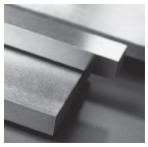
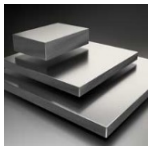
Steel grade

Material No. / Werkstoff-Nr.	PREMIUM 1.1730
Description	C45U
AISI/SAE	1045
Search for alternatives in the ABRAMS STEEL GUIDE®	**www.steel-guide.eu/alternatives/1045**

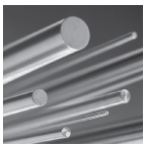
Specifications



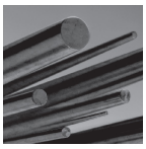
Precision flat steel [PFS]
without machining allowance
L: 500 mm
L: 1.000 mm



P-Plates [PPP]
L: various



Precision round steel [PRS]
without machining allowance
bright drawn / ground, ISO h9
L: 1.000 mm



Round steel [RS]
black
L: 500 mm
L: 1.000 mm

Chemical composition AISI/SAE 1045 (reference value %)

C	Si	Mn	P	S
0,42 - 0,5	0,15 - 0,4	0,6 - 0,8	0 - 0,03	0 - 0,03

Physical properties

Hardness (delivery condition)	max. 190 HB			
Tensile strength R_m (as received condition)	approx. 650 N/mm²			
Working hardness	max. 54 HRC (surface hardness)			
Thermal expansion coefficient 10^{-6}m/(m • K)	20 - 100°C	20 - 200°C	20 - 300°C	20 - 400°C
	12,5	13,0	13,6	14,1
Thermal conductivity W/(m • K)	20°C	350°C		
	44,9	41,6		

Technical properties

Unalloyed tool steel with excellent machining properties for unhardened parts (e.g. fixture construction), due to its carbon proportion (0,45 %) it can be hardened, but has a low depth of hardening. Shallow depth case-hardening steel with a hard surface and a tough core.

Applications

Mechanical engineering, construction materials, jigs, base plates, moulding frames, small dies, hand tools, simple knives, sledges, pliers, hatchets, axes, shears, screwdrivers, chisels.

Divisions of
ABRAMS Industries GmbH & Co. KG
Hannoversche Str. 38 / 46
49084 Osnabrück
Germany

County court Osnabrück / Germany, HRA 6865
GP: ABRAMS Industries Verwaltungs GmbH
Country court Osnabrück /Germany, HRB 20019
CEO: Dipl.-Wi.-Ing. Dr. Jürgen Abrams
COO: Ms. Nur H. Nezir, LL. B.

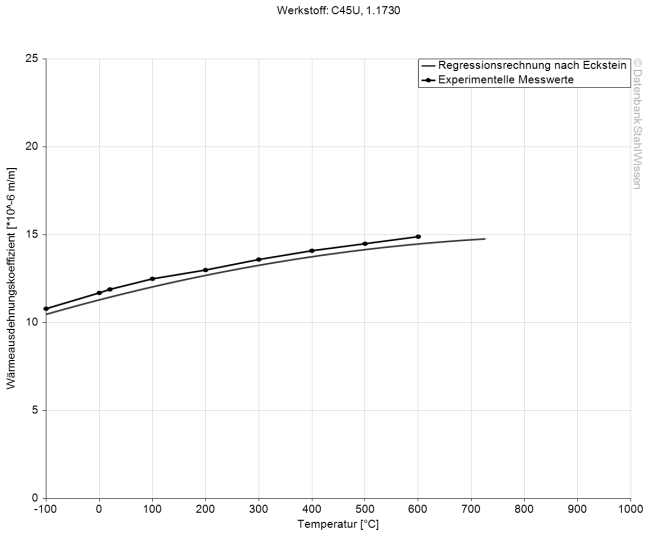
T: +49 541 / 357 39-0
sales@abrams-industries.eu
www.abrams-industries.eu/shop
VAT-No.: DE221940667

Bank details:
Bank: Sparkasse Osnabrück / Germany
SWIFT / BIC: NOLADE22
IBAN: DE63 2655 0105 1522 9268 96

