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Standard Terminology for Printing Inks, Materials, and Processes¹

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1. Scope

1.1 This terminology standard covers terms used in the description of printing inks, printing materials, and printing processes.

1.2 This terminology standard does not include definitions related to Print Problems (see Terminology D6488).

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

D16 Terminology for Paint, Related Coatings, Materials, and Applications

D1316 Test Method for Fineness of Grind of Printing Inks By the NPIRI Grindometer

D1535 Practice for Specifying Color by the Munsell System

D2066 Test Methods for Relative Tinting Strength of Paste-Type Printing Ink Dispersions

D3732 Practice for Reporting Cure Times of Ultraviolet-Cured Coatings

D4040 Test Method for Rheological Properties of Paste Printing and Vehicles by the Falling-Rod Viscometer

D4302 Specification for Artists' Oil, Resin-Oil, and Alkyd Paints

D4361 Test Method for Apparent Tack of Printing Inks and Vehicles by a Three-Roller Tackmeter

D4449 Test Method for Visual Evaluation of Gloss Differences Between Surfaces of Similar Appearance

D5010 Guide for Testing Printing Inks and Related Materials (Withdrawn 2017)³

D5181 Test Method for Abrasion Resistance of Printed Matter by the GA-CAT Comprehensive Abrasion Tester

D5383 Practice for Visual Determination of the Lightfastness of Art Materials by Artists and Art Technologists

D5403 Test Methods for Volatile Content of Radiation Curable Materials

D5909 Test Method for Drying Time of Oxidative-Drying Printing Inks by Squalene Resistance

D6488 Terminology Relating to Print Problems

D6493 Test Methods for Softening Point of Hydrocarbon Resins and Rosin Based Resins by Automated Ring-and-Ball Apparatus

D6687 Guide for Testing Printing Ink Vehicles and Components Thereof

E430 Test Methods for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry

2.2 Other Documents:

NAPIM: National Association of Printing Ink Manufacturers, 5th ed. 1988⁴

Kipphan: *Handbook of Print Media Technologies and Production Methods*, Kipphan, Helmut: Springer 2001⁵

3. Significance and Use

3.1 A common set of definitions is essential to improve communication and avoid misunderstanding among ink makers, paper makers, and printers.

3.2 Definitions that are verbatim from one of the referenced sources are indicated by giving the acronym of the organization or the author of the book at the end of the definition.

4. Terminology

4.1 Definitions:

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

⁴ Available from National Association of Printing Ink Manufacturers, 581 Main St., 5th Fl., Woodbridge, NJ 07095, <http://www.napim.org>.

⁵ Available from Springer Nature, <http://www.springer.com>.

¹ This terminology is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.56 on Printing Inks.

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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.

abrasion resistance, *n*—(1) the ability of a coating to resist being worn away and to maintain its original appearance and structure when subjected to rubbing, scraping, or wear. **D16**
(2) resistance against the act of scraping, smudging, or rubbing off. **D5181**

(3) ability to withstand the effects of repeated rubbing and scuffing. **NAPIM**

abrasiveness, *n*—(1) the degree to which a product tends to cause abrasion by the act of rubbing or scraping. **D5181**

(2) the tendency of a substance to wear or scratch other surfaces with which it is in contact. **NAPIM**

absorbency, *n*—the tendency of a porous material, such as paper, to take up liquids or vapors. **NAPIM**

absorption, *n*—soaking in or penetration of liquid components of the ink into the pores of an absorbent substrate (a type of physical drying, like evaporation). **Kipphan**

‘across-machine’ direction, *n*—the perpendicular to ‘with-machine’ direction, referring to a substrate and its passage through printing machinery.

additive, *n*—a substance added in small quantities to another substance, usually to improve properties; sometimes called a modifier (for example, a drier, mildewcide, etc.). **D16**

additive primary colors, *n*—red, green, and blue. **NAPIM**

DISCUSSION—Mixing lights of these colors together can produce a large gamut of colors. When mixed in equal amounts, they produce the sensation of white light.

adhesion, *n*—the tendency of a material to bond to another material, as in the bonding of a printing ink to a substrate.

adhesion promoter, *n*—a material built into the binder or added to the ink to form primary bonds to either the substrate or the previously applied coating, with the specific aim of improving the dry or wet adhesion, or both.

