



## Standard Test Methods for Sampling Wood Preservatives Prior to Testing<sup>1</sup>

This standard is issued under the fixed designation D 38; 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. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

<sup>ε1</sup> NOTE—A keyword was added editorially in March 2000.

### 1. Scope

1.1 These test methods cover sampling of creosote, creosote-coal tar solutions, creosote-petroleum solutions, and oilborne and waterborne preservatives.

NOTE 1—See Specification D 390, for Coal-Tar Creosote for the Preservative Treatment of Piles, Poles, and Timbers for Marine, Land, and Fresh Water Use,<sup>2</sup> Specification D 391 for Creosote-Coal Tar Solution,<sup>2</sup> and Specification D 1858, for Creosote-Petroleum Solution.<sup>2</sup>

1.1.1 Creosote and creosote solutions are homogeneous liquids, except for their moisture content. At atmospheric temperatures, however, part of the creosote is usually in crystalline form, and shall be heated to a temperature at which it is entirely liquid before sampling.

1.1.1.1 When sampling creosote and creosote solutions, the object is to obtain a sample that will be representative of the water content, and the methods of sampling described are intended to accomplish that purpose.

1.1.2 Recommended test methods are given for sampling a preservative in a liquid or solid state and in the several types of containers in which they are likely to be encountered. Creosote, creosote-coal tar, and creosote-petroleum solutions may be in the form of a liquid or semiliquid. Oilborne and waterborne preservatives may be in the solid state, in concentrated solutions, or in ready-to-use solutions.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 95 Test Method for Water in Petroleum Products and Bituminous Materials by Distillation<sup>2</sup>

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee D07 on Wood and are the direct responsibility of Subcommittee D07.06 on Treatments for Wood Products.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 05.01.

- D 168 Test Method for Coke Residue of Creosote<sup>3</sup>
- D 246 Test Method for Distillation of Creosote and Creosote-Coal Tar Solutions<sup>3</sup>
- D 346 Practice for Collection and Preparation of Coke Samples for Laboratory Analysis<sup>4</sup>
- D 367 Test Method for Xylene-Insoluble Matter in Creosote<sup>3</sup>
- D 368 Test Method for Specific Gravity of Creosote and Oil-Type Preservatives<sup>3</sup>
- D 369 Test Method for Specific Gravity of Creosote Fractions and Residues<sup>3</sup>
- D 370 Test Method for Dehydration of Oil-Type Preservatives<sup>3</sup>
- D 1033 Methods of Chemical Analysis of Chromated Zinc Chloride<sup>3</sup>
- D 1035 Test Methods for Chemical Analysis of Fluor-Chrome-Arsenate-Phenol<sup>3</sup>
- D 1274 Test Methods for Chemical Analysis of Pentachlorophenol<sup>3</sup>
- D 1326 Methods for Chemical Analysis of Ammoniacal Copper Arsenate<sup>3</sup>
- D 1627 Methods for Chemical Analysis of Acid Copper Chromate<sup>3</sup>
- D 1628 Test Methods for Chemical Analysis of Chromated Copper Arsenate<sup>3</sup>
- D 3176 Practice for Ultimate Analysis of Coal and Coke<sup>4</sup>
- D 3180 Practice for Calculating Coal and Coke Analyses from As-Determined to Different Bases<sup>4</sup>

### 3. Significance and Use

3.1 The test methods described are for use in obtaining representative samples of wood preservatives under most phases of shipment, use, or storage. Since these materials may have to be sampled under varying conditions, it is not possible to provide a definite standard for each type of wood preservative under every sampling condition. Individual cases may have to be worked out by the sampler on the basis of judgement, skill, and experience. The basic principle of each

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 04.10.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 05.05.

method, however, is to obtain a sample or a composite of several samples in such manner and from such locations in the container that the sample or composite will be truly representative of the material being sampled.

**4. Apparatus**

4.1 *Continuous-Drip Sampling:*

4.1.1 *Line Connection* constructed substantially as shown in Fig. 1 shall be inserted in the pipeline through which the preservative is being transferred, preferably on the discharge side of the pump. The sampling pipe shall be provided with a valve.

4.1.2 *Receiver*—Use a clean, dry container of convenient size to receive the sample. The container shall be covered with a lid to protect the sample from foreign contamination. Creosote, creosote-coal tar solutions, and creosote-petroleum solutions may become semisolid as they cool in the sample container during the course of the sampling. These samples should be heated to complete liquidity before taking an aliquot for testing.

