

E28 PETROLATUM
Stage 4
CP:USP

BRIEFING NOTE

Compared to the previous Stage 3 document the following changes are proposed:

- (1) Definition – The term “Stabilizer” has been replaced by “antioxidant” at a request from EP to provide a limitation on a single-type of additive.
- (2) Identification – Added IR Requirement
- (3) *Packaging and storage*—added the statement, “...protected from light.” This proposal to specify protection from light is based on comments received.
- (4) *Labeling*—added the statement, “Where the labeling indicates the consistency, determine compliance using *Consistency*.” The *Consistency* test, which measures a functionality parameter of the article, is not intended to be a required test in this harmonized monograph; therefore, the proposed *Labeling* wording regarding consistency is intended to indicate that the *Consistency* test procedure is the harmonized monograph is to be used to determine consistence values if such values are reported in the labeling for the article.
- (5) *Specific gravity*—deleted based on comments that the wide test limits are not suitable to characterize the article.
- (6) *Melting range*—Based on comments from EP, range is widened from 38-60 to 40-75 to better reflect the global market.
- (7) *Polycyclic aromatic hydrocarbons*—Based on requests from global regulatory authorities, a new test has been added based on the existing EP monograph.

In addition, the text has been converted to “global style”.

Petrolatum

Definition

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

Description and Solubility - Unctuous yellowish to light amber mass, having not more than a slight fluorescence even after being melted. Is transparent in thin layers. Is free or practically free from odor and taste. Insoluble in water; freely soluble in benzene, in carbon disulfide, in chloroform, and in turpentine oil; soluble in ether, in solvent hexane, and in most fixed and volatile oils; practically insoluble in cold and hot alcohol and in cold dehydrated alcohol.

Packaging and storage— Preserve in well-closed containers, protected from light.

Labeling— Label it to indicate the name and proportion of any added antioxidant. Where the labeling indicates the consistency, determine compliance using *Consistency*.

Identification – *Infrared Absorption Spectrophotometry*

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 a solution made by mixing 3.8 mL of Ferric Chloride Solution and 1.2 mL of Cobaltous Chloride Solution 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.

Melting Range - Melt a quantity of the test substance slowly, while stirring, until it reaches a temperature of 90° to 92°. Remove the source of the heat and allow the molten substance to cool to a temperature of 8° to 10° above the expected

melting point. Chill the bulb of a suitable thermometer to 5° , wipe it dry, and while it is still cold dip it into the molten substance so that approximately the lower half of the bulb is submerged. Withdraw it immediately, and hold it vertically away from the heat until the wax surface dulls, then dip it for 5 minutes into a water bath having a temperature not higher than 16° .

Fix the thermometer securely in a test tube so that the lower point is 15 mm above the bottom of the test tube. Suspend the test tube in a water bath adjusted to about 16° , and raise the temperature of the bath at the rate of 2° per minute to 30° , then change to a rate of 1° per minute, and note the temperature at which the first drop of melted substance leaves the thermometer. Repeat the determination twice on a freshly melted portion of the test substance. If the variation of three determinations is less than 1° , take the average of the three as the melting point. If the variation of three determinations is 1° or greater than 1° , make two additional determinations and take the average of the five.

The melting range of Petrolatum is between 40° and 75° .

Consistency—

Apparatus— Determine the consistency of Petrolatum by means of a penetrometer fitted with a polished cone-shaped metal plunger weighing 150 g, having a detachable steel tip of the following dimensions: the tip of the cone has an angle of 30° , the point being truncated to a diameter of 0.381 ± 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 ± 0.05 mm.

The remaining portion of the cone has an angle of 90° , is about 28 mm in height, and has a maximum diameter at the base of about 65 mm. The containers for the test are flat-bottom metal cylinders that are 100 ± 6 mm in diameter and not less than 65 mm in height. They are constructed of at least 1.6-mm (16-gauge) metal, and are provided with well-fitting, water-tight covers.

Procedure— Place the required number of containers in an oven, and bring them and a quantity of Petrolatum to a temperature of $82 \pm 2.5^{\circ}$, pour the Petrolatum into one or more of the containers, filling to within 6 mm of the rim. Cool to $25 \pm$

2.5° over a period of not less than 16 hours, protected from drafts. Two hours before the test, place the containers in a water bath at $25 \pm 0.5^\circ$. If the room temperature is below 23.5° or above 26.5° , adjust the temperature of the cone to $25 \pm 0.5^\circ$ by placing it in the water bath.

