C45E QT *Datasheet*

TECHNICAL DATA SHEET

Steel Grade: C45 QT (Quenched and Tempered)
(EN 10083-2:2006 – Equivalent to AISI 1045 / 1.1191)

General Description
C45 QT is a medium carbon steel specifically heat treated through quenching and tempering to achieve an optimal combination of strength, toughness, and wear resistance. This treatment significantly enhances its mechanical properties compared to untreated C45, making it suitable for components subjected to higher mechanical and dynamic loads. Typical uses include high-stress shafts, spindles, gears, and mechanical parts in demanding applications.

CHEMICAL COMPOSITION (*typical values % by weight*)

Element	C	Si	Mn	P (max)	S (max)	Fe
%	0.42–0.50	≤0.40	0.50–0.80	≤0.025	≤0.035	Balance

MECHANICAL PROPERTIES (*in quenched and tempered condition*)

Tensile Strength (Rm)	800–1000 MPa
Yield Strength (Rp0.2)	≥ 600 MPa
Elongation (A5)	≥ 13%
Impact Toughness (KV, +20°C)	≥ 40 J
Hardness (HBW)	220–280 HBW
Note	*Properties refer to normalized and QT round bars, diam. ≤100 mm.*

Physical Properties

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

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Heat Treatment Applied

C45 QT is supplied in a quenched and tempered condition:
- Austenitizing: ~820–860°C
- Quenching: Oil or water quenching
- Tempering: 540–680°C depending on required strength and toughness
- Final properties depend on section size and tempering temperature

Applications

- Transmission and drive shafts
- High-stress spindles and axles
- Forged components under dynamic loads
- General machinery parts requiring improved strength and wear resistance

Standards and Equivalents

- EN: C45 (1.1191) QT
- AISI/SAE: 1045
- DIN: Ck45
- ISO: C45E
- AFNOR: XC48

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