

ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

STEEL, HIGH STRENGTH, WELDED TUBING

WSB-M1A331-A1

1. SCOPE

The material defined by this specification is fully killed, fine grained, high strength martensitic carbon steel electric resistance welded tubing.

2. APPLICATION

This specification was released originally for material used in door intrusion beams where a high strength to weight ratio is required.

Caution: Due to the hardenability response of these materials, individual welding schedules must be developed for each application.

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 CHEMICAL COMPOSITION (weight percent)

The percentages given are heat or cast (ladle) analysis:

Grade	<u>900</u>	<u>1100</u>	<u>1300</u>	<u>1500</u>
Carbon, max	.09	.13	.20	.26
Manganese, max	.60	.60	.60	.60
Phosphorous, max	.02	.02	.02	.02
Sulfur, max	.025	.025	.025	.025

Date	Action	Revisions
2002 09 26	Revised	Updated and renumbered
1993 07 21	NB00I10043054269	Released- J.E. Nelson NAAO C. Sales EAO

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3.3 MECHANICAL PROPERTIES
(ASTM A 370/ISO 6892)

Grade	<u>900</u>	<u>1100</u>	<u>1300</u>	<u>1500</u>
Tensile Strength, MPa, min	900	1100	1300	1500
Tensile Strength, MPa, Typical	1140	1310	1520	1690
Elongation, %, min	4	4	3.5	3.5
Elongation, %, Typical	6.5	6.5	5	5

Note: Tension test specimens shall be taken longitudinally, 180 deg from the weld and shall conform dimensionally to specimen No. 2 shown in Figure 19, ASTM A 370.

3.4 WELD QUALITY

Each tube shall pass nondestructive testing to assure weld soundness. Supplier inspection method must be submitted prior to source approval.

Width of combined weld fusion zone and heat affected zone shall not exceed a total of 12 mm. Measurements shall be made between points at the beginning of the heat affected zone where hardness has been reduced by 6 HRC equivalent points from the adjacent non-heat affected material.

3.5 PAINTABILITY

Material supplied to this specification must have prior approval for paintability by the responsible Materials Engineering Activity. This approval shall be based on samples prepared to the local process and resistance requirements appropriate to the country of Ford vehicle manufacture, or to the relevant Engineering Performance Specification (see para 4.2).

4. GENERAL INFORMATION

The information below is provided for clarification and assistance in meeting the requirements of this specification.

4.1 INITIAL SUPPLIER APPROVAL

For initial approval, the supplier must furnish the following information for each grade:

- A plan detailing how each requirement of para 3 will be controlled on a continuing production basis.
- Test results from a typical production sample for the requirements outlined in para 3.
- Tensile strength, yield strength and elongation histograms including mean and standard deviation values. Data shall consist of a minimum of 40 measurements for each property taken from a minimum of 20 coils while the process is operating in statistical control.