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An American National Standard
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Standard Method for
DISTILLATION OF NATURAL GASOLINE[1]

This standard is issued under the fixed designation D 216; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. This is also a standard of the Institute of Petroleum issued under the fixed designation IP 191. The final number indicates the year of last revision.

This method was issued as a joint ASTM - IP standard in 1965.

This method has been adopted for use by government agencies to replace Method 1015 of Federal Test Method Standard No. 791b.

1. Scope

1.1 This method covers the distillation of natural gasoline.

NOTE 1—The values stated in inch-pound units are to be regarded as the standard.

2. Applicable Documents

2.1 *ASTM Standards:*

E 1 Specification for ASTM Thermometer[2]

E 133 Specification for Distillation Equipment[2]

3. Summary of Method

3.1 A sample of 100 ml is distilled at atmospheric pressure without fractionation, and readings are taken of the vapor temperatures corresponding to the amounts distilled.

4. Significance

4.1 Natural gasoline is so volatile that it must be handled, measured, condensed, and recovered at lower temperatures than most petroleum products. This method incorporates handling and other precautions for precision.

4.2 An indication of the volatility blending characteristics that a natural gasoline will exhibit when blended with refinery stocks to make a finished gasoline is obtained from the results of this type of distillation.

5. Apparatus

5.1 The apparatus listed in the following, 5.1.1 through 5.1.5, shall conform to Specification E 133.

5.1.1 *Flask*—Standard 100-ml distillation flask.

5.1.2 *Condenser and Cooling Bath.*

5.1.3 *Shield,* Type 1 or 2.

5.1.4 *Flask Support,* Type 1 or 2 with board Type A.

5.1.5 *Graduated Cylinder,* 100-ml.

5.1.6 *Gas Burner*—A burner so constructed that heat can be obtained to distill the product at the rate specified. The flame shall never be so large that it spreads over a circle of diameter greater than 4 1/2 in. (115 mm) on the under surface of the asbestos board. A sensitive regulating valve and gas pressure governor are desirable adjuncts, as they give complete control of heating.

5.1.7 *Electric Heater*—An electric heater may be used instead of the gas burner and shall be capable of bringing over the first drop within the time specified in 8.1 when started cold, and of continuing the distillation at a uniform rate. (A heater unit of low-heat capacity, adjustable from 0 to 750 W, has been found satisfactory). When an electric heater is employed, the portion of the shield above the

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[1] This method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants.

In the IP, this method is under the jurisdiction of the Standardization Committee.

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[2] *Annual Book of ASTM Standards,* Vols 05.03 and 14.01.

[3] *Annual Book of ASTM Standards,* Vols 05.03 and 14.02.

board shall be the same as with the gas burner, but the part below the board may be omitted.

5.1.8 *Thermometer,* having a range as shown below and conforming to the requirements for ASTM Thermometer 7F or 7C, as prescribed in Specification E 1, or IP thermometer 5C.

Temperature Range	Thermometer Number ASTM	IP
−2 to +300°C	7C	5C
30 to 580°F	7F	...

6. Sampling

6.1 Samples should be collected in a previously cooled bottle, preferably by immersing the bottle in the liquid, where possible, and discarding the first sample. Where immersion is not possible the sample should be drawn off into a previously cooled bottle in such a manner that agitation is kept at a minimum. The bottle shall be closed immediately with a tight-fitting stopper, and placed in an ice bath or refrigerator capable of bringing the gasoline to a temperature of not less than 32°F (0°C), nor more than 40°F (4.5°C).

7. Preparation of Apparatus

7.1 Fill the condenser bath with cracked ice (Note 2) and add enough water to cover the condenser tube. Maintain the temperature between 32 and 34°F (0 and 1.1°C). Agitation with air gently aids in maintaining the required temperature range.

NOTE 2—Any other convenient cooling medium may be used.

7.2 Swab the condenser tube to remove any liquid remaining from the previous test. A piece of soft, lint-free cloth attached to a cord or copper wire may be used for this purpose.

7.3 Measure a 100-ml sample in the 100-ml graduated cylinder at 32 to 40°F (0 to 4.5°C) and transfer it directly to the distillation flask. Both the flask and the graduated cylinder shall have been cooled to a temperature of from 32 to 40°F (0 to 4.5°C) before use. Do not permit any of the liquid to flow into the vapor tube.

7.4 Make a record of the room temperature at the time of each distillation. The heating apparatus including the shield and flask support shall be at room temperature at the start of each distillation.

7.5 Fit the thermometer (previously cooled to a temperature of 32 to 40°F (0 to 4.5°C) and dried) tightly into the flask with a suitable cork so that it will be in the middle of the neck, and so that the lower end of the capillary tube is on a level with the inside of the bottom of the vapor outlet tube at its junction with the neck of the flask.

7.6 Place the charged flask in the 1¼-in. (32-mm) opening in the 6 by 6-in. (150 by 150-mm) asbestos board with the vapor outlet tube inserted into the condenser tube. A tight connection must be made by means of a cork through which the vapor tube passes. Adjust the position of the flask so that the vapor tube extends into the condenser tube not less than 1 in. (25 mm) nor more than 2 in. (50 mm).

7.7 Place the graduated cylinder used in measuring the charge without drying, at the outlet of the condenser tube in such a position that the condenser tube shall extend into the cylinder at least 1 in. (25 mm), but not below the 100-ml mark. Immerse the graduated cylinder up to the level of the outlet of the condenser tube in a transparent bath maintained between the temperatures of 32 and 34°F (0 and 1.1°C). Cover the top of the cylinder closely during the distillation with a piece of blotting paper, or its equivalent, so cut as to fit the condenser tube tightly. A lead washer, or other suitable material, resting on the blotting paper is a convenient accessory as it serves to hold the paper tightly against the top of the cylinder and also provides the additional weight necessary to overcome the buoyant effect of the liquid in the cooling bath.

8. Procedure

8.1 When everything is in readiness, apply heat immediately at a uniform rate, so regulated that the first drop of the condensate falls from the condenser in not less than 2 min nor more than 5 min. When the first drop falls from the end of the condenser, move the receiving cylinder so that the end of the condenser tube shall touch the side of the cylinder. Then regulate the heat so that the first 10 ml of distillate shall be recovered in not less than 3 min nor more than 4 min. Thereafter, maintain the rate of distillation uniformly at not less than 4 ml/min nor more than 5 ml/min. Record the reading of the distillation thermometer when the level of the distillate