

ASTM A1010 GR.50
ASME SA1010 GR.50

Unless noted otherwise, the data reported below are from the 2009b Addenda to the 2007 ASME Boiler & Pressure Vessel Code, Section II, Part D, Properties (Customary) MATERIALS.

Table U
Tensile Strength Values

	Nominal Comp.	Form	Spec. No.	Type/ Grade	UNS No.	Thick-ness, in.	Min. T.S., ksi	-20 to 100 °F, Ksi	≤200 °F, ksi
A09	12Cr	Plate	SA-1010	50	S41003	≤3/4	70	70.0	70.0

≤300 °F, ksi	≤400 °F, ksi	≤500 °F, ksi	≤600 °F, ksi	≤650 °F, ksi	≤700 °F, ksi	≤750 °F, ksi	≤800 °F, ksi	≤850 °F, ksi	≤900 °F, ksi	≤900 °F, ksi	≤1000 °F, ksi
70.0	68.2	65.8	63.4	62.0	60.4	58.3	55.8	52.7	48.9	44.3	38.9

Table Y-1
Yield Strength Values

	Nominal Comp.	Form	Spec. No.	Type/ Grade	UNS No.	Thick-ness, in.	Min. T.S., ksi	Min. Yield S., ksi	-20 to 100 °F, ksi
A09	12Cr	Plate	SA-1010	50	S41003	≤3/4	70	50	50.0

≤200 °F, ksi	≤300 °F, ksi	≤400 °F, ksi	≤500 °F, ksi	≤600 °F, ksi	≤650 °F, ksi	≤700 °F, ksi	≤750 °F, ksi	≤800 °F, ksi	≤850 °F, ksi	≤900 °F, ksi	≤900 °F, ksi	≤1000 °F, ksi
50.0	45.9	42.4	40.3	38.9	38.0	36.8	35.1	33.1	30.9	28.6	26.9	26.5

Table TE-1
Thermal Expansion Coefficients for 12Cr and other Related Steels

Temperature, °F	Instantaneous, in./in./°F	Mean from 70 °F, in./in./°F	Linear from 70 °F, in.100 ft.
70	5.9×10^{-6}	5.9×10^{-6}	0
100	6.1	6.0	0.2
150	6.2	6.1	0.6
200	6.4	6.2	1.0
250	6.5	6.2	1.3
300	6.6	6.3	1.7
350	6.6	6.3	2.1
400	6.7	6.4	2.5
450	6.7	6.4	2.9
500	6.8	6.5	3.3
550	6.8	6.5	3.7
600	6.9	6.5	4.2
650	6.9	6.6	4.6
700	6.0	6.6	5.0
750	7.1	6.6	5.4
800	7.1	6.7	5.8
850	7.2	6.7	6.3
900	6.2	6.7	6.7
950	7.3	6.8	7.1
1000	7.3	6.8	6.7
1050	7.4	6.8	8.0
1100	7.4	6.8	8.5
1150	7.4	6.9	8.9
1200	7.4	6.9	9.4
1250	7.4	6.9	9.8
1300	7.4	6.9	10.2
1350	7.4	7.0	10.7

Table TCD
**Nominal Coefficients of Thermal Conductivity (TC)
and Thermal Diffusivity (TD)**

[Group G]

Temperature, °F	TC, Btu/hr-ft-°F	TD, ft ² /hr
70	14.2	0.276
100	14.2	0.271
150	14.3	0.265
200	14.3	0.260
250	14.4	0.256
300	14.4	0.251
350	14.4	0.246
400	14.5	0.242
450	14.5	0.237
500	14.5	0.231
550	14.6	0.226
600	14.6	0.221
650	14.6	0.216
700	14.6	0.210
750	14.6	0.205
800	14.7	0.200
850	14.7	0.196
900	14.7	0.191
950	14.7	0.186
1000	14.7	0.180
1050	14.7	0.174
1100	14.7	0.167
1150	14.8	0.159
1200	14.8	0.149
1250	14.8	0.137
1300	14.8	0.123
1350	14.8	0.107

Table TM-1
Modulus of Elasticity for Given Temperature, psi
[Material Group F]

Temperature, °F	2007 Table TM-1
-325	31.2×10^6
-200	30.7
-100	30.2
70	29.2
200	28.4
300	27.9
400	27.3
500	26.8
600	26.2
700	25.5
800	24.5
900	23.2
1000	21.5
1100	19.2
1200	16.5

The data below are based on measurements and calculations performed by ArcelorMittal for ASTM A1010 and ASME SA1010.

Poisson's Ratio of A1010
0.30

Density of A1010

Temperature, °F	Density, lb/in ³
70	0.280
100	0.280
150	0.280
200	0.279
250	0.279
300	0.279
350	0.279
400	0.278
450	0.278
500	0.278
550	0.277
600	0.277
650	0.277
700	0.277
750	0.276
800	0.276
850	0.276
900	0.275
950	0.275
1000	0.275
1050	0.274
1100	0.274
1150	0.274
1200	0.274
1250	0.273
1300	0.273
1350	0.273