

# API 2H 7th Edition

Designation	Grade	Chemical Composition, % <sup>*1</sup>											
		C	Si	Mn	P	S	Nb	Ti	Al	Ni	V	Zr	Ce <sup>*4</sup>
		max.			max.	max.	(Cb)	max.		max.			max.
API 2H	42	0.18 [0.22* <sup>5</sup> ]	0.05~0.40 [0.05~0.45]	0.90 <sup>*1</sup> ~1.35 [0.084~1.46]	0.030 [0.040]	0.010 [0.015]	0.04max. [0.05]max.	0.020	0.02~0.06 [0.015~0.06]	0.012 <sup>*2</sup> 0.017	*3	*3	0.0100 [0.0110]
	50	0.18 [0.22]	0.05~0.40 [0.05~0.45]	1.15 <sup>*1</sup> ~1.60 [1.07~1.72]	0.030 [0.040]	0.010 [0.015]	0.01~0.04 [0.005~0.05]	0.020	0.02~0.06 [0.015~0.06]	0.012 <sup>*2</sup> 0.017	*3	*3	0.0100 [0.0110]

\*1 Manganese up to 1.60 on heat analysis, 1.72 on product analysis, is permitted at the option of the material manufacturer.

\*2 Shall not be intentionally added.

\*3 Shall not be intentionally added without the specific approval of the purchaser, in which case the limiting values for heat and product analyses shall be as agreed upon stated on the order.

\*4 Analysis not required if cerium or "rare earths" not intentionally added.

\*5 The carbon equivalent (ceq.) shall be determined by the following formula.

$$\text{Ceq.} = \text{C} + \frac{\text{Mn}}{6} + \frac{\text{Cr} + \text{Mo} + \text{V}}{5} + \frac{\text{Ni} + \text{Cu}}{15} \%$$

\*6 [ ] shows product analysis.

Ceq. <sup>*5</sup>		Tensile Test				Impact Test <sup>*3</sup>				
		Yield Strength	Tensile Strength	Elongation, %, min		Option	Specimen Size	Test Temp.	Min. Average	Min. Single
Thickness	Max.	ksi	ksi	GL=2 in.	GL=8 in.		mm	°F (°C)	Energy ft•lb	Energy ft•lb
in. mm		(MPa) min.	(MPa)	(50.8mm)	(203.2mm)				(J)	(J)
t ≤ 2-1/2 (63.5)	0.43	42 (289)	62~82 (427-565)	24	20	A	10 x 10	-40 (-40)	25 (34)	20 (27)
						B	10 x 7.5	-40 (-40)	25 (34)	20 (27)
t ≤ 2-1/2 (63.5)	0.45					C	10 x 5.0	-40 (-40)	25 (34)	20 (27)
						D	10 x 7.5	-50 (-46)	19 (26)	15 (20)
						E	10 x 5.0	-80 (-62)	13 (18)	10 (14)
t ≤ 2 (50.8)	0.43	50 (345)	70~90 (482~620)	23	18	A	10 x 10	-40 (-40)	30 (41)	25 (34)
						B	10 x 7.5	-40 (-40)	30 (41)	25 (34)
t > 2 (50.8)	0.45	47 (324)				C	10 x 5.0	-40 (-40)	30 (41)	25 (34)
						D	10 x 7.5	-50 (-46)	23 (31)	19 (26)
						E	10 x 5.0	-80 (-62)	15 (20)	13 (18)

## Supplementary requirements

- S1 Ultrasonic Examination
- S2 Notch Toughness at Lower Temperatures
  - S2.1 Notch Toughness at -60°C
  - S2.2 Notch Toughness at Other Than -40°C or -60°C
  - S2.3 Higher Notch Toughness Energy Values
- S3 Individual Plate Testing
- S4 Through-Thickness (Z-Direction) Testing
- S5 Low Sulfur Steel for Improved Through-Thickness Properties
- S7 Low Nitrogen Content for Improved Notch Toughness in Strain-Aged Condition
- S8 Strain-Edged Charpy V-Notch Impact Tests
- S9 Simulated Post-Weld Heat Treatment
- S11 Preproduction Qualification
- S12 Notch Toughness Using Drop Weight
- S13 Surface Quality
- S14 Thickness Tolerance