

NAVISTAR, INC.		
CEMS (CORPORATE ENGINEERING MATERIAL SPECIFICATION)		NUMBER: CEMS BT-48
TITLE: Determination Of Water & Methanol In Windshield Washer Solvent		CURRENT ISSUE DATE: August 2009
WRITTEN/REVIEWED BY: Materials Engineering	APPROVED BY: Materials Engineering	SUPERSEDES ISSUE OF: October 2001
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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>		
Change Notice: Replaced "International Truck and Engine Corporation" with "Navistar, Inc." per corporate directive.		

1.0 SCOPE

This method covers a test procedure for determining water and methanol in windshield washer solvent by gas chromatography.

2.0 APPARATUS

2.1 Gas Chromatograph (G.C.), capable of isothermal operation, with a thermal conductivity detector: integrator and strip-chart recorder.

2.2 Syringe, G.C. injection 0-10 μ l.

2.3 G.C. column, 1.83 m (72 inches) long x 6.35 mm (0.25 inch) diameter, packed with 10% Carbowax[®] on a #6 Teflon support, or equivalent.

2.4 Gas Regulator, 2 stage, 0-700 kPa (0 - 100 psi) working range. Pipettes, volumetric, T D, 1, 2, 3, 4, 5, 10, 20 and 50 ml.

2.5 Volumetric flasks, glass, 100 ml

3.0 MATERIALS

3.1 Distilled water per ASTM D 1193, Type II.

3.2 Methanol, ACS reagent grade.

3.3 Helium, 99.999% purity, water pumped.

4.0 PREPARATION OF STANDARDS

4.1 Add the following amounts of distilled water to 100 ml volumetric flask and dilute to mark with methanol.

4.1.1 Standards for concentrated grade.

Standard =	Distilled Water, ml	Mass % Water	Mass % Methanol
1	0.00	0.00	100.00
2	1.00	1.26	98.74
3	2.00	2.52	97.48
4	3.00	3.78	96.22
5	4.00	5.04	94.96

4.1.2 Standards for diluted grade.

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<u>Standard =</u>	<u>Distilled Water, ml</u>	<u>Mass % Water</u>	<u>Mass % Methanol</u>
1	37.0	42.6	57.4
2	40.0	45.7	54.3
3	43.0	48.9	51.1
4	46.0	51.8	48.2
5	48.0	53.9	46.1

5.0 PROCEDURE

5.1 Calibration

5.1.1 Preliminary Instructions

5.1.1.1 Recommended parameters for the Carbowax[®], chromatographic column are as follows:

- | | |
|--------------------------------|------------------|
| (1) Injection Port Temperature | 200°C |
| (2) Column Temperature | 100°C |
| (3) Detector Temperature | 300°C |
| (4) Column Inlet Pressure | 448 kPa (65 psi) |

5.1.1.2 Adjust instrument according to manufacturers instructions.

5.1.2 Using the appropriate standards for the grade being tested, draw a 2 microliter sample of one of the Standards into the syringe and inject sample into the G.C. Care should be taken to exclude all air bubbles from the syringe.

NOTE -Two peaks should be eluted within 5 to 10 minutes after injection of the standard. There should be little or no peak overlap.

5.1.3 Repeat Step 2 for the remaining standards for that grade.

5.1.4 Measure and record the areas under the water and the methanol peaks for the standards.

5.1.5 Plot concentration curves of area versus mass percent for water and for methanol.

5.2 Analysis of Sample

5.2.1 Treat sample as described under Steps 5.1.1 to 5.1.4 .

NOTE: As an internal check run at least one of the standards to assure that the apparatus is functioning correctly.

5.2.2 Record water and methanol peak areas of the sample.

6.0 CALCULATION

Plot areas for the water and the methanol peaks of the test sample on the standard concentration curves and determine mass percent of water and methanol in sample to the nearest 0.1%.

7.0 REPORT

Mass percent water and methanol in sample.

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