

THERMOCOUPLES **TYPE E** / EXTENSION LEADS **TYPE EX**

| TYPE E/EX                                      | ISATHERM® PLUS EP / EPX                                          | ISOTAN® EN / ENX                                                    |
|------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Chemical composition*</b>                   | Ni balance / Si 0.5 / Fe 0.4 / Cr 10 %                           | Cu balance / Ni 44 / Mn 1 %                                         |
| <b>Melting point / Density*</b>                | 1,430 °C / 8.70 g/cm <sup>3</sup>                                | 1,280 °C / 8.90 g/cm <sup>3</sup>                                   |
| <b>Magnetic at room temperature</b>            | no                                                               | no                                                                  |
| <b>Electrical resistivity at 20 °C*</b>        | 72 µOhm x cm                                                     | 49 µOhm x cm                                                        |
| <b>Tensile strength / elongation at 20 °C*</b> | hard condition: >970 MPa / 2 %<br>soft condition: 610 MPa / 28 % | hard condition: > 740 MPa / < 2 %<br>soft condition: 420 MPa / 30 % |
| <b>Hardness at 20 °C*</b>                      | hard condition: >310 HV10<br>soft condition: 130 HV10            | hard condition: > 230 HV10<br>soft condition: 95 HV10               |

## THERMOELECTRIC STANDARD TOLERANCES

|                               |                                                                                                                                   |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>TYPE E acc. ASTM E230</b>  | temperature range: 0 to 870 °C<br>tolerance: Standard ±1.7 °C or 0.5 % (t90) / Special ±1.0 °C or 0.4 % (t90)                     |
| <b>TYPE EX acc. ASTM E230</b> | temperature range: 0 to 200 °C<br>tolerance: Standard ±1.7 °C / Special ±1.0 °C                                                   |
| <b>TYPE E acc. IEC 60584</b>  | temperature range: -40 °C to +800 °C<br>tolerance: <b>Class 1</b> ±1.5 °C or 0.4 % (t90) / <b>Class 2</b> ±2.5 °C or 0.75 % (t90) |
| <b>TYPE EX acc. IEC 60584</b> | temperature range: -25 to +200 °C<br>tolerance: <b>Class 1</b> ±120 µV (±1.5 °C) / <b>Class 2</b> ±200 µV (±2.5 °C)               |
| <b>Special tolerances</b>     | possible, depend on customer application, e.g. ½ Special-tolerance acc. ASTM E230                                                 |

## DELIVERY SPECIFICATIONS

|                         |                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Form of delivery</b> | wires: 0.03 to 10.0 mm on spools and coils<br>coated wires: 0.03 to 1.5 mm<br>stranded wires: 0.1 to 0.8 mm (up to 32 strands) on spools<br>flat wires: 0.1 to 1.0 mm thickness and max. 10.0 mm width on spools<br>ribbons: 0.1 to 1.5 mm thickness and max. 110.0 mm width on coils<br>rods: 6.0 / 7.0 / 8.0 / 9.0 / 10.0 mm with max. 2,200 mm length |
| <b>Measuring range</b>  | standard: 0 to 700 °C for E and 100/200 °C for EX<br>upon request: -40 °C for E and -25 °C for EX                                                                                                                                                                                                                                                        |

\* Reference values. The mechanical values considerably depend on dimension. The indicated values refer to a dimension of 1.0 mm diameter.