C45E *Datasheet*

TECHNICAL DATA SHEET

Steel Grade: C45E
(EN 10083-2:2006 – Non-alloy quality steel for quenching and tempering)

General Description

C45E is a medium carbon, non-alloy steel with excellent mechanical properties after quenching and tempering. The "E" indicates controlled sulphur and phosphorus content for improved machinability and structural integrity. C45E is commonly used in the manufacturing of mechanical components subjected to moderate dynamic loads and where high surface hardness and core strength are required.

CHEMICAL COMPOSITION

C45E Hot-formed-hot-rolled-rod mechanichal properties for normalized condition EN 10083-2: 2006

C%	Si% max	Mn%	P% max	S% max	Cr% max	Mo% max	Ni% max
0.42-0.50	0.40	0.40	0.030	0.035	0.40	0.40	0.40
± 0.02	± 0.02	± 0.02	± 0.02	± 0.02			

Cr+Mo+Ni max 0.63%.
C45R n• 1.1201 S% 0.020-0.040. Permissible deviations on the product ± 0.005.
C45 n• 1.0503 S% eP% max 0. 045. Permissible deviations on the product ± 0.005.
Calcium (Ca) treatment may be supplied on reguest

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MECHANICAL PROPERTIES

C45E Hot-formed-hot-rolled-rod mechanichal properties for normalized condition EN 10083-2: 2006

Ø (mm) from - to	thickness (mm) from - to	R N/mm2 min	Re * N/mm2 min	A% min	C% min	Kv Jmin	HB min
to 16	to 16	620	340	14			190
16 - 100	16 - 100	580	305	16			172
100 - 250	100 - 250	560	275	16			162

(*) Testing at room temperature (longitudinal)

C45E Hot-formed-hot-rolled-rod mechanichal properties for quenched and tempered condition EN 10083-2: 2006

Ø (mm) from - to	thickness (mm) from - to	R N/mm2 min	Re * N/mm2 min	A% min	C% min	Kv Jmin	HB referece only
to 16	to 8	700-850	490	14	35		213-253
16 - 40	8 - 20	650-800	430	16	40	25	200-240
40 - 100	20 - 60	630-780	370	17	45	25	192-232

(*) Testing at room temperature (longitudinal)

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Table of tempering values at room temperature for round Ø 10 mm after guenching at 840 °C in water

°C	HB	HRC	R N/mm2
100	615	58	2330
200	597	57	2240
300	510	52	1880
400	401	43	1390
500	311	33	1030
600	242	23	810

Physical Properties

- **Density**: 7.85 g/cm³
- **Modulus of Elasticity**: ~210 GPa
- **Thermal Conductivity**: ~49 W/m·K
- **Specific Heat Capacity**: ~460 J/kg·K

Applications

- Automotive shafts and axles
- Forged components
- Gears, bolts, studs
- Mechanical parts requiring high tensile strength after heat treatment

Standards and Equivalents

- **EN**: C45E (1.1191)
- **AISI/SAE**: 1045
- **ISO**: C45E
- **DIN**: Ck45
- **AFNOR**: XC48

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