adsorption, *n*—the adhesion of an extremely thin layer of material to the surface with which it is in contact. **NAPIM**

after-tack, *n*—the tendency of a printed surface to remain sticky to the touch even when the ink has completed its drying process.

agglomerate, *n*—a cluster of pigment aggregates that can be broken down by appropriate dispersion and milling operations during ink manufacture.

aggregate, *n*—a cluster of primary pigment particles that cannot be broken down by dispersion and milling operations during ink manufacture.

alkyd, *n*—a group of synthetic resins formed by condensations of polybasic acids with polyhydric alcohols, and modified with drying oils for printing ink use. **NAPIM**

aluminum ink, *n*—see **silver ink**.

aniline ink, *n*—early name for rubber plate printing fluid (flexographic) ink. **NAPIM**

aniline point, *n*—the minimum temperature at which a hydrocarbon solvent is completely soluble in an equal volume of freshly distilled aniline. **NAPIM**

DISCUSSION—Below this point, the mixture is cloudy and separates into two layers. It is used as a measure of solvent power of hydrocarbon solvents.

aniline printing, *n*—an earlier name for flexography, based on the use of the aniline inks that were initially used. **Kipphan**

anilox roller, *n*—an engraved metering cylinder used in flexo presses to transfer a controlled film of ink to the printing plate.

antiskinning agents, *n*—chemical substances that retard the skin formation on the surface of an oxidizable oil or ink (frequently antioxidants). **NAPIM**

apparent tack, *n*—a measure of the force required to split an ink film at the out-running nip of a pair of rollers under a specific set of conditions.

ball mill, *n*—a dispersion device comprised of a rotating cylinder containing balls which cascade; used to disperse a pigment in a vehicle by impact and attrition as the cylinder revolves. **NAPIM**

barrier coating, *n*—the coating applied to a substrate to make it resistant to the permeation of moisture vapor, gases, water, or other liquids including oils. **NAPIM**

base, *n*—*in ink manufacture*, a dispersion of very high pigment-to-binder ratio containing usually only one pigment (or dye) dispersed in a vehicle and subsequently mixed with polymers, solvents, and additives to produce the finished ink. **NAPIM**

basis weight, *n*—the weight in pounds of a ream (500 sheets) of paper cut to a given standard size for that grade. **NAPIM**

DISCUSSION—For example, 500 sheets 25 by 38 of 80-lb. coated for book papers will weigh eighty pounds.

batch, *n*—a discrete quantity of manufactured ink or coating produced by following a formula to completion.

bimetal plate, *n*—*in lithography*, a plate in which the image area is copper or brass and the non-image area is aluminum, stainless steel, or chromium. **NAPIM**

binder, *n*—the components in an ink film which hold the pigment to the printed surface. **NAPIM**

blanc fixe, *n*—precipitated barium sulphate used as a semi-transparent extender in printing inks. **NAPIM**

blanket, *n*—(1) *in offset lithography*, a fabric coated with natural or synthetic rubber which is clamped around the blanket cylinder and which transfers the ink from the press plate to the paper. **NAPIM**

(2) the sheet of elastomer-coated fabric or equivalent placed on the blanket cylinder to receive ink from the plate and offset it to the sheet or web on the impression cylinder.

blanket cylinder, *n*—a rigid roller to which a rubber coating fabric is attached.

blanket wash, *n*—the solvent used to clean the blanket.

bleach, *n*—the method of measuring the tinctorial strength of an ink or toner, usually accomplished by mixing a small portion of the ink (or toner) with a large amount of white base and evaluating the tinctorial strength of the ink versus a control standard. **NAPIM**

blind, *n*—an image area on a plate that will not take ink (not to be used where no image is present).

blinding of lithographic plate, *n*—loss of ink-receptivity in the image areas of the plate.

bloom, (see also **blushing**), *n*—(1) material migrating to the surface of a film. **NAPIM**

(2) coating that forms on rubber blankets when they are left standing.

(3)*v*—migration over time of an incompatible component of a dried printing ink to the surface (for example, wax), often resulting in a reduction in surface gloss.

blown oil, *n*—a product obtained by forcing air through heated drying or semi drying oils, which changes the oil by oxidizing the double bonds.

bodied oil, *n*—a drying or semi-drying oil whose viscosity has been increased (usually by heating). **NAPIM**

body, *n*—(1) a general term referring to viscosity, consistency and flow of a vehicle or an ink.

