

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS-DT-8
		<i>Former Designation: TMS-1011 (example)</i>
TITLE: Glass Orientation and Content of Reinforced Plastics		CURRENT REV No.: 1706
		DATE: June 2017
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<i>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.</i>		

1.0 SCOPE

This is a thermal (ASH) method for determining the glass content of glass reinforced plastic components.

2.0 APPARATUS

- 2.1 Three Ceramic Crucibles
- 2.2 Furnace (capable of 538°C/1000°F minimum)
- 2.3 Oven (capable of 110°C/230°F)
- 2.4 Bunsen Burner
- 2.5 Matches or Flint Igniter
- 2.6 Glass Rod
- 2.7 Three 250 ml Glass Beakers
- 2.8 Rubber Policeman
- 2.9 Distilled Water

3.0 MATERIAL

- 3.1 Hydrochloric Acid (10%)
- 3.2 Nitric Acid (10%)
- 3.3 Liquid Paper

4.0 PROCEDURE

- 4.1 Wash and dry the crucibles and glass beakers.
- 4.2 Label each crucible with liquid paper. Place labeled crucibles in the oven to remove moisture from the crucibles and ink.
- 4.3 Remove crucibles from the oven and let cool to ambient in a desiccator.
- 4.4 Tare the balance. Place one crucible on the balance and record weight. Place one sample in crucible on balance and record weight of the crucible plus the sample.
- 4.5 Repeat step 4.4 with the remaining two samples.
- 4.6 Support the three crucibles in a fume hood so that a Bunsen burner can be passed under each crucible. Turn on the fume hood and ignite the Bunsen burner. Set the burner under each crucible until the samples are charred and will no longer support a flame.
- 4.7 Remove the flame and let the samples cool to ambient.

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- 4.8** Place the three crucibles in a furnace at 538°C/1000°F minimum for 4 to 8 hours or until the charred samples and crucibles have changed colors from carbon black to a white or gray ash.
- 4.9** Remove the crucibles from the furnace and cool to ambient.
- 4.10.** After cooling, move the samples to the fume hood and slowly add HCl (10%) onto the sample to visual observe the fiberglass orientation. The sample should be kept intact when pouring the acid and take photos to record the fiberglass orientation.
- 4.11** Add more HCl (10%) to the crucibles until the samples are immersed in the acid solution. (At this time, foaming will occur if the samples contain carbonate fillers). After foaming stops, decant the acid solution into a 250ml glass beaker (labeled identical to the crucible being decanted). Add more acid solution to each sample to confirm that the carbonate fillers have been dissolved.
- 4.12** Decant and rinse the samples with distilled water. Decant again into the appropriate beaker. (If there are some solids remaining that are unreactive with HCl solution, repeat step 4.10 using nitric acid).
- 4.13** Decant into the appropriate beaker and rinse with distilled water. (Any remaining solids or dirt must be considered unreactive filler and must be removed by mechanical agitation followed by decanting.)
- 4.14** Using a glass rod, mechanically agitate the glass and dirt so that a suspension is created. Quickly decant into the appropriate beaker. Repeat this procedure with each sample until the glass fiber is sufficiently clean.
- 4.15** Slowly rinse and decant each beaker into the sink until the beaker is empty or some clean glass is apparent at the bottom of the beaker. If there is glass, collect the glass with an appropriate tool such as a “rubber policeman” and add this glass to the originating crucible.
- 4.16** Place the three crucibles in an oven at 110°C/230°F for one hour. Remove the samples from the oven and fluff with a glass rod. Again place the crucibles into the oven at 110°C/230°F for another hour.
- 4.17** Remove the samples and let them cool to ambient in a desiccator.
- 4.18** Weigh and record the weight of the samples in their respective crucibles.
- 4.19** Calculate the percentage glass content using the formula below:

$$\frac{\text{Final sample weight - crucible weight}}{\text{Original sample weight - crucible weight}} \times 100\%$$

5.0 REPORT

Report the glass content by percentage.

6.0 TECHNICAL INFORMATION

For further information, related to the technical content of this specification, contact:	Suppliers may purchase controlled copies of this specification by contacting:
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