

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 _{max}	Min	0.35	0.15	0.50	-	0.015	-	-
			Pcm 0.49 _{max}	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 ₅ [%]	Hardness	Impact (ISO-V) strength _{min}
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	-

*R_{p0.2} * 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	

Hardenability

As quenched hardness should be approximately 45 HRC

Other properties (typical values)

Youngs module (GPa)	Poisson's ratio (-)	Shear module (GPa)	Density (kg/m ³)
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

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