

# 19MnVS6 All

## General Information

19MnVS6 according to EN10267 may with its generous chemical analysis and moderate mechanical requirements host a number of grades. It does at Ovako's! All variants are microalloyed with vanadium which gives a fine grain size and a good start for excellent toughness. The most frequent usage is as rolled, but all members in the family may be heat-treated in different ways. A heat-treatment will naturally affect the mechanical properties.

The Ovako program starts with a yield strength of minimum 400 MPa and finishes at minimum 520 MPa where each variant is carefully balanced to give the desired properties without a wasteful addition of alloying elements. Weldability goes from excellent to good with increasing alloying content and yield strength.

19MnVS6 is also available as M-steel.

## M-Steel®

The basis for the concept is that non-metallic inclusions are modified and controlled with calcium treatment in a way to minimize tool wear and to maximize chip control in machining operations. Our M-Steel treatment can be applied to any steel grade.


## Similar designations

SB280 - 18Mn6, E470, SS2134, 1.5217, 19MnV6

## Chemical composition

Variant	Cast	Di	Weldability		C%	Si %	Mn %	P %	S %	Cr%	Ni %	Mo %	V %	Cu %	Al%	N%
SB280 / 9838	CC		CEV 0.45 <sub>max</sub>	Min	0.16	0.20	1.30	-	0.020	-	-	-	0.060	-	-	-
			Pcm 0.28 <sub>max</sub>	Max	0.20	0.50	1.60	0.035	0.040	-	-	-	0.110	-	-	-
SB280X / 9858	CC		CEV 0.58 <sub>max</sub>	Min	0.16	0.20	1.40	-	-	-	-	-	0.080	-	0.008	-
			Pcm 0.32 <sub>max</sub>	Max	0.20	0.50	1.75	0.025	0.040	0.30	0.30	0.10	0.130	0.35	0.040	-
SB280XM / 9875	CC		CEV 0.55 <sub>max</sub>	Min	0.15	0.25	1.40	-	0.020	-	-	-	0.080	-	0.017	-
			Pcm 0.3 <sub>max</sub>	Max	0.19	0.45	1.75	0.035	0.040	0.30	0.30	-	0.120	0.35	0.030	-
SB450	CC		CEV 0.31 <sub>max</sub>	Min	-	0.15	0.80	-	-	-	-	-	-	-	-	-
			Pcm 0.18 <sub>max</sub>	Max	0.20	0.50	1.60	0.035	0.035	-	-	-	-	-	-	-
SB500	CC		CEV 0.56 <sub>max</sub>	Min	-	0.15	1.25	-	-	-	-	-	-	-	-	-
			Pcm 0.33 <sub>max</sub>	Max	0.20	0.50	1.60	0.035	0.035	0.30	0.25	-	0.150	-	-	-
7255	CC	1.5	CEV 0.45 <sub>max</sub>	Min	0.16	0.20	1.30	-	0.020	-	-	-	0.060	-	0.011	-
			Pcm 0.28 <sub>max</sub>	Max	0.20	0.50	1.60	0.020	0.040	-	-	-	0.110	-	0.060	-
7256	CC	1.6	CEV 0.5 <sub>max</sub>	Min	0.16	0.20	1.40	-	0.020	-	-	-	0.080	-	0.011	-
			Pcm 0.3 <sub>max</sub>	Max	0.20	0.50	1.75	0.020	0.040	-	-	-	0.130	-	0.060	-
7265	CC		CEV 0.55 <sub>max</sub>	Min	0.16	0.25	1.30	-	-	-	-	-	0.070	-	-	-
			Pcm <sub>max</sub>	Max	0.22	0.50	1.55	0.025	-	0.50	-	-	0.110	-	-	-
19MnVS6 EN10267:1998 (ref)	Std		CEV 0.5 <sub>max</sub>	Min	0.15	0.15	1.20	-	0.020	-	-	-	0.080	-	-	0.0100
			Pcm 0.31 <sub>max</sub>	Max	0.22	0.80	1.60	0.025	0.060	0.30	-	0.08	0.200	-	-	0.0200

