



Designation: D3852 – 20

# Standard Practice for Sampling and Handling Phenol, Cresols, and Cresylic Acid<sup>1</sup>

This standard is issued under the fixed designation D3852; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope\*

1.1 This practice covers procedures for sampling and handling phenol, cresols and cresylic acid in solid and liquid forms, including liquids at elevated temperatures, in a safe manner that represents and preserves quality. In general, this practice also applies to xylenols, and some other alkylated phenolic materials; however, specific information regarding these materials should be sought and used if available.

1.2 Any person sampling or handling these products should consult the applicable Safety Data Sheet (SDS) for specific first aid instructions and information on the proper equipment to have available for use in the event of personal contact or exposure.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see Sections 3, 4, 5, 6, 7, 8 and an appropriate SDS.

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

**E300 Practice for Sampling Industrial Chemicals**

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D16 on Aromatic, Industrial, Specialty and Related Chemicals and is the direct responsibility of Subcommittee D16.08 on Handling and Sampling Aromatic and Cyclic Hydrocarbons.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

### 2.2 Other Documents:

**OSHA Regulations, 29 CFR paragraphs 1910.1000 and 1910.1200**<sup>3</sup>

**U.S. DOT Regulations, 49 CFR Transportation, Subchapter C, Parts 171 – 180**<sup>3</sup>

**NFPA No. 704-1996 Standard System for the Identification of the Hazards of Materials for Emergency Response**<sup>4</sup>

## 3. Significance and Use

3.1 This practice is issued to provide information useful in establishing sampling and handling procedures. It is expected that this information will only be utilized in conjunction with an existing health and safety program and consultation with an appropriate SDS. The information provided cannot be used as a substitute for expert safety and medical advice as provided in an appropriate SDS, but rather as a supplement to such advice.

## 4. Description of Products

4.1 Phenol is a colorless to light pink crystalline material which melts at 40 to 41°C. Technical and USP grades melt at lower temperatures.

4.2 Phenol is both extremely hygroscopic and sensitive to discoloration. Therefore, it cannot be overemphasized that proper precautions must be undertaken when unloading or sampling the product. Moisture must be excluded. The use of sampling devices that contain metals that may catalyze discoloration (iron, copper) must also be avoided.

4.3 Cresylic acid is a common chemical name applied to mixtures of alkyl-substituted phenols. Included are mixtures of cresols, xylenols, and higher alkylated phenols. Many cresylic acid mixtures contain measurable amounts of phenol.

4.4 Most cresylic acid mixtures are liquids at ambient temperatures. However, at low temperatures (<0°C) they sometimes become very viscous and difficult to pour. Some mixtures containing high concentrations of high melting isomers may form thick slurries or become solids at low temperatures.

<sup>3</sup> Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

<sup>4</sup> Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, <http://www.nfpa.org>.

\*A Summary of Changes section appears at the end of this standard

4.5 While phenol or cresylic acids are highly dangerous when handled improperly, particularly at the elevated temperatures sometimes required to unload tank cars or tank trucks, handling and sampling need not be hazardous provided the dangers are recognized. Proper precautionary measures must be provided and scrupulously adhered to as prescribed by the SDS or other locally relevant guidelines.

4.6 Department of Transportation (DOT) Hazardous Materials Regulations regarding the shipment of this chemical are specified in 49 CFR.

## 5. Hazards

5.1 For information on toxicity consult the appropriate SDS.

5.2 Consult current OSHA regulations, suppliers' Safety Data Sheet (SDS), and local regulations for all materials utilized in this practice.

5.3 *Health*—Phenol is very corrosive to the skin and produces painful and dangerous burns in a very short time. Since phenol is a skin anesthetic, the first reaction is not pain, but a whitening of the exposed area. It is readily absorbed through the skin and mucous membranes or lungs, and severe exposures may prove fatal unless prompt first aid and medical treatment are exercised. Consult the appropriate SDS and any other applicable local regulations and guidelines for recommended unloading procedures. Producers/suppliers typically have guidelines for these procedures. Workers should wear appropriate protective clothing and personal protective equipment as recommended in such guidelines and the appropriate SDS.

5.3.1 Qualitatively, cresylic acid is slightly less acute as a health hazard than phenol. However, contact of cresylic acid with the skin can produce painful and serious burns in a short time. It is readily absorbed through the skin and mucous membranes, through the gastro-intestinal tract, or through the lungs (either as a vapor or in droplet form), potentially resulting in systemic poisoning. Consult the appropriate SDS and any other applicable local regulations and guidelines for recommended unloading procedures. Producers/suppliers typically have guidelines for these procedures. Workers should wear appropriate protective clothing and personal protective equipment as recommended in such guidelines and the appropriate SDS.

5.4 *Fire*—For general fire hazards, consult the appropriate SDS as well as any other applicable guidelines such as the NFPA 704M fire hazard classification system.

5.5 Molten phenol or cresylic acid can dissolve carbon dioxide and releases it on solidification. Therefore, special precautions should be observed if “inert gas” containing carbon dioxide is used to agitate or empty containers of phenol or cresylic acid to avoid pressure build-up (for example, leave vents open).

5.6 For chemical emergency (spill, leak, fire, exposure, or accident) consult the appropriate agency or contact as documented in the SDS.

## 6. Protective Equipment

6.1 Use of personal protection equipment in and of itself is not an adequate substitute for safe working conditions and intelligent conduct on the part of employees who work with phenol or cresylic acid. Employees who work with phenol or cresylic acid should be well trained and should maintain safe working conditions.

