



# Steel 1.0503 / C45

## Alternative Designations

C45 (ISO) | 1045 (AISI/SAE) | G10450 (UNS) | AF65C45/C45 (AFNOR) | 080M46/50HS (BS) | C45K (UNE) | 1650 (SIS) | C45 (UNI) | S45C (JIS)

## Key Features

High tensile strength • Low ductility • Low thermal conductivity

## Description

Steel C45 is a medium carbon steel designation assigned to steels that have a carbon content between 0.42 and 0.50 wt. %. While medium carbon steels are used in a variety of applications, they are particularly well suited for parts that require high wear resistance and strength such as gears, shafts, and bearings. This material has low thermal conductivity and low ductility among wrought carbon steels. A combination of size accuracy, straightness and concentricity result in minimal wear in high-speed applications.

## Mechanical Properties

Yield strength	275 MPa
Tensile strength	560 MPa
Elongation at break	16%
Hardness	255
Module of elasticity	205 GPa

## Physical Properties

Density	7.85 g/cm <sup>3</sup>
Electrical conductivity	4.76 m/Ω · mm <sup>2</sup>
Coefficient of thermal expansion	11.5 K <sup>-1</sup> · 10 <sup>-6</sup>
Thermal conductivity	34.2 W/m · K
Specific heat capacity	480 J/kg · K

## Chemical Composition

Al	-	N	-
Bi	-	Nb	-
C	0.46%	Ni	0.4%
Cd	-	O	-
Co	-	P	0.03%
Cr	0.4%	Pb	-
Cu	-	S	0.02 – 0.035%
Fe	-	Si	0.4%
H	-	Sn	-
Mg	-	Ti	-
Mn	0.65%	V	0.4%
Mo	0.1%	Zn	-

## Reference

Datasheets provided by Xometry contain materials sourced through trusted OEMs, material distributors, and databases. Please visit [Materialdatacenter.com](https://Materialdatacenter.com) for further information on this material.