4.2 *Zone Sampling:*

4.2.1 *Sampling Bottle* (see Figs. 2 and 3) with a 19-mm (3/4-in.) diameter opening.

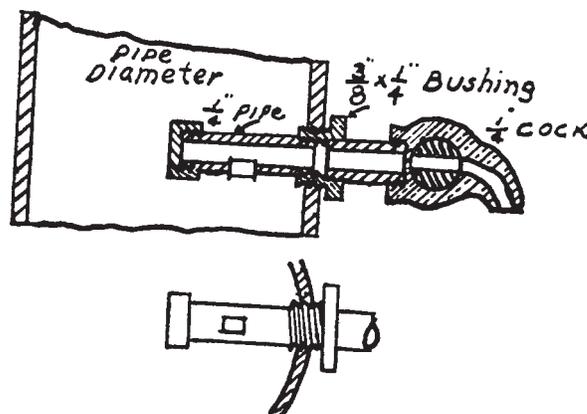
4.3 *Thief Sampling:*

4.3.1 For sampling liquids or semiliquids in tank cars, tank trucks, and storage tanks, use a sampling devise designed so that a sample can be obtained within 13 mm (1/2 in.) of the bottom of the vessel used. A sampling thief for this purpose is illustrated in Fig. 4.

4.3.2 For sampling granular material loose carried in bags, drums, or boxes, use a solids thief sampler 38 mm (1 1/2 in.) in diameter and a least 457 mm (18 in.) long similar to that shown in Fig. 5.

4.4 *Grab Sampling:*

4.4.1 *Shovel or Scoop*, with a width at least twice as great as the maximum dimension of the largest pieces sampled and a sample container suitable for the product being sampled.



| Metric Equivalents |     |     |
|--------------------|-----|-----|
| mm                 | 6.4 | 9.5 |
| in.                | 1/4 | 3/8 |

**FIG. 1 Continuous Sampling Connection**

4.5 *Tube Sampling:*

4.5.1 *Glass or Metal Tube*, designed so that it will reach to within 3 mm (1/8 in.) of the bottom of the container. A metal tube for sampling 208-L (55-gal) drums is shown in Fig. 6.

4.6 *Tap Sampling:*

4.6.1 *Standard Pipe*, with a suitable valve is satisfactory. The valve should be equipped with a delivery tube which will not contaminate or affect the product being sampled.

**5. Procedure**

5.1 *Recommended Sampling Methods:*

5.1.1 See recommended methods for sampling creosote and creosote solutions in Table 1.

5.1.2 See recommended methods for sampling oilborne and waterborne preservatives in Table 2.

5.2 *Continuous Drip Sampling*—Use this method of sampling wherever a liquid is being loaded or discharged from a

**TABLE 1 Sampling of Creosote and Creosote Solutions<sup>A</sup>**

| Shipping, Treating or Storage to be Sampled | Time of Sampling                                  | Preferred Sampling Method | Type of Sample                               | Size of Sample to be Taken from Each Container | Additional Instructions  |
|---|---|---------------------------|--|--|--|
| Ship and barge tanks                        | immediately after loading or prior to unloading   | bottle or beaker sampling | all-levels sample                            | approximately 3 gal                            | Gage free water separately if creosote is not agitated thoroughly.   |
| Tank cars and tank trucks                   | immediately after loading or prior to unloading   | bottle or beaker sampling | composite of upper middle and lower samples  | 1 gal  | Gage free water separately if creosote is not agitated thoroughly. Use Table 1 to determine proportions of subsamples in composite sample. |
| Vertical storage and working tanks          | whenever required for inventory or other purposes | bottle or beaker sampling | all-levels sample                            | 1–8 gal depending on size of tank              | Gage free water separately if creosote is not agitated thoroughly.   |
| Horizontal storage and working tanks        | whenever required for inventory or other purposes | bottle or beaker sampling | composite of upper, middle and lower samples | 1–3 gal depending on size of tank              | Gage free water separately if creosote is not agitated thoroughly. Use Table 1 to determine proportions of subsamples in composite sample. |
| Pressure treating cylinders                 | immediately after cylinder is filled              | tap sampling              | tap sample                                   | 1 gal  | ...  |
| Non-pressure treating vats                  | immediately after vat is filled for cold bath     | bottle or beaker sampling | all-levels sample                            | 1 gal  | ...  |

<sup>A</sup> When the sample is taken the temperature of the material should be at least 150°F and the material should be completely liquefied and thoroughly agitated.

