MATERIAL DATA SHEET

# STEEL GRADE

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OVAKO

# 52CrMoV4 All

## General Information

52CrMoV4 is a springsteel suitable for quenching and tempering, used in e.g. leaf springs and other vehicle springs.

## Similar designations

SB9296 - 54CrMnMo4-4, 51CrMoV4

## Chemical composition

| Variant | Cast | Di | Weldability | | C % | Si % | Mn % | P % | S % | Cr % | Ni % | Mo % | V % | Ti % | Cu % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 596A | IC | | CEV $_{max}$ | Min | 0.48 | 0.15 | 0.70 | - | - | 0.90 | - | 0.15 | 0.100 | - | - |
| | | | Pcm $_{max}$ | Max | 0.56 | 0.40 | 1.10 | 0.025 | 0.008 | 1.20 | 0.30 | 0.30 | 0.200 | - | - |
| SB9296 | CC | 8.4 | CEV 1.01$_{max}$ | Min | 0.51 | 0.25 | 0.94 | - | - | 1.02 | - | 0.15 | 0.100 | - | - |
| | | | Pcm 0.7$_{max}$ | Max | 0.56 | 0.40 | 1.10 | 0.015 | 0.015 | 1.12 | 0.20 | 0.20 | 0.120 | 0.040 | 0.21 |
| 52CrMoV4 EN10089:2002 | Std | | CEV $_{max}$ | Min | 0.48 | - | 0.70 | 0.000 | 0.000 | 0.90 | - | 0.15 | 0.100 | - | - |
| | | | Pcm $_{max}$ | Max | 0.56 | 0.40 | 1.10 | 0.025 | 0.025 | 1.20 | - | 0.30 | 0.200 | - | - |

## Mechanical Properties

| Variant | Condition | Format | Dimension [mm] | Yield strength min [MPa] | Tensile strength [MPa] | Elongation $A_5$ [%] | Reduction of area $Z_{min}$ [%] | Hardness | Impact (ISO-V) $strength_{min}$ |
|---|---|---|---|---|---|---|---|---|---|
| SB9296 | +AR | All formats | - | - | - | - | - | < 440 HB | - |
| | | Flat bar | 9 < 30 | - | - | - | - | 381 HB typical | - |
| | | Flat bar | 30 < 56 | - | - | - | - | 345 HB typical | - |
| | | Round bar | 30 < 50 | - | - | - | - | 353 HB typical | - |
| | | Round bar | 50 < 95 | - | - | - | - | 346 HB typical | - |
| 52CrMoV4 EN10089:2002 | +S | All formats | - | - | - | - | - | < 280 HB | - |
| | +A | All formats | - | - | - | - | - | < 248 HB | - |
| | +AC | All formats | - | - | - | - | - | < 230 HB | - |
| | +QT | All formats | - | 1300 | 1450-1750 | 6 | 35 | - | 20 °C 10 J (long) |

*$Rp_{0.2}$ * $R_{eh}$, ** $R_{el}$*

Impact test is made with U-notched pieces in +QT.

Reference treatment for 52CrMoV4 EN10089:2002 is quench from 860 ℃ followed by tempering at 450 ℃.

