

Quality	C10E
According to standard	EN 10084: 2008
Number	1.1121

Chemical composition

C%	Si%	Mn%	P%	S%	Deviations allowed for analysis product
	max		max	max	
0,07-0,13	0,40	0,30-0,60	0,035	0,035	
± 0.02	+ 0.03	± 0.04	+ 0.005	+ 0.005	

C10R n° 1.1207 S% 0.020-0 product deviation ± 0.005%
 C10 n° 1.0301 P% - S% max 0.045
 On request, this steel grade can be supplied with addition of lead (Pb) 0.15-0.35%

Temperature °C

Hot-forming	Normalizing	Core hardening	Carbonitriding	Carburizing	Hardening carburizing surf.	Tempering
1150-850	920 Air (HB 85 – 140)	880-920 water	750-930 gas	880-980	780-820 water.	150 200
Soft annealing	Isothermal annealing	Natural state	Hardening on specimen Ø 25 mm	Pre-heating welding	Stress-relieving after welding	
660-700 air	930 furnace cooling to 650, then air		900 water	welding must be carried out on the annealed state and before carburizing	100 Ac1	slow cooling Ms * core ** carburizing surface
(HB max 131)	(HB 100-150)	(HB max 150)	(HRC ~ 38)	725	880	480* 220**

Mechanical and physical properties

Hot-rolled values obtained on test blanks after core hardening + stress relieving UNI 7846: 1978. Use only as reference.

size mm	Testing at room temperature (longitudinal)					
	R	Rp 0.2	A%	C%	Kcu	HB
test blanks	N/mm ²	N/mm ² min.	min.	min.	J min.	
11	540-930	345	12		35	158-278
30	390-640	245	15		35	114-198 for information

Work-hardening by cold-rolling table						
R	N/mm ²	615	705	800		
Reduction	%	20	38	66		

C10R 1.1207

Cold-drawn +C EN 10277-4: 2008 ^{c)}

size mm		Testing at room temperature (longitudinal)				Testing at room temperature (longitudinal)			
from	to	R ^{a)} N/mm ²	Rp 0.2 ^{a)} N/mm ² min	A% min	HB	R N/mm ²	Rp 0.2 N/mm ² min	A% min	HB
5 ^{b)}	10	460-760	350	8	139-226				
10	16	430-730	300	9	128-224				
16	40	400-700	250	10	119-213	310-550			92-163
40	63	350-640	200	12	103-198	310-550			92-163
63	100	320-580	180	12	92-172	310-550			92-163

size mm		Soft annealing +A +SH Peeled-reeled, Ground +SL	Soft annealing +A +C Cold-drawn
from	to	HB max	HB max
5 ^{b)}	10		225
10	16		216
16	40	131	207
40	63	131	190
63	100	131	172

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

Forged UNI 8550: 1984. Use only as reference.

size mm		Testing at room temperature (longitudinal)							
from	to	R N/mm ²	Rp 0.2 N/mm ² min	A% L min	A% T min	A% Q min	Kcu L J min	Kv L J min	HB <i>for inform.</i>
	11	540-930	345	12			35		158-278
11	25	440-685	275	14			40		132-209
25	40	390-590	245	16			40		114-176

Mechanical properties obtained on test blanks after core hardening + stress-relieving

L = longitudinal T = tangential Q = radial

Jominy test HRC

distance in mm from quenched end

	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50	--
min	No indications from reference standards															
max																

Specific heat capacity J/(Kg•K)	Density Kg/dm ³	Thermal conductivity W/(m•K)	Mod. of elasticity longitudinal E GPa +20°C	Mod. of elasticity tangential G GPa +20 °C
450	7.86	65	200	76,76

Specific electric resist. Ohm•mm ² /m	Electrical conductivity Siemens•m/mm ²	Thermal expansion 10 ⁻⁶ •K ⁻¹
		100 °C
0.11	9.09	11.8

EUROPE EN	ITALY UNI	CHINA GB	GERMANY DIN	FRANCE AFNOR	U.K. B.S.	RUSSIA GOST	USA AISI/SAE
C10E	C10	10	Ck10	XC10	045M10	10	1010

C10E

Heat treatment	Temperature (+ ... °C) - min. values						Fatigue data			
	20	200	300	350	400	450	500	600		
+U	276								Cyclic yield strength, σ_y'	
+N	245								N/mm ² low cycle fatigue	
+U	0.10								Cyclic strength exponent, n'	
+N	0.14								low cycle fatigue	
+U	505								Cyclic strength coefficient, K'	
+N	607								N/mm ² low cycle fatigue	
+U	1245								Fatigue strength coefficient, σ_f'	
+N	657								N/mm ² low cycle fatigue	
+U	-0.14								Fatigue strength exponent, b	
+N	-0.90								low cycle fatigue	
+U	14.08								Fatigue ductility coefficient, g_f'	
+N	1.40								low cycle fatigue	
+U	-0.84								Fatigue ductility exponent, c	
+N	-0.62								low cycle fatigue	
+U	natural									
+N	normalized									

C % - depth diagram

Carburizing 930°C for 3 h in salt bath