(2) used to describe the increase in viscosity by polymerization of drying oils at high temperatures. **NAPIM**

body gum, *n*—linseed oil that has been heat polymerized to a heavy, gummy state, commonly used as a bodying agent. **NAPIM**

bodying agent, *n*—a material added to an ink to increase its viscosity. **NAPIM**

boiled oil, *n*—a linseed oil which has been heated to a high temperature for a short time, which increases the viscosity and drying rate. **NAPIM**

DISCUSSION—Boiled oil usually contains a small amount of drier.

brightness, *n*—the intensity of whiteness perceived by a viewer. **NAPIM**

brilliance, *n*—the combined effect of brightness and apparent color strength. **NAPIM**

bronze, *n*—metallic appearance of a color caused by a change in the angles of viewing and illumination. **NAPIM**

bronze powder, *n*—a metallic pigment for printing ink, consisting mainly of copper alloys in fine flakes. **NAPIM**

bronzing, *v*—(bronze busting) applying finely powdered metal particles or flakes to give the appearance of metallic printing. **NAPIM**

n—the metal-like reflectance which sometimes appears at the surface of nonmetallic colored materials.

DISCUSSION—Bronzing is perceived at the specular angle by observing the image of a white light source, for example, and is characterized by a distinct hue of different dominant wavelengths than the hue of the

color itself. The origin of the selective specular reflectance observed is generally considered to be reflectance from very small particle size pigment partially separated from surrounding vehicle at or near the ink film surface.

calender, *n*—a set or stack of horizontal rollers at the end of a paper machine. **NAPIM**

DISCUSSION—The paper is passed between the rollers to increase the smoothness and gloss of its surface.

caliper, *n*—the thickness of a sheet or material, usually expressed in thousandths of an inch (mils). **NAPIM**

cast-coated paper, *n*—a paper or board having a coating which is allowed to harden or set while in contact with a finished casting surface (usually a steam heated drum). **NAPIM**

DISCUSSION—Cast-coated papers have a high-gloss finish.

catalytic coating, *n*—coatings formulated as two-part systems, available in both water and solvent reducible formulas, which use reactive resins that cure to form a thermoset film. **NAPIM**

DISCUSSION—These coatings have good heat and abrasion resistance, high gloss, solvent resistance, and adhere to a wide variety of substrates.

cell, *n*—a small etched or engraved depression in a gravure cylinder or flexo anilox roller that carries the ink.

cellophane, *n*—transparent flexible film consisting of regenerated cellulose and plasticizers. **NAPIM**

centipoise, *n*—a unit measure of viscosity. **NAPIM**

DISCUSSION—One hundred centipoises equal one poise. At room temperature, water has a viscosity of approximately one centipoise, gravure inks of approximately 100 centipoise, and offset inks of approximately 50,000 centipoise.

chalking, *n*—a condition of a printing ink in which the pigment is not properly bound to the substrate by the vehicle and can be easily rubbed off as a powder. **NAPIM**

channel black, *n*—carbon black produced by impinging a natural gas flame against a metal surface. **NAPIM**

DISCUSSION—Because of air pollution control requirements, this type of black has been almost completely replaced by Furnace Black in the U.S.

china clay, *n*—natural, white, inorganic mineral pigment used in paper coatings and as an ink extender, also known as kaolin or Pigment White 19. **NAPIM**

chroma, *n*—(1) one of the attributes of color, characterized by its purity or saturation (strength). **NAPIM**

(2) the attribute of color used to indicate the degree of departure of the color from a neutral color of the same lightness. **D1535**

cleaner sheet, *n*—a sheet of blotter-like stock that is sometimes used as an aid in washing up the inked rollers.

coating, *n*—a liquid, liquefiable or mastic composition that is converted to a solid protective, decorative, or functional adherent film after application as a thin layer. **D16**

cobalt drier, *n*—a material containing chemically combined cobalt used to accelerate oxidation and polymerization of a lithographic ink film. **NAPIM**

cohesion, *n*—the tendency of a material to bond to itself rather than another material. **NAPIM**

coldset ink, *n*—ink which dries and forms a printed image by absorption into the substrate, without the use of heat or other energy.