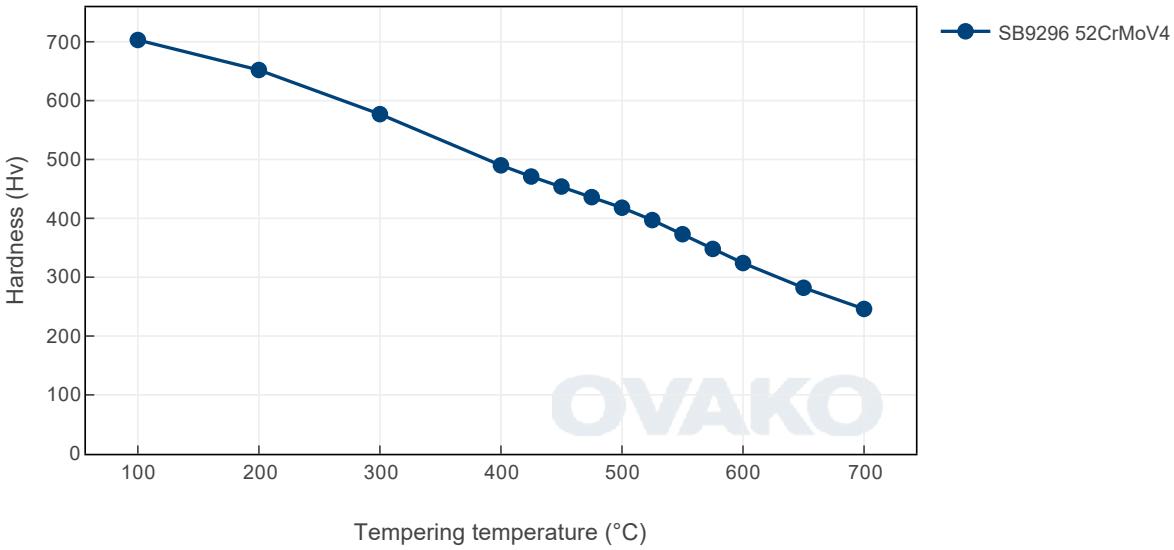
## Transformation temperatures

| | Temperature °C |
|---|---|
| MS | 265 |
| AC1 | 737 |
| AC3 | 776 |

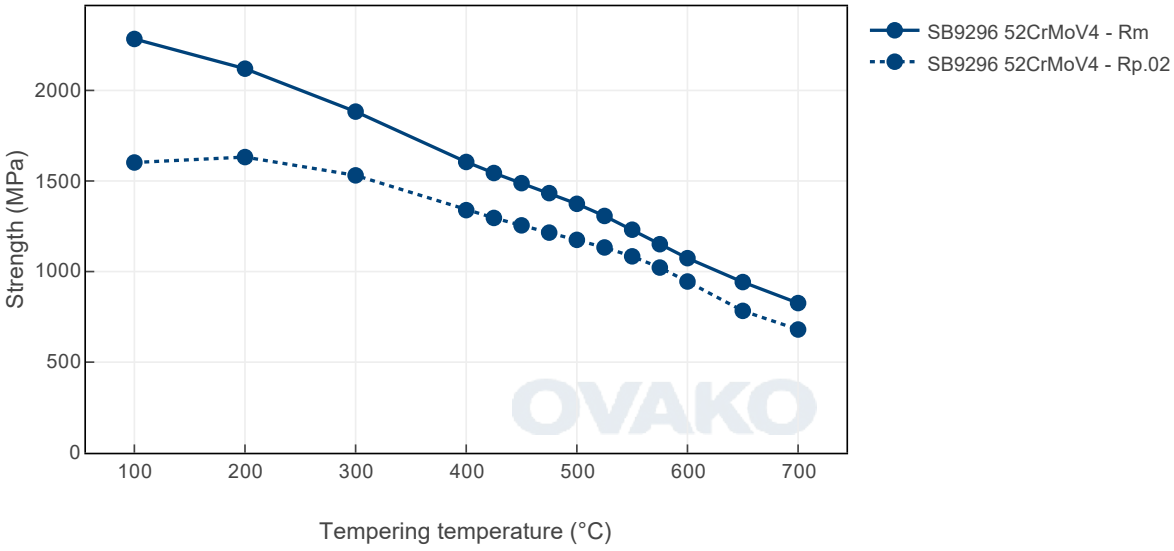
## Heat Treatment Guide generated Graphs

The following graphs are generated from a theoretical model. For further info see the Heat treatment guide module. Select a specific grade version for individual display.

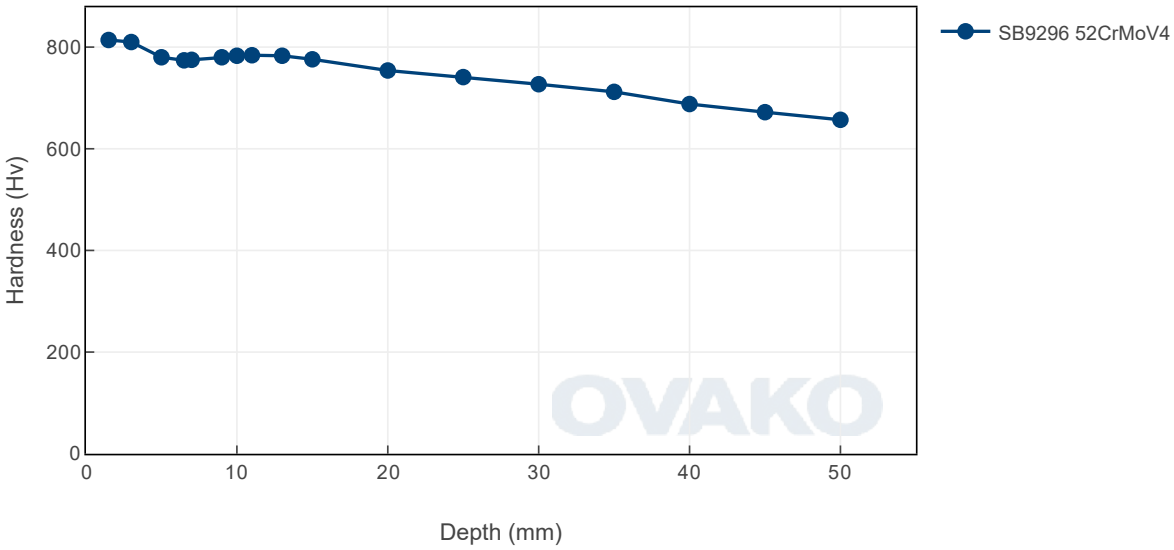
## Tempering Diagram (hardness)




