

# C45 All

## General Information

C45 is a medium carbon steel for e.g. mechanical engineering and automotive components.

Variant SB8673 / SB-C45 is a variant with a narrowed chemical composition in order to reach a high hardenability and it is fine grain treated with Al

Variant SB1672 is a standard variant of C45 with medium Carbon for all purpose use

Variant 5081 is a M-treated variant wich is offered under the name Imatra 4M

Variant 5155 is similar to 5081 but is a non M-steel with lower Sulphur content

Variant 047A is an ingot cast variant. High hardness and high strength can be achieved after hardening thanks to the relatively high carbon content. The steel is suitable for various type of applications where high strength is needed.

## 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

C43, C44, C45R - 1.1201, C45E - 1.1191, Ck45, St70-2, SAE 1045, 080A42, SS 1672, XC 48, C 45, S 45 C, GOST 45, AISI/SAE/ASTM 1045, 1.0503

## Chemical composition

Variant	Cast	Weldability		C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	DI %
5081	CC	CEV 0.72 <sub>max</sub>	Min	0.42	0.10	0.50	-	0.020	-	-	-	1.10
		Pcm 0.55 <sub>max</sub>	Max	0.50	0.40	0.90	0.030	0.035	0.40	0.40	0.10	1.80

The Di-value is in inches.

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>
5081	+AR	Round bar	20 < 160	-	-	-	-	< 230 HB	-
	+QT	Round bar	20 < 40	430**	650-800	16	40	190-240 HB	20 °C 25 J (long)
		Round bar	40 < 100	370**	630-780	17	45	185-235 HB	20 °C 25 J (long)

*Rp0.2 \* Reh, \*\* Rel*

Transformation temperatures

	Temperature °C
MS	305
AC1	725
AC3	760

Heat treatment recommendations

Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+U	800-1150°C	In still air
Normalizing	+N	840-870°C	In still air
Soft annealing	+SA	650-700°C	In still air
Stress relieve annealing	+SRA	550-650°C	In still air
Quench & Tempering	+QT	840-870°C	In oil    Temper immediately
Quench & Tempering	+QT	820-850°C	In water    Temper immediately
Induction or Flame hardening	I-F	870-900°C	In oil    Temper immediately

## 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
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)
047A	Round bar	+AR	573	174
047A	Round bar	+N	579	178
047A	Tube, wall	+AR	593	195
047A	Tube, wall	+N	601	201
SB1672	Flat bar	+AR	392	172
SB8673	Flat bar	+A	398	161
5081, Imatra 4 M	Round bar	+AR	782	257
5155	Round bar	+AR	786	260

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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