



## Standard Terminology Relating to Product Counterfeit Protection Systems<sup>1</sup>

This standard is issued under the fixed designation F 1156; 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.

*absorption spectroscopy*—See **emission spectroscopy**.

**activation analysis**—method of chemical analysis involving creation of a radio-active isotope that can be identified by determining the nature of its radiative emission.

**activation time**—time between the application of a stimulus and the onset of the response to it.

**additive color theory**—the three primary colors of this theory are red, green, and yellow; when mixed together in the proper proportions, they create white by the addition of the color elements, not black as would happen with the mixing of the three subtractive primaries: magenta, cyan, and yellow.

**Aiken code**—two-phase self-clocking code based upon the assumption of a predetermined flux reversal for every bit space such that a reversal between two consecutive clock cycles is treated as one, and no reversal is a zero.

**Algorithm**—a computational methodology or rule, typically a mathematical formula that is applied to a given data set, in order to produce a related, secure data set, that is, encryption.

**alphanumeric**—print set containing both alphabetic and numeric characters.

**alteration**—the modification of a document or article with the intent that it will pass as genuine with minimum risk of detection in circumstances of ordinary use.

*Ames bar code*—See **bar code**.

**angle (normal)**—perpendicular to the surface described.

**angle of acceptance**—widest angle off the normal at which a light ray, etc., may enter an aperture and still be detected by the sensor.

**ANSI**—American National Standards Institute.

**associative counterfeit**—illegal use of a name or product shape that differs from the original product but that the consumer will associate with the original.

**authenticate**—to prove a document or article to be genuine or as represented.

**bar code**—an array of rectangular lines and spaces that are arranged in a predetermined pattern following unambiguous rules and representing data that are referred to as characters.

**bar code:**

**Ames**—discrete, self-checking numeric bar code symbology similar to *Codabar*

**Codabar**<sup>2</sup>—bar code symbology with 4 bars and 3 spaces per numeric (or control) character, 16 in all; self-checking, very good accuracy rate.

**Code 2 of 5**—bar code, numeric with control symbols; 2 wide bars and 3 narrow ones; binary display, bars only.

**Code 2 of 5 matrix**—bar code with 10 digits and start/stop; similar to **Code 11**; 1-modulo, 10 check digit; subject to substitution errors.

**Code 3 of 9**—also known as **Code 39**; bar code symbology using 3 wide bars or spaces (2 bars, 1 space) interspersed with 6 narrow bars or spaces in an interleaved grouping of 44 alphanumeric and control characters; both bars and spaces are used to convey information; self-checking system offers substitution error rates calculated to be less than 1 in  $(1)0 \times 10^6$ .

**Code 11**—bar code symbology for high density numeric uses with 11 characters, no self-checking; uses 3 bars and 2 spaces—one of each is wide.

**Code 39**—See **Code 3 of 9**

**Code 93**—very high density alphanumeric bar code symbology, similar to **Code 39**, continuous, not self-checking.

**Code 128**—128-character bar code symbology, high density, similar to UPC (see **UPC**); not self-checking; continuous; 3 bars, 3 spaces in 11-module character.

**Delta Distance**<sup>3</sup>—bar code symbology of discrete extended 16-character numeric code using 6 narrow bars with variable width spaces between them.

**EAN**—bar code symbology, European Article Numbering; fully compatible with UPC (Universal Product Code), using 7 modules of 2 bars and 2 spaces each; self-checking.

**Interleaved 2 of 5**—bar code symbology based on **Code 2 of 5**, except that the spaces also contribute to the information content.

**Nixdorf**—a computer manufacturer Nixdorf's bar code symbology using 3 bars of 3 different widths and 2 spaces; likely to be superseded by the EAN code.

**Plessey**—proprietary bar code symbology using 4 bars and the adjacent spaces; wide bar followed by narrow spaces are 1 bits and narrow bars followed by wide spaces are 0 bits; also known as a pulse-width modulated code, or an Anker code

<sup>1</sup> These terms are under the jurisdiction of ASTM Committee F-12 on Security Systems and Equipment and are the direct responsibility of Subcommittee F 12.30 on Anti-counterfeiting Systems.

Current edition approved July 15, 1994. Published September 1994. Originally published as F 1156 – 88. Last previous edition F 1156 – 91.

<sup>2</sup> The bar code "Codabar" is used by Federal Express.

<sup>3</sup> The bar code "Delta Distance" is used exclusively by IBM Corp.

**BCD**—binary coded decimal.

**biometric**—use of biologic or physiologic data to identify someone; for example, fingerprints or facial characteristics.

**black market**—the distribution (sale) of legitimate goods through illicit commerce. (See **fence**.)

**bogus**—false; fake or simulation of the genuine article; counterfeit in that it pretends or is purported to be genuine; slang for counterfeit. (See **look-alike**.)

