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Standard Terminology for Waste and Waste Management¹

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1. Scope

1.1 This terminology contains standard definitions of terms used in the general area of waste and waste management. It is intended to promote understanding by providing precise technical definitions of terms used in the standards developed by Committee D34 and its subcommittees.

1.2 Terms used only within an individual standard, and having a meaning unique to that standard, may be defined or explained in the terminology section of that individual standard.

2. Referenced Documents

2.1 *ASTM Standards:*²

- C 1215 Guide for Preparing and Interpreting Precision and Bias Statements in Test Method Standards Used in the Nuclear Industry
- D 1129 Terminology Relating to Water
- D 4439 Terminology for Geosynthetics
- D 4448 Guide for Sampling Ground-Water Monitoring Wells
- D 4547 Guide for Sampling Waste and Soils for Volatile Organic Compounds
- D 4646 Test Method for 24-h Batch-Type Measurement of Contaminant Sorption by Soils and Sediments
- D 4790 Terminology of Aromatic Hydrocarbons and Related Chemicals
- D 4874 Test Method for Leaching Solid Material in a Column Apparatus
- D 5120 Test Method for Inhibition of Respiration in Microbial Cultures in the Activated Sludge Process
- D 5231 Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste
- D 5285 Test Method for 24-Hour Batch-Type Measurement of Volatile Organic Sorption by Soils and Sediments
- D 5368 Test Methods for Gravimetric Determination of Total Solvent Extractable Content (TSEC) of Solid Waste Samples
- D 5369 Practice for Extraction of Solid Waste Samples for Chemical Analysis Using Soxhlet Extraction
- D 5468 Test Method for Gross Calorific and Ash Value of Waste Materials
- D 5660 Test Method for Assessing the Microbial Detoxification of Chemically Contaminated Water and Soil Using a Toxicity Test with a Luminescent Marine Bacterium
- D 5679 Practice for Sampling Consolidated Solids in Drums or Similar Containers
- D 5680 Practice for Sampling Unconsolidated Solids in Drums or Similar Containers
- D 5743 Practice for Sampling Single or Multilayered Liquids, With or Without Solids, in Drums or Similar Containers
- D 5744 Test Method for Laboratory Weathering of Solid Materials Using a Humidity Cell
- D 5745 Guide for Developing and Implementing Short-Term Measures or Early Actions for Site Remediation
- D 5746 Classification of Environmental Condition of Property Area Types for Defense Base Closure and Realignment Facilities
- D 5759 Guide for Characterization of Coal Fly Ash and Clean Coal Combustion Fly Ash for Potential Uses
- D 5792 Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives
- D 5956 Guide for Sampling Strategies for Heterogeneous Wastes
- D 6008 Practice for Conducting Environmental Baseline Surveys
- D 6044 Guide for Representative Sampling for Management of Waste and Contaminated Media

¹ This terminology is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.94 on Terminology

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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* volume information, refer to the standard's Document Summary page on the ASTM website.

- D 6051 Guide for Composite Sampling and Field Subsampling for Environmental Waste Management Activities
- D 6063 Guide for Sampling of Drums and Similar Containers by Field Personnel
- D 6250 Practice for Derivation of Decision Point and Confidence Limit for Statistical Testing of Mean Concentration in Waste Management Decisions
- D 6270 Practice for Use of Scrap Tires in Civil Engineering Applications
- D 6311 Guide for Generation of Environmental Data Related to Waste Management Activities: Selection and Optimization of Sampling Design
- D 6323 Guide for Laboratory Subsampling of Media Related to Waste Management Activities
- D 6346 Guide for Accepting, Segregating and Packaging Materials Collected Through Household Hazardous Waste Programs
- D 6538 Guide for Sampling Wastewater With Automatic Samplers
- D 6582 Guide for Ranked Set Sampling: Efficient Estimation of a Mean Concentration in Environmental Sampling
- D 6661 Practice for Field Collection of Organic Compounds from Surfaces Using Wipe Sampling
- D 6700 Practice for Use of Scrap Tire-Derived Fuel
- D 6759 Practice for Sampling Liquids Using Grab and Discrete Depth Samplers
- D 6842 Guide for Designing Cost-Effective Sampling and Measurement Plans by Use of Estimated Uncertainty and Its Components in Waste Management Decision-Making
- D 6956 Guide for Demonstrating and Assessing Whether a Chemical Analytical Measurement System Provides Analytical Results Consistent with Their Intended Use
- D 6982 Practice for Detecting Hot Spots and Buried Objects Using Point-Net (Grid) Search Patterns
- E 135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials
- E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
- E 456 Terminology Relating to Quality and Statistics
- E 702 Specification for Municipal Ferrous Scrap
- E 708 Specification for Waste Glass as a Raw Material for the Manufacture of Glass Containers
- E 711 Test Method for Gross Calorific Value of Refuse-Derived Fuel by the Bomb Calorimeter
- E 828 Test Method for Designating the Size of RDF-3 From its Sieve Analysis
- E 850 Practice for Use of Inorganic Process Wastes as Structural Fill
- E 856 Definitions of Terms and Abbreviations Relating to Physical and Chemical Characteristics of Refuse Derived Fuel
- E 868 Test Methods for Conducting Performance Tests on Mechanical Conveying Equipment Used in Resource Recovery Systems
- E 884 Practice for Sampling Airborne Microorganisms at Municipal Solid-Waste Processing Facilities
- E 889 Test Method for Composition or Purity of a Solid Waste Materials Stream
- E 897 Test Method for Volatile Matter in the Analysis Sample of Refuse-Derived Fuel
- E 929 Test Method for Measuring Electrical Energy Requirements of Processing Equipment
- E 943 Terminology Relating to Biological Effects and Environmental Fate
- E 949 Test Method for Total Moisture in a Refuse-Derived Fuel Laboratory Sample
- E 953 Test Method for Fusibility of Refuse-Derived Fuel (RDF) Ash
- E 959 Test Method for Characterizing the Performance of Refuse Size-Reduction Equipment
- E 1037 Test Method for Measuring Particle Size Distribution of RDF-5
- E 1138 Terminology for Technical Aspects of Products Liability Litigation
- E 1183 Test Method for Air Drying RDF-5 for Further Analysis
- E 1248 Practice for Shredder Explosion Protection
- E 1266 Practice for Processing Mixtures of Lime, Fly Ash, and Heavy Metal Wastes in Structural Fills and Other Construction Applications

