



STEEL, SHEET, HOT ROLLED, BORON TREATED

WSS-M1A374-A1

1. SCOPE

The material defined by this specification is aluminum killed, hot rolled steel containing boron and titanium. The material is intended to be heat treated after forming to achieve final mechanical properties.

2. APPLICATION

This specification was released originally for heavy truck side rails that are roll formed and then heat treated to achieve the desired mechanical properties. Original thickness range was 7 mm to 11 mm.

3. REQUIREMENTS

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements for Production Materials (WSS-M99P1111-A).

3.2 DIMENSIONS AND DIMENSIONAL TOLERANCES

3.2.1 Thickness and Thickness Tolerance

Unless otherwise specified by Ford Motor Company on the Engineering Drawing or Purchase Order, the tolerance for thickness shall comply with ESBAU5-1N260-AA or latest level.

3.2.2. Other Dimensional Tolerances

Length, width, flatness, camber, out-of-square, mass and other tolerances for the material as delivered by the steel supplier are defined by the relevant local manufacturing activity. Examples include ASTM A568M, ASTM A635M, JFS A 1001, JFS A 2001, and EN 10051.

3.3 COMPOSITION

(JIS G 0320, ASTM A751, Weight percent)

C	0.20 – 0.28
Mn	1.10 – 1.40
P	0.025 max
S	0.010 max
Si	0.300 max
Cr	0.350 max
Mo	0.350 max
Al	0.015 – 0.080
Ti	0.020 – 0.050
N	0.009 max
B	0.002 – 0.006
Ca	Sufficient quantity for inclusion shape control
Cu, Ni, Nb, Sn & V	No Requirement

Note: If necessary, a minimum Carbon Equivalent (CE) level can be added as a line call out on the Engineering Drawing to maintain a minimum level of hardenability.

$$CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15$$

Date	Action	Revisions	Rev. 0
2013 12 16	Released		



3.4 SURFACE APPEARANCE AND CONDITION

The steel may be ordered as sheets or coils. Materials defined by this specification are described as Class 3 (unexposed). The material shall be used only for parts of the vehicle that are concealed during use, per ES-F75B-11007. Both "Pickled and Oiled" (P&O) and "Black" (high temperature oxide, non-pickled) surfaces are available for thicknesses up to about 8 mm. Larger thicknesses are only available with a black surface condition.

The surface condition and associated parameters for a given component are to be defined and recorded by the regional manufacturing activity.

Acceptance of subsequent orders by the steel supplier for a given component at the agreed upon quality level implies that all steel supplied will be of a comparable quality level.

3.5 DECARBURIZATION (SAE J419)

Decarburization of the steel as received shall not exceed 1% of thickness per side for Type I and 2% of thickness for Type I and II combined.

Method of measuring decarburization shall be agreed upon by the affected manufacturing activity and the steel supplier.

3.6 FORMABILITY

The steel must have adequate formability for the application as determined in forming trials by the relevant manufacturing activity. Either as-rolled or annealed material is acceptable but the condition validated during forming trials shall be utilized for production.

If needed to enable the fabrication of a specific component, restricted tolerances and/or additional material property requirements (i.e., the "quality level" of the steel) shall be developed by the affected manufacturing activity and the steel supplier. Examples include, but are not limited to: restricted chemical composition, restricted gauge tolerance, and specified surface condition.

The "quality level" of the steel for a specific component:

- shall not conflict with specified requirements in paragraph 3 of this Engineering Material Specification
- shall be described in detail by the local manufacturing activity
- shall be a mandatory extension of this Engineering Material Specification

Acceptance of subsequent orders by the steel supplier for a given component at the agreed upon quality level implies that all steel supplied will be of a comparable quality level and can be formed satisfactorily as defined and recorded by the manufacturing activity.

3.7 JOINABILITY

In conjunction with the material supplier and Materials Engineering, the affected local manufacturing activity shall, as part of the initial material source approval process, approve the joinability (e.g., resistance spot welding, riveting, adhesive bonding) of this material by means of laboratory test(s), manufacturing trial(s), and/or another mutually acceptable alternative, using the equipment and methods that are proposed for production.

Welding must comply with weld specification WSBCPA-1B310-AA.

If needed to enable the fabrication of a specific component, restricted tolerances and/or additional material property requirements (i.e., the "quality level" of the steel) shall be developed by the affected manufacturing activity and the steel supplier.