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Standard Terminology Relating to Electrostatic Imaging[1]

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1. Scope

1.1 This set of definitions is intended for use by all parties who use, sell, manufacture, test, or develop printer or copier machines so that they will have a common basis for communications.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F149 Terminology Relating to Optical Character Recognition

F221 Terminology Relating to Carbon Paper and Inked Ribbon Products and Images Made Therefrom

F1156 Terminology Relating to Product Counterfeit Protection Systems (Withdrawn 2001)[3]

F1531 Test Method for Comparing Printer or Copier Cartridges (Withdrawn 2002)[3]

3. Terminology

3.1 *Definitions:*

aerosol development—development in which the toner is carried to the field of the electrostatic image by means of a suspending gas.

all-in-one cartridge—(also known as cartridge), a process unit that incorporates all the components, including a photoreceptor, toner compartment and charging devices, used in certain electrostatic imaging devices.

apparent surface resistivity—the surface resistance between two electrodes forming opposite sides of a square on the surface of the copy substrate or the electrical equivalent.

archival quality—the properties of a copy or print necessary to retain specified information under specified conditions of storage, time and use.

background potential—applies only to charged area development process, see **charged area development**. See **residual potential**.

background potential—see **residual potential.**

base stock—see **conductive base stock.**

base weight—the weight of a specified area of paper stock expressed in grams per square metre or in pounds per ream, where the size and number of sheets per ream may vary for each particular grade of paper. Common ream sizes used in electrostatic papers are:

25 by 38 in. by 500 sheets (3300 ft^2)
24 by 36 in. by 500 sheets (3000 ft^2)
17 by 22 in. by 500 sheets (1300 ft^2)

binder—the resinous adhesive component of a pigmented coating composition.

black density—see **image density.**

blasting—haze around a letter, word or image in the form of fine spotting or speckling.

blocking—the tendency for coated sheets to stick together under pressure.

bridging—combination of peaks and smudges that may close or partially close the loop of a character (Terminology F149).

caliper—the thickness of a sheet expressed in millimetres or in thousandths of an inch.

carrier—that substance in a developer that conveys a toner, but does not itself become a part of the image in the finished print. In a liquid developer the carrier may be called a dispersant.

cascade development—development in which dry toner and carrier are drawn over an electrostatic image by gravity.

catcher blade—(also known as a recovery blade or slip sheet), a strip of semi-rigid plastic material that guides the waste toner removed from the photoreceptor into the waste bin.

charge acceptance—the apparent surface voltage present on an electrostatic recording medium immediately after charging.

[1] This terminology is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.01 on Nomenclature and Definitions.

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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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

charged area development—(CAD), a process in electrostatic copying where the photoconductive element is charged with a charge of the opposite sign as that of the toner. A light source is used to discharge all areas on the photoconductor that are NOT to receive toner to form the image. The toner is attracted to the non-discharged areas of the photoconductor when the latent electrostatic image is developed.

charging—the process of establishing an electrostatic surface charge of uniform density on an insulating medium.

cleaned component—the result of substantially removing toner, dust and other undesirable materials, either by mechanical an/or chemical means.

cleaner blade—(also known as wiper blade), a blade which cleans the surface of the photoreceptor to mechanically remove toner and debris.

cloud development—see **aerosol development.**

coated paper—paper which has one or both surfaces covered with a substance to produce certain desired properties for use in specific electrophotographic processes.

coated paper copying—a form of direct electrophotographic copying.

coating weight—the wet or dry weight of coating material applied to a paper or other substrate expressed as grams per square metre or pounds per specified ream.

compatible cartridge—any all-in-one cartridge that can be used in a particular printer or copier, whether new, recycled or remanufactured.

conductive base stock—paper stock intended as a substrate for electrostatic coating with surface or volume conductivity over a range of relative humidities controlled by special treatment.

copying—the act of producing an image on a document or other receptor media which is a duplication of the image of another document, such as by a photographic, xerographic, or facsimile process or by carbon or carbonless papers.

corona—gaseous ions, either positively or negatively charged. Usually produced at atmospheric pressure using a high voltage source and either one or more pointed conductors or a thin long conductor (that is, corona wire).

corona charging—depositing of an electrical charge on a surface by means of corona.

corona wire—a long, thin wire suspended in air and electrically isolated that when connected to a high voltage source will produce corona.

dark adaptation—conditioning of photoelectrostatic copying papers in the absence of light to permit the recovery of photoconductive properties.

dark decay—loss of apparent surface voltage in the absence of light.

dark decay rate—the rate of loss of apparent surface voltage per unit time in the absence of light.

density—see **image density.**

depletion—decrease of toner concentration in a developer composition characterized by low-image density.

developer—the material or combination of materials that renders visible a latent electrostatic image when brought into intimate contact with it. Electrostatic developers can be either liquid or dry and can consist of a toner and a carrier.

developer roller—(also magnetic roller or mag roller), a cylinder built into the copier toner cartridge or printer toner cartridge intended to present correctly charged toner from the toner reservoir to the charged areas of the photoreceptor.

