

BUILDING THE NATION SINCE 1952

BSRM XTREME B 500 DWR

CONFORMS TO BDS ISO 6935-2:2016
IS 1786 GRADE 500S • ASTM-A-615 GRADE 520

BSRM Xtreme

RESULT OF ACTUAL TENSION, BEND & RE-BEND TESTS OF BSRM XTREME GRADE 500 DEFORMED BARS AT BSRM STEELS LTD.

TENSION, BEND, RE-BEND & CHEMICAL TESTS OF DEFORMED BAR														Frog Mark/ID: BSRM XTREME / B500DWR 8,10,12,16,20,25,28,32,40											
Sl. No.	Source	Sample ID	Bar Diameter	Actual Dia	Nominal Cross Section Area	Unit Weight	Tensile Test										Bend Test	Re-Bend Test	Chemical Composition						
							Yield or Proof Load	Yield or Proof Strength	Ultimate Load	Ultimate Strength	T/Y Ratio	%Elongation at Max. Force Agt.	%Elongation after Fracture A	%C	%Mn	%Si			%P	%S	%Cu	%N	%CEV		
			(mm)	(mm)	(mm ²)	(Kg/m)	(N)	(MPa)	(N)	(MPa)		GL: 200mm	GL: 5D												
1			8	7.97	50.27	0.392	26892	535	35689	710	1.33	10.0	22.5	OK	OK	0.292	0.802	0.253	0.03	0.018	0.253	0.0086	0.483		
2			8	7.94	50.27	0.389	27143	540	35186	700	1.30	10.5	23.0	OK	OK	0.299	0.825	0.308	0.04	0.021	0.298	0.0072	0.502		
3			10	9.94	78.54	0.609	42412	540	55371	705	1.31	10.5	21.0	OK	OK	0.298	0.768	0.270	0.04	0.023	0.255	0.0070	0.485		
4			10	9.90	78.54	0.604	42804	545	54978	700	1.28	11.0	24.0	OK	OK	0.292	0.767	0.258	0.03	0.021	0.250	0.0079	0.482		
5			12	11.94	113.10	0.879	61073	540	79734	705	1.31	9.5	21.5	OK	OK	0.302	0.771	0.279	0.04	0.030	0.226	0.0076	0.488		
6			12	11.93	113.10	0.878	62204	550	80865	715	1.30	10.0	21.0	OK	OK	0.297	0.802	0.300	0.04	0.034	0.289	0.0094	0.495		
7			16	15.90	201.06	1.559	108574	540	142754	710	1.31	9.5	22.0	OK	OK	0.294	0.824	0.293	0.04	0.024	0.270	0.0080	0.499		
8			16	15.92	201.06	1.562	107568	535	140744	700	1.31	10.5	24.0	OK	OK	0.304	0.791	0.261	0.04	0.026	0.271	0.0066	0.501		
9			20	19.87	314.16	2.433	169646	540	219912	700	1.30	10.0	22.0	OK	OK	0.308	0.848	0.264	0.04	0.026	0.233	0.0068	0.511		
10			20	19.85	314.16	2.430	172788	550	223054	710	1.29	10.5	21.5	OK	OK	0.309	0.814	0.255	0.04	0.020	0.256	0.0080	0.507		
11			22	21.87	380.13	2.950	210974	555	271796	715	1.29	10.0	22.5	OK	OK	0.296	0.856	0.227	0.04	0.027	0.298	0.0064	0.515		
12			22	21.82	380.13	2.936	205272	540	266094	700	1.30	10.5	23.5	OK	OK	0.290	0.833	0.276	0.04	0.023	0.258	0.0073	0.491		
13			25	24.82	490.88	3.798	267527	545	350976	715	1.31	11.0	21.0	OK	OK	0.294	0.816	0.306	0.03	0.022	0.254	0.0069	0.490		
14			25	24.80	490.88	3.793	269981	550	350976	715	1.30	10.0	20.0	OK	OK	0.295	0.822	0.220	0.04	0.021	0.255	0.0073	0.493		
15			28	27.94	615.75	4.812	335586	545	446421	725	1.33	9.5	22.5	OK	OK	0.304	0.861	0.212	0.04	0.026	0.251	0.0059	0.513		
16			28	27.85	615.75	4.785	344822	560	449500	730	1.30	10.0	20.5	OK	OK	0.303	0.800	0.212	0.03	0.030	0.253	0.0078	0.500		
17			32	31.69	804.25	6.190	446359	555	583081	725	1.31	9.0	20.0	OK	OK	0.287	0.840	0.223	0.03	0.024	0.322	0.0082	0.496		
18			32	31.74	804.25	6.210	438316	545	579060	720	1.32	10.5	19.5	OK	OK	0.297	0.741	0.207	0.04	0.028	0.308	0.0079	0.490		
19			40	39.71	1256.64	9.722	697435	555	929914	740	1.33	9.5	21.0	OK	OK	0.299	0.844	0.210	0.03	0.024	0.251	0.0075	0.499		
20			40	39.74	1256.64	9.735	703718	560	942480	750	1.34	9.5	19.0	OK	OK	0.288	0.867	0.209	0.04	0.030	0.273	0.0071	0.502		