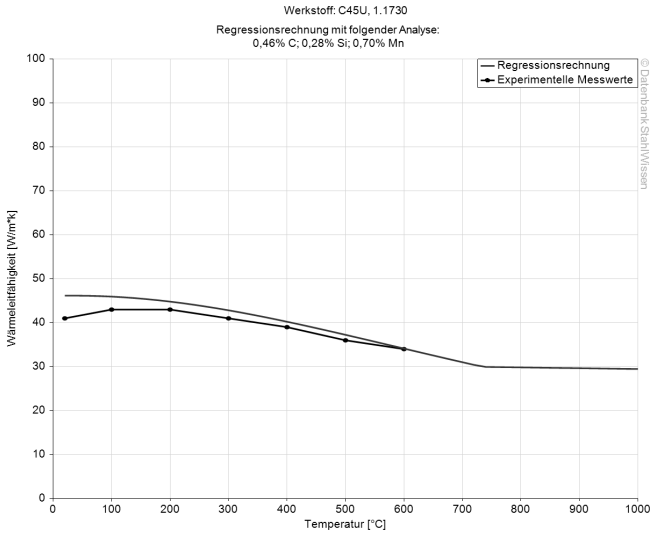
Heat treatment

Soft annealing	**Temperature**		**Cooling**		**Hardness**
	680 - 710°C		Furnace		max. 190 HB
Stress relief annealing	**Temperature**		**Cooling**		
	approx. 600 - 650°C		Furnace		
Hardening	**Temperature**		**Quenching in**		**Hardness after quenching**
	800 - 830°		Water		57 HRC
Tempering	100°C	200°C	300°C	350°C	
	57 HRC	54 HRC	49 HRC	42 HRC	

Thermal expansion coefficient diagram



Thermal conductivity diagram



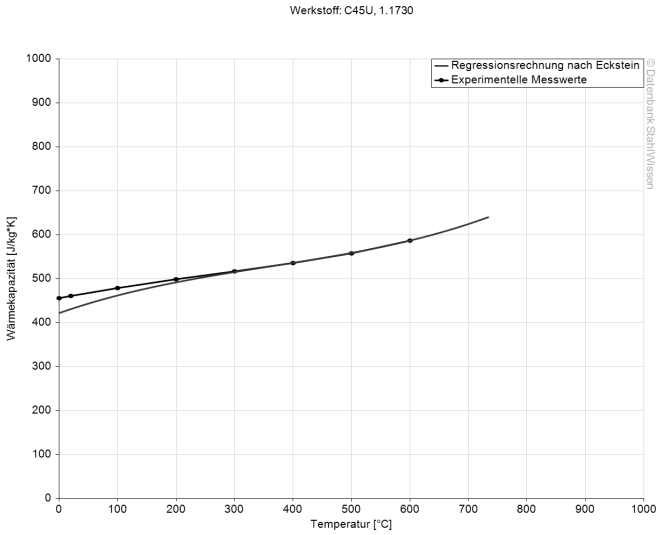
Divisions of
ABRAMS Industries GmbH & Co. KG
Hannoversche Str. 38 / 46
49084 Osnabrück
Germany

County court Osnabrück / Germany, HRA 6865
GP: ABRAMS Industries Verwaltungs GmbH
Country court Osnabrück /Germany, HRB 20019
CEO: Dipl.-Wi.-Ing. Dr. Jürgen Abrams
COO: Ms. Nur H. Nezir, LL. B.

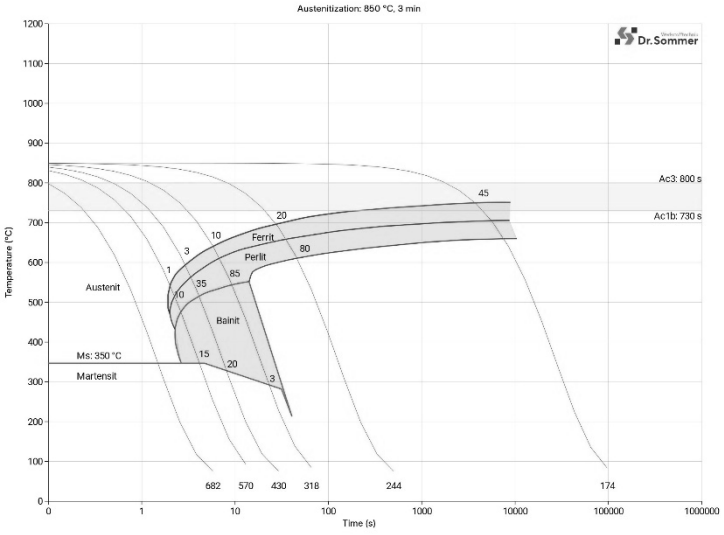
T: +49 541 / 357 39-0
sales@abrams-industries.eu
www.abrams-industries.eu/shop
VAT-No.: DE221940667

Bank details:
Bank: Sparkasse Osnabrück / Germany
SWIFT / BIC: NOLADE22
IBAN: DE63 2655 0105 1522 9268 96