development—the process of converting a latent electrostatic image into a visible image.

direct development—see **positive development.**

direct electrophotographic copying process—an electrophotographic copying process in which the photoconductor is an integral part of the final copy.

discharged area development (DAD)—a process in electrostatic copying where the photoconductive element is charged with a charge of the same sign as that of the toner. A light source is used to discharge only those areas that are to receive toner to form the image. In the development process, the charged background areas repel the like charged toner to the discharged areas on the photoconductor.

dispersant—the material, usually an organic solvent, in a liquid developer system that conveys toner particles, but does not itself become a part of the image in a finished print. (See also **carrier.**)

doctor blade—(also known as a charging blade), a component that imparts an electrical charge to toner by means of the triboelectric effect and/or controls the amount of toner delivered to the developer roller.

doping—the addition of foreign species into a photoconductive material to modify its semiconductor properties such as light sensitivity, response times, and dark conductivity.

dragging—a fringe effect attached to the trailing edge of the developed electrostatic image. (See also **tailing.**)

dry carrier toner—dry powdered toner mixed with bead or granular particles as a carrier to form a developer.

dry time—the time that a copy must reside in the copy tray before it appears to be dry.

duplex copy—a sheet with copied images on both sides.

duplexing—*in a copy system*, the process by which images are placed on both sides of the copy sheet.

dusting—the developer/toner particles deposited in and around the machine on other than the electrostatic copy.

dye sensitizing—the incorporation of dye-stuffs into a photoconductive coating to alter its spectral response.

edge effect—an image defect characterized by a low density or poor fill-in of solid areas coupled with a higher density outline.

electro-negative developer—a developer containing negatively charged toner particle.

electrophotographic copying process—a process in which a copy of an original document results from the combined action of light and externally applied electric forces.

electrophotographic material—photoconductor suitable for application in photographic processes.

electro-positive developer—a developer containing positively charged toner particle.

electrostatic copying process—a process in which a copy of an original document results from charged particle development of an electrostatically formed image.

electrostatics—the science of forces and fields of electric charges in a state of rest.

end of life—the practical or theoretical limit of page production for an all-in-one cartridge used in a page yield test.

exposure lattitude—range of light or time settings over which an acceptable copy can be produced.

fatigue—any degradation in electrophotographic properties of a photoconductive material caused by repetitive charging, light exposure, or other operation in the imaging process.

feathering—an undesirable thread-like deposit extending radially from the edge of an image (Terminology F221).

field adaption—the forced recovery of excited electrons (as in dark adaption) by means of an externally applied electrical field such as a charging corona.

fixing—the process of rendering a developed image permanent.

flare—extraneous light in the dark area.

flare decay—image contrast loss due to flare.

fog—see **background**.

fringe effect—toner deposition in non-printed areas adjacent to the printed areas, such as heading and tailing.

fur brush development—development of electrostatic images by transporting the toner to the image area through the use of fur-like fibers.

fusing—see **heat fixing.**

ghosting—an undesired repeat image. Positive ghost image is an undesired image created in a non-printed area Negative ghost is an undesired reverse repeat image created in a printed area that is seen by the difference in contrast.

halo effect—a condition characterized by an unusually clean background region at the boundary of the image areas.

heading—a fringe effect appearing on the leading edge (relative to copy machine feed direction) of the developed electrostatic image.

heat fixing—the process of making a developed image permanent by heating.

hold down—see **lockdown.**

image—the optical counterpart of an object produced by a lens or mirror system or the graphic representation of an object.

image density—the optical density of the developed image as detected by the eye, or measured by a reflection densitometer.

indirect electrophotographic copying process—an electrophotographic copying process in which the photoconductor is not an integral part of the final copy.

initial potential—see **charge acceptance.**

lid—abbreviation for **liquid development.**

light decay—reduction of apparent surface voltage caused by exposure to light.

light decay rate—the reduction of apparent surface voltage at specific exposure conditions.

liquid development—development by means of a toner dispersed in an organic liquid carrier.

lockdown—adhesion of original or electrostatic copy to bearing surface as due to static charges.

magnetic brush development—development in which the toner is carried by means of a brush-like array of magnetic particles held erect under the influence of a magnetic field.

master—an intermediate, temporary, and usually expendable image vehicle for use on duplicators.

misting—see **dusting.**

mottle—a gross random nonuniformity in the visual density of a printed area.

negative—an image in which the dark tones of the original appear light and the light tones appear dark.

negative developer—see **reversal developer.**

negative development—see **reversal development.**

negative image—a developed image in which dark areas correspond to light area of the original subject.

offset—see **set-off.**

optical density—a measure of image (density) by reflectance densitometer.

optimum exposure—the time-light intensity relationship that produces the most satisfactory print.

original—the object to be copied.

overcoating—the act of making a developed electrostatic image permanent by spraying or laminating a protective film or similar layer over the surface.

page coverage—a term used to describe the percentage of printed area to non-printed area on a page within a specified area of the page.

