



Designation: D 3438 – 99

# Standard Practice for Sampling and Handling Naphthalene, Maleic Anhydride, and Phthalic Anhydride<sup>1</sup>

This standard is issued under the fixed designation D 3438; 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.

## 1. Scope

1.1 This practice covers procedures for sampling and handling naphthalene, maleic anhydride, and phthalic anhydride in various solid forms, and as liquids at elevated temperatures in a safe manner that represents and preserves quality.

1.2 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.

1.3 *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.* For specific hazard statements, see Sections 3, 4, 5, 6, and 7.

## 2. Referenced Documents

### 2.1 ASTM Standards:

**E 300** Practice for Sampling Industrial Chemicals<sup>2</sup>

### 2.2 Other Documents:

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

U.S. DOT Regulations, 49CFR Transportation, Subchapter C, Parts 171-180<sup>3</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. The information provided cannot be used as a substitute for expert safety and medical advice, but rather as a supplement to such advice.

## 4. Description of Products (See Tables 1 and 2)

4.1 Phthalic anhydride is classified as hazardous by the Department of Transportation as a corrosive material and is

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D16 on Aromatic Hydrocarbons 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> *Annual Book of ASTM Standards*, Vol 15.05.

<sup>3</sup> Available from Superintendent of Documents, Government Printing Office, Washington, DC 20402.

therefore subject to DOT regulations governing the transportation of hazardous materials. Maleic anhydride and naphthalene are classified as hazardous by the Department of Transportation and are subject to DOT regulations. Maleic anhydride has the classification corrosive material, and naphthalene has the classification flammable solid.

4.1.1 These products are normally transported in several types of containers, including cartons, barrels, bags, cans, metal and fiber drums, tank trucks, tank cars, and barges.

4.1.2 Products shipped by air must be packaged to meet IATA and (ICAO) requirements.

4.2 While these products are dangerous when handled improperly, particularly at elevated temperatures, their unloading need not be hazardous provided the hazards are recognized and handling instructions are rigidly observed.

## 5. Hazards

5.1 *Health*—Consult current OSHA regulations and supplier's Material Safety Data Sheets, and local regulations for all materials used in this practice.

5.1.1 Aside from the risk of burns in handling these products when molten, and a possibility of dermatitis from impurities, particularly in crude grades, industrial use does not present a significant health hazard. However, ordinary handling precautions must be observed to protect personnel from contact with molten material or excessive exposure to dusts or high concentrations of vapor.

5.1.2 Precautions must be observed to protect personnel from excessive inhalation of vapors and dust.

NOTE 1—For permissible exposure limits see OSHA Regulations, paragraph 1910.1000.

### 5.2 Fire:

5.2.1 These products in both the solid and liquid forms are combustible, and introduce a potential fire hazard where they are stored, handled, or used.

5.2.2 Naphthalene, maleic and phthalic anhydride vapors or dust can form explosive mixtures with air.

5.2.3 When molten naphthalene, at temperatures above 110°C, comes into contact with water, foaming or possible explosion may result.

5.2.4 Dry chemicals, carbon dioxide, and foam can all be used in fighting fires involving these materials.

**TABLE 1 Typical Physical Properties**

Product	Melting Point, °C	Boiling Point, °C	Forms	Flash Point, °C	Explosive Limit, %		Ignition Temperature, °F	Specific Gravity, 20°C
					Lower	Higher		
Naphthalene	80	218 (sublimes)	flakes, balls, liquid, rods, tablets	78	0.9	5.9	979	1.15
Maleic anhydride	53	200 (sublimes)	rods, briquettes, liquid	101	1.4	7.1	878	1.43
Phthalic anhydride	130	284 (sublimes)	flakes, liquid	165	1.7	10.5	1058	1.53

**TABLE 2 Bulk Packaging Regulatory Information**

NOTE 1—Single packagings are not permitted on passenger aircraft in accordance with the International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods By Air and the International Air Transport Association Dangerous Goods Regulations.

DOT Basic Description	RQ, lb	Listed Marine Pollutant	Packaging Authorization 49 CFR, 173.*			Label(s)	Placards	Remarks
			Exception	Non-bulk	Bulk			
Naphthalene, crude, 4.1, UN1334, III	100	yes	151	213	240	Flammable Solid	Flammable Solid	See Note 1.
Naphthalene, refined, 4.1, UN1334, III	100	yes	151	213	240	Flammable Solid	Flammable Solid	See Note 1.
Naphthalene, molten, 4.1, UN2304, III	100	yes	151	213	241	Flammable Solid	Flammable Solid	Forbidden for air transport.
Maleic anhydride, 8, UN2215, III	5000	no	154	213	240	Corrosive	Corrosive	Molten maleic anhydride is forbidden for air shipment. For non-molten, see Note 1.
Phthalic anhydride, 8, UN2214, III	5000	no	154	213	240	Corrosive	Corrosive	Basic description applies for phthalic anhydride with more than 0.05 % maleic anhydride. Note, molten phthalic anhydride is forbidden for air shipment. For non-molten, see Note 1.

5.2.5 Maleic anhydride decomposes violently in the presence of amines or alkali metals, especially at elevated temperatures.

5.3 For chemical emergency (spill, leak, fire, exposure, or accident) call CHEMTREC, day or night, at 1-800-424-9300. For emergency calls outside the United States, call 703-527-3887. (Collect calls are accepted and all calls are recorded.)

## 6. Protective Equipment

6.1 Persons handling molten naphthalene, maleic, and phthalic anhydrides require eye, face, respiratory, body, skin, and hand protection. Coveralls or rubber apron, or both; rubber shoes or boots; chemical goggles or face shield, or both; Bureau of Mines organic respirator (Type AB); and gauntlet-type leather or rubber gloves are recommended.

6.2 Personal protective equipment is not an adequate substitute for good safe working conditions, proper ventilation, and intelligent conduct. Correct usage of protective equipment requires education in its proper use.

## 7. Safety Precautions

7.1 Unloading, loading, and sampling operations of molten liquids should be performed only by carefully instructed personnel and only when adequate light is available.

7.2 Exercise care to prevent spills and leaks. If they do occur, only properly protected personnel should remain in the contaminated area.

7.3 Allow spilled material to cool and solidify. If the spill is large, rope the area off. All spill-related activities should comply with applicable EPA, OSHA, and local regulations and laws.

7.4 Because of fire and explosion hazards, do not permit open flames in the vicinity of tank carriers, other shipping containers, or storage tanks. Provide all electrical fixtures with vapor-proof globes and explosion-proof safety devices. Ground tank carriers and metal drums by an approved method. Prohibit smoking.

7.5 Employees shall:

7.5.1 Know the hazards connected with the handling of naphthalene, maleic anhydride, and phthalic anhydride;

7.5.2 Be completely acquainted with the purpose, use, and maintenance of personal protective equipment;

7.5.3 Be trained to report promptly to supervision all suspected leaks or equipment failures;

7.5.4 Be trained to recognize and report any symptoms of systemic poisoning or skin contact; be thoroughly trained in the proper procedures for administering first aid and for obtaining professional medical help;

7.5.5 Know and routinely practice the accepted methods of sampling and handling these materials in order to avoid spilling or splashing, leaks, skin contact, vapor or mist inhalation, or ingestion;