Thermal capacity diagram



Continuous ZTU-diagram



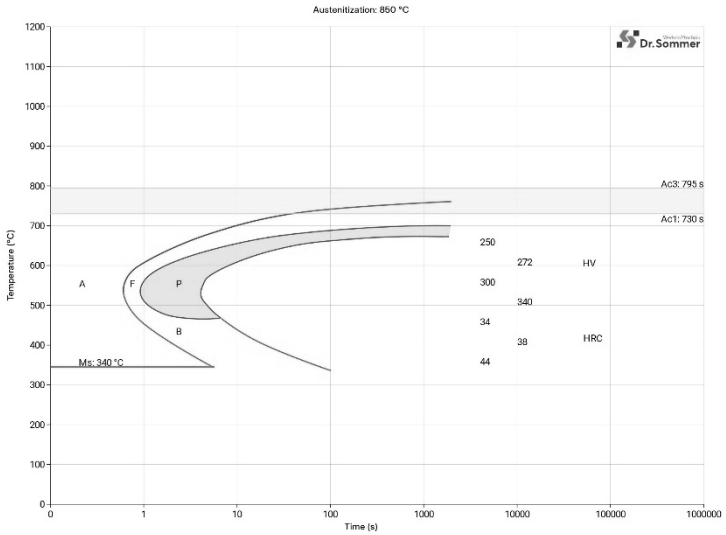
Divisions of
ABRAMS Industries GmbH & Co. KG
Hannoversche Str. 38 / 46
49084 Osnabrück
Germany

County court Osnabrück / Germany, HRA 6865
GP: ABRAMS Industries Verwaltungs GmbH
Country court Osnabrück /Germany, HRB 20019
CEO: Dipl.-Wi.-Ing. Dr. Jürgen Abrams
COO: Ms. Nur H. Nezir, LL. B.

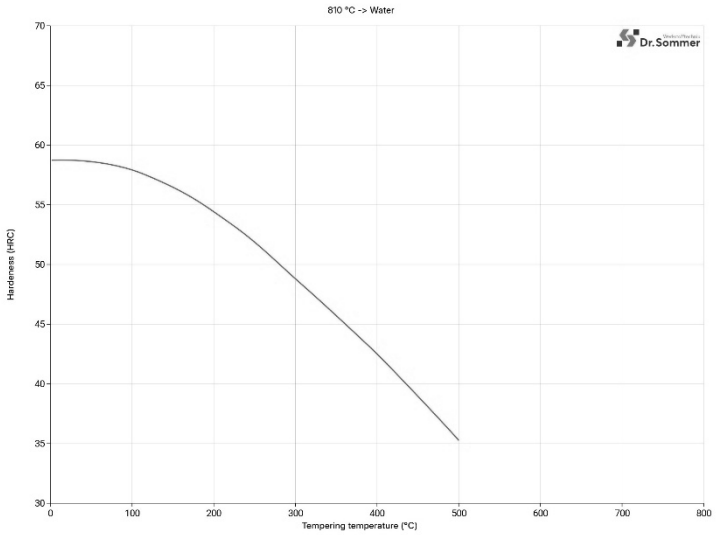
T: +49 541 / 357 39-0
sales@abrams-industries.eu
www.abrams-industries.eu/shop
VAT-No.: DE221940667

Bank details:
Bank: Sparkasse Osnabrück / Germany
SWIFT / BIC: NOLADE22
IBAN: DE63 2655 0105 1522 9268 96

Isothermical ZTU-diagram



Tempering diagram



The data shown here is to be used only as an indication of the statistics, thus we accept no liability.
Diagrams are taken from Datenbank StahlWissen Dr. Sommer Werkstofftechnik
Issued: 2012

Divisions of
ABRAMS Industries GmbH & Co. KG
Hannoversche Str. 38 / 46
49084 Osnabrück
Germany

County court Osnabrück / Germany, HRA 6865
GP: ABRAMS Industries Verwaltungs GmbH
Country court Osnabrück /Germany, HRB 20019
CEO: Dipl.-Wi.-Ing. Dr. Jürgen Abrams
COO: Ms. Nur H. Nezir, LL. B.

T: +49 541 / 357 39-0
sales@abrams-industries.eu
www.abrams-industries.eu/shop
VAT-No.: DE221940667

Bank details:
Bank: Sparkasse Osnabrück / Germany
SWIFT / BIC: NOLADE22
IBAN: DE63 2655 0105 1522 9268 96