

E28 Petrolatum

Stage 2, version 2

Definition

Petrolatum is a purified semi solid mixture of hydrocarbons obtained from petroleum. It may contain a suitable antioxidant.

Package and storage

Preserve in well-closed containers, protected from light.

Labeling

Label to indicate the name and proportion of any added antioxidant. Label to state the drop point value of the product.

Identification

A. Infrared Absorption Spectrophotometry, obtained by spreading a thin film of melted test specimen between sodium chloride plates.

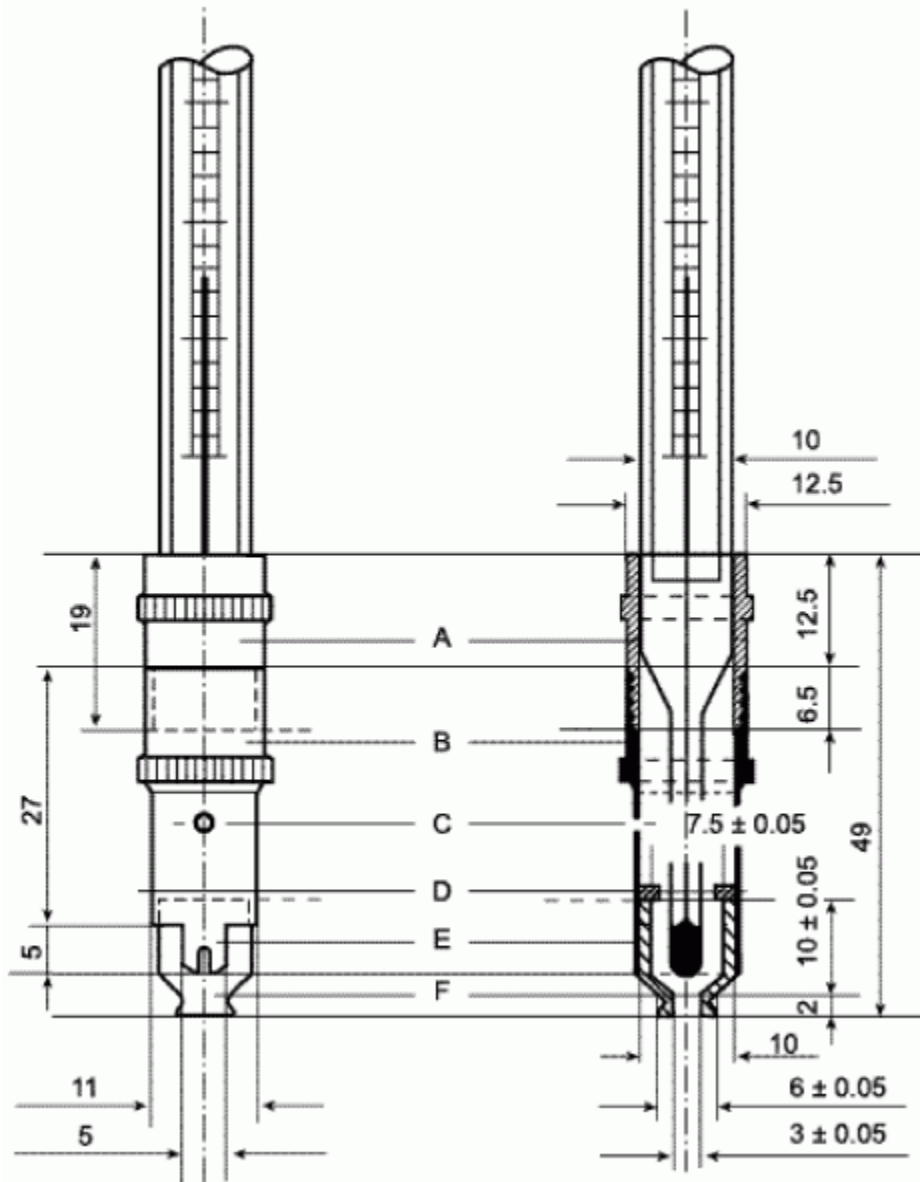
Acceptance criteria:

Record the infrared absorption spectrum and compare the spectrum with the Reference Spectrum or the spectrum of Petrolatum Reference Standard: the transmission minima correspond in position and relative size.

B. Color— Melt about 10 g on a steam bath, and pour about 5 mL of the liquid into a clear-glass 15- × 150-mm test tube, keeping the petrolatum melted. The petrolatum is not darker than 5 mL of a mixture of Ferric Chloride Solution: Cobaltous Chloride Solution (3.8:1.2) in a similar tube, the comparison of the two being made in reflected light against a white background, the petrolatum tube being held directly against the background at such an angle that there is no fluorescence.

