

LOW-CARBON IF STEELS FOR COLD WORKING AND STEELS FOR CONSTRUCTION

MECHANICAL PROPERTIES

Rolled product grade	Standard	Yield strength, MPa (N/mm ²)	Ultimate strength, MPa (N/mm ²)	Relative elongation, %, min.	R ₉₀	n ₉₀	Sampling direction with respect to rolling direction
DX51D	EN 10346	—	270–500	22	—	—	Transverse
DX52D		140–300	270–420	26	—	—	
DX53D		140–260	270–380	30	—	—	
DX54D		140–220	260–350	36	≥ 1.6	≥ 0.18	
DX56D		120–180	260–350	39	≥ 1.9	≥ 0.21	
DX57D		120–170	260–350	41	≥ 2.1	≥ 0.22	
S220GD		≥ 220	≥ 300	20	—	—	
S250GD	≥ 250	≥ 330	19	—	—		
S280GD	≥ 280	≥ 360	18	—	—		
S320GD	≥ 320	≥ 390	17	—	—		
S350GD	≥ 350	≥ 420	16	—	—		
S390GD	≥ 390	≥ 460	15	—	—		
S420GD	≥ 420	≥ 480	15	—	—		
S450GD	≥ 450	≥ 510	14	—	—		
01	GOST 14918	—	—	—	—	—	Transverse
02		—	270–500	20	—	—	
03		—	270–420	24	—	—	
04		≤ 260	270–380	28	—	—	
05		≤ 220	270–350	34	≥ 1.6	≥ 0.18	
06		≤ 180	270–350	35	≥ 1.9	≥ 0.21	
07		≤ 170	260–350	37	≥ 2.1	≥ 0.22	
220		≥ 220	≥ 300	18	—	—	Longitudinal
250		≥ 250	≥ 330	17	—	—	
280		≥ 280	≥ 360	16	—	—	
320		≥ 320	≥ 390	15	—	—	
350		≥ 350	≥ 420	14	—	—	
390		≥ 390	≥ 450	13	—	—	
420		≥ 420	≥ 480	12	—	—	
450	≥ 450	≥ 510	13	—	—		
BF	TU 14-106-438	—	270–410	26–28	—	—	Transverse
CB		≤ 205	270–380	32–34	—	—	
OCB		≤ 195	270–350	34–36	≥ 1.6	≥ 0.20	
BOCB		≤ 185	270–350	38–40	≥ 2.0	≥ 0.21	
CS Type A	ASTM A 653M	170–380	—	20	—	—	Longitudinal
CS Type B		205–380	—	20	—	—	
CS Type C		170–410	—	15	—	—	
FS Type A, B		170–310	—	26	1.0–1.4	0.17–0.21	Longitudinal
SS 230		≥ 230	≥ 310	20	—	—	
SS 255	≥ 255	≥ 360	18	—	—		
SS 275	≥ 275	≥ 380	16	—	—		

For galvanized steel as per GOST 14918, GOST R 52246, and TU 14-106-438, requirements for relative elongation depend on the rolled product thickness. For galvanized steel as per EN 10346 with thickness < 0.7 mm, relative elongation can be reduced by 2%.

Mechanical properties of galvanized steel of CS, FS, DDS and EDDS grades are not rated; the table contains the typical range of mechanical properties as per ASTM A 653/A 653M.

Yield strength of DX52D grade steel is rated only for skin-passed steel (with "B" and "C" surface finish).

Other specified mechanical properties are available upon request.

