

## C35 All

### General Information

C35 is a medium Carbon steel, one of the most widely used for machinery parts. Excellent forgeability. Special variants can be made available for cold drawing. Due to the carbon content preheating and postheating are required when welding. Wide range of mechanical properties can be attained by quenching and tempering.

### Similar designations

C35E, DIN Ck35, 080M36, XC38, 1035, GOST 35

### Chemical composition

Variant	Cast	Di	Weldability		C%	Si%	Mn%	P%	S%	Cr%	Ni%
C35E	CC	0.98	CEV 0.65 <sub>max</sub>	Min	0.35	0.15	0.50	-	0.015	-	-
			Pcm 0.49 <sub>max</sub>	Max	0.39	0.35	0.80	0.030	0.035	0.30	0.30

## 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>
C35E	+AR	Round bar	< 20	345*	520-690	10	< 230 HB	0 °C 0 J (long) 0 °C 0 J (transv)
		Round bar	20 < 90	345*	520-690	19	165-220 HB	-

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

## Transformation temperatures

	Temperature °C
MS	355
AC1	722
AC3	781

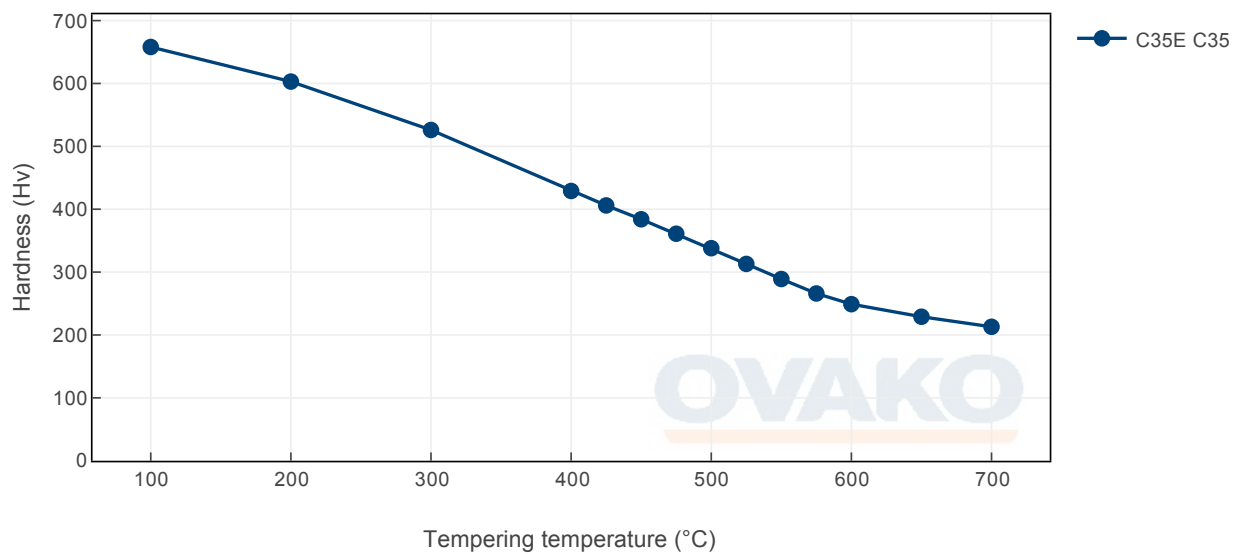
## Heat treatment recommendations

Treatment	Condition	Temperature cycle	Cooling/quenching
Hot forging	+AR	Heat to 1245°C	Cooling in air
Normalizing	+AR	Heat to 915°C ( min 800°C)	Cooling in air
Quench & Tempering	+AR	Hardened at 845°C	Quenching in oil
Tempering	+QO	Tempering at 370°C in order to get tensile strength in the range 620-860 MPa	