C. Drop Point – *Apparatus*. The apparatus consists of 2 metal sheaths (*A* and *B*) screwed together. Sheath *A* is fixed to a mercury thermometer. A metal cup is loosely fixed to the lower part of sheath *B* by means of 2 tightening bands. Fixed supports 2 mm long determine the exact position of the cup, and in addition are used to centre the thermometer. A hole pierced in the wall of sheath *B* is used to balance the pressure. The draining surface of the cup must be flat and the edges of the outflow orifice must be at right angles to it. The lower part of the mercury thermometer has the form and size shown in the figure; it covers a range from 0 °C to 110 °C and on its scale a distance of 1 mm represents a difference of 1 °C. The mercury reservoir of the thermometer has a diameter of 3.5 ± 0.2 mm and a height of 6.0 ± 0.3 mm. The apparatus is placed in the axis of a test-tube about 200 mm long and with an external diameter of about 40 mm. It is fixed to the test-tube by means of a laterally grooved stopper through which the thermometer passes. The opening of the cup is placed about 15 mm from the bottom of the test-tube. The whole device is immersed in a beaker with a capacity of about 1 litre, filled with water. The bottom of the test-tube is placed

43 about 25 mm from the bottom of the beaker. The water level reaches the upper part of sheath A. A
 44 stirrer is used to ensure that the temperature of the water remains uniform. Alternatively, a
 45 validated automated method can be used.



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- | | |
|----------------------------|---------------------|
| A. upper metal sheath | D. fixed supports |
| B. lower metal sheath | E. tightening bands |
| C. pressure-balancing hole | F. metal sample cup |

47 *Figure 1. Apparatus for the determination of drop point*

48 *Dimensions in millimeters*

49

50 Heat the substance to be examined at 100-105 °C for not more than 10 min, with stirring to ensure
 51 uniformity. Warm the metal cup at 100-105 °C in an oven, remove it from the oven, place on a

52 clean plate or ceramic tile and pour a sufficient quantity of the melted sample into the cup to fill it
53 completely. Allow the filled cup to cool for 30 min on the ceramic tile ($25 \pm 3^\circ\text{C}$) and place it in a
54 water-bath at $24\text{--}26^\circ\text{C}$ for a further 30–40 min. Level the surface of the sample with a single stroke
55 of a knife or razor blade, avoiding compression of the sample. Determine the drop point using a
56 starting temperature of at least 10°C below the expected drop point and increasing the temperature
57 at a rate of $1^\circ\text{C}/\text{min}$.” Note the temperature at the fall of the first drop. Carry out at least
58 3 determinations, each time with a fresh sample of the substance. The difference between the
59 readings must not exceed 3°C . The mean of 3 readings is the drop point of the substance. The
60 drop point is 35°C to 70°C and does not differ by more than 5°C from the value stated on the
61 label.

62 63 **Consistency**

64 *Apparatus*— Determine the consistency of Petrolatum by means of a penetrometer fitted with a
65 polished cone-shaped metal plunger weighing 150 g, having a detachable steel tip of the following
66 dimensions: the tip of the cone has an angle of 30° , the point being truncated to a diameter of 0.381
67 ± 0.025 mm, the base of the tip is 8.38 ± 0.05 mm in diameter, and the length of the tip is $14.94 \pm$
68 0.05 mm. The remaining portion of the cone has an angle of 90° , is about 28 mm in height, and
69 has a maximum diameter at the base of about 65 mm. The containers for the test are flat-bottom
70 metal cylinders that are 100 ± 6 mm in diameter and not less than 65 mm in height. They are
71 constructed of at least 1.6-mm (16-gauge) metal, and are provided with well-fitting, water-tight
72 covers.

73 *Procedure*— Place the required number of containers in an oven, and bring them and a quantity of
74 Petrolatum to a temperature of $82 \pm 2.5^\circ$, pour the Petrolatum into one or more of the containers,
75 filling to within 6 mm of the rim. Cool to $25 \pm 2.5^\circ$ over a period of not less than 16 hours, protected
76 from drafts. Two hours before the test, place the containers in a water bath at $25 \pm 0.5^\circ$. If the room
77 temperature is below 23.5° or above 26.5° , adjust the temperature of the cone to $25 \pm 0.5^\circ$ by
78 placing it in the water bath.

79 Without disturbing the surface of the substance under test, place the container on the penetrometer
80 table, and lower the cone until the tip just touches the top surface of the test substance at a spot 25
81 mm to 38 mm from the edge of the container. Adjust the zero setting and quickly release the
82 plunger, then hold it free for 5 seconds. Secure the plunger, and read the total penetration from the
83 scale. Make three or more trials, each so spaced that there is no overlapping of the areas of
84 penetration. Where the penetration exceeds 20 mm, use a separate container of the test substance
85 for each trial. Read the penetration to the nearest 0.1 mm. Calculate the average of the three or
86 more readings, and conduct further trials to a total of 10 if the individual results differ from the
87 average by more than $\pm 3\%$: the final average of the trials is not less than 10.0 mm and not more
88 than 30.0 mm, indicating a consistency value between 100 and 300.