3. Significance and Use

3.1 This terminology defines terms and specialized meanings of terms in the subject areas of waste and management of waste.

3.2 This terminology is not intended for subjects other than waste and waste management. For terms applicable to other subject areas, the appropriate terminology standard(s) should be consulted. See the current edition of the *Compilation of ASTM Standard Definitions*³ and the list of terminology standards cited therein.

3.3 Standards relating to subcategories of waste or waste management may use terms defined more narrowly than those included here. The more specialized terminology standards relating to the applicable specific subcategory, or terms defined within individual standards, or both, should be consulted for the exact meaning intended within a given standard.

3.4 The *Thesaurus on Resource Recovery Terminology* (Special Technical Publication (STP) 832)⁴ contains many terms and may be useful for those not listed in terminology standards. However, a definition in a standard terminology shall be considered governing when the term is used in the sense or meaning defined therein.

³ *Compilation of ASTM Standard Definitions*, ASTM, 8th edition, 1994.

⁴ *Thesaurus on Resource Recovery Terminology*, ASTM STP 832, ASTM, 1983.

3.5 Statistical terms are not defined in this terminology to the extent that the terms, when used regarding waste and management of waste, have the same meanings as in Practice E 177 or Terminology E 456.

3.6 Regulatory terms are often developed by regulatory agencies for special regulatory purposes and may have technical content or meaning different from terms defined herein. When a regulatory term exists that differs in meaning from a term given here, the regulatory term should be considered to take precedence for regulatory matters.

4. Terminology

accepts, *n*—the output stream from a materials separation device that contains the highest concentration (purity) of the components that the device is designed to separate.

accuracy, *n*—closeness of a measured value to the true or an accepted reference or standard value. **E 135, D 6311**

acid producing potential (AP), *n*—the potential for a solid material sample to produce acidic effluent, based on the percent of sulfide contained in that sample as iron-sulfide mineral (for example, pyrite or pyrrhotite). The AP is commonly converted to the amount of calcium carbonate required to neutralize the resulting amount of acidic effluent produced by the oxidation of contained iron sulfide minerals; it is expressed as the equivalent tons of calcium carbonate per 1000 tons of solid material. The AP is therefore calculated by multiplying the percent of sulfide contained in the material by a stoichiometric factor of 31.25.

D 5744

action level (AL)—the level above or below which will lead to the adoption of one of two alternative actions. **D 6956**

adiabatic calorimeter, *n*—a calorimeter that has a jacket temperature adjusted to follow the calorimeter temperature as closely as possible so as to maintain zero thermal head. **D 5468**

air drying—a process of partial drying of RDF-3 to bring its moisture content near to equilibrium with the atmosphere in the room in which the sieving is to take place. **E 828**

air drying—a process of partial drying of RDF to bring its moisture content near to equilibrium with the atmosphere in which further reduction, division, and characterization of the sample are to take place. In order to bring about the equilibrium, the RDF is usually subjected to drying under controlled temperature conditions ranging from 30 to 40°C. **E 949**

all season radial, *n*—a highway tire designed to meet the weather conditions in all seasons of the year, that meets the Rubber Manufacturers Association⁵ definition of a mud and snow tire. **D 6700**

altered tire, *n*—a scrap tire which has been modified so that it is no longer capable of retaining air, holding water, or being used on a vehicle. **D 6700**

analysis, *n*—the activity to determine the proximate and ultimate analysis, fuel value and size specification of TDF. **D 6700**

analysis sample, *n*—the final subsample prepared from the air-dried laboratory sample but reduced in particle size by passing through a mill with a 0.5 mm (0.02-in.) size or smaller final screen.

analysis sample—the final subsample prepared from the air-dried laboratory sample but reduced by passing through a mill with a 0.5 mm (0.02 in.) size or smaller final screen. **E 949**

analysis of variance (ANOVA), *n*—a statistical method of decomposing (or breaking down) the total variance and estimating or testing its contributing component variances for statistical significance. **D 6842**

analyte—the constituent to be measured. **D 6956**

analytical unit, *n*—the actual amount of the sample material analyzed in the laboratory. **D 6044**

applicable or relevant and appropriate requirements (ARAR)—those requirements, cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that show either a direct correspondence or address problems or situations sufficiently similar at a site to show that they are well suited for application. **D 5745**

asbestos—six naturally occurring fibrous minerals found in certain types of rock formations. Of the six, the minerals chrysotile, amosite, and crocidolite have been most commonly used in building products. When mined and processed, asbestos is typically separated into very thin fibers. Because asbestos is strong, incombustible, and corrosion-resistant, asbestos was used in many commercial products beginning early in this century and peaking in the period from World War II into the 1970s. When inhaled in sufficient quantities, asbestos fibers can cause serious health problems. **D 6008**

asbestos-containing material (ACM)—any material or product that contains more than 1 % asbestos. **D 6008**

as-determined basis, *n*—analytical data obtained from an analysis sample after conditioning and preparation which represent the numerical values obtained at the particular moisture and ash level in the sample at the time of analysis.

as-received basis, *n*—test data calculated to the condition of the sample as it arrived in the laboratory and before any laboratory processing or conditioning.

ash *n*—the residue remaining after ignition of a substance as determined by definite prescribed methods.

