Technical Datasheet

# Nitriding Steel 31CrMoV9+QT+SH

30.06.23 Rev. N°1

## General product description

For components in general mechanical engineering and automotive engineering that are nitrided due to high wear, such as gears, connecting rods or shafts. Nitriding steel 31CrMoV9 is used when components are exposed to high surface stress and dynamic loads. Depending on the nitriding temperature, surface hardness values of 650 - 800 HV 0.5 can be achieved through gas nitriding.

## Individual bar hardening - homogeneity makes the difference

Compared to conventionally hardened products, the microstructure, strength, toughness, straightness, and residua stress state are significantly improved after individual ba hardening. Additionally, this process works with lo decarburization and scale formation and drastically reduces hardness distortions. The dimension range for individual bar hardening is Ø 15-80 mm.

## International designation

| Steel number | EU/DE | ASTM | JIS | AFNOR | B.S. | SIS |
|---|---|---|---|---|---|---|
| 1.8519 | 31CrMoV9 | - | - | - | - | - |

## Chemical composition (cast analysis in percentage by mass)

| Element | C | Si | Mn | P | S[x] | Cr | Mo | V |
|---|---|---|---|---|---|---|---|---|
| min. | 0,27 | - | 0,40 | - | - | 2,30 | 0,15 | 0,10 |
| max. | 0,34 | 0,40 | 0,70 | 0,025 | 0,035 | 2,70 | 0,25 | 0,20 |

Deviation of the piece analysis from the melt analysis according to ISO EN 683-5 : 2017 Table 3.
Customer-specific analyses are possible upon request. For example, steel grade X can be supplied with a lower sulfur content.

## Mechanical-technological properties

| Characteristic d [mm] | $R_{p0,2}$ [N/mm²] | $R_m$ [N/mm²] | $A_5$ [%] | Z [%] | $KV_{RT}$ [J] |
|---|---|---|---|---|---|
| 16 < d ≤ 40 | 900 | 1100 – 1300 | 9 | 35 | 25 |
| 40 < d ≤ 80 | 800 | 1000 – 1200 | 10 | 40 | 30 |

According to ISO EN 683-5: 2017, customer-specific mechanical properties and other dimensions are possible upon request.

## Dynamic properties

| 31CrMoV9 +HH +QT +SH | Bending fatigue strength $\sigma_{bw}$ [MPa] | Tensile strength $R_m$ [MPa] |
|---|---|---|
| Formel: $\sigma_{bw} \sim 0{,}5\ R_m$ | ~ 500 | ~ 1100 |

Calculated

## Physical properties

| properties | approx. value |
|---|---|
| Density in kg/dm$^3$ | 7,73 |
| E-module in GPa | 210 |
| Electrical resistance at 20 °C in Ω mm$^2$/m | 0,19 |
| Thermal conductivity at 20 °C in W / (m K) | 43 |
| Specific heat capacity at 20 °C in J / (kg K) | 441 |

### Microstructure

The microscopic oxide purity grade according to DIN 50602 can be agreed. The grain size according to ASTM E 112 is > 5.

### Surface finish

The surface finish complies with the specifications of EN 10277. Ultrasonic full volume testing is possible. In the standard version, the rod ends up to 50 mm are untested.

### Condition of delivery

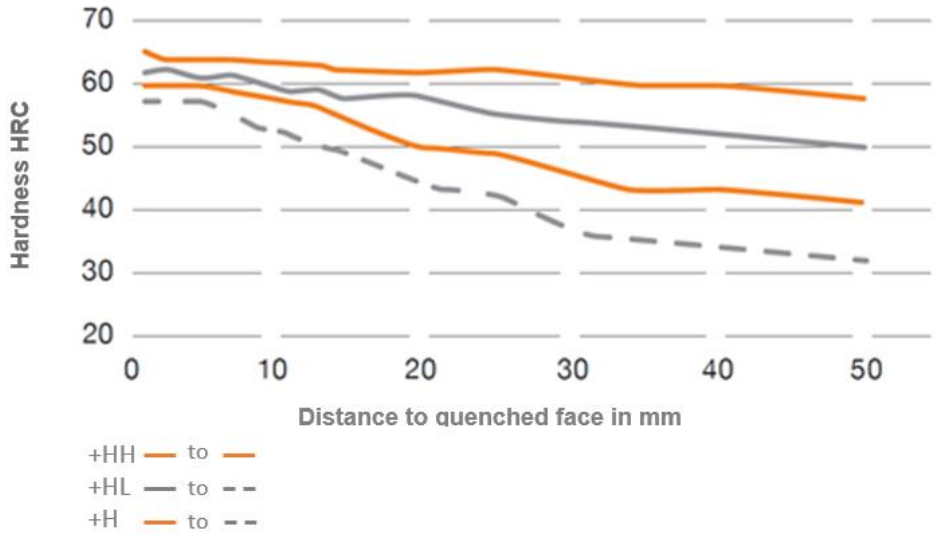
Bright steel, quenched and tempered, peeled.

### Miscellaneous

Other agreements according to order

**Hardenability**

**31 CrMoV9**




Without further specification we use the quality +HH.

For further info on our product range of tool steel, stainless steel and Engineering steel please visit www.swisssteelgroup.com

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**Swiss Steel Group**
Steeltec AG / Steeltec GmbH:
Emmenbrücke / Düsseldorf / Gebze
info.engineering@swisssteelgroup.com