

## Material specification sheet

### Saarstahl - C40E (Ck40)

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

<b>Hot forming and heat treatment:</b>	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:

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

Normalised, +N:

<b>Diameter d [mm]</b>	< 16	>16 – 100	>100 – 250		
<b>Thickness t [mm]</b>	< 16	16<t<100	100<t<250		
<b>0,2% proof stress R<sub>p0,2</sub> [N/mm<sup>2</sup>]</b>	min. 320	min. 290	min. 260		
<b>Tensile strength R<sub>m</sub> [N/mm<sup>2</sup>]</b>	min. 580	min. 550	min. 530		
<b>Fracture elongation A<sub>5</sub> [%]</b>	min. 16	min. 17	min. 17		