DISCUSSION—Ash may not be identical in composition or quantity with the inorganic substances present in the analysis sample before ignition.

attribute, *n*—a quality of samples or a population. **D 5956, D 6311**

auxiliary variable, *n*—the secondary characteristic or measurement of interest.

⁵ Available from the Rubber Manufacturers Association (RMA) 1400 K Street, NW, Suite 900, Washington, DC 20005.

DISCUSSION—In ranked set sampling, information contained in an auxiliary variable is useful for ranking the samples. This ranking may mimic the rankings of the samples with respect to the values of the primary variable when there is correlation between the auxiliary variable and the primary variable. Auxiliary information may include visual inspection, inexpensive quick measurement, knowledge of operational history, previous site data, or any other similar information. **D 6582**

balanced design, n—a statistical study where replication in each of the levels of ANOVA is identical. **D 6842**

baling, n—a method of volume reduction whereby tires are compressed into bales. **D 6270**

bead, n—the anchoring part of the tire which is shaped to fit the rim and is constructed of bead wire wrapped by the plies. **D 6270**

bead, n—the anchoring part of the tire, which is shaped to fit the rim. The bead is constructed of high tensile steel wires wrapped by the plies. **D 6700**

bead wire, n—a high tensile steel wire surrounded by rubber, which forms the bead of a tire that provides a firm contact to the rim. **D 6270, D 6700**

bear claw, n—the rough-edged bead wire sticking out from a shredded tire. **D 6700**

belt, n—an assembly of rubber coated fabric or wire used to reinforce a tire's tread area. In radial tires, also constrains the outside diameter against inflation pressure and centrifugal force. **D 6700**

belt wire, n—a brass-plated high tensile steel wire cord used in steel belts. **D 6270, D 6700**

bias, n—the difference between the sample value of the test results and an accepted reference value.

DISCUSSION—*Bias* represents a constant error as opposed to a *random error*. A method *bias* can be estimated by the difference (or relative difference) between a measured average and an accepted standard or reference value. The data from which the estimate is obtained should be statistically analyzed to establish *bias* in the presence of *random error*. A thorough *bias* investigation of a measurement procedure requires a statistically designed experiment to repeatedly measure, under essentially the same conditions, a set of standards or reference materials of known value that cover the range of application. *Bias* often varies with the range of application and should be reported accordingly. **C1215, D5792**

bias, n—a systematic positive or negative deviation of the sample or estimated value from the true population value. **D 6044**

bias—the difference between the value determined using the measurement protocol in question and the true value; operationally the difference between the expected mean of the sample test results and an accepted true value. **D6956**

bias—a systematic error that is consistently negative or consistently positive. The mean of errors resulting from a series of observations that does not tend towards zero. **E949**

bias ply tires, n—a tire built with two or more casing plies, which cross each other in the crown at an angle of 30 to 45° to the tread centerline. **D 6700**

biased sampling, n—the taking of a sample(s) with prior knowledge that the sampling result will be biased relative to the true value of the population.

DISCUSSION—This is the taking of a sample(s) based on available information or knowledge, especially in terms of visible signs or knowledge of contamination. This kind of sampling is used to detect the presence of localized contamination or to identify the source of a contamination. The sampling results are not intended for generalization to the entire population. This is one form of authoritative sampling (see *judgment sampling*.) **D 6044**

binary separator—a device that separates a single input feed stream into two output or product streams. **E 889**

body, n—tire structure not including the tread portion of the tire. (See also *casing* and *carcass*.) **D 6700**

bonding—touching the sampling equipment to the drum to form an electrically conductive path to minimize potential electrical differences between the sampling equipment and the drum, reducing the buildup of static electricity. **D 5679, D 5680, D 5743**

buffing rubber, n—vulcanized rubber usually obtained from a worn or used tire in the process of removing the old tread in preparation for retreading. **D 6270**

bulking—the act of emptying multiple containers of compatible materials and mixing those materials together in a single package unit destined for shipment. This would also include material placed in storage tanks to be packaged for shipment at a later date, or pumped into a bulk tank truck for shipment. **D 6346**

bung—usually a 2-in. (5.1-cm) or 3/4-in. (1.3-cm) diameter threaded plug designed specifically to close a bung hole. **D 5679, D 5680, D 5743, D 6063**

bung hole—an opening in a barrel or drum through which it can be filled, emptied, or vented. **D 5679, D 5680, D 5743, D 6063**

calorific value, n—the heat produced by combustion of a unit quantity of a specimen under specified conditions. **D 5468**

calorific value—the heat of combustion of a unit quantity of a substance. It may be expressed in joules per gram (J/g), British thermal units per pound (Btu/lb), or calories per gram (cal/g) when required.