**C**—a computer language.

**CADS**—acronym for Counterfeiting, Altering, Duplicating, and Simulating; also for Currency Authenticating and Denominating System, and Computer Aided Design System.

**CD**—compact disk.

**centrifuge**—device for separating items of various masses by inducing gravitational forces/actions through the use of high rotational velocities.

**chromophore**—color forming element.

**CIE**—Commission Internationale de l'Éclairage.

*Codabar bar code*—See **bar code**.

**code:**

**Hamming**—any of a class of forward error correcting codes based upon the use of Galois Fields (extended, commutative, finite, sometimes imbedded, algebraic rings) utilizing  $2^n$ , and represented as:  $GF(2^n)$ , where  $n$  is the degree of an arbitrary polynomial.

*Code 2 of 5 bar code*—See **bar code**.

*Code 2 of 5 matrix bar code*—See **bar code**.

*Code 3 of 9 bar code*—See **bar code**.

*Code 11 bar code*—See **bar code**.

*Code 39 bar code*—See **bar code**.

*Code 93 bar code*—See **bar code**.

*Code 128 bar code*—See **bar code**.

**collimated light**—light with all of the rays going in exactly the same direction; parallel light rays (do not spread apart as they move away from their source.)

**color donor film**—film support, usually thin plastic, coated or impregnated with a volatile dyestuff that can be sublimed off onto a target substrate.

**color separations**—process of (preparing printing plates by) photographing the subject image through color filters to produce (printing) plates that can be used to print the sequence of discrete colors used to create a multi-color printed image.

**complementary color pair**—in color theory, two discrete colors opposite one another on the color chart, such as blue and orange or red and green (additive theory).

**computer generated seed**—random number arbitrarily generated by computer and used to create a string of random digits; especially useful in cryptography.

**continuous tone**—a positive or negative print or transparency composed of a range of optical densities from black through grey to white in which the greys are formed by varying the amounts of silver, dye, or pigment, or combination thereof.

**contrast ratio**—optical measurement of the ratio of the intensity of the lightest and darkest elements in an image.

**counterfeit**—the reproduction of a document, article, or security feature with the intent to deceive the close scrutiny of a qualified examiner.

**counterfoil**—the stub of a check, postal money order, receipt, etc., kept by the user as a record of the transaction, such as a rectangular shaped security label affixed so it overlaps the two center pages on the stitching of a United States Non-Immigrant Visa (NIV).

**covert**—discrete; not readily discernible; hidden.

**craze**—to produce many small cracks or fracture lines.

**cyan**—one of the primary colors, a sky blue, in subtractive color theory.

**cylinder molded watermark**—watermark made in paper by using a wax mold of the desired image fastened to the wire mesh basket upon which the paper is being formed during rotation of the basket in and out of the pulp. Common in Europe, not so in the United States.

**decay/time curve**—a plot of the relationship between time and intensity of emission, or similar interrelationships.

*Delta Distance bar code*—See **bar code**.

**deltas**—points in a fingerprint formed between diverging type lines.

**desktop forgery**—counterfeits and forgeries using computerized systems to produce documents appearing genuine.

**deterrent**—a security feature to discourage illicit duplication or counterfeiting by instilling anxiety, doubt, fear, etc., in the mind of the counterfeiter.

**diffuse spurge**—emitting in more than one direction (from a relatively large area; sometimes referred to as a Lambertian source).

**digitization**—dividing into discrete elements, usually with the assignment of numerical values to each element.

**dipliod**—in two parts; for example, an element with only two naturally occurring isotopes, such as lithium [ $Li^6$  and  $Li^7$ ], or pairs of chromosomes in human beings.

**diversion**—the distribution and sale of legitimate products through unauthorized dealers.

**DoD**—Department of Defense.

**dpi**—dots per inch.

**dpmm**—dots per millimetre.

**duplication**—the reproduction of a document or part thereof by means of a photoreproductive device.

*EAN bar code*—See **bar code**.

**electro-magnetic field**—magnetic forces developed by the passage of an electric current through a conductor (wrapped around an iron (or similar metal or alloy) core).

**electro-photographic (photography)**—creation of an image onto a substrate by generation of a latent image on a photoreceptive surface.

**electro-optic (sensor)**—device that converts optical energy to electrical signals.

**electro-static charged**—charge, often negative, induced or transferred onto a surface.

**emission (or absorption) spectroscopy**—measurement of energy spectrum emitted by or from, or absorbed by, an object under some form of energetic stimulation; for example, light, electrical discharge (heating), etc.