## Mechanical Properties

Variant	 Condition	Format	Dimension [mm]	Yield strength min [MPa]	Tensile strength [MPa]	Elongation A <sub>5</sub> [%]	Reduction of area Z <sub>min</sub> [%]	Hardness	Impact (ISO-V) strength <sub>min</sub>
SB280 / 9838	+AR	Round bar	15 < 70	460**	600-770	19	-	180-230 HB	-20 °C 27 J (long)
		Round bar	70 < 90	440**	550-700	19	-	180-230 HB	-20 °C 27 J (long)
SB280X / 9858	+AR	Flat bar	10 < 60	520**	650-800	19	-	200-250 HB	-20 °C 27 J (long)
		Round bar	25 < 100	520	650-800	19	-	200-250 HB	-20 °C 27 J (long)
SB280XM / 9875	+AR	Round bar	20 < 90	520**	650-800	19	-	200-250 HB	-20 °C 27 J (long)
SB450	+AR	Flat bar	10 < 50	450**	400-695	16	-	-	-
SB500	+AR	Round bar	14 < 25	500*	670-830	19	-	200-250 HB	-
		Round bar	25 < 60	500*	650-750	19	-	190-230 HB	-20 °C 27 J (long)
		Flat bar	6 < 10	500*	630-780	19	-	190-250 HB	-
		Flat bar	10 < 15	500*	630-750	19	-	190-230 HB	-
		Flat bar	15 < 30	500*	630-750	19	-	190-230 HB	-
		Flat bar	30 < 70	470*	610-730	19	-	180-225 HB	-20 °C 27 J (long)
7255	+AR	Round bar	95 < 130	440*	550-700	19	-	< 230 HB	-20 °C 27 J (long)
		Round bar	130 < 160	400*	550-700	19	-	< 230 HB	-20 °C 27 J (long)
7256	+AR	Round bar	45 < 90	520*	650-800	19	-	< 240 HB	-20 °C 27 J (long)
		Round bar	25 < 160	-	-	-	-	< 250 HB	-
7265	+AR	Round bar	25 < 120	450*	550-750	21	55	180-220 HB	0 °C 27 J (long)
		Round bar	121 < 160	410*	550-750	21	55	180-220 HB	0 °C 27 J (long)
19MnVS6 EN10267:1998 (ref)	+AR	All formats	-	390*	600-750	16	32	-	-

$Rp_{0.2}$  \*  $R_{eh}$ , \*\*  $R_{eL}$

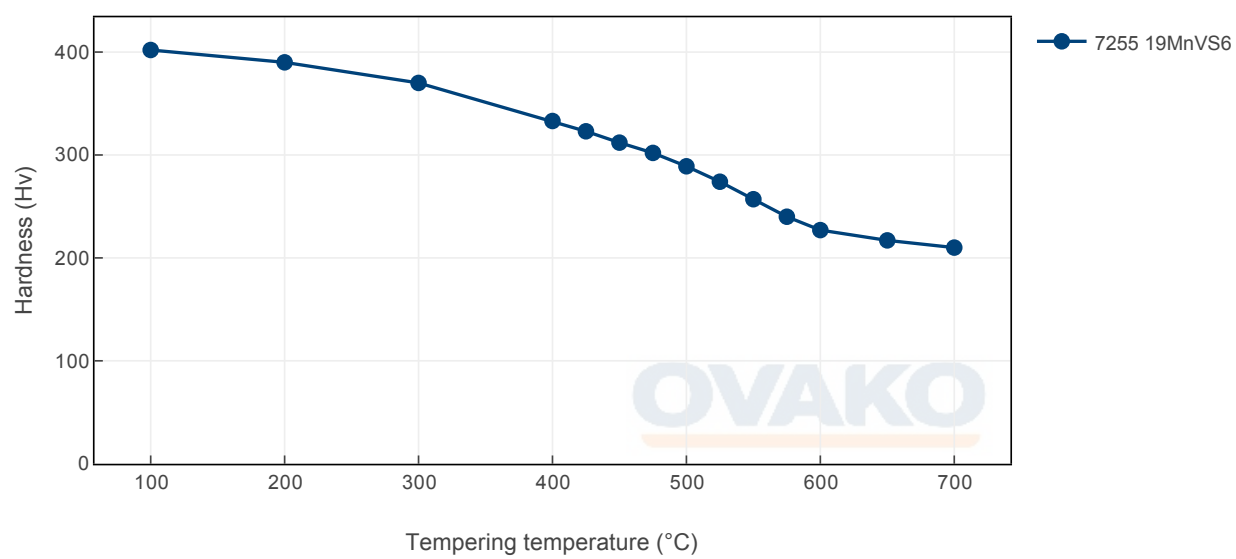
## Transformation temperatures

	Temperature °C
MS	410
AC1	720
AC3	810

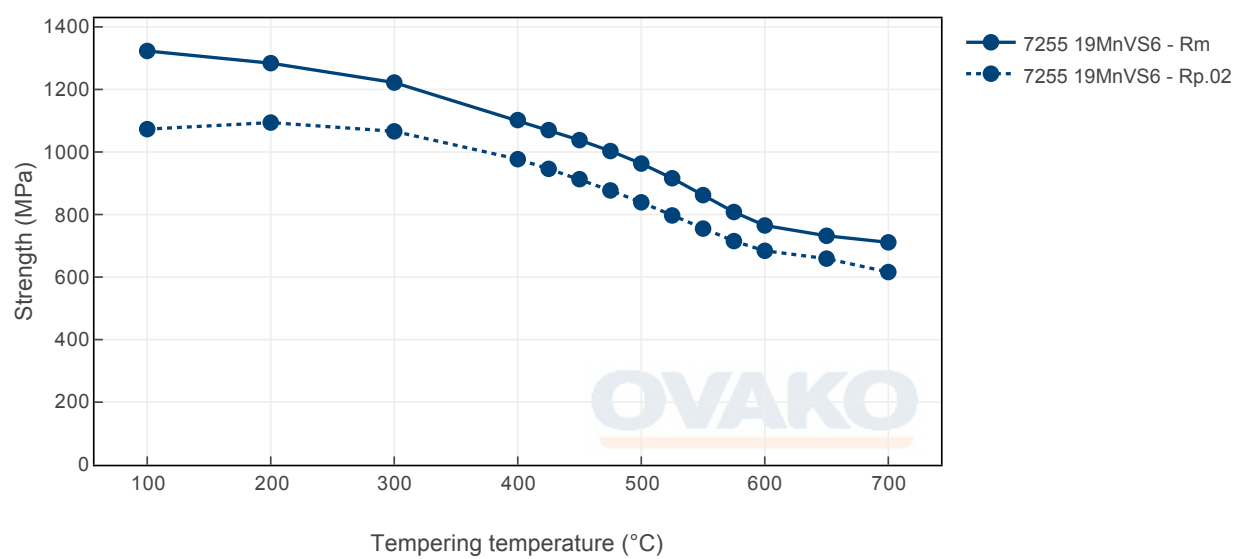
## Heat Treatment Guide generated Graphs

