

AB (1996) Hull Structural Steel Plates

Designation	Chemical Composition, % ⁽²⁾										Marking	Deoxidation ⁽¹⁾	
	C	Si	Mn	P	S	C+Mn 6	Ni	Cr	Mo	Cu			
Grade A	0.21 ⁽⁴⁾	0.50	2.5 x C min	0.035	0.035	0.40					(7)	AB/A	Killed or semi-killed ⁽²⁾ ($t \leq 50$ mm (2.0in.)) Killed ($t > 50$ mm (2.0 in.))
Grade B	0.21	0.35	0.8(5)	0.035	0.035	0.40					(7)	AB/B	Killed or semi-killed ($t \leq 50$ mm (2.0in.)) Killed ($t > 50$ mm (2.0 in.))
Grade D	0.21	0.10~0.35 ⁽⁶⁾	0.60	0.035	0.035	0.40					(7)	AB/D ⁽⁸⁾	Killed ($t \leq 25$ mm (1.0 in.)) Killed and fine grain ($t > 25$ mm (1.0in.)) ⁽³⁾
Grade E	0.18	0.10~0.35 ⁽⁶⁾	0.70	0.035	0.035	0.40					(7)	AB/E	Killed and fine grain ⁽³⁾

Notes:

- 1) Chemical Composition (Ladle Analysis), % max. unless specified otherwise. Intentionally added elements are to be determined and reported.
- 2) For Grade A, rimmed steel sections may be accepted up to and including 12.5 mm (0.5 in).
- 3) Grade D steel over 25 mm and Grade E steel are to contain at least one of the grain refining elements in sufficient amount to meet the fine grain practice requirements. (See 2/1.3.2d.)
- 4) A maximum carbon content of 0.23% is acceptable for Grade A sections.
- 5) For Grade B steel of cold flanging quality or where fully killed, the lower limit of manganese may be reduced to 0.60%
- 6) Where the content of soluble aluminum is not less than 0.015%, the minimum required silicon content does not apply.
- 7) The contents of nickel, chromium, molybdenum and copper are to be determined and reported. When the amount does not exceed 0.02%, these elements may be reported as $\leq 0.02\%$.
- 8) Grade D hull steel which is normalized, thermo-mechanical control processed or control rolled is to be marked AB/DN.

Regency Steel Asia

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Tensile Properties			Grade	Temp	Impact Properties					
Tensile Strength	Yield Pt min.	Elongation ^{(9),(11),(12),(14)}			Average Absorbed Energy ⁽¹⁵⁾ J (kgf-m,ft-lbs)					
N/mm ²	N/mm ²	min. %			t≤50mm(2.0 in.)		50mm(2.0in.)< t ≤70mm(2.8 in)		70mm(2.8in.)< t ≤100mm(4.0 in)	
(kgf/mm ² ,ksi)	(kgf/mm ² ,ksi)			C (F)	Long ⁽¹⁶⁾	Transv ⁽¹⁶⁾	Long ⁽¹⁶⁾	Transv ⁽¹⁶⁾	Long ⁽¹⁶⁾	Transv ⁽¹⁶⁾
400/520 ^{(10),(13)} (41/53) (58/75)	235 (24,34)	22	Grade A	20 (68) ⁽¹⁷⁾	-	-	34 (3.5, 25) ⁽¹⁷⁾	24 (2.4, 17) ⁽¹⁷⁾	41 (4.2, 30) ⁽¹⁷⁾	27 (28, 20) ⁽¹⁷⁾
			Grade B ⁽¹⁸⁾	0 (32)	27 (2.8, 20)	20 (2.0, 14)	34 (3.5, 25)	24 (2.4, 17)	41 (4.2, 30)	27 (28, 20)
			Grade D	-20 (-4)	27 (2.8, 20)	20 (2.0, 14)	34 (3.5, 25)	24 (2.4, 17)	41 (4.2, 30)	27 (28, 20)
			Grade E	-40 (-40)	27 (2.8, 20)	20 (2.0, 14)	34 (3.5, 25)	24 (2.4, 17)	41 (4.2, 30)	27 (28, 20)

- 9) Based on alternative A flat test specimen or alternative C round specimen in Figure 2/1.1
- 10) For Grade A section, the upper limit of tensile strength may be 550 N/mm² (56 kgf/mm² 80ksi).
- 11) Minimum elongation for alternative B flat specimen in Figure 2/1.1 is to be in accordance with Table 2/1.1-3
- 12) Minimum elongation for ASTM E8M/E8 or A370 specimen is Table 2/1.1-3 for 200 mm (8 in.) specimen and 24% for 50 mm (2 in.) specimen.
- 13) Steel ordered to cold flanging quality may have tensile strength range of 380-450N/mm² (39-46 kgf/mm², 55--65 ksi) and a yield point of 205N/mm² (21kg/mm² 30 ksi) minimum. See also 2/1.36c and 3/2.1
- 14) Elongation requirements for alternative B Specimen are as follows.

Thickness in mm (in.)								
exceeding:		5 (.20)	10 (.40)	15 (.60)	20 (.80)	25 (1.00)	30 (1.20)	40 (1.60)
not exceeding:	5 (.20)	10 (.40)	15 (.60)	20 (.80)	25 (1.00)	30 (1.20)	40 (1.60)	50 (2.00)
elongation (min. %)	14	16	17	18	19	20	21	22

- 15) The energy shown is minimum for full size specimen. See 2/1.3.5c for subsize specimen requirements.
- 16) Either direction is acceptable
- 17) Impact tests for Grade A are not required when the material is produced using a fine grain practice and normalized.
- 18) CVN test requirements for Grade B apply where such test is required by Table 2/1.1.