photoconductor—a material that exhibits increased electrical conductivity when exposed to light.

plain paper copying—a form of indirect electrophotographic copying in which the electrostatic image of the original is first formed on a photoconductor element, then developed with a toner, and finally transferred onto a plain sheet of paper where it is fixed (see also Terminology F1156).

plate—an image vehicle, usually permanent and reusable for use on printing presses.

positive development, direct development—charged area development by means of toner particles having appropriate charge polarity so that dark areas of the print correspond to dark areas of the original.

positive image—a developed image in which dark areas correspond to dark areas of the original subject.

pre-exposure—exposure of a photoconductive medium to a light source prior to imaging.

pressure fixing—the process of making the image permanent by means of pressure.

printing—the act of producing an image on a document or other receptor media from a machine or printer designed for that purpose, such as a printing press, thermal printer, or a computer printer, such as a laser or ink jet.

recycled cartridge—a used cartridge that contains some or all parts that have been reused.

recyclable cartridge—a cartridge that is recyclable by its manufacturer through an established recycling program that the manufacturer makes available to the majority of its customers.

refilled cartridge—a used cartridge in which the toner has been replaced but none of the other components have been replaced or refurbished.

refurbished component—a used component that has been restored to its original function.

remanufactured cartridge—a cartridge that has had all parts that materially affect function replaced or refurbished so that its original performance has been restored.

replenisher—a toning material added to the developer mix to replace that which is consumed during the copying process.

residual potential—apparent surface voltage remaining in light exposed areas of the photoconductive surface.

resin binder—see **binder.**

resistivity—see **apparent surface resistivity** and **volume resistivity.**

reversal developer (negative developer)—uncharged area development by means of toner particles having appropriate charge polarity so that dark areas of the print correspond to light areas of the original.

reversal development (negative development)—uncharged area development by means of toner particles having appropriate charge polarity so that dark areas of the print correspond to light areas of the original.

saturation charge—the maximum electrostatic charge that can be held on a photoconductive layer without the occurrence of dielectric breakdown.

scuffing—marks on coated surface due to movement between sheets under pressure.

sensitizing—see **dye sensitizing.**

set-off—the unintentional transfer of part of an image or ink from its intended location to another surface.

single-component developer—see **single-component toner.**

single-component toner—a dry powder in an electrostatic copying process that does not contain a carrier and is used to form a visible image.

smudging—the tendency of a developed electrostatic image to smear upon rubbing.

solvent holdout—the degree to which a paper base or other substrate can resist penetration of organic liquids either during coating or in the process of liquid development.

solvent resistance—a measure of the inertness of base papers and coatings toward the solvent used in the electrostatic coatings and liquid toner systems.

spectral response—the relative light sensitivity of an electrophotographic layer to light of differing wavelengths.

speed—commonly used term to describe the relative light sensitivity of photoconductive papers.

spill—see **flare.**

spill decay—see **flare decay.**

tailing—a fringe effect appearing on the trailing edge of the developed electrostatic image, but not directly attached to it. (See also **dragging**.)

test target—a printed page design, which has a composition of graphic text elements.

test quality cartridge—a new or remanufactured cartridge with poor graphc quality.

threshold potential—the minimum charge level on the surface of an electrostatic copy that is necessary to attract a particular toner by overcoming the attracting force between the toner and the carrier.

toner—the material in a developer system which when deposited by the field of an electrostatic charge pattern, becomes the visible record.

toner reservoir—(also known as toner hopper), an area of a toner cartridge that stores toner for future use in image development.

toner reservoir shipping seal—(also known as a cartridge seal or seal), a component that covers the toner reservoir to prevent toner from escaping.

toner throwout—see **dusting.**

toner usage—the amount of toner (in milligrams per page) removed from the toner reservoir.

transfer—the act of moving a developed image, or a portion thereof, from one surface to another as by electrostatic or adhesive forces.

trailing—see **dragging.**

triboelectric effect—the phenomenon of producing an electrostatic voltage differential between dissimilar materials by contact or friction as between the toner and the carrier.

vapor fixing—the act of making a developed electrostatic image permanent by submitting the image-forming toner to the vapor of a solvent for the toner.

volume resistivity—the volume resistance (in ohm-centimetres) between opposite faces of a centimetre cube of the material. A practical relative value for paper is obtained by the measure of resistance to electrical current electrodes placed in contact with the opposing surfaces of the sample.

waste hopper—(also known as waste toner bin), an area of a cartridge tht receives the waste toner removed from the photoreceptor by the cleaner blade.

waste toner bin—a compartment or container on the cartridge which receives the waste toner removed by the cleaner blades from the photoreceptor or OPC by the wiper blades. (Test Method F1531)

writing—the act of producing an image on a document, or other receptor media, one character or stroke at a time, such as by hand with a pen or pencil or by means of a typewriter or pen plotter.

xerographic copying—a form of plain paper copying which uses a dry toner. Synonym for *xerography.*

xerography—See **xerographic copying.**

yield—an estimate of the number of pages that can be produced with a particular toner cartridge under specified conditions.