

## S355J2 All

### General Information

S355J2 is a micro alloyed structural steel suitable for e.g. mechanical engineering applications. The steel possess a good weldability with max CEV =0.47 for all variants. The steel may be delivered with a controlled silicon content for good galvanizing properties. Below, a number of closely related variants with various impact strength are presented.

Variant SB9813 is delivered with a closely controlled C-content for predictable properties and with a CEV value of max 0.41.

Variant S355J2(M) is a M-treated variant

Variant S355K2 and S355L4 both show good Impact toughness

Variant 285K is a variant of 520M

Variant 520M is a M-steel variant of S355J2

Variant 550M is a drawn or peeled version of S355J2

### 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

ASt 52, A52 FP, Q420q-D, 1501 Gr.224-460, A52 RBII, 1.0577, St52-3, SB9837 Grade32-36, SB9833

### Chemical composition

Variant	Cast	Di	Weldability		C%	Si%	Mn%	P%	S%	Cr%	Ni%	Mo%	V%	Cu%	Al%
SB9813	CC		CEV 0.41 <sub>max</sub>	Min	0.13	0.15	1.00	-	-	-	-	-	0.030	-	0.025
			Pcm 0.25 <sub>max</sub>	Max	0.18	0.25	1.30	0.025	0.025	0.15	0.25	0.07	0.120	0.30	-
S355J2(M)	CC		CEV 0.5 <sub>max</sub>	Min	-	-	-	-	0.020	-	-	-	-	-	-
			Pcm 0.3 <sub>max</sub>	Max	0.20	0.55	1.60	0.035	0.040	-	-	-	0.150	-	-
S355K2	CC		CEV 0.45 <sub>max</sub>	Min	-	-	-	-	-	-	-	-	-	-	-
			Pcm 0.3 <sub>max</sub>	Max	0.20	0.55	1.60	0.030	0.030	-	-	-	-	0.55	-
S355L4	CC		CEV 0.43 <sub>max</sub>	Min	-	-	-	-	-	-	-	-	-	-	-
			Pcm 0.26 <sub>max</sub>	Max	0.16	0.55	1.60	0.030	0.030	-	-	-	-	0.40	-
285K	CC		CEV <sub>max</sub>	Min	0.11	0.15	1.15	-	0.025	-	-	-	0.040	-	-
			Pcm <sub>max</sub>	Max	0.14	0.55	1.35	0.025	0.045	-	-	-	0.080	0.35	-
520 M (2721, 2723)	CC	0.9	CEV 0.47 <sub>max</sub>	Min	0.05	0.05	1.00	0.000	0.020	-	-	-	0.030	-	-
			Pcm 0.3 <sub>max</sub>	Max	0.20	0.50	1.50	0.025	0.040	-	-	-	0.100	0.55	-
550 M (2723)	CC	0.9	CEV 0.47 <sub>max</sub>	Min	0.05	0.05	1.00	0.000	0.020	-	-	-	0.030	0.00	-
			Pcm 0.3 <sub>max</sub>	Max	0.20	0.50	1.50	0.025	0.040	-	-	-	0.100	0.55	-
S355J2 EN10025-2:2019	Std		CEV 0.47 <sub>max</sub>	Min	-	-	-	-	-	-	-	-	-	-	-
			Pcm 0.35 <sub>max</sub>	Max	0.20	0.55	1.60	0.030	0.030	-	-	-	-	0.55	-

