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Standard Practice for Sampling and Handling Liquid Cyclic Products[1]

This standard is issued under the fixed designation D 3437; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This practice covers procedures for sampling and handling several liquid cyclic products. These specifically cover liquids at ambient temperature and include benzene, toluene, xylenes, cyclohexane, styrene, pyridine, ethylbenzene, isopropylbenzene, and alpha-methylstyrene.

1.2 Any person sampling and handling these products should have specific first aid instructions and equipment available for use in the event of personal contact or exposure.

~~1.3~~

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered 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 and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see Sections 5, 6 and 7.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 56 Test Method for Flash Point by Tag Closed Cup Tester

D 850 Test Method for Distillation of Industrial Aromatic Hydrocarbons and Related Materials

D 3505 Test Method for Density or Relative Density of Pure Liquid Chemicals

E 300 Practice for Sampling Industrial Chemicals

2.2 *American National Standards Institute Standard:*

Z 288.1 Flammable and Combustible Liquids Code[3]

2.3 *API Document:*[4]

RP-500A Classification of Locations for Electrical Installations in Petroleum Refineries[4]

2.4 *Other Documents:*

~~*OSHA Regulations, 29 CFR paragraphs 1910.1000 and 1910.2000*~~

OSHA Regulations, 29 CFR paragraphs 1910.1000 and 1910.2000[5]

~~OSHA Benzene Standard,29 CFR 1910.1028[7]~~

~~*U.S. DOT Regulations*, 49 CFR Transportation, Subchapter C, Parts 171-180[7]~~ OSHA Benzene Standard, 29 CFR 1910.1028[5]

U.S. DOT Regulations, 49 CFR Transportation Subchapter C, Parts 171-180[5]

DOT/USCG 46 CFR Subchapter O, Part 171[5]

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

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[1] 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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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* ~~, Vol 05.01.~~volume information, refer to the standard's Document Summary page on the ASTM website.

~~[3] Annual Book of ASTM Standards, Vol 06.04.~~

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

~~[4] Annual Book of ASTM Standards, Vol 15.05.~~

[4] Available from American Petroleum Institute (API), 1220 L. St., NW, Washington, DC 20005-4070, http://www.api.org.

~~[5] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.~~

[5] 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.

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

appropriate MSDS. The information provided herein cannot be used as a substitute for expert safety and medical advice as provided in appropriate MDSD, but rather as a supplement to such advice.

4. Description of Products (See Table 1)

4.1 These liquids are marketed in different grades of purity so the physical properties may vary slightly.

4.2 The products listed in Table 1 are classified by the Department of Transportation as flammable liquids, and containers must bear flammable liquid labels. Trucks and tank cars must have flammable liquid placards.

4.2.1 These products are ordinarily transported in steel drums, tank cars, tank trucks, barges and ships.

4.2.2 While these products are dangerous when handled improperly, their unloading need not be hazardous providing the hazards are recognized and handling instructions are rigidly observed.

4.3 Products shipped by air must be packaged to meet IATA and ICAO requirements.

5. Hazards

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

5.2 *Fire*:

5.2.1 All of these liquids introduce a potential fire hazard where they are stored, handled, or used.

5.2.2 Vapors of all of these materials can form explosive mixtures with air.

5.2.3 Foam, carbon dioxide, dry chemical, or water fog can be used in fighting fires of these products. Special alcohol-type foam is required to extinguish effectively a fire involving pyridine.

~~5.3For chemical emergency (spill, leak, fire, exposure, 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. Protection Equipment

6.1 Employees who work with the chemicals listed in Table 1 should be trained and should maintain safe working conditions. Persons working with these chemicals require eye, face, body protection, and, for benzene, various types of respiratory protection that is dictated by the amount of exposure. Consult MSDS for more specific recommendations.

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

7. Safety Precautions

7.1 Unloading, loading and sampling operations must be conducted by carefully instructed employees and only when adequate lighting is provided.

7.2 Be sure that the storage tank is safely vented before connecting the unloading line.

7.3 Take extreme care to prevent spills and leaks. In case material is spilled, wash contaminated areas thoroughly with large quantities of water and collect the liquid in the plant chemical waste system. All spill-related activities should comply with applicable EPA, OSHA and local regulations and laws.

7.4 Because of the flammability of vapors, do not permit sparks or open flames in the vicinity of barges, ships, tank cars, tank trucks, drums, or storage tanks. All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with the National Electrical Code after determining whether or not the operation is carried out in a classified or unclassified area for electrical installations. Electrically bond tank cars, tank trucks, and drums by an approved method. Smoking is absolutely prohibited.

TABLE 1 Physical Properties

Product	Boiling Point,[A] °C	Solidification Point,[B] °C	Flash Point[C] Closed Cup, °C	Reid Vapor Pressure Characteristics,[B] psia	Relative Density,[D] 15.56/15.56°C	Odor Threshold,[B] ppm	Explosion Limit[B] Lower	Explosion Limit[B] Higher	Ignition Temperature[B] ° F
Benzene	80	5.5	–11	3.22	0.88	4.7	1.3	7.9	1097
Cyclohexane	80	6.6	–17	3.3	0.78	2.5	1.3	8.4	518
Ethylbenzene	136	–95	15	0.4	0.87	140	1.0	6.7	860
Isopropylbenzene	152	–96	46	0.5	0.87	1.2	0.9	6.5	797
Pyridine	115	–42	20	0.77	0.99	0.02	1.8	12.4	900
Styrene	145	–30	31	0.27	0.91	0.15	1.1	6.1	914
Toluene	110	–95	4	1.1	0.87	0.17	1.3	7.0	997
Xylene (mixed)	137 to 144	–65	27	0.4	0.87	0.05	1.0	7.0	977
o–Xylene	144	–25	17	0.28	0.88	0.05	1.1	7.0	869
p–Xylene	138	13	27	0.34	0.87	0.05	1.1	6.6	870
alpha-Methyl Styrene	165	–23	45	0.23	0.91	<10	1.9	6.1	1066

[A] See Test Method D 850.
[B] Weiss, G., *Hazardous Chemicals Data Book,* Second Edition.
[C] See Test Method D 56.
[D] See Test Method D 3505.