APPROXIMATE COMPARISON OF GRADES AND THEIR APPLICATIONS

Rolled product application as per GOST 14918	GOST 14918	TU 14-106-438	EN 10346	ASTM A 653M
Production of flat products by bending	01	–	–	–
Production of cooking and household wares by bending and lock-joining	02	–	DX51D	CS (Type A, B, C)
Production of stamped products with special deep drawing quality and complex sections	03	BF	DX52D	FS (Type A, B)
Production of stamped products of complex drawing quality	04	–	DX53D	–
	–	CB	–	–
Production of stamped products of extra-complex drawing quality	05	–	DX54D	–
	–	OCB	–	–
Production of stamped products of special extra-complex drawing quality	06, 07	BOCB	DX56D, DX57D	–
	–	–	–	–
Structural rolled steel for shaped products	220	–	S220GD	SS 230
	250	–	S250GD	SS 255
	280	–	S280GD	SS 275
	320	–	S320GD	–
	350	–	S350GD	–
	420	–	S420GD	–
	450	–	S450GD	–

THICKNESS/WIDTH RATIO FOR ROLLED PRODUCTS

● 01, 02, DX51D, CS (Type A, B, C)

Thickness, mm	Strip width, mm									
	900	1,000	1,250	1,350	1,440	1,520	1,550	1,620	1,800	
0.22–0.30										
0.31–0.39										
0.40–0.41										
0.42–0.49										
0.50–0.70										
0.71–0.90										
0.91–2.00										
2.01–2.99										
3.00–4.00										

● 03, DX52D, FS (Type A, B)

Thickness, mm	Strip width, mm									
	900	1,000	1,250	1,350	1,440	1,520	1,550	1,620	1,720	
0.30–0.39										
0.40–0.41										
0.42–0.49										
0.50–0.70										
0.70–1.50										
1.51–2.00										
2.01–2.99										
3.00–4.00										

● 04, 05, DX53D, DX54D, CB, OCB

Thickness, mm	Strip width, mm					
	900	1,250	1,600	1,650	1,750	1,800
0.45–0.59						
0.60–0.69						
0.70–0.85						
0.71–0.83						
0.86–1.00						
1.01–2.00						

● 05, 06, 07, DX56D, DX57D, BOCB, BOCB-T

Thickness, mm	Strip width, mm						
	900	1,250	1,350	1,450	1,600	1,750	1,800
0.60							
0.61–0.70							
0.71–0.85							
0.86–1.00							
1.01–2.00							

● 220, S220GD, SS 230

Thickness, mm	Strip width, mm									
	900	1,000	1,250	1,350	1,440	1,500	1,520	1,550	1,620	
0.30–0.39										
0.40–0.41										
0.42–0.49										
0.50–0.80										
0.81–2.00										
2.01–2.99										
3.00–4.00										

● 250, S250GD, SS 255

Thickness, mm	Strip width, mm									
	900	1,250	1,350	1,400	1,500	1,520	1,550	1,600	1,620	
0.30–0.39										
0.40–0.49										
0.50–0.54										
0.55–0.70										
0.71–0.80										
0.81–2.00										
2.00–2.99										
3.00–3.50										
3.51–4.00										

● 280, S280GD, SS 275

Thickness, mm	Strip width, mm									
	900	1,250	1,320	1,350	1,420	1,470	1,500	1,520	1,600	
0.30-0.41										
0.42-0.54										
0.55-0.80										
0.81-1.50										
1.51-1.80										
1.81-2.00										
2.01-2.44										
2.45-3.00										
3.01-4.00										

● 320, 350, S320GD, S350GD

Thickness, mm	Strip width, mm									
	900	1,250	1,270	1,300	1,320	1,370	1,505	1,520	1,550	1,600
0.50-0.80										
0.81-0.85										
0.86-0.95										
0.96-1.80										
1.81-2.00										
2.01-2.49										
2.50-2.99										
3.00										
3.01-3.50										
3.51-4.00										

● 390, S390GD

Thickness, mm	Strip width, mm									
	900	1,250	1,300	1,320	1,370	1,400	1,520	1,550	1,600	
0.80-2.00										
2.01-2.49										
2.50-2.99										
3.00										
3.01-3.51										
3.51-4.00										

● 420, 450, S420GD, S450GD

Thickness, mm	Strip width, mm									
	900	1,078	1,265	1,320	1,370	1,400	1,520	1,550	1,600	
1.50-1.79										
1.80-2.29										
2.30-2.99										
3.00-4.00										