

Quality	C55E
According to standard	EN 10083-2: 2006
Number	1.1203

Chemical composition

C%	Si%	Mn%	P%	S%	Cr%	Mo%	Ni%	Deviations allowed for analysis product
	max		max	max	max	max	max	
0,52-0,60	0,40	0,60-0,90	0,030	0,035	0,40	0,10	0,40	
± 0.03	+0.03	± 0.04	+ 0.005	+ 0.005				

Cr+Mo+Ni max 0.63%

For C55R n° 1.1209, S% 0.020-0.040 product deviations ± 0.005

For C55 n° 1.0535, P% - S% max 0.045

Temperature °C

Hot-forming	Normalizing	Quenching	Quenching	Tempering	Stress-relieving	
1050-850	825-885 air	830 water	850 oil or polymer	550-650 air	50° under the temperature of tempering	
Soft annealing	Isothermal annealing	Natural state	End quench hardenability test	Pre-heating welding		Stress-relieving after welding
680-700 air (HB max 229)	790 furnace cooling to 660, then air	(HB max 255)	830 water	250 Ac1 Ac3 730 765		600 furnace cooling Ms Mf 300 80

Mechanical and physical properties

Hot-rolled mechanical properties in **normalized** condition EN 10083-2: 2006

size d / t		Testing at room temperature (longitudinal)					
mm		R	Re ^{a)}	A%	C%	Kv	HB
from	to	N/mm ² min	N/mm ² min.	min.	min.	J min.	min
	16/16	680	370	11			208
16/16	100/100	640	330	12			198
100/100	250/250	620	300	12			190

d = diameter t = thickness

Hot-rolled mechanical properties in **quenched and tempered** condition EN 10083-2: 2006

size d / t		Testing at room temperature (longitudinal)					
mm		R	Re ^{a)}	A%	C%	Kv	HB
from	to	N/mm ²	N/mm ² min	min.	min.	J min	for information
	16/8	800-950	550	12	30		240-286
16/8	40/20	750-900	490	14	35		225-271
40/20	100/60	700-850	420	15	40		213-253

^{a)} Re upper yield strength or, if no yield phenomenon occurs, Rp_{0.2} has to be considered

d = diameter t = thickness

Table of tempering values obtained at room temperature on rounds of Ø 60 mm after quenching at 830 °C in oil

HB		286	268	253	240	226	223	162
HRC		28	25	23	22.5	20		
R	N/mm ²	950	890	850	800	760	720	560
Rp 0.2	N/mm ²	650	590	530	480	430	400	380
A	%	9	11	13	16	18	19	24
C	%	28	38	42	45	50	50	
Tempering at °C		400	450	500	550	600	650	690 (annealing)

C55 1.0535 EN 10277-2: 2008

Cold-drawn +C ^{c)}						Hot-rolled + peeled-reeled +SH ^{c)}			
size		Testing at room temperature (longitudinal)				Testing at room temperature (longitudinal)			
mm		R ^{a)}	Rp 0.2 ^{a)}	A%	HB	R	Rp 0.2	A%	HB
from	to	N/mm ²	N/mm ² min	min	for inform.	N/mm ²	N/mm ² min	min	
5 ^{b)}	10	770-1100	590	5	231-331				
10	16	730-1080	520	6	224-327				
16	40	690-1050	440	7	210-319	610-910			181-269
40	63	650-1030	390	8	200-311	610-910			181-269
63	100					610-910			181-269

^{a)} for flats and special sections, yield point can be – 10% and tensile strength can be ± 10%

^{b)} for thickness < 5 mm, mechanical properties should be agreed before order placement

^{c)} values valid also for +C+SL and +SH+SL

C55E 1.1203 Forged normalized EN 10250-2: 2001

size		Testing at room temperature (longitudinal)							
mm		R	Re ^{c)}	A% L	A% T	A% Q	Kv L	Kv T	HB
from	to	N/mm ² min	N/mm ² min	min	min	min	J min	J min	min
	100	640	330	12					198
100	250	620	300	12	9				190
250	500	600	260	12	9				178
500	1000	590	250	11	8				176

d = diameter t = thickness

C55E 1.1203 Forged quenched and tempered EN 10250-2: 2001

size d / t		Testing at room temperature (longitudinal)							
mm		R	Re ^{c)}	A% L	A% T	C% L	Kv L	Kv T	HB
from	to	N/mm ² min	N/mm ² min	min	min	J min	J min	J min	min
	100/70	700	420	15					213
100/70	250/160	630	360	17	11				192
250/160	500/330	610	330	16	10				183

L = longitudinal T = tangential Q = radial

^{c)} Re upper yield strength or, if no yield phenomenon occurs, Rp 0.2 has to be considered

d = diameter t = thickness

EN 10083-2: 2006 Jominy test HRC grain size 5 min.

mm distance from quenched extremity																	
	1	2	3	4	5	6	7	8	9	10	11	13	15	20	25	30	H
min	58	55	47	37	33	32	31	30	29	28	27	26	25	24	22	20	normal
max	65	64	63	62	60	57	52	45	37	36	35	34	33	32	30	29	

Temperature	Mod. of elasticity GPa		Thermal expansion				Density
Testing at °C	E long.	G tang.	10 ⁻⁶ · K ⁻¹				Kg/dm ³
20	205	79					7.85

EUROPE EN	ITALY UNI	CHINA GB	GERMANY DIN	FRANCE AFNOR	U.K. B.S.	RUSSIA GOST	USA AISI/SAE
C55E	C55	55	Ck55	XC55 H1	870M55		1055