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SURFACE VEHICLE STANDARD

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Materials for Plastic Pistons for Hydraulic Disc Brake Cylinders

RATIONALE

This technology is viewed as stable by the committee, and the standard will be reviewed for stabilization.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE Hydraulic Brake Components Standards Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. ***Scope***—The materials defined by this SAE Standard are glass-fiber-reinforced, mineral-filled phenolic molding compounds suitable for compression molding. Preforms may be radio frequency preheated or screw preheated slugs. Compound for use in hydraulic disc brake caliper pistons.

2. ***References***

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein.

2.1.1 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 543—Standard Test Method for Resistance of Plastics to Chemical Reagents
ASTM D 570—Standard Test Method for Water Absorption of Plastics
ASTM D 638—Test Method for Tensile Properties of Plastics
ASTM D 648—Standard Test Method for Deflection Temperature of Plastics Under Flexural Load
ASTM D 695—Standard Test Method for Comprehensive Properties of Rigid Plastics
ASTMD696—Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between −30 Degrees C and 30 Degrees C
ASTM D 785—Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials
ASTMD790—Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D 794—Practice for Determining Permanent Effect of Heat on Plastics

2.1.2 ISO PUBLICATIONS—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 62—Plastics—Determination of water absorption
ISO 175—Plastics—Determination of the effects of liquid chemicals, including water
ISO 178—Plastics—Determination of flexural properties of rigid plastics
ISO/R 527—Plastics—Determination of tensile properties
ISO 2039/2—Plastics—Determination of hardness—Rockwell hardness

3. *General Material Requirements*

3.1 Conditioning—All specimens shall be compression-molded and post-cured at 205 °C ± 5 °C for 16 h in an air-circulating oven prior to testing.

4. *Test Requirements*

4.1 Hardness—The material when tested by the procedure specified in 5.1 shall have a Rockwell Hardness of 90min.

4.2 Compressive Strength—The material when tested by the procedure specified in 5.2 shall have a Compressive Strength of not less than 187 MPa.

4.3 Tensile Strength—The material when tested by the procedure specified in 5.3 shall have a Tensile Strength of not less than 41 MPa.

4.4 Modulus of Elasticity—The material when tested by the procedure specified in 5.4 shall have a Tangent Modulus of Elasticity (Flexural Modulus) of not less than 19 GPa.

4.5 Flexural Strength—The material when tested by the procedure specified in 5.5 shall have a Flexural Strength of not less than 76 MPa.

4.6 Coefficient of Linear Thermal Expansion—The material when tested by the procedure specified in 5.6 shall have a Coefficient of Linear Thermal Expansion of not more than 20 x 10^{-6} mm/mm/°C.

4.7 Heat Aging—The material when tested by the procedure specified in 5.7 shall not crack or blister, shall have a volume change of not more than −0.6% and shall have a hardness change of not less than 0 nor more than +6.

4.8 Fluid Aging—The material when tested by the procedure specified in 5.8 shall have a weight change of not more than −0.5%, a volume change of not more than −0.3%, and a hardness change of not less than 0 nor more than +6.

4.9 Water Aging—The material when tested by the procedure specified in 5.9 shall have a weight change of not more than 0.15% and a volume change of not more than 0.20%.

4.10 Deflection Temperature—The material when tested by the procedure specified in 5.10 shall have a Deflection Temperature of not less than 250 °C.

5. *Test Procedures*

5.1 Hardness—Determine the Rockwell Hardness of the material by ASTM D 785 using scale E (ISO 2039/2).

5.2 Compressive Strength—Determine the Compressive Strength of the material by ASTM D 695 (ISO N/A).

5.3 Tensile Strength—Determine the Tensile Strength of the material by ASTM D 638 using a Type I specimen (ISO/R 527 Type 1 specimen).

5.4 Modulus of Elasticity—Determine the Tangent Modulus of Elasticity (Flexural Modulus) of the material by ASTM D 790 using Method I and Procedure A (ISO 178).

5.5 Flexural Strength—Determine the Flexural Strength of the material by ASTM D 790 using Method I and Procedure A (ISO 178).