

BS EN 10028-2: 1993 Flat products made of steels for pressure purposes
Non-alloy and alloy steels with specified elevated temperature properties

		Grade		161-360	161-400	161-430		271	281	621	660
		C	0.17	0.20	0.25	0.11 ~ 0.17		0.08 ~ 0.14	0.09 ~ 0.17	0.08 ~ 0.13	
Chemical Composition % maximum	Si	0.10 ~ 0.35	0.10 ~ 0.35	0.10 ~ 0.35			0.40	0.40	0.50 ~ 0.80	0.30	
	Mn	0.40 ~ 1.20	0.50 ~ 1.30	0.60 ~ 1.40			1.10 ~ 1.50	1.00 ~ 1.50	0.40 ~ 0.65	0.60 ~ 1.00	
	P	0.030	0.030	0.030			0.025	0.025	0.025	0.025	
	S	0.030	0.030	0.030			0.015	0.015	0.015	0.015	
	Cr	0.25	0.25	0.25			0.40 ~ 0.70	0.40 ~ 0.70	1.00 ~ 1.50	0.25 ~ 1.50	
	Mo	0.10	0.10	0.10			0.24 ~ 0.30	0.24 ~ 0.30	0.45 ~ 0.60	0.50 ~ 0.70	
	Ni	0.30	0.30	0.30			0.80	0.60 ~ 1.00	0.30	0.30	
	Cu	0.30 ⁷⁾	0.30 ⁷⁾	0.30 ⁷⁾			0.30	0.30	0.30	0.20	
	Al	-	-	-			0.020	0.020	0.020	0.020	
	V	-	-	-			0.04 ~ 0.12	0.04 ~ 0.12	-	0.22 ~ 0.28	
Treatment		AR or N ¹¹⁾	AR or N ¹¹⁾	AR or N ¹¹⁾		N & T	N & T	N & T	N & T		
		Thickness (mm)				Thickness (mm)					
Yield ³⁾ Stress R _{eH} N/mm ²	3 < t ≤ 16	205	225	250	t ≤ 25	500	500	340	-		
	16 < t ≤ 40	195	215	240	25 < t ≤ 75	460	460	340	-		
	40 < t ≤ 60	185	205	230	75 < t ≤ 150	430	-	320 ⁹⁾	-		
	60 < t ≤ 100	175	200	220	100 < t ≤ 150	-	-	310	-		
	100 < t ≤ 150	170	195	210	t ≤ 100	-	-	-	310		
Tensile Strength R _m N/mm ²	3 < t ≤ 16	360/480	400/520	430/550	t ≤ 25	640/760	640/760	515/690	-		
	16 < t ≤ 40	360/480	400/520	430/550	25 < t ≤ 75	610/730	610/730	515/690	-		
	40 < t ≤ 60	360/480	400/520	430/550	75 < t ≤ 150	590/690	590/690	500/670 ⁹⁾	-		
	60 < t ≤ 100	360/480	400/520	430/550	100 < t ≤ 150	-	-	490/650	-		
	100 < t ≤ 150	360/480	400/520	430/550	t ≤ 100	-	-	-	460/610		
Elongation A ⁵⁾ %	3 < t ≤ 16	26	24	23	t ≤ 25	16	16	18	-		
	16 < t ≤ 40	26	24	23	25 < t ≤ 75	16	16	18	-		
	40 < t ≤ 63	25	23	22	75 < t ≤ 150	16	16	16 ⁹⁾	-		
	63 < t ≤ 100	24	22	21	100 < t ≤ 150	-	-	16	-		
	100 < t ≤ 150	24	22	21	t ≤ 100	-	-	-	-		
Impact ¹²⁾ KV J	min. average of 3 min. individual	-	-	-	t ≤ 150	27 at 0°C 19 at 0°C	27 at -40°C 19 at -40°C	- -	- -		
	min. average of 3 min. individual	-	-	-	t ≤ 100	-	-	27 at 20°C	-		
						-	-	19 at 20°C	-		
Minimum 0.2% proof stress N/mm ²	100	3 < t ≤ 16	-	-	-	t ≤ 25	420	420	315	282	
		16 < t ≤ 40	-	-	-	25 < t ≤ 75	402	402	315	282	
		40 < t ≤ 63	-	-	-	75 < t ≤ 100	363	363	300	282	
		63 < t ≤ 100	-	-	-	100 < t ≤ 150	363	363	290	-	
	150	3 < t ≤ 16	172	200	222	t ≤ 25	406	406	305	276	
		16 < t ≤ 40	169	192	210	25 < t ≤ 75	389	389	305	276	
		40 < t ≤ 63	158	185	-	75 < t ≤ 100	349	349	290	276	
		63 < t ≤ 100	148	170	186	100 < t ≤ 150	349	349	280	-	
	200	3 < t ≤ 16	168	195	215	t ≤ 25	398	398	291	267	
		16 < t ≤ 40	162	185	202	25 < t ≤ 75	380	380	291	267	
		40 < t ≤ 63	152	175	-	75 < t ≤ 100	341	341	277	267	
		63 < t ≤ 100	144	166	181	100 < t ≤ 150	341	341	268	-	
	250	3 < t ≤ 16	150	174	192	t ≤ 25	389	389	280	241	
		16 < t ≤ 40	144	165	181	25 < t ≤ 75	372	372	280	241	
		40 < t ≤ 63	141	162	-	75 < t ≤ 100	332	332	265	241	
		63 < t ≤ 100	136	157	172	100 < t ≤ 150	332	332	256	-	
	300	3 < t ≤ 16	124	145	161	t ≤ 25	374	374	266	225	
		16 < t ≤ 40	124	145	161	25 < t ≤ 75	354	354	266	225	
		40 < t ≤ 63	124	145	-	75 < t ≤ 100	310	310	250	225	
		63 < t ≤ 100	124	145	161	100 < t ≤ 150	310	310	239	-	
	350	3 < t ≤ 16	117	137	153	t ≤ 25	363	363	255	216	
		16 < t ≤ 40	117	137	153	25 < t ≤ 75	343	343	255	216	
		40 < t ≤ 63	117	137	-	75 < t ≤ 100	301	301	238	216	
		63 < t ≤ 100	117	137	153	100 < t ≤ 150	301	301	227	-	
	400	3 < t ≤ 16	115	133	148	t ≤ 25	351	351	251	209	
		16 < t ≤ 40	115	133	148	25 < t ≤ 75	332	332	251	209	
		40 < t ≤ 63	115	133	-	75 < t ≤ 100	292	292	234	209	
		63 < t ≤ 100	115	133	148	100 < t ≤ 150	292	292	222	-	
	450	3 < t ≤ 16	-	-	-	t ≤ 25	347	347	245	203	
		16 < t ≤ 40	-	-	-	25 < t ≤ 75	329	329	245	203	
		40 < t ≤ 63	-	-	-	75 < t ≤ 100	289	289	228	203	
		63 < t ≤ 100	-	-	-	100 < t ≤ 150	289	289	217	-	
	500	3 < t ≤ 16	-	-	-	t ≤ 25	314	314	238	200	
		16 < t ≤ 40	-	-	-	25 < t ≤ 75	301	301	238	200	
		40 < t ≤ 63	-	-	-	75 < t ≤ 100	266	266	221	200	
		63 < t ≤ 100	-	-	-	100 < t ≤ 150	266	266	211	-	
	550	t ≤ 40	-	-	-	t ≤ 75	-	-	227	197	
		40 < t ≤ 63	-	-	-	75 < t ≤ 100	-	-	211	197	
		63 < t ≤ 100	-	-	-	100 < t ≤ 150	-	-	201	-	