Without disturbing the surface of the substance under test, place the container on the penetrometer table, and lower the cone until the tip just touches the top surface of the test substance at a spot 25 mm to 38 mm from the edge of the container. Adjust the zero setting and quickly release the plunger, then hold it free for 5 seconds. Secure the plunger, and read the total penetration from the scale. Make three or more trials, each so spaced that there is no overlapping of the areas of penetration. Where the penetration exceeds 20 mm, use a separate container of the test substance for each trial. Read the penetration to the nearest 0.1 mm.

Calculate the average of the three or more readings, and conduct further trials to a total of 10 if the individual results differ from the average by more than $\pm 3\%$: the final average of the trials is not less than 10.0 mm and not more than 30.0 mm, indicating a consistency value between 100 and 300.

Acidity— If the addition of Phenolphthalein Solution in the test for *Alkalinity* produces no pink color, add 0.1 mL of methyl orange solution: no red or pink color is produced.

Alkalinity— Introduce 35 g into a suitable beaker, add 100 mL of boiling water, cover, and place on a stirring hot-plate maintained at the boiling point of water. After 5 minutes, allow the phases to separate. Draw off the separated water into a casserole, wash the petrolatum further with two 50-mL portions of boiling water, and add the washings to the casserole. To the pooled washings add 1 drop of phenolphthalein solution, and boil: the solution does not acquire a pink color.

Residue on ignition— Heat 2 g in an open porcelain or platinum dish over a Bunsen flame: it volatilizes without emitting an acrid odor and on ignition yields not more than 0.1% of residue.

Organic acids— Weigh 20.0 g, add 100 mL of a 1 in 2 mixture of neutralized alcohol and water, agitate thoroughly, and heat to boiling. Add 1 mL of

phenolphthalein solution, and titrate rapidly with 0.1 N sodium hydroxide, with vigorous agitation to the production of a sharp pink endpoint, noting the color change in the alcohol-water layer: not more than 400 μL of 0.100 N sodium hydroxide is required.

Fixed oils, fats, and rosin— Digest 10 g with 50 mL of 5 N sodium hydroxide at 100° for 30 minutes. Separate the water layer, and acidify it with 5 N sulfuric acid: no oily or solid matter separates.

Polycyclic aromatic hydrocarbons: maximum 300 ppm.

Dissolve 1.0 g in 50 ml of hexane which has been previously shaken twice with 10 ml of *dimethyl sulfoxide*. Transfer the Solution to a 125 ml separating funnel with unlubricated ground-glass parts (stopper, stopcock). Add 20 ml of *dimethyl sulfoxide*. Shake vigorously for 1 min and allow to stand until 2 clear layers are formed. Transfer the lower layer to a second separating funnel. Repeat the extraction with a further 20 ml of *dimethyl sulfoxide*. Shake vigorously the combined lower layers with 20 ml of *hexane* for 1 min. Allow to stand until 2 clear layers are formed. Separate the lower layer and dilute to 50.0 ml with *dimethyl sulfoxide*. Measure the absorbance over the range 260 nm to 420 nm using a path length of 4 cm and as compensation liquid the clear lower layer obtained by vigorously shaking 10 ml of *dimethyl sulfoxide* with 25 ml of *hexane* for 1 min. Prepare a reference Solution in *dimethyl sulfoxide* containing 6.0 mg/L of *naphthalene* and measure the absorbance of the Solution at the maximum at 278 nm using a path length of 4 cm and *dimethyl sulfoxide* as compensation liquid. At no wavelength in the range 260 nm to 420 nm does the absorbance of the test Solution exceed that of the reference Solution at 278 nm.

REAGENTS

Ferric Chloride Solution—Dissolve about 55 g of Ferric Chloride ($\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$) in enough of a mixture of 25 mL of hydrochloric acid and 975 mL of water to make 1000 mL. Pipet 10 mL of this solution into a 250-mL iodine flask, add 15 mL of water, 3 g of potassium iodide, and 5 mL of hydrochloric acid, and allow

the mixture to stand for 15 minutes. Dilute with 100 mL of water, and titrate the liberated iodine with 0.1 N sodium thiosulfate VS, adding 3 mL of starch solution as the indicator. Perform a blank determination with the same quantities of the same reagents, and make any necessary correction. Each mL of 0.1 N sodium 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 addition of enough of the mixture of hydrochloric acid and water so that each mL contains 45.0 mg of $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$.

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

Starch Solution—Mix 1 g of soluble starch with 10 mg of red mercuric iodide and sufficient cold water to make a thin paste. Add 200 mL of boiling water, and boil for 1 minute with continuous stirring. Cool, and use only the clear solution. [NOTE—Commercially available, stabilized starch indicator solutions may be used.]

Hydrogen Peroxide Solution - Contains, in each 100 mL, not less than 2.5 g and not more than 3.5 g of H_2O_2 .

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

Methyl Orange Solution —Dissolve 100 mg of methyl orange in 100 mL of water, and filter if necessary.