LOW ALLOY STEEL FORGINGS BAR STOCK OR MILL SHAPES TO MEET ASTM A350 LF2 CLASS 1

Rev	Reason of Change	Date	Made By	Reviewed By	Approved By	Status
2	Complete Amended	13-05-2013	USR	J Gulati	KKD	Released

Summary:

This specification covers low alloy steel forgings, bar stock or mill shapes to meet ASTM A350 LF2 Class 1.

Table of Contents

1.0 Scope

This specification covers low alloy steel forgings, bar stock or mill shapes to meet ASTM A350 LF2 Class 1.

2.0 Applicable Specifications

Specification	Title
ASTM A350	Standard Specification for Carbon and Low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components

3.0 Chemistry Requirements

The chemistry shall be as follows (all are maximums unless otherwise noted, list ranges when applicable):

Elements	Wt. Percentage (%)
Carbon, max	0.30
Manganese	0.60 1.35
Phosphorus, max	0.035
Sulfur, max	0.040
Silicon	0.15 0.30
Nickel, max	0.40
Chromium, max	0.30
Molybdenum, max	0.12
Copper, max	0.40
Columbium, max	0.02
Vanadium, max	0.08
Carbon Equivalence (CE), max	0.45

For Carbon Equivalence:

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

4.0 Mechanical Properties

The material shall meet the following mechanical requirements (all are minimums unless otherwise listed:

Tensile Strength	70-95 ksi (485-655 MPa)
Yield Strength, min	36 ksi (250 MPa)
Elongation, min	22%
Reduction of Area, min	30%
Hardness, Max	197 HBW

For Charpy impact (CVN) Test:

Test Temperature	-50°F (-46°C)
Min. average for set of 3 specimen	15 ft-lb (20 J)
Min. for individual specimens of set	12 ft-lb (16 J)

5.0 Heat Treatment

Forgings shall be furnished in the normalized, in the normalized and tempered or in the quenched and tempered condition.

The minimum tempering temperature shall be 1100°F (594°C).

6.0 Markings

Each piece of the material shall be identified with the heat number stamped with low stress or interrupted dot stencils on the exterior surface in a nonmachined area.

7.0 Inspection

Forgings shall be inspected and free of laps, seams, cracks or other injurious defects.