NOTE 1—The unit equivalents are as follows:

- 1 Btu (International Table) = 1055.06 absolute joules
- 1 Calorie (International Table) = 4.1868 absolute joules
- 1 Btu/lb = 2.326 J/g
- 1.8 Btu/lb = 1.0 cal/g

- calorimeter jacket, *n***—the insulating medium surrounding a calorimeter. **D 5468**
- carcass, *n***—see **casings**. **D 6270, D 6700**
- casings, *n***—the basic tire structure excluding the tread (Syn. *carcass*). **D 6270, D 6700**
- cemented materials**—materials consisting of one or more substances that develop hardness by chemical reaction after placement of the material in a fill. **E 850**
- characteristic, *n***—a property of items in a sample or population that can be measured, counted, or otherwise observed, such as viscosity, flash point, or concentration. **D 6044**
- characteristic, *n***—a property of items in a sample or population that can be measured, counted, or otherwise observed. **D 5956, D 6311**

DISCUSSION—A characteristic of interest may be the cadmium concentration or ignitability of a population. **D 5956, D 6311**

- characteristic product size, *n***—the screen size corresponding to 63.2 % cumulative passing by mass. **E 959**
- chip size, *n***—the range of rubber particle sizes resulting from the processing of whole tires. **D 6700**
- chipped tire, *n***—a classified scrap tire particle that has a basic geometrical shape, which generally is 2 in. (5.08 cm) or smaller and has most of the bead wire removed. Also referred to as a *tire chip*. **D 6700**
- chopped tire, *n***—a scrap tire that is cut into relatively large pieces of unspecified dimensions. **D 6700**
- classifier, *n***—equipment designed to separate oversized tire shreds from the desired size. **D 6700**
- clean coal combustion**—the burning of coal, coal culm, or coal fines in a furnace designed to operate to minimize emissions (that is, a fluidized bed or aerated fluidized bed, etc.) or coal burned in the presence of alkaline materials, which combine to reduce these emissions. **D 5759**
- coarse material**—material coarser than a No. 200 (75- μ m) U.S. standard sieve. **E 850**
- color**—that is, the presence of dissolved matter that absorbs the light emitted by *P. phosphoreum* (that is, wavelength of 490 \pm 100 nm). **D 5660**
- combustibles, *n***—the portion of a sample which is consumed by oxidation upon ignition and exclusive of the moisture present in the sample.
- combustion, *n***—the chemical reaction of a material through rapid oxidation with the evolution of heat and light. **D 6700**
- combustion unit, *n***—any number of devices to produce or release energy for the beneficial purpose of production by burning a fuel to include, but not limited to, units such as industrial power boilers, electrical utility generating boilers, and cement kilns. **D 6700**
- commercial tire, *n***—truck and industrial tires. **D 6700**
- composite item**—an object in the waste composed of multiple waste components or dissimilar materials, such as disposable diapers, bi-metal beverage containers, electrical conductors composed of metallic wire encased in plastic insulation, etc. **D 5231**
- composite sample, *n***—a combination of two or more samples. **D 1129, D 6044, D 6051, D 6311, D 6538**
- compound, *n***—a mixture of blended chemicals tailored to meet the needs of the specific components of the tire. **D 6700**
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)**—the list of sites compiled by EPA that EPA has investigated or is currently investigating for potential hazardous substance contamination for possible inclusion on the National Priorities List. **D 6008**
- conceptual site model, *n***—a mental or physical representation of the physical system and the iterative characterization of the physical and chemical processes and conditions that affect the transport of contaminants from sources through environmental media to receptors or potential receptors. **D 5745**
- confidence interval, *n***—an interval used to bound the value of a population parameter with a specified degree of confidence (this is an interval that has different values for different samples).

DISCUSSION—The specified degree of confidence is usually 90, 95, or 99 %. *Confidence intervals* may or may not be symmetric about the mean, depending on the underlying statistical distribution. For example, *confidence intervals* for the variances are not symmetric. **C 1215, D 5792**

- confidence interval, *n***—a numerical range used to bound the value of a population parameter with a specified degree of confidence (that the interval would include the true parameter value).

DISCUSSION—When providing a confidence interval, the number of observations on which the interval is based should be identified. **D 6311**

- confidence level, *n***—the probability, usually expressed as a percent, that a *confidence interval* is expected to contain the parameter of interest (see discussion of *confidence interval*). **D 5792**
- confidence level, *n***—the probability, usually expressed as a percent, that a confidence interval will contain the parameter of interest. **D 6311**
- confidence limits, *n***—the limits on either side of the mean value of a group of observations which will, in a stated fraction or percent of the cases, include the expected value. Thus the 95 % confidence limits are the values between which the population mean will be situated in 95 out of 100 cases. **D 4790**

DISCUSSION—A one-sided upper or lower confidence limit can also be used when appropriate. An upper confidence limit is a value below which the population mean is expected to be with the specified confidence. Similarly, a lower confidence limit is a value above which the population mean is

expected to be with the specified confidence. It is to be noted that confidence limits are calculated after the collection of sample data. **D 6250**

consolidated—the characteristic of being cemented or compacted, or both, and not separated easily into smaller particles. **D 5679**

consolidation—the act of combining two or more materials to make a single package unit. Common types of consolidation packaging used by HHW programs include: bulking, lab packaging, and composite packaging. **D 6346**

constituent, n—an element, component, or ingredient of the population.

DISCUSSION—If a population contains several contaminants (such as acetone, lead, and chromium), these contaminants are called the constituents of the population. **D 6044**

contaminant, n—any substance potentially hazardous to human health or the environment and present in the environment above background concentration. **D 5745**

contaminant unit, n—the largest particle size that contains the contaminant of interest.

