SPECIFICATION FOR 1040 CARBON STEEL BARS & TUBING, 40 KSI YIELD, HRC 22 MAX

Rev	Reason of Change	Date	Made By	Reviewed By	Approved By	Status
0	Initial release	03-08-2018	MN	AS	KKD	Released

1.0 Scope

This specification covers medium carbon forgings, bar stock, tubing and mill shapes used for pressure containing components.

2.0 Reference Specifications

2.1 ASTM A29, A311, A370, A519 and A576

3.0 Chemical Requirements

The chemistry shall conform to the limits of Table 1.

Table 1: Chemical Requirements. (All are maximums unless otherwise noted)

Elements	Wt. Percentage (%)
Carbon	0.37- 0.44
Manganese	0.60 - 0.90
Phosphorus	0.040 max.
Sulfur	0.050 max.

4.0 Mechanical Properties

Material shall meet the requirements listed in Table 2.

Table 2: Mechanical Properties. (All are minimums unless otherwise noted)

Tensile Strength	75,000 psi (517 MPa)
Yield Strength	40,000 psi (276 MPa)
Elongation in 2" or 4D	16%
Reduction of Area	25% *
Hardness (forgings, raw)	235 HB or 22 HRC max.
*Reduction of area need not be reported on tubing with wall thickness less than	

5.0 Heat Treatment

Heat treatment shall be in accordance with the requirement listed in Table 3.

Table 3: Acceptable Heat Treat Procedures

PROCESS	ATMOSPHERE/MEDIA	TEMPERATURE	TIME AT TEMPERATURE
Normalized	Air	1600 ºF – 1700 ºF (870 ºC – 925 ºC)	30 Minutes / Inch of T, Minimum Time is 30 Minutes.

Still air cool to below 400 degrees F (204 degrees C) before further processing

6.0 Workmanship

Material shall be inspected in accordance with part report (DBI). Material shall be free of injurious defects that are detrimental to the integrity of the final product, such as laps, scabs, cracks and exogenous inclusions.