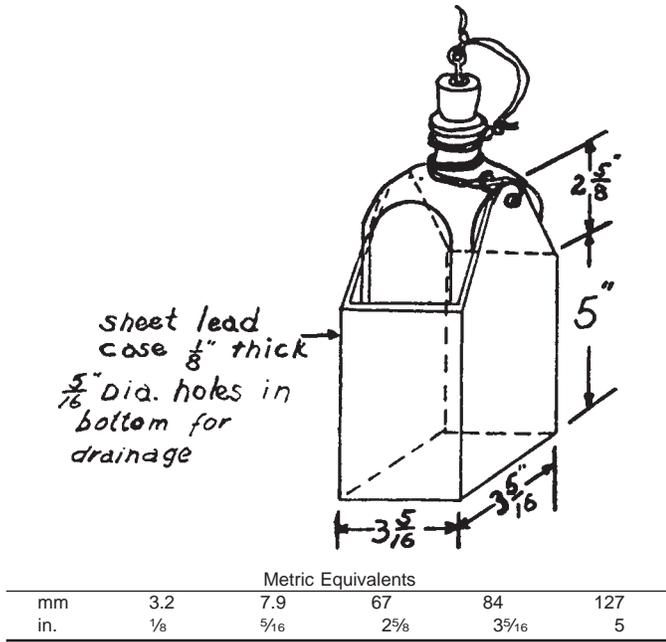


FIG. 2 Weighted Bottle

vessel by means of pumping. Obtain the sample from a pipe line conveying the product in such manner as to give a representative average of the stream throughout the period of transit.

5.2.1 Insert a 1/4-in. sampling pipe in the line through which the liquid preservative is being pumped, on the discharge side of the pump and preferably in a rising section of the pipe line. Extend this sampling pipe halfway to the center of the main pipe, with the inner open end of the sampling pipe turned at an angle of 1.57 radius (90°) and facing the flow of the liquid. Provide the sampling pipe with a valve and discharge it into a receiver of 4 to 19-L (1 to 5-gal) capacity. Clean the sampling pipe of foreign material by quickly collecting and discarding the first 500 mL of discharge.

5.2.2 Adjust the valve so that with a steady continuous drip of the preservative the receiver will be filled in the time required to pump the entire quantity of material being transferred.

5.2.3 Immediately upon completion of the pumping, thoroughly mix the contents of the receiver by agitation (heat to complete liquidity if necessary), rolling, or shaking, and immediately take duplicate 1-L (1-qt) samples for the purpose of testing. Do not collect less than 4 L (1 gal) of drop samples except in the case of large volumes, such as boat shipments, where a maximum of 19 L (5-gal) is sufficient.

5.3 *Zone Sampling*—Use this method of sampling to sample liquid-wood preservatives in tank cars, storage tanks, tank trucks and trailers, work tanks, ship tanks, and barge tanks. Semiliquid materials, which can be heated until sufficiently fluid, may be sampled by this procedure. Thoroughly agitate creosote and solutions of creosote with coal tar or petroleum and heat to 65 to 93°C (150 to 200°F) to effect solution. Obtain the sample by submerging a closed sampler to a point as near

