

CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES OF POPULAR GRADES

Spec.	Type	Grade	Chemical Composition (%)															Mechanical Properties*		
			C		Mn		P	S	Si		Cr		Mo		Cu	Ni	V	Yield Strength	Tensile Strength	
			Min	Max	Min	Max	Max	Max	Min	Max	Min	Max	Min	Max	Max	Max	Max	Max	Min	Min - Max
																		MPa	MPa	
IS-1161	E & S	YST-210	-	0.12	-	0.80	0.040	0.040	-	-	-	-	-	-	-	-	-	210	330	
		YST-240	-	0.16	-	1.20	0.040	0.040	-	-	-	-	-	-	-	-	-	240	410	
		YST-310	-	0.25	-	1.30	0.040	0.040	-	-	-	-	-	-	-	-	-	310	450	
IS-1239 Pt-I	E & S	-	0.20	-	1.30	0.040	0.040	-	-	-	-	-	-	-	-	-	-	320		
IS-3589	E & S	Fe-330	-	0.16	-	1.20	0.040	0.040	-	-	-	-	-	-	-	-	-	195	330	
		Fe-410	-	0.20	-	1.30	0.040	0.040	-	-	-	-	-	-	-	-	-	235	410	
		Fe-450	-	0.25	-	1.20	0.040	0.040	-	-	-	-	-	-	-	-	-	275	450	
BS 3059	S	320	-	0.16	0.30	0.70	0.040	0.040	-	0.35	-	-	-	-	-	-	-	195	320 480	
	Part - I	S	320	-	0.16	0.30	0.70	0.040	0.040	0.10	0.35	-	-	-	-	-	-	195	320 480	
BS 3059 Part - II	S	360	-	0.17	0.40	0.80	0.035	0.035	0.10	0.35	-	-	-	-	-	-	-	235	360 500	
DIN 2391	S	St-35 NBK	-	0.17	0.40	-	0.025	0.025	-	0.35	-	-	-	-	-	-	-	235	340 470	
		St-45 NBK	-	0.21	0.40	-	0.025	0.025	-	0.35	-	-	-	-	-	-	-	255	315 - 440 570	
		St-52 NBK	-	0.22	-	1.60	0.025	0.025	-	0.55	-	-	-	-	-	-	-	355	390 - 490 630	
		St-52 GBK	-	0.22	-	1.60	0.025	0.025	-	0.55	-	-	-	-	-	-	-	355	490 -	
ASTM A519	S	0.33	0.28 0.33	0.40	0.60	0.04	0.04	0.15	0.35	0.80	1.10	0.15	0.25	-	-	-	HR : 483 SR : 586 A : 379 N : 410	HR : 621 SR : 724 A : 517 N : 621		

LEGENDS : C : Carbon, Mn : Manganese, P : Phosphorous, S : Sulfur, Si : Silicon, Cr : Chromium, Mo : Molybdenum, Cu : Copper, Ni : Nickel, V : Vanadium, N : Nitrogen, Al : Aluminium
 Nb / Cb : Niobium / Columbium, Ti : Titanium, Zr : Zirconium, HR : Hot Rolled, SR : Stress Relieved, A/GBK, Annealed, N / NBK : Normalized, MPa : Mega Pascal
 * Mechanical Properties like elongation, hardness, impact, Etc. have not been provided due to space constraint, the same can be provided on request.