DISCUSSION—The contaminant of concern, as defined by the project objectives, may be associated with all the particle sizes or associated with only a certain particle size or sizes. At the time of waste generation, discharge or spill, the particle size of this contaminant of concern may be on the atomic or molecular scale, such as solvent spill into sand, or a macro scale, such as lead acid batteries at a dump site. The contaminant unit may also be in-between these scales, such as lead particles encapsulated in coal. In practice, the contaminant unit may change if the contaminant unit becomes absorbed or adsorbed to particles larger than the contaminant unit. It is the size of the contaminant unit at the time of subsampling, not at the time of generation, that is referred to as the contaminant unit. **D 6323**

contaminated public wells—public wells used for drinking water that have been designated by a government entity as contaminated by toxic substances (for example, chlorinated solvents), or as having water unsafe to drink without treatment. **D 6008**

converted tire, n—a scrap tire that has been processed into a usable commodity other than a tire. **D 6700**

cords, n—the strands of wire or fabric that form the plies and belts in a tire. **D 6700**

corrected temperature rise, n—the increase in temperature of the calorimeter caused by the process that occurs inside the bomb; the observed temperature change corrected for various effects.

data quality objective (DQO)—qualitative and quantitative statements of the overall level of uncertainty that a decision-maker is willing to accept in results or decisions derived from environmental measurements, includes uncertainties in sampling location, sample handling, and sample analysis. **D6956**

data quality objectives (DQOs), n—qualitative and quantitative statements derived from the DQO process describing the decision rules and the uncertainties of the decision(s) within the context of the problem(s). **D 6311, D 6044**

DISCUSSION—DQOs clarify the study objectives, define the most appropriate type of data to collect, determine the most appropriate conditions from which to collect the data, and establish acceptable levels of decision errors that will be used as the basis for establishing the quantity and quality of data needed to support the decision. The DQOs are used to develop a sampling and analysis design. **D 5792**

data quality objectives process, n—a quality management tool based on the scientific method and developed by the U.S. Environmental Protection Agency (EPA) to facilitate the planning of environmental data collection activities. The DQO process enables planners to focus their planning efforts by specifying the use of the data (the decision), decision criteria (decision point), and decision maker's acceptable decision error rates. The products of the DQO process are the DQOs.

DISCUSSION—DQOs result from an iterative process between the decision makers and the technical team to develop qualitative and quantitative statements that describe the problem and the certainty and uncertainty that decision makers are willing to accept in the results derived from the environmental data. This acceptable level of uncertainty should then be used as the basis for the design specifications for project data collection and data assessment. All of the information from the first six steps of the DQO process are used in designing the study and assessing the data adequacy. **EPA QA/G-4, D 5792**

data quality objectives process (DQO), n—a quality management tool based on the scientific method and developed by the U.S. Environmental Protection Agency (EPA) to facilitate the planning of environmental data collection activities. **D 6582**

DISCUSSION—The DQO process enables planners to focus their planning efforts by specifying the use of the data (the decision), the decision criteria (action level) and the decision maker's acceptable decision error rates. The products of the DQO Process are the DQOs. **D 5956, D 6311**

data quality objectives process, n—a quality management tool based on the Scientific Method and developed by the U.S. Environmental Protection Agency to facilitate the planning of environmental data collection activities. The DQO process enables planners to focus their planning efforts by specifying the use of the data (the decision), decision criteria (action level), and decision maker's acceptable decision error rates. The products of the DQO process are the DQOs. **D 6044**

decision error

false negative error, n—this occurs when environmental data mislead decision maker(s) into not taking action specified by a decision rule when action should be taken. **D 5792**

false positive error, n—this occurs when environmental data mislead decision maker(s) into taking action specified by a decision rule when action should not be taken. **D 5792**

