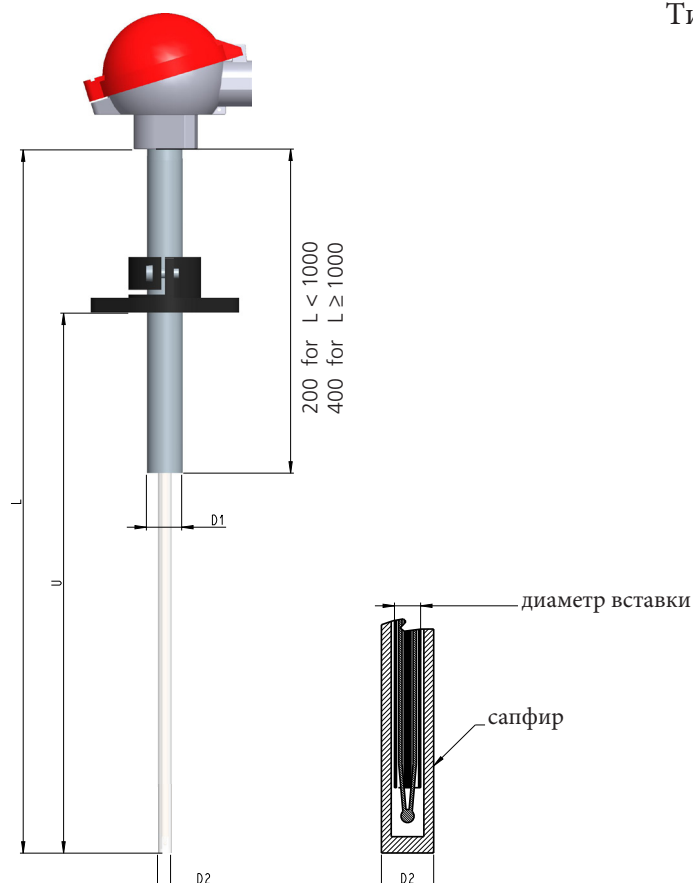


Термопары тип R, S, В или С для температур до 2000°C, с сенсором из благородных или тугоплавких металлов в керамических или сапфировых вставках, и в цельнокристалльных сапфировых термогильзах.

Тип **S 41-04**



## Применение

- Промышленные печи (термическая обработка, сжигание).
- Энергетика, реакторы.
- Дымоходы, дымовые газы.
- Процессы отжига и термической обработки
- Ванны для плавки металла и стекла.
- Исполнение для работы во взрывоопасных средах



## Описание

Эти термосенсоры RÜEGER специально разработаны для применения в условиях высокой температуры до 2000°C и высокого давления до 200 bar. Термогильзы изготовлены из цельнокристалльного сапфира. Вставка изготовлена из керамики или сапфира и содержит одну или несколько термопар из благородных или тугоплавких металлов.

Возможно размещение нескольких точек измерения по длине термогильзы для получения многоточечного датчика температуры. В состав каждого датчика входит подсоединение к процессу (регулируемый или сварной фланец), а также соединительная головка. Так как сапфировая термогильза абсолютно газонепроницаема, то извлечение вставки возможно без прерывания технологического процесса.

Доступно два типа вставок:

IC = KER 710 »

IS = сапфировая вставка для одной или нескольких термопар, с возможностью распределения точек измерения по длине термогильзы.

Специальное исполнение для взрывоопасных сред в соответствии с сертификатами EN / IEC 60079-0: «электрические аппараты для потенциально (general requirements)», EN / IEC 60079-11: «intrinsic safety (i)».

## Technical Data

### 1. Limiting Temperatures (°C) for Thermocouples according to wire diameters:

The permissible temperatures given below are for exposure to gases.

Type of Sensor Temperature (°C)	S	R	B	C
for 0.35 mm dia. wire	1300	1300	1500	2000(*)
for 0.5 mm dia. wire	1600	1600	1800	2000(*)

\* Limited by maximum permitted temperature for the thermowell. The thermocouple may only be exposed to inert gases or hydrogen.

