

METRIC

A-A-52446
March 10, 1994
SUPERSEDING
MIL-S-62502(AT)
15 December 1987

COMMERCIAL ITEM DESCRIPTION

SHEET MOLDING COMPOUND: LOW SHRINKAGE (METRIC)

The General Services Administration has authorized the use of this commercial item description (CID) as a replacement for MIL-S-62502(AT) which is canceled.

ABSTRACT

This CID covers requirements for a high strength, low shrinkage, sheet molding compound (SMC) and molded plastic parts made therefrom. The low shrinkage property imparts dimensional stability to the molded parts. Items made from this material are primarily used for nonappearance, high strength body panels that are not painted.

SALIENT CHARACTERISTICS

a. Materials. The SMC material covered by this CID shall possess high strength, low shrinkage characteristics and shall be reinforced with 32.5 + 2.5 percent (%) by weight of glass fiber rovings chopped into lengths not less than 23 millimeters (mm). The SMC material shall be formulated with appropriate types and amounts of additives, such as, calcium carbonate filler, zinc stearate mold release, catalyst, thickener, and pigment, as required to meet the salient characteristics of this CID. The use of recovered material made in compliance with regulatory requirements is acceptable provided all the requirements of this CID are met (see Note d).

b. Design and construction. Parts molded from this SMC material shall be designed and constructed in accordance with the applicable engineering drawing (AED) (see Note b).

Beneficial comments, recommendations, additions, deletions clarifications, etc. and any other data which may improve this document should be sent by letter to: U.S. Army Tank-Automotive Command, ATTN: AMSTA-GDS, Warren, MI 48397-5000.

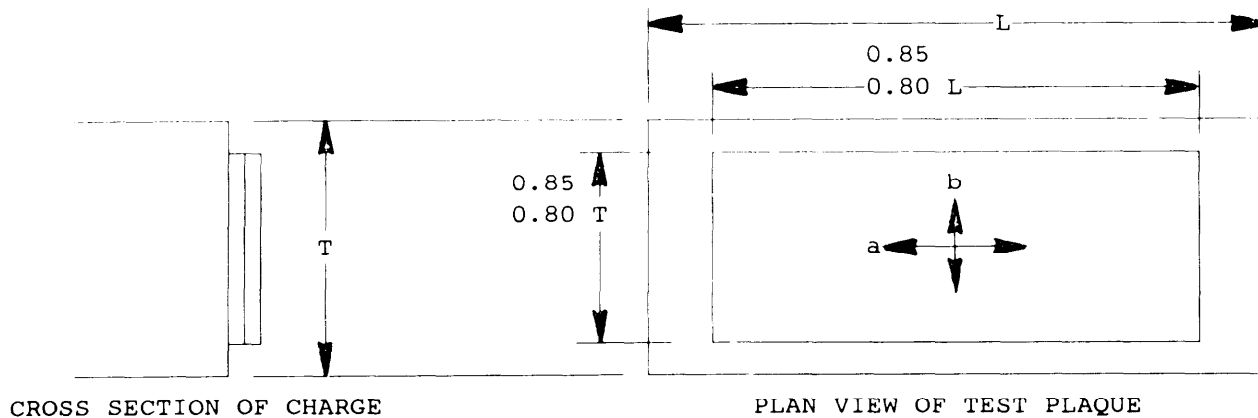
AMSC N/A

FSC 9330

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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c. Properties of SMC material. The SMC material shall be molded into test plaques to verify conformance to the physical and mechanical properties specified herein. The test plaques shall be 2.5 ± 0.1 mm thick and shall be molded using the same cure cycle, mold temperature, and mold pressure as is used to mold the production items (parts). The charge pattern used to mold the test plaques shall conform to the conditions specified in figure 1, unless the combination of SMC sheet weight and plaque mold dimensions make this impossible.



Legend:

- L = Longitudinal dimension of mold.
- T = Transverse dimension of mold.
- a = Indicated is the longitudinal direction of the SMC in charge no. 1 (sometimes referred to as the machine direction of the SMC).
- b = Indicated is the longitudinal direction of the SMC in charge no. 2.

FIGURE 1. Charge pattern conditions.

1. Physical and mechanical properties. The physical and mechanical properties of the SMC material shall be as specified in table I.

d. SMC molded parts. The properties and performance requirements of SMC molded parts shall be as follows:

1. Properties of SMC molded parts. The physical and mechanical properties of SMC molded parts and verification of same shall be as specified in table I (for parts thicker than 2.5 mm use 0.5 mm offset for second modulus). The part or specimens made from the part, as appropriate, shall be used for this purpose. For glass fiber content, at least five specimens shall be taken at random from the part.

2. Performance/environmental requirements.

(a) Dimensional stability. The SMC molded parts shall maintain their dimensions and tolerances, as specified in the AED, before and after exposure to 150°C for 90 minutes. Also, the parts shall not blister or show any other deleterious effects after exposure.

