NAVISTAR, INC.			
Material, Parts, and Process Specifications (MPAPS)		*NUMBER:* **MPAPS S-R-5.101-GS**	
		Former Designation: **ESP-R-5.101-GS**	
TITLE: **Fuses – General Specifications (Noun Code – 3660)**		*CURRENT REV No.:* **1506**	*DATE:* **June 2015**
WRITTEN/EDITED BY: **Materials Engineering**	*APPROVED BY:* **Materials Engineering**	*SUPERSEDES:* **ESP-R-5.101-GS - September 2000**	

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This specification may involve hazardous materials, equipment, and procedures. This specification does not purport to address all of the safety issues associated with its use. The user is responsible to consult appropriate safety and health practices and to determine the applicability of regulatory limits prior to use.

Change Notice: **Changed to New MPAPS format.**

1.0 GENERAL: This standard conforms in all essentials with the SAE Standard for fuses, as defined below, which are intended to provide protection for automotive wiring and apparatus.

2.0 RESTRICTED CHEMICAL SUBSTANCES: Effective January 1, 2007, all product supplied to the requirements of this specification must comply with the requirements of the MPAPS B-50 specification.

3.0 DEFINITION: A fuse is a device designed to open the electrical circuit when subjected to overloads that could damage the circuit or equipment. This is to be a non-reversible action and the fuse is intended to be replaced after the circuit malfunction has been corrected.

4.0 VOLTAGE RATING: Fuses will be rated at the voltage indicated in the dimensional table.

5.0 MAXIMUM VOLTAGE DROP: The maximum voltage drop (in millivolts) at rated current across the fuse only, will be as shown in Figure 1, when measured across the fuse from ferrule to ferrule.

6.0 AMPERE RATING: This standard covers ampere ratings up to and including 30 amperes. Preferred ampere ratings are shown in dimensional table. These ratings are determined at 75°F (24°C) ambient temperature. Approximate capacity change with respect to temperature is shown in Figure 2 for the recommended 1.250 in (31.75 mm) length fuses. The use of fuses in ambient temperature beyond the limits shown is not recommended without thorough testing experimentally in the vehicle. It is further recommended that fuses not be loaded to 100 percent of their adjusted capacity, according to ambient temperature, due to electrical system variation. See Figure 3 for additional deratings when fuses are used on cable gage sizes other than the test gage wire (SAE #8).

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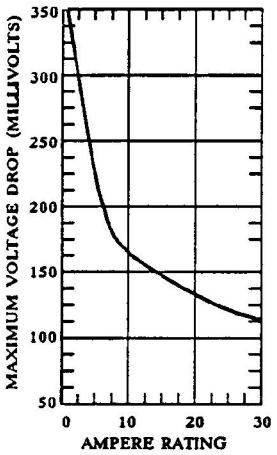
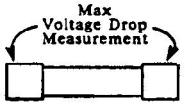


FIGURE 1 -MAXIMUM VOLTAGE DROP OF FUSE AT RATED CURRENT

Ambient Temperature (°C)	
- 67°F (-55°C)	112.5
- 20°F (-29°C)	108.0
+ 20°F (-6.7°C)	104.5
+ 75°F (+23.9°C)	100.0
+140°F (+60°C)	95.0
+185°F (+85°C)	91.5



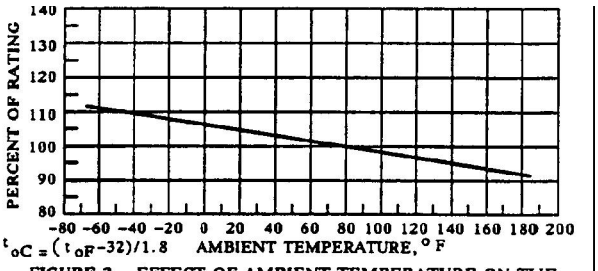


FIGURE 2 - EFFECT OF AMBIENT TEMPERATURE ON THE AMPERE RATING OF SAE SPECIFICATIONS FUSES

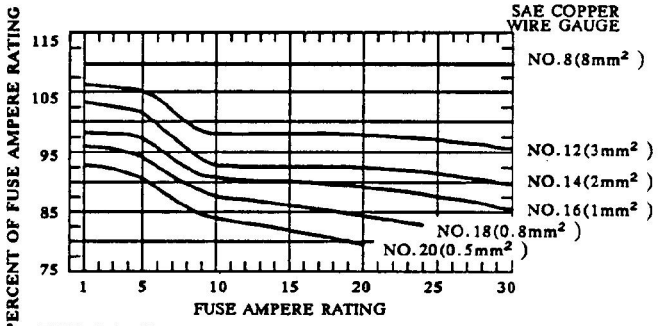


FIGURE 3 -FUSE DERATING FOR VARIOUS WIRE SIZES (1.250 in (31.75 mm) LENGTH)

7.0 IDENTIFICATION: The rated ampere capacity, type, and manufacturer's identification symbol will be clearly and permanently marked on end of cap. Where so designated by part number, ampere rating will, in addition to marking on cap, be identified by a colored stripe around glass as specified in the dimensional table. Placement of the stripe on inside of glass will be preferable, however, where agreeable to purchaser, application of stripe to outside of glass will be permissible. Identification stripes will adhere to the glass, be uniform throughout and will not discolor, crack, fade or peel under normal storage, handling and operating conditions.

8.0 MATERIAL: Fuse tubes will be of clear glass. Fuse caps will be of brass or copper. Caps will be plated with nickel, cadmium, or other material having equivalent electrical and protective properties.

9.0 CONSTRUCTION: Fuse caps will be tightly attached to the glass tube, and the end will be square and free of solder. The fuse elements will be clearly visible through the glass tube. The fuses will be capable of being passed through a tubular gage having a length as long as the fuse and having a uniform hole of 0.258-0.259 in (6.55-6.59 mm) diameter.

10.0 PERFORMANCE TESTS: Fuses will perform satisfactorily when subjected to the overload, cycling and vibration tests specified below in accordance with the test procedure shown.

11.0 BEST PROCEDURE: The fuses, with the exceptions noted in the vibration test, will be mounted horizontally. When testing two or more fuses in series, the fuses will be mounted no less than 6 in (152 mm) apart with no less than 24 in (609 mm) of interconnecting cable. All electrical tests will be made using SAE #8 gage copper wire, and with fuse clip attachment terminals that have a maximum voltage drop of 4 millivolts per ampere when measured between points located on the wire 3 in (76 mm) from the attachment terminals. This determination will be made by using a solid copper dummy .250 in (6.35 mm) in diameter and 1.250 ± .005 in (31.75 ± 0.13 mm) long, with suitable plated ferrules, installed in the fuse clips. Test will be conducted within an ambient temperature range of 75 ± 9°F (24 ± 5°C), except for the overload test which is to be connected at 75 ± 2°F (24 ± 1°C).

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