



## R823.11

EN:  
Type: 314



R823.11 is a heat resistant austenitic Cr-Ni-steel with good high temp. strength at elevated temp. and the highest heat resistance properties of any Cr-Ni-steel. The high Si-content increases the resistance towards oxidation and carburization but on the other hand, increases the risk of sigma phase embrittlement if exposed for long periods in temp. range 590-870°C (1020-1740°F). This steel is used when max. resistance to carburization is desired. R823.11 is subjected to carbide precipitation and embrittlement in temp. range of 430-820°C (800-1500°F) and is slightly sensitive for SO<sub>2</sub> and particularly gases containing H<sub>2</sub>S at temp. above 650°C (1200°F). Typical applications are wire for furnace parts, annealing boxes and chemical processing equipment.

### CHEMICAL COMPOSITION (Nominal) %

| C      | Si   | Mn   | Cr   | Ni   | Mo    | N      |  |  |
|--------|------|------|------|------|-------|--------|--|--|
| <0.030 | 2.70 | 1.75 | 23.5 | 19.4 | <0.60 | <0.060 |  |  |

PRE: 26 (PRE = Cr + 3.1 x Mo + 25 x N)

Comments:

### PHYSICAL PROPERTIES

Condition: Annealed

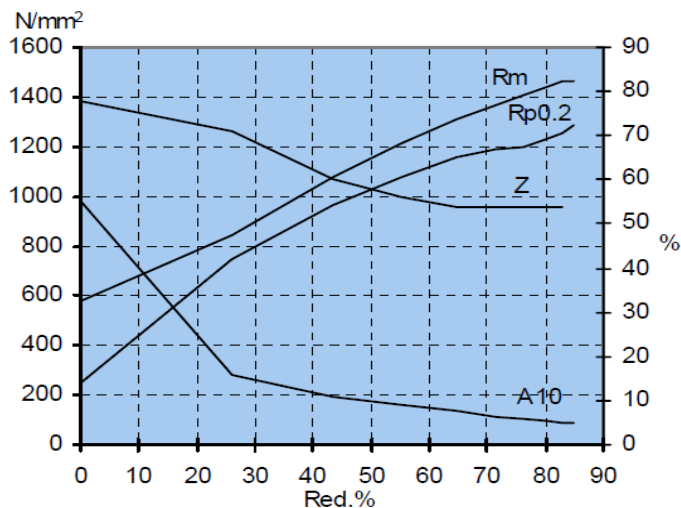
|                         |                         |
|-------------------------|-------------------------|
| Density                 | 7.9 g / cm <sup>3</sup> |
| Moduls of elasticity, E | 200 000 GPa             |
| Specific heat 0-100°C   | 500 J / kg°C            |

### TYPICAL MECHANICAL PROPERTIES

Condition: Annealed

|                  |       |                              |
|------------------|-------|------------------------------|
| Proof strength   | Rp0.2 | min. 200 N / mm <sup>2</sup> |
| Tensile strength | Rm    | 550-650 N / mm <sup>2</sup>  |
| Elongation       | A10   | min. 45 %                    |

### DEFORMATION GRAPH



### THERMAL TREATMENT

|                       | °C        | °F        |
|-----------------------|-----------|-----------|
| Annealing temperature | 1050-1100 | 1920-2010 |

### MAX. OPERATING TEMPERATURE

|                                   | °C        | °F        |
|-----------------------------------|-----------|-----------|
| Scaling temp. in air              | 1150      | 2100      |
| Oxidizing atm. intermitt. / cont. | 1020-1100 | 1868-2012 |
| Oxidizing sulphurous atm.         | 1120      | 2050      |
| Carburizing/carbonitriding atm.   | 1120      | 2050      |
| Diss. ammonia and hydrogen at.    | 1120      | 2050      |

### THERMAL CONDUCTIVITY

|        |             |
|--------|-------------|
| 20 °C  | 14.0 W / mK |
| 100 °C | 17.5 W / mK |
| 500 °C | 21.0 W / mK |
|        |             |
|        |             |
|        |             |

### THERMAL EXPANSION

Thermal expansion per °C x 10<sup>-6</sup> from 20°C to:

|         |      |
|---------|------|
| 200 °C  | 15.5 |
| 400 °C  | 17.0 |
| 600 °C  | 17.5 |
| 800 °C  | 18.0 |
| 1000 °C | 19.0 |
|         |      |

### RESISTIVITY

|       |          |
|-------|----------|
| 20 °C | 770 μΩmm |
|       |          |
|       |          |
|       |          |
|       |          |