- decision point, *n***—the numerical value that causes the decision-maker to choose one of the alternative actions point (for example, compliance or noncompliance). **D 5792**
- decision point, *n***—the numerical value which causes the decision maker to choose one of the alternative actions (for example, conclusion of compliance or noncompliance). **D 6250**
- decision rule, *n***—a set of directions in the form of a conditional statement that specify the following: (1) how the sample data will be compared to the decision point, (2) which decision will be made as a result of that comparison, and (3) what subsequent action will be taken based on the decisions. **D 5792, D 6250**
- decision rule, *n***—a set of directions in the form of conditional statements that specifies: (1) how the sample data will be compared to the decision point or action level, (2) which decision will be made as a result of that comparison, and (3) what subsequent action will be taken based on the decisions. **D 6311**
- deflagration**—an explosion in which the flame or reaction front propagates at a speed well below the speed of sound in the unburned medium, such that the pressure is virtually uniform throughout the enclosure (shredder) at any time during the explosion. **E 1248**
- deheading**—removal of the lid of a closed-head drum; usually accomplished with a drum deheader. **D 5679, D 5680, D 5743**
- detonation**—an explosion in which the flame or reaction front propagates at a supersonic speed into the unburned medium, such that the pressure increases occur in the form of shock waves. **E 1248**
- dewired, *n***—the absence of exposed wire on the perimeter of the tire chips. Belt wire typically remains in the chip, but is is embedded in the chip. **D 6700**
- discarded tires, *n***—a worn or damaged tire that has been removed from a vehicle. **D 6700**
- discrete depth sample, *n***—sample obtained from a defined level within the liquid being sampled. **D 6759**
- discrete throughput method**—the method whereby average throughput is calculated as the average of a number of discrete throughput measurements conducted during a test period. **E 959**
- dispose, *v***—to discard, abandon, or manage as waste.
- drum**—implicity any drum, barrel, or non-bulk container of 5 to 110 U.S. gal (19 to 416 L) capacity. **D 5743**
- drum**—implies any drum, barrel, or non-bulk container of 5 to 110 U.S. gal (19 to 416 L) capacity. **D 5679, D 5680**
- drum**—a container (typically, but not necessarily, holding 55 gal [208 L] of liquid) that may have been used to store hazardous substances or petroleum products. **D 6008**
- dry ash-free basis, *n***—test data calculated to a theoretical base of no moisture or ash associated with the sample.
- dry basis, *n***— test data calculated to a theoretical base of no moisture associated with the sample.
- duplicate analysis, *n***—paired determinations on the same sample performed by one analyst at essentially the same time.
- dwelling**—structure or portion thereof used for residential habitation. **D 6008**
- early action, *n***—any remedial plan initiated in advance of a complete or final characterization of a contaminated site. **D 5745**
- EC₅₀**—the concentration of the test candidate in this procedure (volume percent or mg/L) that results in a reduction of respiration rate to 50 % of that observed for the control. **D 5120**
- effective coefficient of permeability**— the coefficient of permeability that characterizes a fill and is the result of combined materials characteristics and construction techniques including compaction, capping, placement of impermeable layers, etc. **E 850**
- electrical metering system**—a system composed of current and potential transformers and a wattmeter electrically connected in such a manner so as to measure the energy usage of a piece of equipment driven by an electric motor. **E 929**
- end user, *n***—the facility which utilizes the heat content or other forms of energy from the combustion of scrap tires (for energy recovery). The last entity who uses the tire, in whatever form, to make a product or provide a service with economic value (for other uses). **D 6700**
- energy equivalent, *n***—the energy required to raise the temperature of a calorimeter system 1°C (or 1°F) per gram of sample.
- energy recovery, *n***—a process by which all or part of the tire is utilized as fuel (TDF) to recover its entire value. **D 6700**
- energy value, *n***—the assignment of a value to the tire-derived fuel as measured in British thermal units per pound or calories per gram. **D 6700**
- environmental baseline survey (EBS)**—a survey of DoD real property based on all existing environmental information related to the storage, release, treatment, or disposal of hazardous substances or petroleum products or derivatives on the property to determine or discover the obviousness of the presence or likely presence of a release or threatened release of any hazardous substance or petroleum product. In certain cases, additional data, including sampling and analysis, may be needed in the EBS to support classification of the property into one of the standard environmental condition of property area types. Additionally, an EBS may also satisfy the uncontaminated property identification requirements of CERFA. An EBS will consider all sources of available information concerning environmentally significant current and past uses of the real property and shall, at a minimum, consist of the following: (1) a detailed search and review of available information and records in the possession of the DoD components or records made available by the regulatory agencies or other involved Federal agencies. DoD components are responsible for requesting and making reasonable inquiry into the existence and availability of relevant information and records to include any additional study information (for example, surveys for radioactive materials, asbestos, radon, lead-based paint, transformers containing PCB, Resource Conservation and Recovery Act Facility Assessments and Investigations (RFA and

RFI), and underground storage tank cleanup program) to determine the environmental condition of the property; (2) a review of all reasonably obtainable Federal, state, and local government records for each adjacent facility where there has been a release or likely release of any hazardous substance or any petroleum product, and that is likely to cause or contribute to a release or threatened release of any hazardous substance or any petroleum product on the DoD real property; (3) an analysis of aerial photographs that may reflect prior uses of the property, which are in the possession of the Federal government or are reasonably obtainable through state or local government agencies; (4) interviews with current or former employees, or both, involved in operations on the real property; (5) visual inspections of the real property; any buildings, structures, equipment, pipe, pipeline, or other improvements on the real property; and of properties immediately adjacent to the real property, noting sewer lines, runoff patterns, evidence of environmental impacts (for example, stained soil, stressed vegetation, and dead or ill wildlife), and other observations that indicate the actual or potential release of hazardous substances or petroleum products; (6) the identification of sources of contamination on the installation and on adjacent properties that could migrate to the parcel during Federal government ownership; (7) ongoing response actions or actions that have been taken at or adjacent to the parcel; and (8) physical inspection of the property adjacent to the real property, to the extent permitted by owners or operators of such property.

D 5746

environmental baseline survey (EBS) report— the written record of an EBS that includes the following: (1) an executive summary briefly stating the areas of real property (or parcels) evaluated and the conclusions of the EBS; (2) the property identification (for example, the address, assessor parcel number, or legal description); (3) any relevant information obtained from a detailed search of Federal government records pertaining to the property, including available maps; (4) any relevant information obtained from a review of the recorded chain of title documents regarding the real property. The review should address those prior ownerships and uses that could reasonably have contributed to an environmental concern, and, at a minimum, cover the preceding 60 years; (5) a description of past and current activities, including all past DoD uses to the extent such information is reasonably available, on the property and on adjacent properties; (6) a description of hazardous substances or petroleum products management practices (to include storage, release, treatment, or disposal) at the property and adjacent properties; (7) any relevant information obtained from records reviews and visual and physical inspections of adjacent properties; (8) a description of ongoing response actions or actions that have been taken at or adjacent to the property; (9) an evaluation of the environmental suitability of the property for an intended lease or deed transaction, if known, including the basis for determination of such suitability; and (10) references to key documents examined (for example, aerial photographs, spill incident reports, and investigation results).

D 5746

environmental condition of property map— a map, prepared on the basis of all environmental investigation information conducted to date, that shows the environmental condition of a DoD installation's real property in terms of the seven standard environmental condition of property area types defined in this classification.