## Tempering Diagram (strength)



Jominy


Hardness (Hv)
800
600
400
200
0
0
10
20
30
40
50
Depth (mm)
SB9296 52CrMoV4
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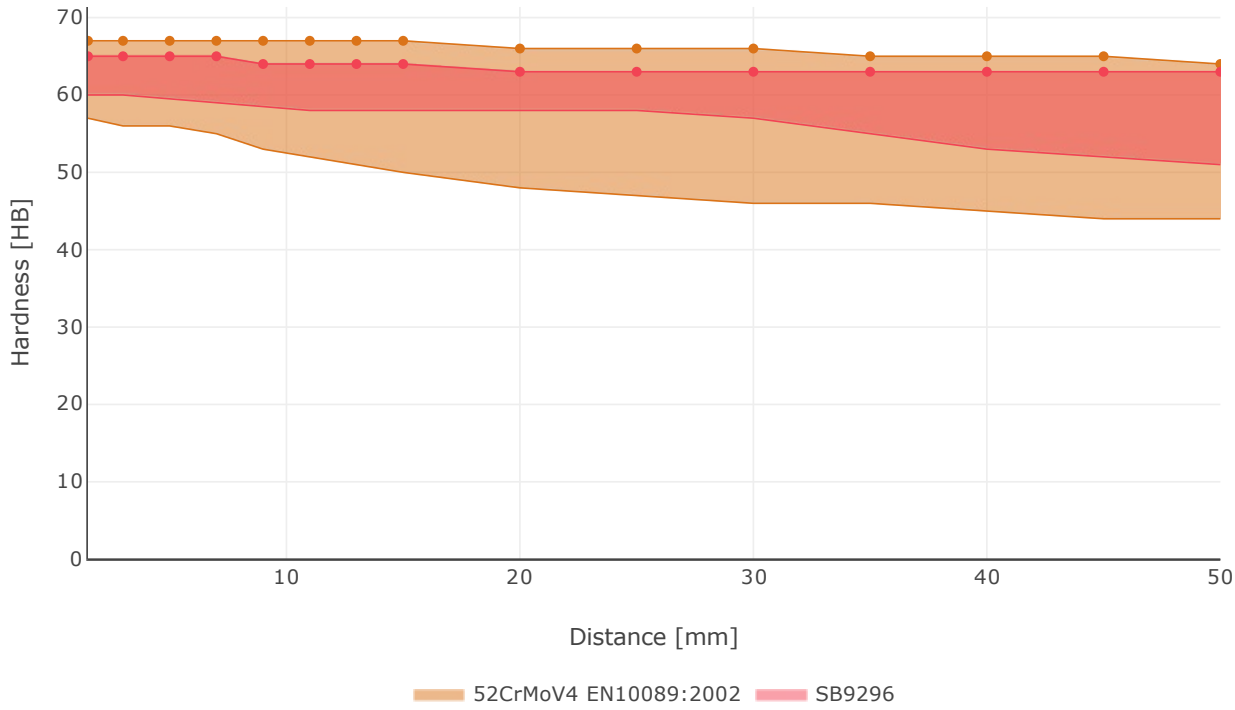
## Hardenability




## SUSTAINABILITY-ENVIRONMENTAL IMPACT DATA

At Ovako sustainability and reduction of our environmental impact is a major focus in everything we do.
Further information is found here.

| Steel works | Hofors | Smedjebacken | Imatra |
|---|---|---|---|
| CO2e/kg | 120 | 62 | 76 |

To get the full picture of our products environmental impact we have to look at all of our $CO_2$ emission sources.
Not only the steel work Scope 1-2 itself, but all operations downstream in our production, heating and heat treatment furnaces etc (full scope 1-2) as well as all the emission from input material, eg. alloys, scope 3.

| Steel Grade | Format | Condition | Scope 1-3 (CO2e kg /1000 kg steel) | Climate compensated Net emission = Scope 3 (CO2e kg /1000 kg steel) Scope 1 - 2 = 0 (compensated) |
|---|---|---|---|---|
| SB9296 | Flat bar | +AR | 454 | 221 |

All above data are to be seen as typical values for the specified format and condition. Detailed information about your specific product please contact your sales contact.

## Other properties (typical values)

| Youngs module (GPa) | Poisson´s ratio (-) | Shear module (GPa) | Density (kg/m3) |
|---|---|---|---|
| 210 | 0.3 | 80 | 7800 |
| Average CTE 20-300°C (µm/m°K) | Specific heat capacity 50/100°C (J/kg °K) | Thermal conductivity Ambient temperature (W/m°K) | Electrical resistivityAmbient temperature (µΩm) |
| 12 | 460 - 480 | 40 - 45 | 0.20 - 0.25 |

## Contact us

Would you like to know more about our offers? Don´t hesitate to contact us:

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Via telephone: +46 8 622 1300

For more detailed information please visit http://www.ovako.com/en/Contact-Ovako/