**encryption**—encoding.

**error:**

**Type I**—false rejection errors; those that do not recognize an authentic item as being authentic. (See **FR**.)

**error rates:**

**Type II**—false acceptance errors; those that accept a non-genuine item as if it were the real thing. (See **FA**.)

**evaluation matrix**—two-dimensional listing of properties, results, or both, etc, used to compare and evaluate data.

**FA**—false acceptance; incorrectly accepting an inaccurate or non-genuine item or fact as if it were real; also called **Type II error**.

**Fast Walsh/Hadamard/Fourier transforms**—See **transforms**. Complex mathematical procedures for data handling.

**fence, n**—one who deals in the redistribution (resale) of goods (usually legitimate) obtained by illegitimate means, that is, theft, misappropriation, or diversion.

**fence, v**—engaging in redistribution or resale of goods obtained illegally, usually to knowing buyers; most often applied to smaller scale operations.

**fiduciary marks**—marks placed on objects to assure proper optical orientation item-to-item.

**field of view**—angle subtended when viewing an image through an aperture, often expressed in terms of the chord of the angle at the image plane.

**fine**—very small, as in fine powder; narrow, as in fine lines; (high quality, as in fine gold or fine wine).

**font**—a style of typeface, such as Helvetica or Gothic.

**forgery**—the replication or alteration of a document's data with the intent to defraud, such as check amount, check signature, and date.

**forward error correction**—data handling process that anticipates the possible occurrence of an error in a data stream before it happens, and makes suitable provision for accommodating that error; can handle more than one error (in a given stream).

**FR**—False Rejection, of a genuine (real, authorized) individual person or item on the fallacious assumption that it (he/she) was represented improperly or falsely.

**frangible**—easily broken. (See **friable**.)

*Fresnel (lens)*—See **lens**.

**friable**—easily crumbled; brittle. (See **frangible** for comparison.)

**fuse**—to melt; to join together by melting.

**GaAs**—gallium arsenide, a semiconductor material; used in making integrated circuits and light-emitting diodes (**LEDs**).

**gas chromatography**—method of chemical analysis involving the separation of volatile constituents of a mixture by means of gas flow entrainment, vapor pressure differences, and affinity of specific compounds for various liquids or solid materials.

**geometric lathe**—very complicated device for the generation of complex geometric patterns in surfaces, often under computer control of the cutting engine.

**graphic protection**—procedure for the identification of counterfeit graphic images; based upon the inclusion of deliberate errors (for example, broken fonts, variable line weight, line imperfections, etc.) or special graphic devices (for example, rainbow printing) into the original design of the object.

**grating frequency**—the number of lines per unit length engraved into that grating; often expressed as lines per millimetre.

**gray market**—goods available through diversion, usually more cheaply and without service guarantee.

**guilloche pattern**—pattern formed of two or more bands interlaced in such a way as to repeat a (curved, flowing) design; the design can be non-symmetrical. Often used with documents of value to increase the difficulty of engraving counterfeit printing plates; modern photoreproduction methods have lessened the effectiveness of the technique.

**half-tone**—process in which a series of dots of variable diameter and (regular) interdot spacing is used to print photographs and full drawings.

**half-tone image**—image produced using a **half-tone process**.

*Hamming code*—See **code**.

**HeCd**—helium-cadmium; most often used to refer to a laser system using helium gas and cadmium electrodes to support the internal gas discharge.

**hot stamped**—mark made on an item with the use of heat to effect formation or transfer of (an) image.

**hue**—(a particular) color (as distinct from other colors; a quality that distinguishes colors in the visible portion of the spectrum; the first of the three dimensions of color: hue, lightness, and saturation.)

**hydrophilic**—wettable by water; as opposed to oleophilic (see **oleophilic**); important materials' property in relation to their use in ink-making.

**hygroscopic**—to absorb moisture from the atmosphere; having a tendency to absorb moisture from the atmosphere.

**hypochlorite bleach**—solution containing the hypochlorite ion ( $\text{ClO}^-$ ) in a reactive solution.

**hysteresis**—failure of a property that has been changed by an external agent to return to its original value when that external agent has been removed; especially if the original change is not reversed exactly, even though the end point is the same as the starting point.

**IC**—integrated circuit.

**identifyee**—person or thing being identified.

**ideographic**—(an) image conveying an idea, such as Chinese writing.

**IEC**—International Electrotechnical Commission.

**IF/F**—Identification Friend/(or)Foe.

**illegal upgrade**—substitution of a component of lesser grade or quality for one of higher grade or quality during manufacture, rework, or repair in contravention of **OEM** specifications.

**illicit duplication**—making copies without the permission to do so; simple counterfeiting.

**imitation**—see **associative counterfeit**.

**inductive coil**—a (partial) loop (or one with one or more turns) of wire, or other conductive material, in which an electrical signal is induced when the coil is placed into an electromagnetic field.

**information data plane**—a surface on which data is recorded.

**ink eradicator**—chemical used to remove ink from a writing surface, often used in the illicit alteration of documents.

