EMULSIFIABILITY AND FOAMING TEST FOR COOLANTS

Application

This procedure is used to determine the emulsification and foaming properties of cutting fluids, coolants and radiator water soluble anti-rust.

Apparatus and Materials Required

Mechanical Mixer

1300 rpm, propeller type stirrer, stainless steel, four-blade, diameter 45 - 50 mm.

Water

For the determination of foaming as well as emulsifiability of the material to be tested a synthetic water with a total hardness of 3.58 mmol $CaCl_2 \cdot 6H_2O$ and $MgSO_4 \cdot 7H_2O$ per liter shall be used which is prepared from:

17 mL of solution A
3 mL of solution B
980 mL of boiled and cooled, distilled chemically pure water*

Solution A

39 g calcium chloride ($CaCl_2 \cdot 6H_2O$), A.R., dissolved with distilled water to 1 liter.

1 mL of this solution A diluted with distilled water to 1 liter results in water of a hardness of 0.179 mmol $Cacl_2 \cdot 6H_2O$ per liter.

Solution B

44 g magnesium sulphate ($MgSO_4 \cdot 7H_2O$), A.R., dissolved with distilled water to 1 liter.

1 mL of this solution B diluted with distilled water to 1 liter results in water of a hardness of 0.179 mmol $MgSO_4 \cdot 7H_2O$ per liter.

Glass Beakers

800 mL and 1000 mL, tall form.

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

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Procedure

A. Emulsifiability Test

1. Place 500 mL of synthetic water at ambient temperature in the 1000 mL beaker.

2. Stir the water with the mixer. Add the calculated amount of soluble oil to give the specified concentration and then continue stirring for two minutes.

   Note: During the emulsification process the propeller blades should be positioned approx 20 mm above the bottom of the beaker.

3. Cover the beaker and allow to stand for 24 hours at ambient temperature.

Evaluation

Examine for the presence of creaming and oil separation.

B. Foaming Test

1. Place 500 mL of synthetic water at a temperature of 20 +/- 2 C in the 800 mL beaker.

2. Stir the water with the mixer. Add slowly the calculated amount of soluble oil to give the concentration and then continue stirring for five minutes.

   Note: During this process the propeller blades should be positioned approximately 20 mm below the liquid surface.

Evaluation

Measure and report the height of the foam in millimetres immediately following the end of stirring and after a standing period of 10 minutes.

Note: Do not remove stirrer while performing the test.

Chemicals, materials, parts, and equipment referenced in this document must be used and handled properly. Each party is responsible for determining proper use and handling in its facilities.

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