

<b>Quality</b>	<b>46S20</b>
According to standard	<b>EN 10087: 2000</b>
Number	<b>1.0727</b>

Chemical composition						
C%	Si%	Mn%	P%	S%	Pb%	Deviations allowed for analysis product
	max		max			
0,42-0,50	0,40	0,70-1,10	0,06	0,15-0,25		
± 0.03	+ 0.03	± 0.04	+ 0.008	± 0.03		

Temperature °C					
Hot-forming	Natural state	Soft annealing	Carburizing	Hardening on carburized surface	Stress-relieving
1230-950	(HB 234 max)	680 air			
Normalizing	Direct hardening	Direct hardening	Stress-relieving	Pre-heating welding	Stress-relieving after welding
860 air	840 water	860 oil or polymer	540-680 furnace cooling		not recommended

Mechanical properties							
Hot-rolled natural forming condition EN 10087: 2000				Hot-rolled quenched and tempered			
Testing at room temperature (longitudinal)				Testing at room temperature (longitudinal)			
size mm		R	HB	R	Rp 0.2	A%	HB
from	to	N/mm <sup>2</sup>	for information	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	for inform.
5	10	590-800	176-240	700-850	490	12	213-253
10	16	590-780	175-232	700-850	490	12	213-253
16	40	590-760	175-225	650-800	430	13	200-240
40	63	580-730	172-216	630-780	370	14	192-232
63	100	560-710	166-211	630-780	370	14	192-232

Cold-drawn +C EN 10277-3: 2008				Hot-rolled Peeled-Reeled +SH					
Values valid also for +C+SL				Values valid also for +SH+SL					
size mm		Testing at room temperature (longitudinal)			Testing at room temperature (longitudinal)				
from	to	R <sup>a)</sup>	Rp 0.2 <sup>a)</sup>	A%	HB	R	Rp 0.2	A%	HB
		N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	for inform.	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	
5 <sup>b)</sup>	10	740-980	570	5	224-295				
10	16	690-930	470	6	210-278				
16	40	640-880	400	7	198-263	590-760			175-225
40	63	610-850	380	8	183-253	580-730			172-216
63	100	580-820	340	8	172-246	560-710			166-211

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

Cold-drawn + quenching and tempering +C +QT EN 10277-3: 2008				Quenched and tempered + cold-drawn +QT +C					
size mm				Testing at room temperature (longitudinal)					
from	to	R <sup>c)</sup>	Rp 0.2 <sup>c)</sup>	A% <sup>c)</sup>	HB <sup>c)</sup>	R	Rp 0.2	A%	HB
		N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	for inform.	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	for inform.
5 <sup>b)</sup>	10					850-1000	595	8	253-298
10	16					800-950	560	9	240-286
16	40	650-800	430	13	200-240	700-850	490	10	213-253
40	63	630-780	370	14	192-232	700-850	490	11	213-253
63	100	630-780	370	14	192-232	650-850	455	11	200-253

c) values valid also for +C+QT+SL and +QT+C+SL

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

<b>Table of tempering</b> values obtained at room temperature on rounds of Ø 10 mm after quenching at 850 °C in oil								
<b>HB</b>	560	560	525	482	390	327	279	
<b>HRC</b>	55	55	53	50	42	35	29	
<b>R</b> N/mm <sup>2</sup>	2070	2070	1950	1760	1340	1080	930	
<b>Tempering at °C</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>	<b>500</b>	<b>600</b>	
<b>EUROPE EN</b>	<b>ITALY UNI</b>	<b>CHINA GB</b>	<b>GERMANY DIN</b>	<b>FRANCE AFNOR</b>	<b>U.K. B.S.</b>	<b>RUSSIA GOST</b>	<b>USA AISI/SAE</b>	
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