**interfacial chemical coacervation**—process for creating many very small droplets of microencapsulated materials by a chemical reaction at the interface between two or more (immiscible) compounds.

*Interleaved 2 of 5 bar code*—See **bar code**.

**interleaving**—process in bar code symbology of assigning information content to the spaces in the code as well as to the bars.

**infrared-radiation opaque (ir-opaque)**—a hiding quality of ink coating or other substances that causes obstruction of an image from the human eye, but allows detection or sensing by a photodiode operating with a light source that is usually specified at a peak response of about 900 nm.

**ISO**—International Organization for Standardization.

**isotopes**—atoms of an element that have the same number of protons (atomic number) in the nucleus and undergo the same chemical reactions, but have differing numbers of neutrons in their nuclei and different atomic weights.

**k**—abbreviation for *kilo*; 1000 units.

**keyboard input seed**—seed provided by operator intervention; can be item serial number, the data point, per se, or any other character sequence desired; see computer generated seed.

**kHz**—kilohertz; 1000 Hertz.

**knock-off**—a product that copies another design closely but carries its own name; slang for counterfeit.

**laminate**, *n*—object or material structure formed by the process of lamination.

**laminate**, *v*—join layers of materials together using fusion; the process of joining layers of materials together using adhesion.

**laminelle**—any one of the layers being joined together to form a laminate by the process of lamination.

**laser copier**—a copier that uses a laser scanner to generate the image.

**laser etching**—etching by ablation with a controlled high energy laser beam to create a pattern, mark, or alphanumeric phrase for use in subsequent identification of the item so marked.

**laser printers**—xerographic printers using a laser scanning device (**laser ROS**) as the writing device.

**laser ROS**—raster output scanner using a laser beam for the output device.

**latent images**—images created on or in a substance (substrate) that have not yet been visualized (for example, undeveloped film).

**LC**—a type of electronic circuit element combining an inductor (L) and a capacitor (C), usually to provide sensitivity or output at some specific frequency related to the product of the values of L and C.

**LED**—Light Emitting Diode.

**lenticular lens**—a biconvex lens; in this instance, a plate containing a series of parallel cylindrical lens engraved into its surface; the lenses might, or might not, all be of the same optical character and activity.

**lens:**

**Fresnel**—optical device which is modified in configuration to lessen its mass or bulk by division into segments comprised primarily of the active surfaces.

**leuco**—colorless.

**lightness**—the quality of a color that expresses various shades

of tones within the same color range; for example, light pink to intense red.

**linear CCD arrays**—a line (linear array) of charge-coupled devices (CCD), semiconductor devices that may be used as circuit elements or as a sequence of photosensitive cells.

**load cell**—device for determining the magnitude of a force (load) applied to it; usually either a semiconductive material or a resistive wire strain gauge.

**lpi**—lines per inch or line pairs per inch, depending upon usage.

**lpmm**—line pairs per millimetre (mm).

**luminophores**—materials that emit light energy of one wavelength when activated by light of another wave length; includes both fluors and phosphors.

**magnetic anomaly device**—device for the detection of variations in a magnetic field, especially those caused by the presence of a foreign body in the field; for example, a submarine in the ocean, or a gun in a passenger's coat pocket, or a special piece of metal attached to an object that is not to be removed from an area without prior permission.

**magnetic domains**—small areas on the surface or in the body of thin films of a magnetic medium each of which maintains a discrete magnetic field orientation relative to the others around it. Used to store the information in a binary format.

**magnetic medium**—material coated with a magnetically susceptible material upon which a series of individual magnetic domains can be created, usually at will, for the storage of information; for example, magnetic tape, computer disks, etc.

**magnetometer**—device for measuring and comparing the direction and magnitude of magnetic fields.

**magneto-optic**—optical properties of certain materials that can be altered by exposure to magnetic fields; most common form of this is the alteration of the angle of polarization of light passing through a material, or reflecting from it, as a function of the magnetic field strength in which it is immersed—this is used in one version of the **CD** music player.

**magneto-optic polarization**—polarization of light using the magneto-optic effect; see **magneto-optic**.

**materials engineer**—person who works with the properties of materials, usually to alter them in some manner so as to make them more useful for some application.

**matrixed binary codes**—two-dimensional binary notation symbology; similar to an encrypted or scrambled bar code except that it is two-dimensional, not limited to only one dimension.

**metallic driers**—metallic or organometallic compounds used to accelerate the drying of inks.

**metameric color pairs**—colors that appear the same to the human eye, but differently to a machine.

**MHz**—MegaHertz; millions of Hertz.

**MICR**—Magnetic Ink Character Recognition.

**micro-capsules**—very small beads or capsules (typically a few micrometers,  $\mu\text{m}$ , in size) containing specific materials, used as a method of delivery of those materials.