

SX 310S Technical Data

SX 310S is the low carbon version of SX 310 and is suggested for applications where sensitization, and subsequent corrosion by high temperature gases or condensates during shutdown may pose a problem.

SX 310 is manufactured in accordance with ASTM A 167 and SX 310S to ASTM A 240.

Typical Applications

SX 310/310S find wide application in all high-temperature environments where scaling and corrosion resistance, as well as high temperature strength and good creep resistance, are required.

Chemical Composition

| SX | C | Mn | P | S | Si | Cr | Ni |
|------|----------|---------|-----------|-----------|---------|-------------|-------------|
| 310 | 0.25 max | 2.0 max | 0.045 max | 0.030 max | 1.5 max | 24.0 - 26.0 | 19.0 - 22.0 |
| 310S | 0.08 max | 2.0 max | 0.045 max | 0.030 max | 1.5 max | 24.0 - 26.0 | 19.0 - 22.0 |

Typical Properties in the Annealed Condition

The properties quoted in this publication are typical of mill production and unless indicated should not be regarded as guaranteed minimum values for specification purposes.

1. Mechanical Properties at Room Temperature

| | SX 310 | | SX 310S | |
|----------------------------------|---------|---------|---------|---------|
| | Typical | Minimum | Typical | Minimum |
| Tensile Strength, MPa | 625 | 515 | 575 | 515 |
| Yield Stress (0.2 % offset), MPa | 350 | 205 | 290 | 205 |
| Elongation (Percent in 50mm) | 50 | 40 | 50 | 40 |
| Hardness (Brinell) | 172 | - | 156 | - |
| Endurance (fatigue) limit, MPa | 260 | - | 260 | - |

2. Properties at Elevated Temperatures

The values quoted are those for SX 310.

Enquire for data on 310S .

Short Time Elevated Temperature Tensile Strength

| | | | | | | |
|-----------------------|-----|-----|-----|-----|----|----|
| Tensile Strength, MPa | 550 | 430 | 280 | 180 | 90 | 50 |
|-----------------------|-----|-----|-----|-----|----|----|

Creep data

Stress to develop a creep rate of 1% in the indicated time at the indicated temperature.

| | | | | | | | |
|-----------|----------------|-----|-----|-----|-----|-----|-----|
| Time | Temperature °C | 550 | 600 | 650 | 700 | 750 | 800 |
| 10 000 h | Stress MPa | 110 | 90 | 70 | 40 | 30 | 15 |
| 100 000 h | Stress MPa | 90 | 75 | 50 | 30 | 20 | 10 |

Creep Rupture Stress

| | | | | | | |
|-----------|----------------|-----|-----|-----|-----|------|
| Time | Temperature °C | 600 | 700 | 800 | 900 | 1000 |
| 1 000 h | Stress MPa | 190 | 110 | 50 | 35 | 15 |
| 10 000 h | Stress MPa | 170 | 70 | 35 | 20 | 10 |
| 100 000 h | Stress MPa | 110 | 55 | 25 | 10 | 2 |

Recommended Maximum Service Temperature

(Oxidizing Conditions without load)

Continuous 1150°C

Intermittent 1035°C

Thermal Processing

1. **Annealing.** Heat from 1050 to 1150°C and water quench.

This treatment ensures that all carbides are in solution.

2. **Hot working**

Initial forging and pressing: 1150 - 1200°C

Finishing temperature: above 950°C