

NAVISTAR, INC.		
CEMS (CORPORATE ENGINEERING MATERIAL SPECIFICATION)		NUMBER: CEMS BT-38
TITLE: Test For Water Content In Air Conditioner Refrigerant		CURRENT ISSUE DATE: August 2009
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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 APPLICATION

This is a method for determining the water content of air conditioner refrigerant.*

In the event of disagreement in regard to water content as determined by this test method or by other methods: The Karl Fisher Test Method, as per ASTM E700, will be the referee test.

2.0 SCOPE

This specification describes the test method.

3.0 APPARATUS

3.1 Portable moisture monitor, DuPont Model 303, available from Ametek Corp., 455 Corporate Blvd., Pencader Corp. Center, Newark, Delaware 19702.

3.2 Adapter valve for drawing sample from refrigerant container.

4.0 PROCEDURE

4.1 For line operation, make sure the slide switch in the rear is in the "AC" position; plug the moisture monitor into an electrical outlet. For battery operation, place the slide switch into the "DC" position. Turn the attenuator switch to the cell position. This applies voltage to the cell and is used as a cell check.

4.2 Close valves V-2, V-3 and V-4 (see schematic diagram). Remove caps from bypass and sample flow meters.

4.3 Connect the sampling line of the analyzer to the sample to be analyzed.

4.4 Open valve V-1 fully. Open valve V-2 sufficiently to purge the sample line liquid phase for 10 to 15 seconds. Close valve V-2.

4.5 Open valve V-5, then open valve V-3 sufficiently to obtain a flow of one-half of full scale on the bypass meter. There should be no reading on the pressure gage or flow through the sample flow meter during this step. Purge the sample through the analyzer in this manner for 10 minutes

4.6 At the conclusion of the 10 minute purge, adjust valves V-3, V-5 and regulator R-1 until the following conditions have been attained:

* This method is adapted from DuPont's special test method for moisture content in fluorocarbon.

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4.6.1 a pressure gage reading of 20 to 40 psig (138 to 276 kPa)

4.6.2 a flow exists through the sample flowmeter (see correction flows on unit);

4.6.3 a flow of 400 divisions exists through the bypass flowmeter.

4.6.4 The above conditions should be reached as quickly as possible. Attend to valves V-3 and V-5 and regulator R-1 as necessary. Also, change the attenuator to furnish a reading on the current meter which is on-scale. If the unit is in a dry state, the current reading will rise to its final value without an overshoot in 10 to 15 minutes. If an overshoot occurs, the maximum current reading will be reached within this 10 to 15 minute period and then will drop off to its final equilibrium value. If there is no overshoot and the moisture level of the sample is determined at the peak level, it can be assumed that the sample is no wetter than the value obtained in this manner.

4.7 At the end of the 15 minute period, read the current level. When this reading is taken, the lowest range which furnishes an on-scale current meter reading must be used. The XI scale is the lowest possible range.

4.8 At the conclusion of the analysis, close valves V-3 and V-1 and purge the remaining sample through valve V-2.

5.0 CALCULATIONS

Calculate the water content of the samples from the following equation:

Water content, ppm by weight = A x B x C

where: A = attenuator scale

B = current meter reading

$$C = \frac{18}{\text{molecular weight of the sample gas}}$$

5.1 The molecular weight of dichlorodifluoromethane is 121; therefore, for R-12 refrigerant, factor C becomes 0.149.

5.2 The molecular weight of 1,1,1,2 - tetrafluoroethane is 102; therefore, for R-134a Refrigerant, factor C becomes 0.176.

6.0 REPORT

Report the moisture content in parts per million by weight.

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