N.B: Tested materials comply with the requirements of BDS ISO 6935-2:2016

Strength is based on nominal cross sectional area

1 kg/cm² = 14.223 psi, 1 kg/cm² = 0.09809 MPa, 1 MPa = 145 psi & 1 N/mm² = 1 MPa

DIMENSIONS, MASS PER UNIT LENGTH AND PERMISSIBLE DEVIATIONS AS PER BDS ISO 6935-2:2016

Nominal bar diameter ^a d mm	Nominal cross-sectional area ^b A _n mm ²	Mass per unit length	
		Requirement ^c kg/m	Permissible deviation ^d %
6	28.3	0.222	±8
8	50.3	0.395	±8
10	78.5	0.617	±6
12	113	0.888	±6
16	201	1.58	±5
20	314	2.47	±5
25	491	3.85	±4
28	616	4.84	±4
32	804	6.31	±4
40	1257	9.86	±4
50	1964	15.42	±4

a Diameters larger than 50 mm should be agreed between the manufacturer and purchaser. The permissible deviation on such bars shall be ±4%

b $A_n = 0.7854 \times d^2$

c Mass per unit length = $7.85 \times 10^{-3} \times A_n$

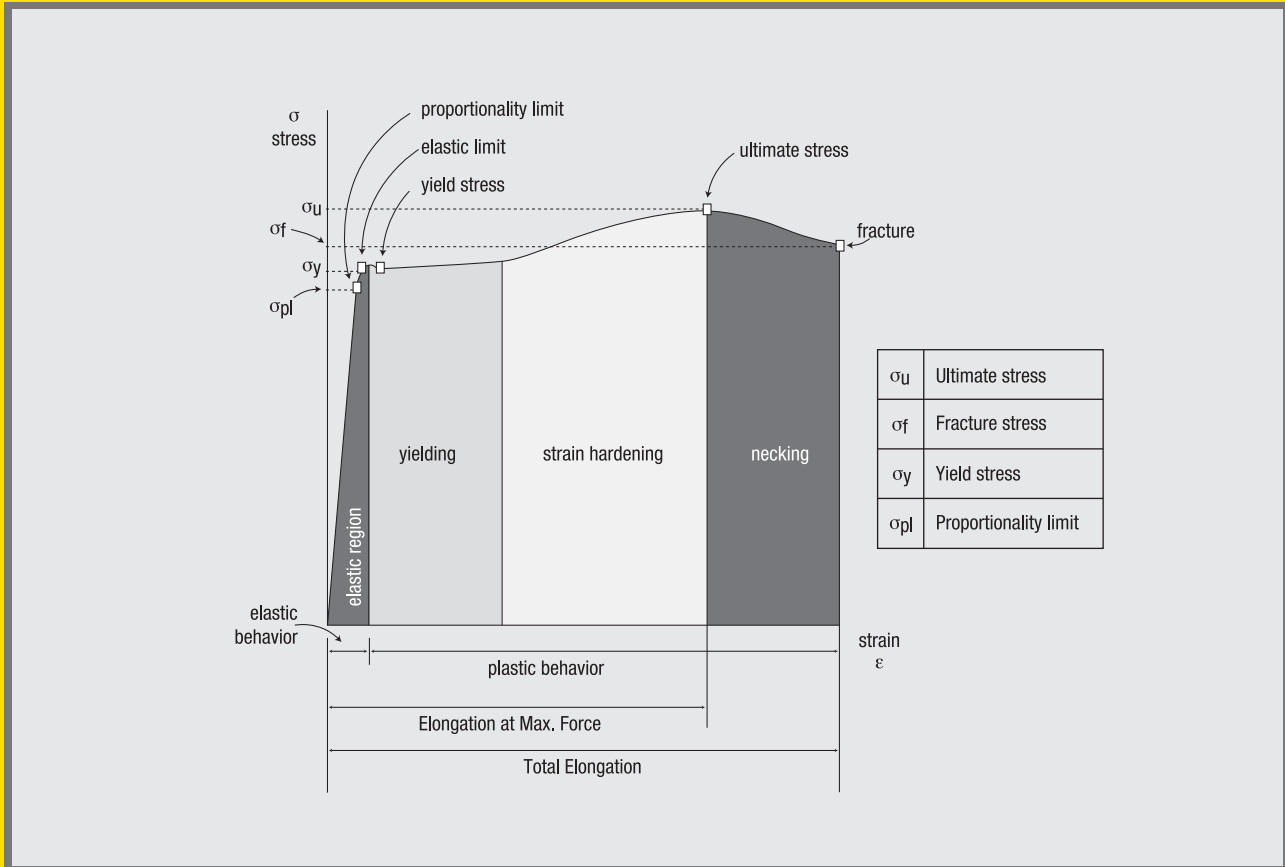
d Permissible deviation refers to a Single bar

TENSILE AND BEND TEST REQUIREMENTS AS PER ISO STANDARD

Standard	Grade	Yield Strength		Ultimate Strength (Min.)	Elongation Gauge: 8"	Elongation at Max. Force (Min.)	Elongation* Gauge: 5D (Min.)	Bend Test Mandrel Dia: d	Re-Bend Test Mandrel Dia: d	Ductility Class
