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DRAFT EAST AFRICAN STANDARD

Cosmetics — Analytical methods — Part 7: Determination of specific gravity

EAST AFRICAN COMMUNITY

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DRAFT EAST AFRICAN STANDARD FOR PUBLIC REVIEW

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 071, *Cosmetics and related products*

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

This second edition cancels and replaces the first edition (EAS 847-7:2017), which has been technically revised.

EAS 847 consists of the following parts, under the general title *Cosmetics — Analytical methods*:

- *Part 1: Glossary of terms*
- *Part 2: Determination of moisture content and volatile matter content*
- *Part 3: Determination of insoluble impurities*
- *Part 4: Determination of acid value and free fatty acids*
- *Part 5: Determination of unsaponifiable matter*
- *Part 6: Determination of melting point*
- *Part 7: Determination of specific gravity*
- *Part 8: Titre test*
- *Part 9: Determination of colour*
- *Part 10: Determination of acetyl value and hydroxyl value*
- *Part 11: Determination of allyl isothiocyanate*
- *Part 12: Determination of flash point by Pensky – Martens Closed Cap Tester*
- *Part 13: Determination of rancidity*

- *Part 14: Determination of Polenske value*
- *Part 15: Determination of ash content*
- *Part 16: Determination of lead, mercury and arsenic content*
- *Part 17: Determination of pH*
- *Part 18: Determination of thermal stability*
- *Part 19: Determination of non-ionic, anionic and cationic surfactant content*
- *Part 20: Determination of lather volume (foaming power)*
- *Part 21: Determination of free acid in oils*
- *Part 22: Determination of sulphur and sulphides in oils*
- *Part 23: Test for absence of grit in powders*
- *Part 24: Determination of matter insoluble in boiling water*
- *Part 25: Determination of fineness*
- *Part 26: Determination of boric acid*
- *Part 27: Determination of total fatty substance by gravimetric method*
- *Part 28: Determination of free caustic alkali*

Cosmetics — Analytical methods — Part 7: Determination of specific gravity

1 Scope

This Draft East African Standard prescribes the test methods for the determination of specific gravity in oils and fats for cosmetic industry.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies

EAS 847-1, *Cosmetics — Analytical methods — Part 1: Glossary of terms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EAS 847-1 apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <http://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

4 Principle

4.1 The specific gravity may be determined with a Westphal hydrostatic balance, or with a specific gravity bottle or pycnometer. The latter method shall be adopted as the reference method in cases of dispute.

4.2 The temperatures at which the specific gravity is determined shall be reported, namely specific gravity 25 °C/25 °C or specific gravity 95 °C/95 °C.

5 Preparation of the material

Melt the sample, if necessary and filter through a filter paper to remove any impurities and the last traces of moisture, to ensure that the sample is completely dry. Cool the sample to 25 °C or warm to the desired test temperature.

6 Westphal hydrostatic balance method

6.1 Procedure

6.1.1 Suspend the plummet in the cylinder filled with recently boiled distilled water at the test temperature, and place the largest rider on the hood. Adjust the screw on the base until the pointer is exactly opposite the fixed indicator point. Wipe the plummet and the cylinder to remove the water. Fill the cylinder with the material at the same temperature and dip the plummet into the material, removing air bubbles, if any, formed in the eye-hole of the plummet, by lifting it from the material.

6.1.2 Re-immers the plummet in the material and adjust the height of the balance to ensure that the plummet will be nearly in the middle of the material when the beam is counter-poised. Place riders on the beam, till the pointer and the fixed indicator are exactly opposite each other. Read the specific gravity from the position of the riders on the beam, beginning with the largest and ending with the smallest

6.2 Corrections

Sometimes, especially when using the hydrostatic balance, it is not convenient to make the determination at the specified temperature. The determination may be made at a convenient temperature (T') as near to the specified temperature (T) as possible and the result corrected as shown below to the specified temperature. This correction is based on the average value for the coefficient of expansion of oils and fats (0.000 64 per 1 °C and for water (0.00 23 per 1 °C). Approximate temperature corrections may, therefore, be made as follows:

- a) Specific gravity at T °C/ T °C shall be expressed using the formula below:

$$\frac{D' + 0.000\ 64 (T' - T)}{W' + 23\ 0.000 (T' - T)}$$

where

D' is the density of oil/fat at T' °C

T' is the temperature at which the densities D' and W' were determined;

T is the standard temperature 25 °C; and

W' is the density of water at T' °C

- b) The specific gravity at T °C/ T °C shall be expressed using the formula below:

$$S' + 0.000\ 41 (T' - T)$$

where

S' is the specific gravity at T'/T' °C;

T' is the temperature at which the specific gravity was determined; and

T is the standard temperature, 25 °C

7 Specific gravity bottle or pycnometer method

7.1 Apparatus

7.1.1 Specific gravity bottle or pycnometer, with well-fitting ground glass joints.

7.1.2 Water-bath, maintained at $25\text{ }^{\circ}\text{C} \pm 0.2\text{ }^{\circ}\text{C}$ or $95.0\text{ }^{\circ}\text{C} \pm 0.2\text{ }^{\circ}\text{C}$, as required

7.1.3 Thermometer, calibrated, of a suitable range with $0.1\text{ }^{\circ}\text{C}$ or $0.2\text{ }^{\circ}\text{C}$ subdivisions

7.2 Conditioning of specific gravity bottle or pycnometer

7.2.1 To calibrate, clean and dry the specific gravity bottle or pycnometer thoroughly, weigh and then fill with recently boiled and cooled water at about $25\text{ }^{\circ}\text{C}$ after removing the cap of the side arm.