## Mechanical Properties

Variant	Condition 	Format	Dimension [mm]	Yield strength min [MPa]	Tensile strength [MPa]	Elongation A <sub>5</sub> [%]	Hardness	Impact (ISO-V) strength <sub>min</sub>
SB9813	+AR		< 16	355**	520-600	25	160-180 HB	-20 °C 40 J (long)
			16 < 40	345**	520-600	25	160-180 HB	-20 °C 40 J (long)
S355J2(M)	+AR	All formats	< 16	355**	490-630	22	150-190 HB	-20 °C 27 J (long)
		All formats	17 < 40	345**	490-630	22	150-190 HB	-20 °C 27 J (long)
		All formats	41 < 63	335**	490-630	21	150-190 HB	-20 °C 27 J (long)
			64 < 80	325**	490-630	30	150-190 HB	-20 °C 27 J (long)
S355K2	+AR		< 16	355**	470-630	22	140-190 HB	-20 °C 40 J (long)
			16 < 40	345**	470-630	22	140-190 HB	-20 °C 40 J (long)
			40 < 63	335**	470-630	21	140-190 HB	-20 °C 40 J (long)
S355L4	+AR		< 16	355**	470-630	22	140-190 HB	-40 °C 60 J (long)
			16 < 40	345**	470-630	22	140-190 HB	-40 °C 60 J (long)
			40 < 63	335**	470-630	21	140-190 HB	-40 °C 60 J (long)
			63 < 80	325**	470-630	20	140-190 HB	-40 °C 60 J (long)
			80 < 100	315**	470-630	20	140-190 HB	-40 °C 60 J (long)
285K	+AR	Tube, wall	-	450*	> 550	20	180 HB typical	-20 °C 27 J (long)
520 M (2721, 2723)	+AR		25 < 40	400*	520-630	22	< 200 HB	-20 °C 40 J (long)
		Round bar	40 < 63	390*	520-630	22	< 200 HB	-20 °C 40 J (long)
		Round bar	63 < 100	380*	520-630	21	< 200 HB	-20 °C 40 J (long)
		Round bar	100 < 200	350*	500-600	18	< 200 HB	-20 °C 27 J (long)
	+N	Round bar	25 < 40	345*	470-630	25	< 200 HB	-40 °C 40 J (long)
		Round bar	40 < 63	335*	470-630	24	< 200 HB	-40 °C 40 J (long)
		Round bar	63 < 80	325*	470-630	23	< 200 HB	-40 °C 40 J (long)
		Round bar	80 < 100	315*	470-630	23	< 200 HB	-40 °C 40 J (long)
		Round bar	100 < 150	295*	450-600	21	< 200 HB	-40 °C 40 J (long)
		Round bar	150 < 200	285*	450-600	20	< 200 HB	-40 °C 40 J (long)
	550 M (2723)	+C	Round bar	22 < 55	500*	550-750	12	< 220 HB
+SH		Round bar	55 < 70	380*	490-630	22	< 200 HB	-20 °C 27 J (long)
		Round bar	70 < 120	350	490-630	20	< 200 HB	-20 °C 27 J (long)

Variant	Condition	Format	Dimension [mm]	Yield strength min [MPa]	Tensile strength [MPa]	Elongation A <sub>5</sub> [%]	Hardness	Impact (ISO-V) strength <sub>min</sub>
S355J2 EN10025-2:2019	+AR		< 16	355**	470-630	22	140-190 HB	-20 °C 27 J (long)
			16 < 40	345**	470-630	22	140-190 HB	-20 °C 27 J (long)
			40 < 63	335**	470-630	21	140-190 HB	-20 °C 27 J (long)
			63 < 80	325**	470-630	20	140-190 HB	-20 °C 27 J (long)
			80 < 100	315**	470-630	20	140-190 HB	-20 °C 27 J (long)

