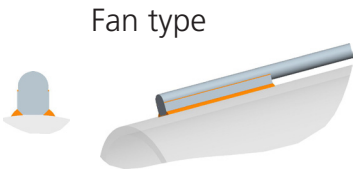
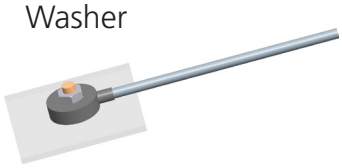
## Skin Thermocouples

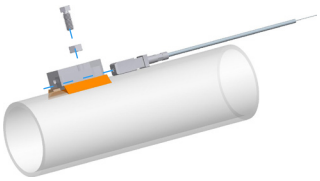
Type **S 70**

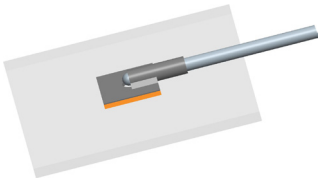



### Applications

- Surface temperature measurement on steam pipes, inside or outside vessels and reactors.
- Temperature measurement on walls or flat surfaces.
- Special executions for dangerous environments certified.

### User Industries

Oil & Gas
Chemical
Powergen
etc...

### Description

These RÜEGER "Thermo-Sensor" probes are provided with a single thermocouple sensor, placed inside a flexible metal sheath. With connection head, with or without lag extension, process connection on request. Sealing if necessary, by a compression fitting on the sheathed cable.
The spirals of the sheathed cable serve to compensate the dimensional changes due to thermal expansion between the measuring point and the process connection. They also protect against a cable failure due to vibration.

For explosive environments, executions meeting the requirements of EN / IEC 60079-0 "Electrical apparatus for potentially explosive atmospheres (general requirements)",
EN / IEC 60079-1 (flameproof enclosure "d"),
EN 60079-7 (increased safety "e")
EN / IEC 60079-11 (intrinsic safety "i") are available.

## Technical data

**1. Operating conditions**:
**Permissible temperatures (°C) at measuring point**
-200... + 1100

**Ambient temperature at connection head**
-40+85°C, -50 on request.
**Maximum operating pressure in the lag extension**

| | |
|---|---|
| without sealing compression fitting | 20 mbar |
| with sealing compression fitting | 50 bar at ambient temperature |

**2. Precision classes**:

| | |
|---|---|
| **TC** | according to IEC 60584-2 |
| class 1 | |
| J | -40 ... + 750 [°C] +/- 1.5°C or +/- (0.004 Itl) (1) |
| K | -40 ... +1000 [°C] +/- 1.5°C or +/- (0.004 Itl) (1) |
| class 2 | |
| J | -40 ... + 750 [°C] +/- 2.5°C or +/- (0.0075 Itl) (1) |
| K | -40 ... +1200 [°C] +/- 2.5°C or +/- (0.0075Itl) (1) |
| class 3 | |
| J | n/a |
| K | -200 ... + 40 [°C] +/- 2.5°C or +/- (0.015 Itl) (1) |

*Itl = absolute value of measuring range*
*Between -130°C and -40°C, tolerances could be higher than class 3.*
*ISA MC 96.1 on request.*
*(1) Highest of the two values applicable.*

**3. Connection head**:
IP54 to IP66

**4. Inset sheath**:
The thermocouple sensor within the probe is embedded in a compacted MgO powder of purity over 99% and protected by a metal sheath.
This sheath is poreless, and can be bent to a limited radius (see below).

**Minimum bending radius (r) of the inset sheath**

r = 5 x d (bending once only).

With curved knife edge or fan type execution, the radius depends on the diameter of the pipe to which the end of the sheath is attached.

| **Sheath dia.** | **Minimum dia. pipe** |
|---|---|
| 6 or 8 mm | 2" |
| 3/8"(9.53 mm) | 3" |
| 1/2"(12.70 mm) | 5" |

Sheath material AISI 316L, Inconel 600, AISI 446, Hastelloy X, others on request.

**5. Installation**:
It is namely important that the material of the knife edge, fan type, weld pad and thermal block are compatible with the material to which it is welded.

**Different fixing types are available**:
- Knife - Edge
- Washer
- Interchangeable
- Fan type
- Weld Pad
- Expansion loop or S design
- Interchangeable with heat shield

**6. Contact between sensor tip & metallic surface temperature**:
The area may corrode and act as an insulator. Then, the sensor will not more measures correctly the metallic surface temperature. The solution is that the contact area as to be as small as possible. The place should be cleaned and ground smooth. Weld should be clear.

**7. Temperature measuring may be influenced by flames or heat radiation**:
In this case, the place of sensor tip should be optimized avoiding direct flames and the contact area as small as possible. The sensor tip should be protected or insulated with a heat shield.

**8. Design**:
Due to the variety of vessels, reactors, boilers or furnaces, sensors need to be individually designed to suit each application. For transmitters options please refer to corresponding technical data sheets.

RÜEGER S.A. shall not be responsible for the consequences of any application not conforming to the regulations or recommendations concerning explosive environments.



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