

Materials for Plastic Check Valves for Vacuum Booster Systems

- 1. Scope**—The materials defined by this SAE Standard are unreinforced thermoplastic acetal and thermoplastic 6/6 heat stabilized nylon, as both materials will function in this application.

The specific material chosen will depend on the final application's surroundings and heat requirements. They are for use in vacuum booster check valves for hydraulic brake systems.

2. References

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

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

ISO 75—Plastics and ebonite—Determination of temperature of deflection under load
ISO 175—Plastics—Determination of the effects of liquid chemicals, including water
ISO 178—Plastics—Determination of flexural properties of rigid plastics
ISO 180—Plastics—Determination of Izod impact strength of rigid materials
ISO/R 527—Plastics—Determination of tensile properties
ISO 1183—Plastics-Methods for determining the density and relative density of non-cellular plastics
ISO 2039/2—Plastics—Determination of hardness—Rockwell hardness

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

ASTM D 256—Test Methods for Impact Resistance of Plastics and Electrical Insulating Materials
ASTM D 543—Standard Test Method for Resistance of Plastics to Chemical Reagents
ASTM D 638—Standard Test Method for Tensile Properties of Plastics
ASTM D 648—Standard Test Method for Deflection Temperature of Plastics Under Flexural Load
ASTM D 785—Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials
ASTM D 790—Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D 792—Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

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3. General Material Requirements

3.1 Conditioning—All test values are based on materials dry as molded or conditioned in a controlled atmosphere of $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and $50\% \pm 5\%$ relative humidity for 24 h prior to testing and tested under the same conditions.

4. Test Requirements—See Table 1.

TABLE 1—TEST REQUIREMENTS

Property Tested	Units	Thermoplastic Acetal	Type 6/6 Nylon Heat Stabilized
Specific Gravity	—	1.41 ± 0.02	1.14 ± 0.02
Hardness, Rockwell	R	115 min	118 min ⁽¹⁾
Tensile Strength	MPa	62 min	55 min ⁽¹⁾ 44 min ⁽²⁾
Flexural Modulus	MPa	2400 min	2550 min ⁽¹⁾ 1100 min ⁽²⁾
Izod Impact	J/M	62 min	28 min ⁽¹⁾ 96 min ⁽²⁾
Deflection Temperature			
0.5 kPa	$^{\circ}\text{C}$	160 min	225 min
1.8 kPa	$^{\circ}\text{C}$	125 min	85 min

1. dry as molded

2. 50% relative humidity

4.1 Fluid Aging—The material when tested by the producer specified in 5.7 shall have a weight gain of not more than 2.0%.

5. Test Procedures

5.1 Specific Gravity—Determine the Specific Gravity of the material by ASTM D 792 (ISO R 1183).

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

5.3 Tensile Strength—Determine the Tensile Strength of the material by ASTM D 638 (ISO R 527). Type I sample size.

5.4 Modulus of Elasticity—Determine the Tangent of Modulus of Elasticity (Flexural Modulus) of the material by ASTM D 790 (ISO 178).

5.5 Impact Strength—Determine the notched Izod Strength of the material by ASTM D 256 (ISO 180). Samples to be 3.18 mm thick.

5.6 Deflection Temperature—Determine the Deflection Temperature by ASTM D 648, using a test specimen that is 127 x 12.7 x 12.7 mm and a load of 1.820 MPa (ISO 75).