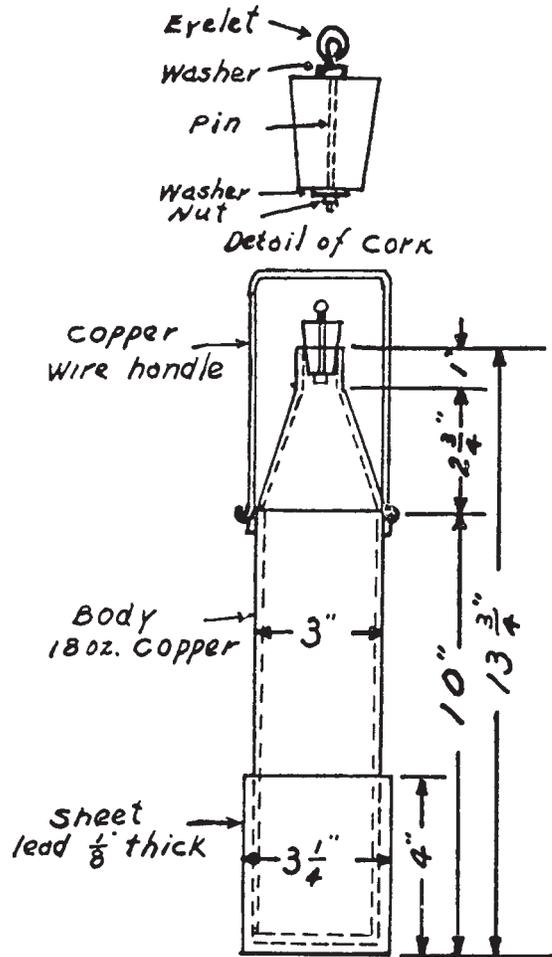


FIG. 3 Weighted Beaker

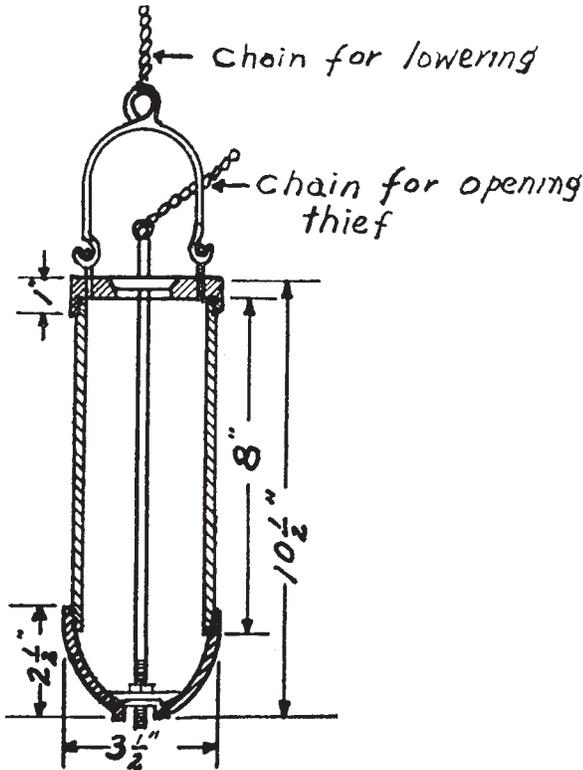
as possible to the selected draw-off level, then open the sampler, allowing the sample container to fill at that point, and slowly withdraw it.

5.3.1 Obtain three samples. Take each in a similar manner, with the sampling apparatus lowered to the point selected as the following zones (Table 3):

|             |   |
|-------------|---|
| Upper zone  | obtained from the middle of the upper third of the vessel contents. |
| Middle zone | obtained from the middle of the vessel contents.                    |
| Lower zone  | obtained from the middle of the lower third of the vessel contents. |

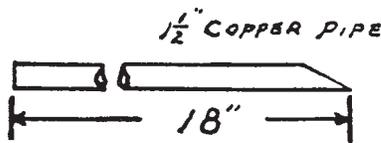
5.3.2 The individual samples may be analyzed separately or composited for testing. If composited, combine the three samples (Table 3) and mix at once while the material is thoroughly liquid. Take no sample for analysis from material that contains crystals.

5.4 *Thief Sampling*—Use this method of sampling to obtain bottom samples of liquids or semiliquids from tank cars, and storage tanks, by means of the liquid thief apparatus, and to obtain samples of granular material in bags, drums, or boxes, by means of the solids thief apparatus.



| Metric Equivalents |    |    |     |     |
|--------------------|----|----|-----|-----|
| mm                 | 64 | 89 | 203 | 267 |
| in.                | 2½ | 3½ | 8   | 10½ |

FIG. 4 Thief for Sampling Tank Cars



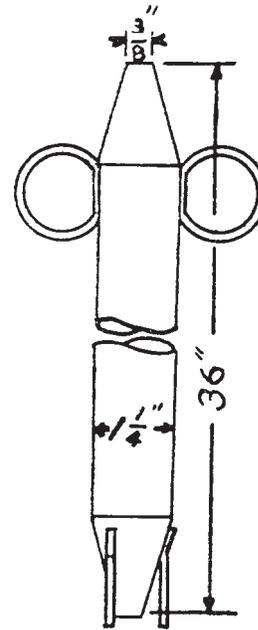
| Metric Equivalents |    |     |
|--------------------|----|-----|
| mm                 | 38 | 457 |
| in.                | 1½ | 18  |

FIG. 5 Solids or Bag Thief

5.4.1 For sampling liquids or semiliquids, lower the clean, dry thief (see 4.3.1) through the dome of the tank car or tank hatch until it strikes the bottom. When full, remove the thief and transfer the contents to the sample container. Close and label the container immediately and deliver it to the laboratory. Agitate oil-type preservatives such as creosote, coal tar, petroleum and their solutions, and heat to the temperature necessary to effect complete liquidity prior to sampling.