89
90 **Acidity or alkalinity.** To 10 g add 20 mL of boiling water and shake vigorously for 1 min. Allow
91 to cool and decant. To 10 mL of the aqueous layer add 0.1 mL of *phenolphthalein solution*. The
92 solution is colorless. Not more than 0.5 mL of *0.01 M sodium hydroxide* is required to change the
93 color of the indicator to pink or red.

94
95 **Residue on ignition**— Heat 2 g in an open porcelain or platinum dish: it volatilizes. Then ignite
96 at $600 \pm 50^\circ$ in the presence of sulfuric acid until constant weight and yield not more than 0.05%
97 of residue.

98
99 **UV absorbance limit for Polycyclic aromatic hydrocarbons**

100 Dissolve 1.0 g in 50 ml of hexane which has been previously shaken twice with 10 ml of *dimethyl*
101 *sulfoxide*. Transfer the Solution to a 125 ml separating funnel with unlubricated ground-glass parts
102 (stopper, stopcock). Add 20 ml of *dimethyl sulfoxide*. Shake vigorously for 1 min and allow to
103 stand until 2 clear layers are formed. Transfer the lower layer to a second separating funnel. Repeat
104 the extraction with a further 20 ml of *dimethyl sulfoxide*. Shake vigorously the combined lower
105 layers with 20 ml of *hexane* for 1 min. Allow to stand until 2 clear layers are formed. Separate the
106 lower layer and dilute to 50.0 ml with *dimethyl sulfoxide*. Measure the absorbance over the range
107 260 nm to 420 nm using a path length of 1 cm and as compensation liquid the clear lower layer
108 obtained by vigorously shaking 10 ml of *dimethyl sulfoxide* with 25 ml of *hexane* for 1 min.
109 Prepare a reference Solution in *dimethyl sulfoxide* containing 6.0 mg/L of *naphthalene* and
110 measure the absorbance of the Solution at the maximum at 278 nm using a path length of 1 cm and
111 *dimethyl sulfoxide* as compensation liquid. At no wavelength in the range 260 nm to 420 nm does
112 the absorbance of the test Solution exceed one-fourth of the reference Solution at 278 nm.

113

114 **REAGENTS**

115 **Ferric Chloride Solution (Yellow solution)**—Dissolve about 55 g of Ferric Chloride
116 ($\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$) in enough of a mixture of 25 mL of hydrochloric acid and 975 mL of water to make
117 1000 mL. Pipet 10 mL of this solution into a 250-mL iodine flask, add 15 mL of water, 3 g of
118 potassium iodide, and 5 mL of hydrochloric acid, and allow the mixture to stand for 15 minutes.
119 Dilute with 100 mL of water, and titrate the liberated iodine with 0.1 N sodium thiosulfate VS,
120 adding 3 mL of starch solution as the indicator. Perform a blank determination with the same
121 quantities of the same reagents, and make any necessary correction. Each mL of 0.1 N sodium
122 thiosulfate is equivalent to 27.03 mg of $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$. Adjust the final volume of the solution by the
123 addition of enough of the mixture of hydrochloric acid and water so that each mL contains 45.0
124 mg of $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$.

125 **Cobaltous Chloride Solution (Red solution)**—Dissolve about 65 g of cobaltous chloride
126 ($\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$) in enough of a mixture of 25 mL of hydrochloric acid and 975 mL of water to make
127 1000 mL. Pipet 5 mL of this solution into a 250-mL iodine flask, add 5 mL of hydrogen peroxide
128 solution and 15 mL of sodium hydroxide solution (1 in 5), boil for 10 minutes, cool, and add 2 g
129 of potassium iodide and 20 mL of dilute sulfuric acid (1 in 4). When the precipitate has dissolved,
130 titrate the liberated iodine with 0.1 N sodium thiosulfate VS, adding 3 mL of starch solution as the
131 indicator. Perform a blank determination with the same quantities of the same reagents, and make
132 any necessary correction. Each mL of 0.1 N sodium thiosulfate is equivalent to 23.79 mg of
133 $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$. Adjust the final volume of the solution by the addition of enough of the mixture of
134 hydrochloric acid and water so that each mL contains 59.5 mg of $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$.

135 **Starch Solution**—Mix 1 g of soluble starch with 10 mg of red mercuric iodide and sufficient cold
136 water to make a thin paste. Add 200 mL of boiling water, and boil for 1 minute with continuous
137 stirring. Cool, and use only the clear solution.

138 [NOTE 1—Commercially available, stabilized starch indicator solutions may be used.]

139 [NOTE 2—Starch solution can be prepared without the use of red mercuric iodide, provided the
140 solution is used immediately after preparation]

141 **Hydrogen Peroxide Solution** —Contains, in each 100 mL, not less than 2.5 g and not more than
142 3.5 g of H₂O₂.

143 **Phenolphthalein Solution** —Dissolve 1 g of phenolphthalein in 100 mL of alcohol.

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