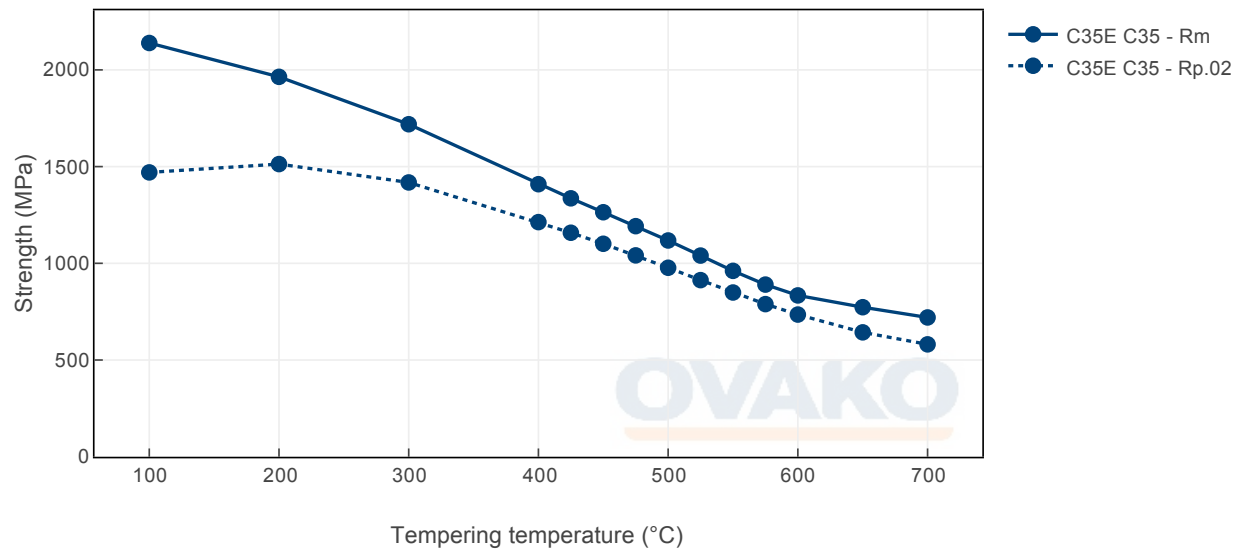
## Heat Treatment Guide generated Graphs

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.

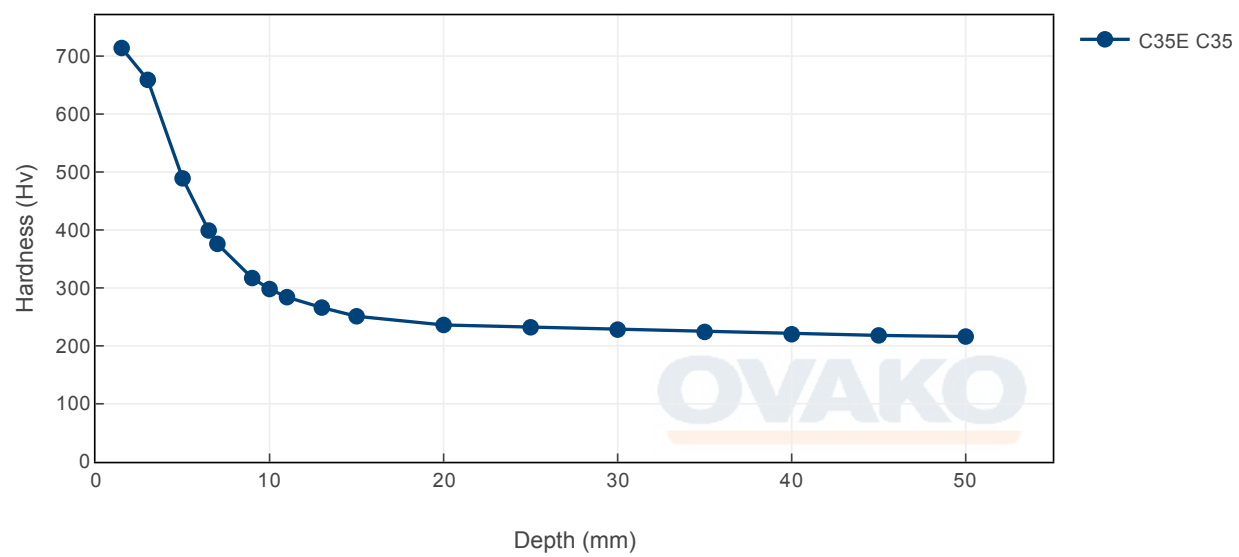
Tempering Diagram (hardness)



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)
C35E	Flat bar	+AR	540	173

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

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