5.4.2 To sample solid granular material, force the solids thief sampler (see 4.3.2) completely through the body of the material in each package at the following locations: One at the center; one ¼ the diameter or width from the right side, and one at ¼ the diameter or width from the left side. Put the three sets of samples in individual containers, label, and deliver them to the laboratory (see 5.7).

5.5 *Grab Sampling*—Use this method of sampling to sample a quantity of loose granular, or lumpy solids in bins, bunkers, barrels, bags, boxes, and conveyors.



| Metric Equivalents |     |    |     |
|--------------------|-----|----|-----|
| mm                 | 9.5 | 83 | 914 |
| in.                | ¾   | 1¼ | 36  |

FIG. 6 Thief for Sampling Drums

5.5.1 The sample that is taken with a shovel or scoop from bulk material shall be at least 0.01 % of the total, but not less than 2.3 kg (5 lb) nor more than 45 kg (100 lb).

5.5.2 When sampling solids in bags or barrels, obtain a single sample from each of several packages selected at random as indicated in Table 4.

5.5.3 Thoroughly blend the samples together and reduce the combined quantity to a convenient laboratory size by the quartering procedure illustrated in Practice D 346, or with a riffle sampler as described in Practice D 3176 and Practice D 3180.

5.6 *Tube Sampling*—Use the tube sampling procedure to sample liquids and semiliquids in drums and cans.

5.6.1 Place the drum on its side with the bung up. If the drum does not have a side bung, stand it upright and sample from the top. Close the upper end of the clean, dry sampling tube with the thumb, and lower the tube into the material for a depth of about 305 mm (1 ft).

5.6.2 Remove the thumb, allowing liquid to flow into the tube. Again close the upper end with the thumb and withdraw the tube. Rinse the tube with the material by holding it nearly horizontal and turning it so that the liquid comes in contact with that part of the inside surface which will be immersed when the sample is taken. Allow the tube to drain and discard the rinse oil.

5.6.3 Insert the tube into the material again, holding the thumb against the upper end. When the tube reaches the desired depth, remove the thumb and allow the tube to fill. Replace the thumb, withdraw the tube quickly, and transfer the contents to a labeled container.

5.6.4 When sampling cans of 19-L (5-gal) capacity, a tube sampler of proportionately smaller dimensions may be used.

**TABLE 2 Sampling of Oilborne and Waterborne Preservatives  
(In Solid State, Concentrated Solutions, or Ready-to-Use Solutions)**

| Shipping, Treating or Storage Container to be Sampled               | Time of Sampling                                  | Preferred Sampling Method                  | Type of Sample                               | Size of Sample to be Taken from Each Container                                  | Additional Instructions  |
|---|---|--|--|---|--|
| Tank cars and tank trucks   | immediately after loading or prior to unloading   | bottle or beaker sampling                  | composite of upper, middle and lower samples | 4 L (1 gal)   | ...  |
| Vertical storage and working tanks                                  | whenever required for inventory or other purposes | bottle or beaker sampling                  | all-levels sample                            | 4 to 11 L (1–3 gal) depending on size of tank                                   | ...  |
| Horizontal storage and working tanks                                | whenever required for inventory or other purposes | bottle or beaker sampling                  | composite of upper, middle and lower samples | 4 to 11 L (1–3 gal) depending on size of tank                                   | ...  |
| Pressure treating cylinders   | immediately after cylinder is filled              | tap sampling                               | tap sample                                   | 4 L (1 gal)   | ...  |
| Nonpressure treating vats   | immediately after vat is filled for cold bath     | bottle or beaker sampling                  | all-levels sample                            | 4 L (1 gal)   | ...  |
| Drums or cans of 19-L (5-gal) capacity or larger containing liquids | whenever required                                 | tube sampling                              | tube sample                                  | 1 L (1 qt)  | Prepare composite sample in accordance with 5.7. Select cans at random in accordance with Table 2.                 |
| Cans of less than 19-L (5-gal) capacity containing liquids          | whenever required                                 | random sampling in accordance with Table 2 | random sample                                | entire contents of can  | Prepare composite sample in accordance with 5.7. Select cans at random in accordance with Table 2.                 |
| Bins or freight cars containing loose solids                        | preferably during unloading                       | grab sampling                              | grab sample                                  | 0.1 % of total but not less than 22.6 kg (50 lb) nor more than 454 kg (1000 lb) | Follow appropriate instructions in 5.4 depending on whether container is being sampled before or during unloading. |
| Bags, drums, or barrels containing solids                           | whenever required                                 | solids thief sampling                      | thief sample                                 | commensurate with size of thief tried   | Following instructions in 5.3.2, select number of bags or barrels to be sampled as indicated in Table 2.           |

