Material specification sheet

Saarstahl - C22E (Ck22) - C22R (Cm22)

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

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.

Hot forming and heat treatment:

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 $R_{p0,2}$ [N/mm²]	min. 340	min. 290	-	-	-
Tensile strength R_m [N/mm²]	500 - 650	470 - 620	-	-	-
Fracture elongation A_5 [%]	min. 20	min. 22	-	-	-
Reduction of area Z [%]	min. 50	min. 50	-	-	-
Notch impact energy ISO-V [J]	min. 50	min. 50	-	-	-

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. 240	min. 210	-		
Tensile strength R_m [N/mm²]	min. 430	min. 410	-		
Fracture elongation A_5 [%]	min. 24	min. 25	-		