



ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

STEEL, SHEET, BAKE HARDENABLE

WSB-M1A312-A1

NOT TO BE USED FOR NEW DESIGN

1. SCOPE

The material defined by this specification is steel sheet which has the capability of strengthening during the paint bake operation. Annealing by the steel supplier will be by the batch or continuous annealing process.

2. APPLICATION

This specification was released originally for material used in body components to improve dent resistance. Due to higher tensile and yield strength properties attainable with this product, downgaging with subsequent cost and weight savings are possible.

CAUTION: The maximum yield strength is not specified, therefore for test or evaluation purposes, it is essential that prototype parts are produced using material with maximum yield strengths within 10 % of the grade level specified.

3. REQUIREMENTS

3.1 QUALITY SYSTEM REQUIREMENTS

Material suppliers and part producers must conform to Quality System Requirements, QS-9000. Material specification requirements are to be used for initial qualification of materials. A Control Plan for ongoing production verification is required. This plan must be reviewed and approved by the relevant Ford Materials activity and/or Ford Supplier Technical Assistance (STA) prior to production parts submission. Appropriate statistical tools must be used to analyze process/product data and assure consistent processing of the materials.

Part producers using this material in their products, must use Ford approved materials and must conform to a process control plan which has been approved by STA and/or the relevant Materials Activity.

Date	Action	Changes
1999 11 22	N-Status	Replaced by WSS-M1A341-A3/A4/A5/A6
1996 11 06	Revised	Revised para 3.3 K. Thurgood FAO
1991 07 05	NB00I10043054106	Released K. Thurgood EAO J. Nelson NAAO

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3.2 CHEMICAL COMPOSITION

Base material shall have a low carbon steel composition.

3.3 MECHANICAL PROPERTIES
(ASTM A 370, ISO 6892)

	180	210	280	210	250
Grade*	BA/CA	CA	CA	BA	BA/CA

As Received by Ford:

Yield Strength, typical, MPa	210	250	310	240	280
Yield Strength, min, MPa	180	210	280	210	250
Tensile Strength, typical, MPa	320	360	410	350	400
** Elongation, typical, %	42	37	35	38	36

After 2 % Strain and Bake
Hardening for 30 minutes
at 175 C:

Yield Strength, typical, MPa	260	300	365	300	330
Yield Strength, min, MPa	230	260	335	280	305

Note: Tension specimens shall be taken longitudinally from the coated finished sheet and shall conform to the standard sheet type specimen shown in ASTM A 370, ISO 6892.

* The notation "CA" and "BA" following grade numerals indicate continuous annealed and batch annealed respectively.

** Gage lengths other than 50 mm may be used for control purposes with appropriate correction in % elongation. In all cases, 50 mm will be considered the umpire standard gage length.

3.4 GRAIN SIZE

(ASTM E 112)

CA Grades

BA Grades

No. 8 and finer

No. 6 and finer

3.5 BEND TEST
(ASTM A 607)

Test samples shall pass a 180 degree transverse bend test at room temperature with the inside bend diameter not exceeding the specimen thickness.



3.6 SURFACE FINISH

The material shall have a workmanlike appearance and shall not have defects of a nature or degree for the grade and quality ordered that will be detrimental to the fabrication of the finished part. The need for a final temper mill reduction to control surface appearance or formability is to be negotiated between the manufacturing activity and the steel supplier.

3.7 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 section 5.2.

3.8 WELDABILITY (Spot Weld)

Coated steel shall conform to the requirements of Ford Welding Acceptance Test Method FLTM BA 13-4.

3.9 FORMABILITY

The quality level of steel supplied to fabricate a specific component is to be negotiated between the Manufacturing activity and the steel supplier. Acceptance of subsequent orders by the steel supplier for a given component at the agreed upon quality level implies that all steel supplied will form that part satisfactorily as defined by the Manufacturing activity.

3.10 SUPPLIER'S RESPONSIBILITY

All materials supplied to this specification must be equivalent in all characteristics to the material upon which approval was originally granted.

Prior to making any change in the properties, composition, construction, color, processing or labeling of the material originally approved under this specification, whether or not such changes affect the material's ability to meet the specification requirements, the Supplier shall notify Purchasing, Toxicology and the affected Materials Engineering activity of the proposed changes and obtain the written approval of the Materials Engineering activity. Test data, test samples and a new code identification are to be submitted with the request.

Substance restrictions imposed by law, regulations or Ford, apply to the materials addressed by this document. The restrictions are defined in Engineering Materials Specification WSS-M99P9999-A1.