**TABLE 3 Compositing of Samples from Horizontal Cylindrical Tanks**

| Liquid Depth Percent of Diameter | Parts of Sample to be Taken at Each Sampling Level |        |       |
|----------------------------------|--|--------|-------|
|                                  | Upper  | Middle | Lower |
| ...                              | ...  | ...    | 1     |
| 10                               | ...  | ...    | 1     |
| 20                               | ...  | 3      | 2     |
| 30                               | ...  | 2      | 1     |
| 40                               | ...  | 2      | 1     |
| 50                               | ...  | 2      | 1     |
| 60 and over                      | 1  | 2      | 1     |

For cans of less than 5-gal capacity, use the entire contents as the sample, randomly selecting cans as indicated in Table 4.

**5.7 Tap Sampling**—Use the tap sampling procedure to sample wood preservatives actually in use in pressure treating cylinders, storage and working tanks where contents can be properly agitated before sampling.

**5.7.1** Before a sample is drawn, flush the tap and line until they are purged completely. Connect the clean delivery tube to the tap.

**5.7.2** Draw the sample. Stopper and label the sample container immediately after filling and deliver it to the laboratory.

**6. Test Methods**

6.1 To determine compliance with the appropriate specification, the preservative shall be tested in accordance with the following standards as appropriate.

**6.1.1 Test Methods:**

6.1.1.1 *Coke Residue*—D 168.

**TABLE 4 Minimum Number of Samples to be Selected from Packaged Shipments**

| No. of Packages |        | No. of Samples |
|-----------------|--------|----------------|
| 1               | ...    | 1              |
| 2 to            | 8      | 2              |
| 9 to            | 27     | 3              |
| 28 to           | 64     | 4              |
| 65 to           | 125    | 5              |
| 126 to          | 216    | 6              |
| 217 to          | 343    | 7              |
| 344 to          | 512    | 8              |
| 518 to          | 729    | 9              |
| 730 to          | 1 000  | 10             |
| 1 001 to        | 1 331  | 11             |
| 1 332 to        | 1 728  | 12             |
| 1 729 to        | 2 197  | 13             |
| 2 198 to        | 2 744  | 14             |
| 2 745 to        | 3 375  | 15             |
| 3 376 to        | 4 096  | 16             |
| 4 097 to        | 4 913  | 17             |
| 4 914 to        | 5 832  | 18             |
| 5 833 to        | 6 859  | 19             |
| 6 860 to        | 8 000  | 20             |
| 8 001 to        | 9 261  | 21             |
| 9 262 to        | 10 648 | 22             |
| 10 649 to       | 12 167 | 23             |
| 12 168 to       | 13 824 | 24             |

6.1.1.2 *Distillation*—D 246.

6.1.1.3 *Xylene Insoluble*—D 367.

6.1.1.4 *Specific Gravity*—D 368.

6.1.1.5 *Specific Gravity of Fractions*— D 369.

6.1.1.6 *Water*—D 95 and D 370.

6.2 *Chemical Analysis:*

6.2.1 *Chromated Zinc Chloride*—D 1033.

6.2.2 *Fluor Chrome-Arsenate-Phenol*—D 1035.

6.2.3 *Pentachlorophenol*—D 1274.

6.2.4 *Ammoniacal Copper Arsenate*—D 1326.

6.2.5 *Acid Copper Chromate*—D 1627.

6.2.6 *Chromated Copper Arsenate*—D 1628.

## **7. Keywords**

7.1 preservatives; sampling; wood; wood preservatives

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