

Material specification sheet

Saarstahl - C40E (Ck40)

Material No.:	Former brand name:	International steel grades:
1.1186		BS: 080M40, 080A40, 060A40 AFNOR: C40E, 2C40, XC42H1 SAE: 1040

Material group: Steel for quenching and tempering according to DIN EN 10083

Chemical composition: (Typical analysis in %)	C	Si	Mn	S	other
	0,40	0,25	0,65	<=0,03	(Pb)

Application: Plain carbon steel for mechanical engineering and automotive components

Hot forming and heat treatment:	Forging or hot rolling:	1100 - 850°C
	Normalising:	850 - 890°C/air
	Soft annealing:	680 - 710°C/furnace
	Hardening:	830 - 870°C/water, oil
	Tempering:	550 - 660°C/air

Mechanical Properties: Treated for cold shearability +S: Shearable in as rolled condition
Soft annealed +A: -

Quenched and tempered, +QT:

Diameter d [mm]	< 16	>16 – 40	>40 – 100	>100 – 160	>160 – 250
Thickness t [mm]	< 8	8<t<20	20<t<60	60<t<100	100<t<160
0,2% proof stress R _{p0,2} [N/mm ²]	min. 460	min. 400	min. 350	-	-
Tensile strength R _m [N/mm ²]	650 - 800	630 - 780	600 - 750	-	-
Fracture elongation A ₅ [%]	min. 16	min. 18	min. 19	-	-
Reduction of area Z [%]	min. 35	min. 40	min. 45	-	-
Notch impact energy ISO-V [J]	min. 30	min. 30	min. 30	-	-

Normalised, +N:

Diameter d [mm]	< 16	>16 – 100	>100 – 250		
Thickness t [mm]	< 16	16<t<100	100<t<250		
0,2% proof stress R_{p0,2} [N/mm²]	min. 320	min. 290	min. 260		
Tensile strength R_m [N/mm²]	min. 580	min. 550	min. 530		
Fracture elongation A₅ [%]	min. 16	min. 17	min. 17		