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Replacing SH/T 0324-1994

Standard test method for oil separation from lubricating grease (conical sieve method)

润滑分油的测定 锥网法

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Standard test method for oil separation from lubricating grease (conical sieve method)

1 Scope

1.1 This Standard applies to the determination of the tendency of lubricating grease to separate oil at an elevated temperature. Unless other conditions are required by the grease specification, the test condition of this Standard is 100 °C for 30 h.

1.2 This Standard does not apply to lubricating grease products having a penetration greater than 340 (1/10 mm) (test methods GB/T 269, softer than NLG grade II lubricating grease).

1.3 This Standard uses the International System of Units [SI].

1.4 This Standard may involve certain hazardous materials, operations and equipment, but does not address all the safety concerns related to them. Therefore, before using this Standard, users shall establish corresponding safety and protective measures and determine the applicability of relevant regulations.

2 Normative references

The following documents contain the provisions which, through reference in this Standard, become the provisions of this Standard. For dated references, their subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard. However, the parties who enter into agreement based on this Standard are encouraged to investigate whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB/T 269 Lubricating grease and petrolatum - Determination of cone penetration (GB/T 269-1991, eqv ISO 2137:1985)

GB/T 10611 Industrial screens - Designation and nominal sizes of apertures (GB/T 10611-2003, ISO 2194:1991, MOD)

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions apply.

3.1

lubricating grease

A stable semifluid to solid product of a dispersion of a thickener in a liquid lubricant.

NOTE: The dispersion of the thickener forms a two-phase system and immobilizes the liquid lubricant by surface tension and other physical forces. Other ingredients imparting special properties are often included.

3.2

oil separation

The appearance of a liquid fraction from a homogeneous lubricating composition.

3.3

thickener

In a lubricating grease, a substance composed of finely divided particles dispersed in a liquid lubricant to form a skeleton structure.

NOTE: The thickener can be fibers (such as various metallic soaps) or plates or spheres (such as certain non-soap thickeners) which are insoluble or, at most, only very slightly soluble in the lubricating grease. The general requirements are that the solid particles be extremely small, uniformly dispersed, and capable of forming a relatively stable, gel-like structure with the liquid lubricant.

4 Summary of method

The weighed specimen is placed in a cone-shaped, nickel wire, nickel-copper alloy wire or stainless steel wire cloth sieve, suspended in a beaker, then heated for the specified time and temperature. Unless otherwise required by the lubricating grease specification, the specimen is subjected to standard conditions of 100 °C ± 0.5 °C for 30 h ± 0.25 h before test. The separated oil is weighed and reported as a percentage of the mass of the starting test specimen.

have been used in the past. Such sieves do not conform to this Standard.

6.2 Oven, capable of maintaining the specified temperature, 100 °C ± 0.5 °C.

6.3 Balance: having a minimum capacity of 250 g and a sensitivity of at least 0.01 g.

7 Sampling

7.1 Examine the specimen for any indication of non-homogeneity such as oil separation, phase changes, or gross contamination. If any abnormal conditions are found, obtain a new specimen.

7.2 The amount of the specimen submitted for analysis shall be minimally sufficient for duplicate testing.

7.3 Although the mass of the test lubricating grease is determined, the amount of lubricating grease used to fill the cone sieve will still be more than the amount required by the test. Each test will require a sufficient amount of lubricating grease to fill the sieve to approximately the same level as indicated in Figure 1 (about 10 mL). Regardless of the lubricating grease density, approximately the same volume of lubricating grease shall be used for each test; the mass will range from about 8 g to 12 g.

8 Preparation of apparatus

8.1 Carefully clean the cone sieve, beaker, and cover with a suitable solvent. Allow the cone sieve to air dry.

NOTE: Use of a solvent to clean the sieve in an ultrasonic tank has been found highly effective in cleaning the sieve.

8.2 Inspect the cone sieve to make certain that it is clean and free of deposits that could affect the passage of oil. If the cone sieve has any screen irregularities such as tears, dents, creases, or enlarged or diminished openings, it shall be replaced.

9 Procedure

9.1 PREHEAT the oven to test temperature. Unless otherwise specified, the test shall be conducted at standard conditions of 100 °C ± 0.5 °C for 30 h ± 0.25 h.

9.2 WEIGH the beaker, to the nearest 0.01 g, W_i.

9.3 ASSEMBLE the sieve, cover, and beaker as shown in Figure 1. TARE them to the nearest 0.01 g.

9.4 With a suitable spatula, FILL the cone sieve with sufficient lubricating grease to approximate the level shown in Figure 1, being careful to avoid inclusion of air. Exercise care not to force specimen through the screen. Smooth and shape the top of the specimen into a slightly convex surface to prevent trapping free oil.

9.5 ASSEMBLE the entire apparatus as shown in Figure 1, and WEIGH to the nearest 0.01 g. CALCULATE the mass of the lubricating grease specimen by difference, *W*.

9.6 PLACE the assembled cone sieve oil separation apparatus in the oven that has been controlled at the specified temperature for the specified time.

9.7 REMOVE the cone sieve oil separation apparatus from the oven and COOL to room temperature. REMOVE the cover from the beaker, tapping it gently against the inside of the beaker to take off any oil adhering to its tip. WEIGH the beaker containing the collected oil to the nearest 0.01 g, W_f.

9.8 Soon after completion of the test, CLEAN the apparatus according to Clause 8 in preparation for subsequent testing.

10 Calculation

10.1 The oil separation, *X* [% (mass fraction)], of the specimen is calculated according to formula (1):

$$X = 100 \times (W_f - W_i)/W \quad \cdots\cdots (1)$$

where:

W_i - mass of the empty beaker before heating, g;

W_f - mass of the beaker after heating, g;

W - mass of the specimen, g.

11 Report

The test report shall include the following information:

11.1 Specimen identity.

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