6.2 Persons engaged in the handling of phenol or cresylic acid shall use protective equipment as dictated by the extent of their exposure, the appropriate SDS, and any and all local regulations and guidelines. It is highly recommended that working areas have immediately and easily available deluge-type safety showers as well as eye wash fountains.

## 7. First Aid

7.1 The establishment of first aid procedures must be done prior to sampling and handling of phenol, cresols and cresylic acid under the guidance of competent safety and medical advice, and based on recommendations in the appropriate SDS. With phenol and cresylic acid, speed in acting to remove the contacting material and seeking medical care is imperative.

## 8. Precautions

8.1 Any person sampling or handling these products should have specific first aid instructions and equipment available for use in the event of personal contact or exposure as detailed in the appropriate SDS or other local rules and guidelines.

8.2 It is recommended that sampling be conducted only by carefully instructed, experienced, reliable employees, under adequate supervision following all the procedures recommended in the appropriate SDS, by the supplier, or by any other applicable local guidelines and rules, or combinations thereof.

8.3 Follow shipper's instructions always, and read and observe all caution markings on containers.

8.4 Although the vapor given off at elevated temperatures from phenol or cresylic acid will ignite, these materials can generally be handled with little direct danger of fire. The flash points of the liquids are higher than the temperatures at which they are normally handled. In spite of this, carefully restrict open flames and smoking in the vicinity of loading, unloading, and storage operations.

8.5 Do not permit any person ever to enter an empty phenol or cresylic acid tank, tank car, or tank truck until it has been thoroughly washed out with warm water, followed by a thorough steaming. Ensure that the oxygen content is acceptable and the vessel is free of organic vapors. Require the approval and observation by a supervisor in every case. Review Sections 6 and 7 in detail.

## 9. Handling and Sampling of Drums

9.1 Before loading, unloading, or sampling of drums of phenol, cresols or cresylic acid, carefully read and proceed in accordance with Sections 4 – 8.

9.2 Handle drums carefully when being transported. Block drums in place during transportation to prevent movement and during unloading to prevent spilling.

9.3 Place the drum bung up, loosen the plug slowly to relieve internal pressure, and allow all internal pressure to vent prior to unloading or sampling.

9.4 Most cresylic acids are liquids at ambient temperatures. Phenol and some cresylic acids are solids at ambient temperatures. If melting is necessary to remove the contents of a drum, do the necessary heating in a special steam-heated melting chamber, hot-water bath, with steam coils, or with an approved electric drum heater. Never use a flame for melting the drum contents. Properly vent the drum during this operation in order to prevent pressuring. (**Warning**—Do not overheat drums as the danger of spillage caused by thermal expansion and excessive vapors exists.)

9.5 Prior to sampling, mix the contents of the drum thoroughly in order to ensure uniformity of the material. This may be accomplished by mechanical agitation or sparging with inert gas (nitrogen is recommended). Exercise extreme caution to prevent pressurization or splashing if inert gas sparging is used.

9.6 Obtain the sample in accordance with Practice E300. Accomplish sampling by using a clean, dry glass or polypropylene sample tube and a clean, dry, glass or other appropriate container of appropriate size. The closure shall be a screw cap fitted with a polyethylene or other inert liner. Label the sample container to indicate, as a minimum, the date and time, source of sample, type of material, quantity, hazards, purpose of sample, and the name of the sampler and in accordance with OSHA regulations or any other applicable local regulations.

9.7 Unload by any convenient, safe method, including gravity flow and pumping, or as recommended in the appropriate SDS. Pressure unloading of drums is not recommended. Take full precautions to protect personnel and equipment from the effects of a possible drum rupture.

## 10. Unloading of Tank Cars and Tank Trucks

10.1 Before unloading or sampling tank cars or tank trucks of phenol, cresols or cresylic acid, carefully read and proceed in accordance with Sections 4 – 8.

10.2 Always follow DOT or other appropriate local regulations and shipper’s instructions, and place, read, and observe all caution markings on the sides of the tank or dome.

10.3 Follow the unloading recommendations as provided by the appropriate SDS, the Producer/Supplier, or any other locally applicable rules and guidelines, or combinations thereof.

## 11. Sampling of Tank Cars and Tank Trucks

11.1 Sample tank cars or trucks in accordance with Practice E300. Any method of sampling therein described that provides a representative sample is acceptable. Among these are “Average Sample,” “All-Level Sample,” “Continuous Sample,” and “Running Sample.”

11.1.1 Refer to DOT 49 CFR 173 or other applicable local regulations for specific packaging regulations for sample shipment.

11.2 A suitable clean, dry glass or other appropriate container, of appropriate size, must be used.

11.3 Sampling shall be done after heating or mixing, or both, or during unloading (in the case of a continuous sample).

11.4 Place emphasis on the use of clean and dry sampling equipment and sample containers.

11.5 Immediately after the sample container is filled, screw the cap on tightly before making any attempt to rinse off phenol, cresol or cresylic acid from the outside. Rinse bottle with water and follow approved procedures for disposal. Label the sample as with drum samples (see 9.6).

## 12. Barges and Tankers

12.1 Barges and tankers are sampled and handled in a manner similar to tank cars and tank trucks (Section 11).

## 13. Keywords

13.1 alkyl-substituted phenols; cresols; cresylic acid; handling; phenol; sampling; xylenols

## SUMMARY OF CHANGES

Committee D16 has identified the location of selected changes to this standard since the last issue (D3852–16) that may impact the use of this standard. (Approved June 1, 2020.)

(1) Added 1.5: This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the

Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.