SAE Aerospace
An SAE International Group

AEROSPACE INFORMATION REPORT

SAE AIR9968

REV. A

Issued 2003-02
Revised 2004-12

Superseding AIR9968

Viscosity Test of Thickened Aircraft Deicing/Anti-icing Fluids

FOREWORD

In freezing weather conditions, situations conductive to aircraft icing on the ground may be encountered. Methods of protection of aircraft surfaces with anti-icing fluids are described in ARP4737.

Aircraft operators and deicing companies perform viscosity tests on thickened anti-icing fluids for quality control purposes. Since controls and audits are performed by various companies, a reference viscosity measurement method has been selected to perform exchange and interpretation of results. This SAE Aerospace Information Report (AIR) describes the selected test method.

1. SCOPE:

This SAE AIR provides a description of a reference method for viscosity tests of thickened (AMS 1428) anti-icing fluids.

1.1 Purpose:

To provide a reference method for viscosity tests of thickened (AMS1428) anti-icing fluids.

TO PLACE A DOCUMENT ORDER:
Tel: 877-606-7323 (inside USA and Canada)
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: custsvc@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AIR9968A

2. REFERENCES:

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 1428	Fluid, Aircraft Deicing/Anti-icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV
ARP4737	Aircraft Deicing/Anti-icing Methods
AS5485	Endurance Time Tests for Aircraft Deicing/Anti-icing Fluids SAE Type I, II, III, and IV (proposed)

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 2196	Standard Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield type) Viscometer

3. TEST METHOD:

3.1 Instrument:

A Brookfield LV series viscometer shall be used.

NOTE: RV, HA or HB series Brookfield viscometers shall not be used for this test. It may be necessary to verify on the label on the back of the instrument if it is an LV series model, because normally the display on the front only indicates the sub model.

3.2 Basic Method:

The test method shall be in accordance with ASTM D 2196; Test Method A, however, the special requirements as listed in 3.3 shall take precedence.

3.3 Special Requirements:

3.3.1 The fluid may be degraded by shearing; therefore the fluid processing shall avoid excessive shaking and inappropriate methods to fill the sample chamber.

3.3.2 The fluid to be tested shall be substantially free of air bubbles.

3.3.3 The viscosity reading shall be taken at a fluid temperature of 20 °C ± 1 °C.

3.3.4 Spindle Selection:

3.3.4.1 For viscosities equal to or below 10,000 mPa·s, Brookfield spindle LV1 shall be used.

3.3.4.2 For viscosities equal to or above 20,000 mPa·s, Brookfield spindle LV2-disc shall be used.

3.3.4.3 For viscosities between 10,000 mPa·s and 20,m000 mPa·s either one of the Brookfield spindles LV1 or LV2-disc may be used.

To avoid repetition of measurements, following is recommended:

If viscosities are expected to be in the range of 0 to 20,000 mPa·s, use the LV1 spindle.

If viscosities are expected to be in the range of 10,000 to 100,000 mPa·s, use the LV2-disc spindle.

3.3.4.4 When viscosity results are above 20,000 mPa·s when measured with the LV1 spindle or below 10,000 mPa·s when measured with the LV2-disc spindle, the measurements shall be repeated using the other spindle.

3.3.4.5 Any air bubbles clinging to the flat bottom side of the spindle must be avoided. This may be accomplished by inserting the spindle in the fluid sample at an angle (approximate 30-45 degrees) to the vertical, then put it upright and attach it to the device while keeping the spindle in the fluid sample.

3.3.5 The guard leg shall be attached to the viscometer. The sample container shall be round and big enough for immersion of the spindle and guard leg.

3.3.6 The viscometer shall be set at a rotational speed of 0.3 rpm.

3.3.7 The viscosity reading shall be taken exactly 10 minutes after spindle rotation is started.

4. INTERPRETATION OF TEST RESULTS:

The viscosity values obtained from measurement in accordance with a method of this AIR9968 must only be compared with viscosity limits or other viscosity values if these have been established with exactly the same method. Other methods may produce different results.