STRUCTURAL STEEL PLATES, ANGLES, CHANNELS, TUBES AND OTHER LOW CARBON MILL SHAPES

Rev	Reason of Change	Date	Made By	Reviewed By	Approved By	Status
0		09-05-2013	USR	J Gulati	KKD	Released

Summary:

This specification covers low carbon shapes including plate, sheet, channel, angle and tubes for use in welded fabrications.

1.0 Scope

This specification covers low carbon shapes including plate, sheet, tube, channel and angle for use in welded fabrications. When this specification is used to manufacture welded structures, the fabricator shall have an Sara Sae approved weld procedure that is applicable to the materials and work to be done.

This specification provides a variety of ASTM standard structural materials of similar chemistry and strength level. The selections within this specification may be considered interchangeable for Sara Sae approved weld procedures where impact testing is NOT required.

Equivalent or higher quality grades may be used by the supplier provided they meet the requirements of this specification. When substituted grades do not meet the requirements of this specification, they may be used provided the supplier informs and receives approval from Sara Sae prior to commencement of fabrication.

2.0 Chemistry Requirements

The heat analysis shall conform to the composition in Table 1.
Table 1: Chemical composition, weight% (all are maximums unless otherwise noted)

Element	Wt. Percentage (%)
Carbon, C	0.35
Manganese, Mn*	1.30
Phosphorus, P	0.04
Sulfur, S	0.05
Silicon, Si**	0.4
Carbon Equivalence (CE), max	0.45
* Actual Mn contents above the limits specified are acceptable as long as CE < 0.45. ** There are no Si requirements for ASTM A-36 shapes and bars.	

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

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3.0 Heat Treatment

When notch toughness is required for ASTM A516 plates 1.5-inches (40mm) and under in thickness the, plates shall be supplied in the normalized condition.

Plates over 1.5-inches (40mm) shall be supplied in the normalized condition, regardless of whether or not notch toughness tests are required.

4.0 Mechanical Properties

For design purposes use 36,000 psi (248 MPa) for yield strength. Material supplied to meet this specification shall have a minimum yield strength of 36,000 psi (248 MPa).

ASTM A516 should be used for applications requiring notch toughness. Specific heat treatments to achieve sufficient impact toughness for sizes greater than 1.5-inches (40mm) may be required.

Commercial sheet provided to this specification may have yield strength in the 30-50 ksi range. Tensile testing is not required and actual mechanical properties may not be reported for commercial sheet grades.

5.0 Markings

Each piece of the material shall be identified with the heat number marked with low stress or interrupted dot stamps on the exterior surface in a non-machined area.

6.0 Inspection

Material shall be inspected and free of laps, seams, cracks or other injurious indications.

7.0 Reference Specifications

The following list of typical industry specifications and grades may be used as reference specifications for purchasing.

Any industry specification can be used as long as requirements of this specification are met.

AISI 1018-1026 AISI 1010-1024	All Shapes
ASTM A106	Seamless Carbon Steel Pipe
ASTM A500	Tubing in Rounds and Shapes
ASTM A105	Carbon Steel Forgings
ASTM A36	Shapes, Plates, Bars
ASTM A516 Grade 55,60,70	Plates
ASTM A1011 Grade CS and DS, all types	Sheet and Strip
CSA G40.21 44W	Plate
BS 4360 -43 & -50 EN 10025 S355 & S275 ASTM A131 EH36, ABS EH36 JIS G3101 SS400 & SS490	All Shapes
DIN 17121 ST 52.3 DIN 1629 ST 52 DIN 2448 ST 52 EN 10210 S355 J2H EN 10297 E355	Tubes