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.

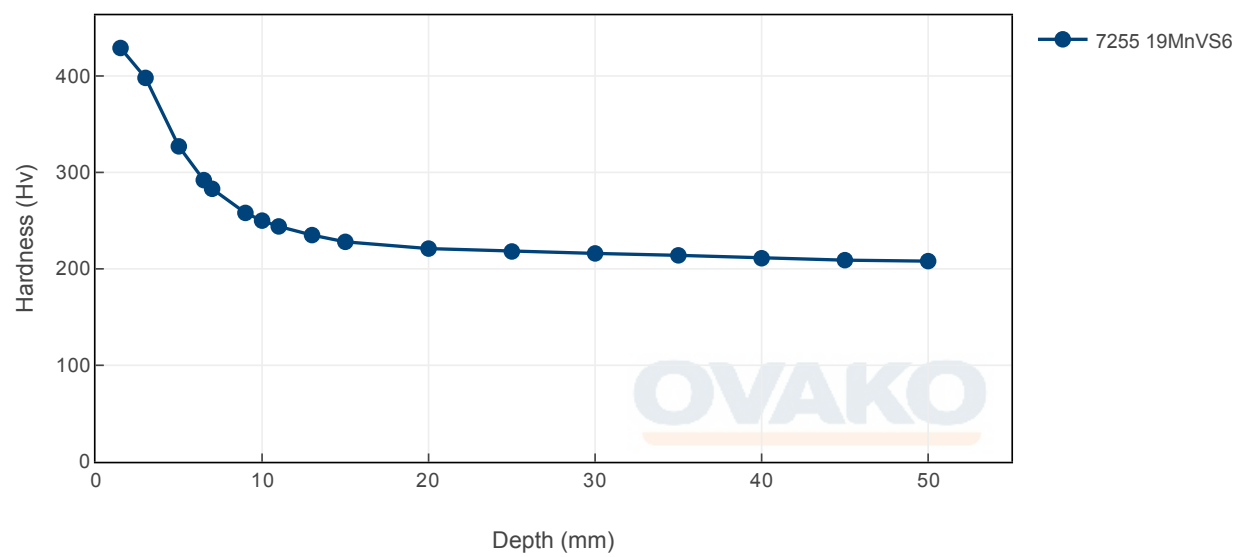
Tempering Diagram (hardness)



Tempering Diagram (strength)



# Jominy



## 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](#).

In many international comparisons the crude steel Scope 1-2 emission is a key parameter, ie. the CO<sub>2</sub> emission from the steel works itself.

As of 1 January 2022 we carbon offset all our scope 1 and 2 volume shown below.

Steel works	Hofors	Smedjebacken	Imatra
CO <sub>2</sub> e/kg	120	62	76

To get the full picture of our products environmental impact we have to look at all of our CO<sub>2</sub> 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 (CO <sub>2</sub> e kg /1000 kg steel)	Climate compensated Net emission = Scope 3 (CO <sub>2</sub> e kg /1000 kg steel) Scope 1 - 2 = 0 (compensated)
SB500	Flat bar	+AR	416	179
SB280	Round bar	+AR	410	177
SB280X	Flat bar	+AR	411	181
SB450	Round bar	+AR	411	190
SB280XM	Round bar	+AR	429	195
7256	Round bar	+AR	511	220
280 M (7266)	Round bar	+AR	516	225
7255	Flat bar	+AR	513	229

As of 1 January 2022 we use carbon offset for all our scope 1- 2 emissions, so in practice the climate compensated data is the same as the full Scope 3 level.

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/m <sup>3</sup> )
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 resistivity Ambient 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:

Via e-mail: [info@ovako.com](mailto:info@ovako.com)

Via telephone: +46 8 622 1300

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

### Disclaimer

*The information in this document is for illustrative purposes only. The data and examples are only general recommendations and not a warranty or a guarantee. The suitability of a product for a specific application can be confirmed only by Ovako once given the actual conditions. The purchaser of an Ovako product has the responsibility to ascertain and control the applicability of the products before using them. Continuous development may necessitate changes in technical data without notice. This document is only valid for Ovako*

*material. Other material, covering the same international specifications, does not necessarily comply with the properties presented in this document.*