$R_{p0.2}$  \*  $R_{eH}$ , \*\*  $R_{eL}$

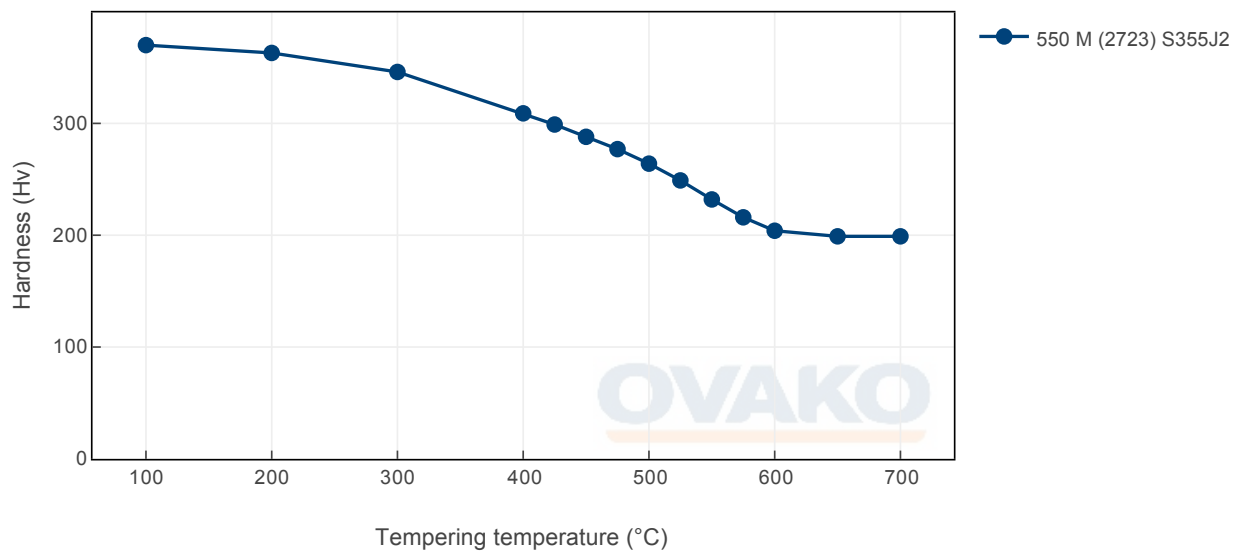
### Transformation temperatures

	Temperature °C
MS	400
AC1	720
AC3	815

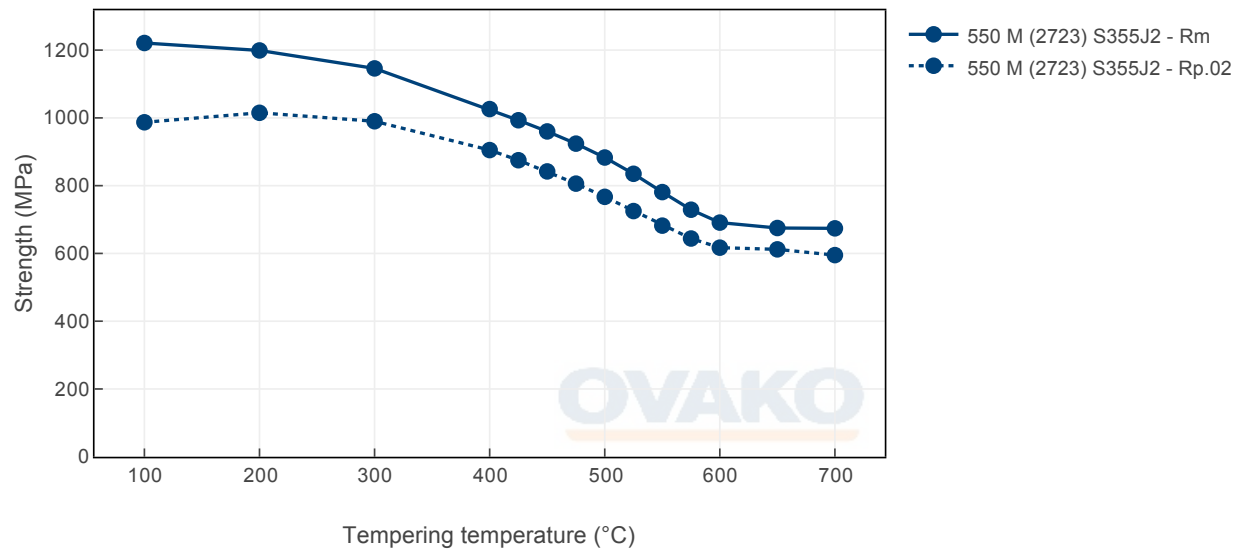
### Heat Treatment Guide generated Graphs

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.

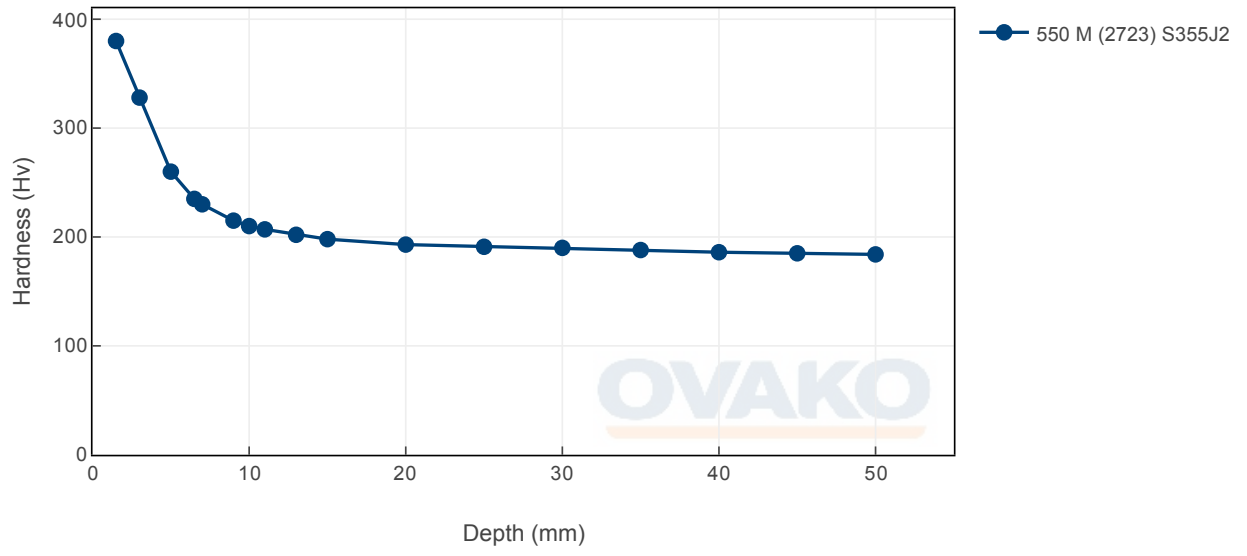
Tempering Diagram (hardness)



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)
SB9813	Flat bar	+AR	404	167
550 M (2723)	Round bar	+AR	526	222
520 M (2721, 2723)	Round bar	+AR	525	221

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:

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Via telephone: +46 8 622 1300

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

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