7.2.2 Fill to overflowing by holding the specific gravity bottle or pycnometer on its side in such a manner as to prevent the entrapment of air bubbles. Insert the stopper and immerse in a water-bath at the desired test temperature $\pm 0.2\text{ }^{\circ}\text{C}$. Keep the entire bulb completely covered with water and hold at that temperature for 30 min.

7.2.3 Carefully remove any water which has exuded from the capillary opening. Remove from the bath, wipe completely dry, replace the cap, cool to room temperature and weigh. Calculate the weight of water. This is a constant for the specific gravity bottle or pycnometer, but should be checked periodically. A specific gravity bottle of about 50-mL capacity and of either of the two shapes as shown in Figure 1 is recommended.

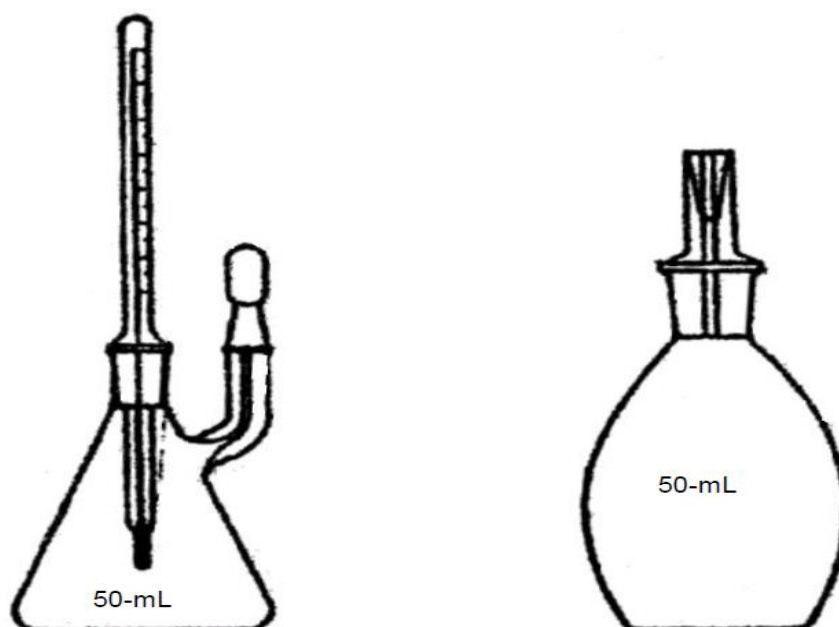


Figure 1 — Specific gravity bottle

7.3 Procedure

7.3.1 Weigh the mass of empty specific gravity bottle or pycnometer and record the mass W_1 .

7.3.2 Fill the specific gravity bottle or pycnometer with distilled water previously cooled to about $25\text{ }^{\circ}\text{C}$ to overflowing. Carefully wipe off any water which has come through the capillary opening. Remove the bottle from the bath and dry it thoroughly. Replace the cap of the side arm, cool to room temperature, weigh and record the mass W_2 .

7.3.2 Fill the specific gravity bottle or pycnometer with the oil previously cooled to about $25\text{ }^{\circ}\text{C}$ to overflowing, holding the bottle on its side in such a manner as to prevent the entrapment of air bubbles after removing the cap of the side arm. Insert the stopper, immerse in the water-bath at $25.0\text{ }^{\circ}\text{C} \pm 0.2\text{ }^{\circ}\text{C}$, or at $95.0\text{ }^{\circ}\text{C} \pm 0.2\text{ }^{\circ}\text{C}$, as required, and hold for 30 min. Carefully wipe off any oil which has come through the capillary

opening. Remove the bottle from the bath and dry it thoroughly. Replace the cap of the side arm, cool to room temperature, weigh and record the mass W_3 .

7.4 Calculation

a) The specific gravity at 25 °C /25 °C shall be expressed using the formula below:

$$\frac{W_3 - W_1}{W_2 - W_1}$$

where

W_3 is the mass, in grams, of the specific gravity bottle with oil at 25 °C,

W_1 is the mass, in grams, of the specific gravity bottle, and

W_2 is the mass, in grams, of the specific gravity bottle with water at 25 °C.

b) The specific gravity at 95 °C /95 °C shall be expressed using the formula below:

$$\frac{W_3 - W_1}{W_2 - W_1}$$

where

W_3 is the mass, in grams, of the specific gravity bottle with oil at 95 °C,

W_1 is the mass, in grams, of the specific gravity bottle, and

W_2 is the mass, in grams, of the specific gravity bottle with water at 95 °C.

c) The specific gravity at 95 °C /25 °C shall be expressed using the formula below:

$$\frac{W_3 - W_1}{(W_2 - W_1) \times [1 + 0.000025 \times 26]} = \frac{W_3 - W_1}{(W_2 - W_1) \times 1.00065}$$

where

W_3 is the mass, in grams, of the specific gravity bottle and fat at 95 °C,

W_1 is the mass, in grams, of the specific gravity bottle, and

W_2 is the mass, in grams, of the specific gravity bottle with water at 25 °C and

0.000 025 is the coefficient of expansion of glass.

7.5 Corrections

See 6.2.

Bibliography

EAS 847-7: 2017, *Cosmetics — Analytical methods — Part 7: Determination of specific gravity*

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