### 2. Precision Classes:

TC according to IEC 60584-2

class 1

S:  $0 \dots + 1600 [^{\circ}\text{C}] \pm 1^{\circ}\text{C}$  or  $\pm [1 + 0.003 \times (t - 1100)]^{\circ}\text{C}$  (1)

R:  $0 \dots + 1600 [^{\circ}\text{C}] \pm 1^{\circ}\text{C}$  or  $\pm [1 + 0.003 \times (t - 1100)]^{\circ}\text{C}$  (1)

B: n/a

C: n/a

class 2

S:  $-40 \dots + 1600 [^{\circ}\text{C}] \pm 1,5^{\circ}\text{C}$  or  $\pm 0.0025 \cdot |t|^{\circ}\text{C}$  (1)

R:  $-40 \dots + 1600 [^{\circ}\text{C}] \pm 1,5^{\circ}\text{C}$  or  $\pm 0.0025 \cdot |t|^{\circ}\text{C}$  (1)

B:  $+600 \dots + 1700 [^{\circ}\text{C}] \pm 1,5^{\circ}\text{C}$  or  $\pm 0.0025 \cdot |t|^{\circ}\text{C}$  (1)

C:  $0 \dots + 2000 [^{\circ}\text{C}] \pm 4,5^{\circ}\text{C}$  or  $\pm 0.01 \cdot |t|^{\circ}\text{C}$  (1)

class 3

S: n/a

R: n/a

B:  $+600 \dots + 1700 [^{\circ}\text{C}] \pm 4^{\circ}\text{C}$  or  $0.005 \cdot |t|^{\circ}\text{C}$  (1)

C: n/a

*l* = absolute value of measuring range

ISA MC 96.1 on request.

(1) Highest of the two values applicable.

### 3. Identification of Measurements Circuits:

#### Colors for thermocouples IEC 584:

The type of the thermocouple is identified by color code.

Type	conductor "+"	conductor "-"
S	orange	white
R	orange	white
B	grey	white
C	on request	

According to ISA MC 96.1 on request.

### 4. The maximum permissible temperature for sapphire thermowells is 2000°C.

Please also refer to DIN EN 50446.

#### Sapphire Thermowells:

Single-crystal sapphire is absolutely gas-tight and stands temperatures of up to 2000°C, in combination with pressures of up to 200 bars. Its extremely high surface hardness (HV 2500, Mohs 9) yields an excellent resistance to abrasion.

It is chemically inert to most substances, with the exception of hydrofluoric and phosphoric acid, potassium hydroxide and molten salts.

### 5. Connection Head:

Form A or equivalent, according to DIN EN 50446.

For ambient temperatures:  $-40 \dots +85^{\circ}\text{C}$ ;  $-50^{\circ}\text{C}$  on request.

Degree of protection: IP 54.

Thermowell and process connection tube fixed by two screws.

Cable gland with PG 16 thread or M20 x 1.5, to be chosen according to the cable entry.

Terminal block: ceramic, with 2 or 4 screw terminals.

### 6. Mounting Instruction:

In cases where the process involves large amounts of residual deposits, it is advisable to mount the sensor vertically.

The connection head should be located as far as possible from the hot medium.

### 7. Process Connection Tube:

The metallic process connection tube can be fitted with either an adjustable flange or a compression fitting, and provides extra protection for the thermowell.

The flange according to DIN EN 50446 cannot fulfill any sealing requirements. In the case that sealing is required, a compression fitting must be used, and the interface between the process connection tube and the thermowell must be sealed with an appropriate material.

### 8. Nominal Length "L":

500 mm

710 mm

1000 mm

1400 mm

Other lengths on request.

Maximum length: 1800 mm.

### 9. Transmitters:

Because this type of probe is used for high temperatures, it is preferable to install transmitters outside the connection head.

For the AUZH head however, which has a raised cover, a transmitter may be placed inside, provided that the temperature attained in the connection head does not exceed the 85°C mentioned under point 5. The advantage of the transmitter being mounted in the head is an improved reliability of the signals, as no extension/compensation cable is required.

The cold junction compensation is included in all universal transmitters.

### 10. Important:

Sapphire thermowells are sensitive to strong mechanical shocks as well as to thermal quenching. Handle with care.

Modifications reserved.  
All technical data serves as a guideline  
and is not contractual.

**RÜEGER**



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