

## Material for Value-Tec stainless steel probes

The material used for manufacturing the Value-Tec stainless steel probe handles and probe needles is a martensitic hardened stainless steel AISI 410

### It is used for the following products:

- [#52-001070 Value-Tec VP1 probe with straight tip](#)
- [#52-001071 Value-Tec VP2 probe with bend tip](#)
- [#52-001072 Value-Tec VP3 probe with slight curved tip](#)
- [#52-001073 Value-Tec VP4 probe with bend hook tip](#)
- [#52-001074 Value-Tec VP5 probe with curved hook tip](#)
- [#52-001075 Value-Tec VP6 probe with sharp curved hook tip](#)

### General remarks:

- AISI 410 is a martensitic steel (DIN 1.4006, X12Cr13) which can be hardened by heat treatment
- Contains 11.5 – 13.5 wt% Chromium
- Magnetic, hardened stainless steel
- Can be hardened by heat treatment
- Properties can be varied by different heat treatments
- Good corrosion resistance to most solvents, moderate corrosion resistance to salts and weak acids
- Generally used where moderate corrosion resistance combined with high mechanical strength is required
- Typical applications include probes, spatulas, knives, tools and springs

### General composition of AISI 410

| Element | Wt. %       |
|---------|-------------|
| C       | ≤0.15       |
| Cr      | 11.5 – 13.5 |
| Mn      | ≤1.0        |
| Si      | 0.0         |
| P       | ≤0.04       |
| S       | ≤0.03       |
| Fe      | Balance     |

## Properties of AISI 410

| <b>Mechanical Properties</b>         |                                       |
|--------------------------------------|---------------------------------------|
| State                                | Hardened, stress relieved             |
| Density                              | 7.74.0 g/cm <sup>3</sup>              |
| Hardness Rockwell B                  | 80                                    |
| Hardness Vickers                     | 291                                   |
| Tensile strength, ultimate           | 485 MPa                               |
| Tensile strength, yield              | 310 MPa                               |
| Yield stress, 0.2%                   | 275 Mpa                               |
| Elongation until break               | 25%                                   |
| Modulus of Elasticity                | 200 GPa                               |
| Poisson's ratio                      | 0.29                                  |
| <b>Thermal Properties</b>            |                                       |
| Coefficient of thermal expansion     | 9.9 x 10 <sup>-6</sup> /°C (20-100°C) |
| Coefficient of linear expansion      | 11 x 10 <sup>-6</sup> /°C (20-300°C)  |
| Specific heat capacity               | 0.46 J/(g.K)                          |
| Thermal conductivity                 | 24.9W/(m.K)                           |
| Continuous use (service) temperature | 705°C                                 |
| Maximum service temperature (short)  | 815°C                                 |
| <b>Electrical Properties</b>         |                                       |
| Resistivity                          | 0.57 x 10 <sup>-4</sup> Ohm.cm        |

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