D 5746

environmental lien—a charge, security, or encumbrance upon title to a property to secure the payment of a cost, damage, debt, obligation, or duty arising out of response actions, cleanup, or other remediation of hazardous substances or petroleum products upon a property, including (but not limited to) liens imposed pursuant to CERCLA 42 USC § 9607(1) and similar state or local laws.

D 6008

equal allocation, n —this occurs when the number of sets in ranked set sampling is an integer multiple of the size of the set.

D 6582

ERNS list—EPA's Emergency Response Notification System list of reported CERCLA hazardous substance releases or spills in quantities equal to or greater than the reportable quantity, as maintained by the National Response Center. Notification requirements for such releases or spills are codified in 40 CFR Parts 302 and 355.

D 6008

error, n —the random or systematic deviation of the observed sample value from its true value (see *bias* and *sampling error*).

D 6044

explosion—a rapid release of energy (usually by means of combustion) with a corresponding pressure buildup capable of damaging equipment and building structures.

E 1248

explosion suppression—the technique of detecting and extinguishing incipient explosions in the shredder enclosure and contiguous enclosed areas before pressures exceed the damage threshold.

E 1248

explosion venting—the provision of an opening(s) in the shredder enclosure and contiguous enclosed areas to allow gases to escape during a deflagration and thus prevent pressures from reaching the damage threshold.

E 1248

fabric, n —textiles cords used in tire manufacturing.

D 6700

false negative error, n —occurs when environmental data mislead decision maker(s) into not taking action specified by a decision rule when action should be taken.

D 5792, D 6250

false negative error, n —an error which occurs when (environmental) data misleads the decision maker(s) into not taking action when action should be taken.

D 6311

false positive error, n —occurs when environmental data mislead decision maker(s) into taking action specified by a decision rule when action should not be taken.

D 5792, D 6250

false positive error, n —an error which occurs when environmental data misleads the decision maker(s) into taking action when action should not be taken.

D 6311

Federal Register (FR)—publication of the United States government published daily (except for Federal holidays and weekends)

- containing all proposed and final regulations and some other activities of the Federal government. When regulations become final, they are included in the Code of Federal Regulations (CFR) as well as published in the Federal Register. **D 6008**
- fill material, *n***—material used in the construction of a structural fill. **E 850**
- final remedy, *n***—site restoration. **D 5745**
- fine material**—material finer than No. 200 (75- μ m) U.S. standard sieve. **E 850**
- fishhooks, *n***—strands of belt or bead wire exposed from a processed scrap tire or an individual piece of belt or bead wire. (See also *bear claw*). **D 6700**
- fixed carbon, *n***—the ash-free carbonous material that remains after volatile matter is driven off during the proximate analysis of a dry sample.
- flint glass cullet, *n***—a particulate glass material that contains no more than 0.1 mass percent Fe_2O_3 , or 0.0015 mass percent Cr_2O_3 , as determined by chemical analysis.
- flint glass cullet**—a particulate glass material that contains no more than 0.1 weight % Fe_2O_3 , or 0.0015 weight % Cr_2O_3 , as determined by chemical analysis. **E 708**
- fluff, *n***—the fibrous, nonrubber, nonmetal portion of a tire that remains after the scrap tire is processed (that is, cotton, rayon, polyester, fiberglass, or nylon). **D 6700**
- fluid temperature, FT, *n***—in ash fusion determinations, the temperature at which a fused mass has spread out in a nearly flat layer with maximum height of 1.6 mm (1/16 in.).
- fluid temperature, FT**—the temperature at which the fused mass has spread out in a nearly flat layer with a maximum height of 1.6 mm (1/16 in.). **E 953**
- fly ash, *n***—residual material that exits a combustion chamber in the flue gas. **D 5759**
- fly ash**—finely sized ash generated from combustion of pulverized coal. Descriptions and types are listed in Specifications C 593 and C 618. **E 1266**
- forms of refuse-derived fuel (RDF)**—RDF-1—Wastes used as a fuel in as-discarded form.
- RDF-2—Wastes processed to coarse particle size with or without ferrous metal separation.
- RDF-3—shredded fuel derived from municipal solid waste (MSW) that has been processed to remove metal, glass, and other inorganics. This material has a particle size such that 95 weight % passes through a 2-in. (50-mm) square mesh screen.
- RDF-4—Combustible waste processed into powder form, 95 weight % passing 10-mesh screening.
- RDF-5—Combustible waste densified (compressed) into the form of pellets, slugs, cubettes, or briquettes.
- RDF-6—Combustible waste processed into liquid fuel.
- RDF-7—Combustible waste processed into gaseous fuel. **E 949, E 953**
- freewheeling condition**—a piece of equipment under an unloaded condition wherein the electrical energy is dissipated due to friction and windage. **E 929**
- freewheeling power**—power requirement of a piece of equipment under unloaded, or freewheeling, conditions. **E 929**
- fuel value, *n***—the heat content, as measured in British thermal units (Btu)/lb or cal/g. **D 6700**
- GC**—gas chromatography. **D 5369**
- GC/MS**—gas chromatography with mass spectrometric detection. **D 5369**
- grab sample, *n***—individual sample collected over a period of time usually not exceeding 15 min. and in such a manner as to be representative of conditions at the time of sampling. Grab samples are sometimes called individual or discrete samples. **D 6759**
- granulated rubber, *n***—particulate rubber composed of mainly nonspherical particles that span a broad range of maximum particle dimension, from below 425 μ m (40 mesh) to 12 mm (also refer to **particulate rubber**).⁶ **D 6270**
- gross calorific value, (gross heat of combustion), Q_v (gross), *n***—the heat produced by combustion of unit quantity of a solid or liquid specimen when burned at constant volume in an oxygen bomb calorimeter under specified conditions with the resulting water condensed to a liquid.
- gross calorific value (gross heat of combustion), Q_v (gross)**—the heat produced by combustion of unit quantity of a solid or liquid fuel when burned at constant volume in an oxygen bomb calorimeter under specified conditions with the resulting water condensed to a liquid. **D 5468**
- gross calorific value**—the heat produced by combustion of a unit quantity of solid fuel, at constant volume, in an oxygen bomb calorimeter under specified conditions such that all water in the products remains in liquid form. **E 711**
- gross energy**—energy usage of a piece of equipment operating under loaded conditions as measured using an electrical metering system. **E 929**
- gross power**—power requirement of a piece of equipment under loaded conditions. **E 929**
- gross sample *n***—a sample representing one lot, normally composed of a number of increments, on which neither reduction nor division has been performed.
- gross sample**—a sample representing a lot of RDF and composed of a number of increments on which neither reduction nor division has been performed. **E 828**

