

## Material specification sheet

### Saarstahl - C22E (Ck22) - C22R (Cm22)

Material No.:	Former brand name:	International steel grades:
1.1151	R2	<b>BS:</b> 055M15 <b>AFNOR:</b> C22E, C22R, XC25, 2C22 <b>SAE:</b> 1020, 1023
1.1149		

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

Chemical composition: (Typical analysis in %)	Steel	C	Si	Mn	S	other
	C22E	0,20	0,25	0,50	<0,030	(Pb)
	C22R	0,20	0,25	0,50	0,020 0,035	(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:	880 - 920°C/air
	Soft annealing:	680 - 710°C/furnace
	Hardening:	860 - 900°C/water
	Tempering:	550 - 660°C

**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 <sub>p0,2</sub> [N/mm <sup>2</sup> ]	min. 340	min. 290	-	-	-
Tensile strength R <sub>m</sub> [N/mm <sup>2</sup> ]	500 - 650	470 - 620	-	-	-
Fracture elongation A <sub>5</sub> [%]	min. 20	min. 22	-	-	-
Reduction of area Z [%]	min. 50	min. 50	-	-	-
Notch impact energy ISO-V [J]	min. 50	min. 50	-	-	-

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. 240	min. 210	-		
<b>Tensile strength R<sub>m</sub> [N/mm<sup>2</sup>]</b>	min. 430	min. 410	-		
<b>Fracture elongation A<sub>5</sub> [%]</b>	min. 24	min. 25	-		