

IS: 2041-2009 - Chemical Composition (wt %)

(Steel Plates for pressure vessels used at moderate and low temperature)

Grade	C max	Si	Mn	P max	S max	Al (total) min	N max	Nb max	V max	Ti max	Nb + V + Ti min	Cr max	Cu max	Mo max	Ni max
R 220	0.21	0.15-0.35	0.60-1.50	0.035	0.035	0.020	0.012	—	—	—	—	—	—	—	—
R 260	0.25	0.15-0.35	0.85-1.50	0.035	0.035	0.020	0.012	—	—	—	—	—	—	—	—
R 275	0.16	0.40 max	0.80-1.50	0.025	0.015	0.020	0.012	0.05	0.05	0.03	0.05	0.30	0.30	0.08	0.50
R 355	0.18	0.50 max	1.10-1.70	0.025	0.015	0.020	0.012	0.05	0.10	0.03	0.12	0.30	0.30	0.08	0.50
H 235	0.16	0.35 max	0.60-1.20	0.025	0.015	0.020	0.012	0.02	0.02	0.03	0.06	0.30	0.30	0.08	0.30
H 265	0.2	0.40 max	0.80-1.40	0.025	0.015	0.020	0.012	0.02	0.02	0.03	0.06	0.30	0.30	0.08	0.30
H 295	0.2	0.40 max	0.90-1.50	0.025	0.015	0.020	0.012	0.02	0.02	0.03	0.06	0.30	0.30	0.08	0.30
H 355	0.22	0.60 max	1.10-1.70	0.025	0.015	0.020	0.012	0.02	0.02	0.03	0.06	0.30	0.30	0.08	0.30

NOTES :

- For Grades R220, R 260, R275, R355 Carbon content over the maximum specified shall be increased by 0.03 percent for plates over 12 mm thickness.
- Microalloying elements Nb and V maybe added to Grades R220 & R260, subject to mutual agreement between purchaser and manufacturer/supplier.
- For product thicknesses <6 mm, a minimum Mn of 0.6 percent is permitted.
- The minimum Al (total) content may not be applicable, if Nb, Ti or V either singly or in combination are additionally used for Nitrogen binding.
- If only Al is used for nitrogen binding, a ratio Al/N >= 2 shall apply.
- Cr + Cu + Mo shall not exceed 0.45 percent.
- Elements not listed in the table shall not be intentionally added to the steel without agreement of the purchaser.
- Closer limits of composition maybe agreed to between the supplier and the purchaser.
- Whenever micro alloying elements are added for achieving the strength, maximum carbon equivalent shall not exceed 0.50 for steels used for welding.
- Carbon equivalent (CE) based on ladle analysis = $C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{(Ni + Cu)}{15}$.