		Minimum	Maximum							
BDS ISO 6935-2 2016	B500DWR	500 MPa (72500 Psi)	1.3X500 = 650 Mpa (94250 Psi)	1.25 X Yield Strength	--	8%	13%	d ≤ 16mm: 3d 16mm < d ≤ 32mm: 6d 32mm < d ≤ 50mm: 7d	d ≤ 16mm: 5d 16mm < d ≤ 25mm: 8d 25mm < d ≤ 50mm: 10d	D

* In case of the bar with dia ≥ 32mm, the elongation may be decreased by 2% for each 3mm increase in dia. (Max. diminution is 4%)

NOMENCLATURE IN TENSILE TEST OF STEEL



CHEMICAL COMPOSITION AS PER ISO, IS STANDARDS

	BDS ISO: 6935-2 B500DWR	IS 1786 Grade 500S
Carbon (C) %	0.32 (max.)	0.32 (max.)
Silicon (Si) %	0.55 (max.)	-
Manganese (Mn) %	1.8 (max.)	-
Phosphorous (P) %	0.04 (max.)	0.04 (max.)
Sulfur (S) %	0.04 (max.)	0.04 (max.)
Nitrogen (N) %	0.012 (max.)	-
Carbon Equivalent (C.E.) %	0.61 (max.)	0.61 (max.)

The carbon equivalent CEV, is calculated according to the following formula.

$$CEV = C + \frac{Mn}{6} + \frac{(Cr + V + Mo)}{5} + \frac{(Cu + Ni)}{15}$$

where C, Mn, Cr, V, Mo, Cu and Ni are the mass fractions, expressed as percentages, of the respective chemical elements of the steel.

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