⁶ The defined term is the responsibility of Committee D11 on Rubber.

gross sample—a sample representing one lot and composed of a number of increments on which neither reduction nor division has been performed. **E 889, E 949**

ground rubber, *n*—particulate rubber composed of mainly nonspherical particles that span a range of maximum particle dimensions, from below 425 μm (40 mesh) to 2 mm (also refer to **particulate rubber**).⁶ **D 6270**

hair, *n*—wire protruding from the perimeter of a tire chip or shred. (See also *fishhooks*). **D 6700**

hazardous substance—a substance defined as a hazardous substance pursuant to CERCLA 42 USC § 9601(14), as interpreted by EPA regulations and the courts: “(A) any substance designated pursuant to section 1321(b)(2)(A) of Title 33, (B) any element, compound, mixture, solution, or substance designated pursuant to section 9602 of this title, (C) any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (42 USC § 6921) (but not including any waste the regulation of which under the Solid Waste Disposal Act (42 USC § 6921 *et seq.*) has been suspended by Act of Congress), (D) any toxic pollutant listed under section 1317(a) of Title 33, (E) any hazardous air pollutant listed under section 112 of the Clean Air Act (42 USC § 7412), and (F) any imminently hazardous chemical substance or mixture with respect to which the Administrator (of EPA) has taken action pursuant to section 2606 of Title 15. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).” **D 5746, D 6008**

hazardous waste—any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (42 USC § 6901 *et seq.*) (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress) and so forth. **D 6008**

heat capacity—the quantity of heat required to raise a system one degree in temperature either at constant volume or constant pressure. **D 5468**

heat capacity (energy equivalent, or water equivalent), *n*—the energy required to raise the temperature of a calorimeter one arbitrary unit; the quantity that when multiplied by the corrected temperature rise, then adjusted for extraneous heat effects and divided by the mass of the sample, gives the gross calorific value.

heat of formation—the increase in heat content resulting from the formation of 1 mole of a substance from its elements at constant pressure. **D 5468**

heavy-duty tires, *n*—tires weighing more than 40 lb (18.1 kg), used on trucks, buses, and off the road vehicles in heavy-duty applications. **D 6700**

heavy metal wastes—industrial wastes containing heavy metals such as arsenic, cadmium, chromium, barium, lead, silver, selenium, and mercury; these wastes are generally liquids, sludges, or filter cakes. **E 1266**

hemispherical temperature, HT, *n*—the temperature at which a pyrometric cone has fused down to a hemispherical lump where the height is one half the width of the base.

hemispherical temperature, HT—the temperature at which the cone has fused down to a hemispherical lump at which point the height is one half the width of the base. **E 953**

heterogeneity, *n*—the condition or degree of the population under which all items of the population are not identical with respect to the characteristic(s) characteristic of interest.

DISCUSSION—Although the ultimate interest is in the statistical parameter such as the mean concentration of a constituent of the population, heterogeneity relates to the presence of differences in the characteristics (for example, concentration) of the units in the population. It is due to the presence of fundamental heterogeneity (or fundamental error)⁷ in the population that sampling variance arises. Degree of sampling variance defines the degree of precision in estimating the population parameter using the sample data. The smaller the sampling variance is, the more precise the estimate is. See also *sampling error*. **D6044**

~~**heterogeneity, *n***—the condition of the population under which items of the population are not identical with respect to the characteristic of interest. **D 5956, D6311**~~

higher heating value, HHV, *n*—a synonym for gross calorific value.

homogeneity, *n*—the condition of the population under which all items of the population are identical with respect to the characteristic(s) of interest. **D 6044, D 6311**

horsetail, *n*—a rough piece of shredded tire with a width of 2 to 4 in. (5.1 to 10.2 cm) and a length greater than 6 in. (15.2 cm). **D 6700**

hot spot—a localized area of soil or groundwater contamination.

DISCUSSION—A hot spot may be considered as a discrete volume of buried waste or contaminated soil where the concentration of a contaminant of interest exceeds some prespecified threshold value. Although elliptically shaped hot spots or targets are assumed for the purposes of calculating probabilities of detecting hot spots, hot spots are more likely to have variable sizes and shapes and not have clear and distinct boundaries. However, the concept of hot spots is consistent with known historical patterns of contaminant distributions. **D 6982**

hypothesis, *n*—a supposition or conjecture put forward to account for certain facts and used as a basis for further investigation

⁷ Pitard, F. F., “*Pierre Gy’s Sampling Theory and Sampling Practice: Heterogeneity, Sampling Correctness and Statistical Process Control*,” 2nd ed., CRC Press Publishers, 1993.