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(b) Environmental conditions. The SMC molded parts shall be capable of withstanding exposure to the following high and low temperature and humidity conditions without showing evidence of any functional/visual degradation or embrittlement:

- (1) High temperature of $70 \pm 3^\circ\text{C}$ for 168 hours.
- (2) Low temperature of $-40 \pm 3^\circ\text{C}$ for 4 hours.
- (3) Relative humidity, as follows:

Step 1.

Gradually raise the internal chamber temperature and RH from room ambient to 60°C and RH to $95 \pm 5\%$ for a period of two hours minimum.

Step 2.

Maintain the conditions of step 1 for a period of six hours minimum.

Step 3.

Reduce and maintain RH at 85% minimum and gradually reduce the internal chamber temperature to 30°C in eight hours.

Step 4.

Increase RH to $95 \pm 5\%$ and maintain temperature at 30°C for an additional eight hours.

Step 5.

Repeat steps 1 through 4 for a total of 10 cycles and not less than 240 hours.

Step 6.

Near the end of the fifth and tenth cycle, while still at 30°C and 95% RH, visually and functionally check the item.

TABLE I. Physical and mechanical properties.

| Property | Minimum value required | ASTM test method | Notes |
|--|--|------------------|-----------------------|
| Tensile strength at 23°C | 85 MPa ^{1/} | D638 | <u>2/</u> & <u>6/</u> |
| Flexural strength at 23°C | 169 MPa | D790 | <u>3/</u> & <u>6/</u> |
| Flexural modulus at 23°C | 8000 MPa | D790 | <u>4/</u> & <u>6/</u> |
| Water absorption | 0.8% max | D570 | |
| Glass fiber content | 30 to 35% by weight (average) 25 to 40% by weight per specimens | | <u>5/</u> |
| Notes: | | | |
| <u>1/</u> MPa = megapascal | | | |
| <u>2/</u> Use: type M-1 specimens and testing speed of 5 mm/minute. | | | |
| <u>3/</u> Use: procedure A, test method I, test speed of 1.3 mm/minute, and a span of 50 mm. specimen molded size shall be 25 mm wide by 80 mm long (min) by 2.5 mm thick. | | | |
| <u>4/</u> Use: secant modulus at 2.5 mm deflection using same procedures under note <u>3/</u> . | | | |
| <u>5/</u> Use: test specimens that weigh between 4.5 to 10.0 grams. | | | |
| <u>6/</u> Average of six specimens: three from transverse direction and three from longitudinal direction. | | | |

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e. Body sealer. The SMC material shall be compatible with body sealer. Sealer shall not contain any chlorofluorocarbon (CFC).

f. Finish color. Unless otherwise specified (see Note b), the SMC molded part shall be integrally colored black.

g. Identification and marking. Unless otherwise specified in the AED, identification and marking of the SMC molded parts shall be permanent and legible and shall include, as a minimum, the AED part number, the manufacturer's CAGE code, and when specified, the molder's identification marking (see Note b).

QUALITY ASSURANCE PROVISIONS

a. Responsibility for inspection. The contractor is responsible for the performance of all inspections (examinations and tests).

b. First article inspection. When specified (see Note b), a first article sample shall be inspected to verify conformance to the salient characteristics in this CID. Approval of the first article sample by the Government shall not relieve the contractor of the obligation to supply items that are fully representative of those inspected as a first article sample.

c. Contractor certification. The contractor shall certify and maintain substantiating evidence that the product offered meets the salient characteristics of this commercial item description and that the product conforms to the producer's own drawings, specifications, workmanship standards, and quality assurance practices. Items with known defects shall not be submitted for Government acceptance. The Government reserves the right to require proof of such conformance prior to the first delivery and thereafter as may be otherwise provided for under the provisions of the contract.

PRESERVATION, PACKAGING, PACKING, LABELING, AND MARKING

Preservation, packaging, packing, labeling, and marking for the desired level shall be as specified in the contract or order (see Note b).

NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

a. Addresses for obtaining copies of referenced documents. Copies of ASTM D570 "Standard Test Method for Water Absorption of Plastics"; ASTM D638 "Test Method for Tensile Properties of Plastics"; and ASTM D790 "Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials (Metric)," can be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.

b. Ordering data. Acquisition documents must specify the following:

1. Title, number, and date of this commercial item description.
2. Issue of DODISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced
3. AED and revision letter, and part number.
4. Molder's identification marking, if required.
5. First Article, if required.
6. Selection of applicable level and packaging requirements.
7. Color, if other than as specified.

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c. Cross-reference data. SMC material that conforms to this CID are interchangeable/substitutable with material conforming to MIL-S-62502(AT) and AMG 157 Revision D, dated 24 August 1985.

d. Regulatory requirements. The offeror/contractor is encouraged to use recovered materials in accordance with Public Law 94-580 to the maximum extent practicable.

MILITARY INTERESTS:

Custodian

Army - AT

Review activity

DLA - GS

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Army - AT

(Project 9330-1268)