DISCUSSION—News inks are often referred to as coldset inks.

colorant, *n*—the color-generating component of an ink, typically a pigment or a dye or combination of the two.

color bar, *n*—a device printed in a trim area of a press sheet to monitor printing variables such as trapping, ink density, dot gain, and print contrast; usually consisting of single solid colors, overprints, or two and three color solids and tints of cyan, magenta, yellow, and black.

DISCUSSION—Additional aids such as resolution targets and dot gain scales can be included.

color burn-out, *n*—an objectionable change in the color of a printing ink which may occur either in bulk or on the printed sheet. **NAPIM**

DISCUSSION—In the bulk case it is associated primarily with tints, and is caused by a chemical reaction between certain components in the ink formulation. In the printed sheet case it is generally caused by heat generated in a pile of printed material during drying of an ink.

colorfastness, *n*—see **lightfastness**.

color process, *n*—halftone color printing created by the color separation process in which a piece of copy is broken down to the primary colors to produce individual halftones, recombined at the press to produce the complete range of colors of the original. **NAPIM**

DISCUSSION—In printing, the process colors are cyan, magenta, yellow, and black.

color proof (see also **progressive proof**), *n*—a print, in color, either from the engraving or from the mounted plates. **NAPIM**

color separation, *n*—using red, green, and blue filters to divide the colors of a multicolored original into three process colors and black. **NAPIM**

DISCUSSION—The four resulting film intermediates are used to prepare the yellow, magenta, cyan, and black printing plates. Color separation is most often accomplished with an electronic color scanner, but film contacting and process camera methods are also employed on occasion.

color standard, *n*—a wet ink sample, or printed proof, to which another similar material is compared. **NAPIM**

color strength (relative tinting strength), *n*—measure of the effective concentration of a colorant mixed into a standard base required to match the color of a specified concentration of a standard colorant mixed into the same standard base.

Colour Index Name, *n*—consists of the category (type of dye or pigment), general hue, and an assigned number given to a colorant in the Colour Index as an international identification system. **D4302**

Colour Index Number, *n*—a five-digit number given in the Colour Index that describes the chemical constitution of a colorant. **D4302**

compatibility, *n*—the ability of two or more differing solutions or substances to be mixed together without resultant kick-out or haziness. **NAPIM**

CONEG, *n*—regulations proposed by the Coalition of North-eastern Governors, and enacted by many states, that limit lead, mercury, cadmium and hexavalent chromium to 100 ppm total in packaging materials, including inks. **NAPIM**

continuous tone, *n*—the form of an image in which changes of density from element to element are smooth and without steps, as contrasted to halftone images in which density changes are represented by steps in halftone dot size. **NAPIM**

copy, *n*—material, including art and text, submitted for reproduction; also used to refer to the final printed result. **NAPIM**

corrugated board, *n*—a composite paper product made by applying a liner to each side of a fluted or corrugated inner sheet or medium. **NAPIM**

DISCUSSION—The liner is often made from kraft board, and the corrugated medium is made from neutral sulfite or recycled board.

coverage, *n*—see **mileage**.

covering power (see also **opacity**), *n*—the ability of an ink to hide the material beneath, and to produce a uniform opaque surface. **NAPIM**

cover ink, *n*—ink formulated to print covers, having exceptional scuff resistance, good gloss and lightfastness. **NAPIM**

crocking, *n*—smudging or rubbing off of ink. **NAPIM**

cure, *n*—(1) the condition of a coating after conversion to the final state of cure as measured by tests generally related to end-use performance and mutually agreeable to supplier and purchaser. **D3732**

(2) chemical conversion of a wet coating or printing ink film to a solid film. **NAPIM**

curl, *n*—*in paper*, distortion of an unrestrained sheet due to differences in structure or coatings from one side to the other; the curl side is the concave side of the sheet. **NAPIM**

cut, *v*—to dilute an ink, lacquer or varnish with solvents or with clear base.) **NAPIM**

cylinder rolling, *n*—the effective circumference of the plate, blanket, or impression cylinder. **Kipphan**

DISCUSSION—The rolling of the cylinders in contact with one another must be balanced and ideally identical. Rolling errors can cause dot deformation, doubling, differences in print length, register differences, and increased printing plate wear.

cylinders, *n*—any of various rotating rollers in printing presses; especially, one of three on a rotary offset press (plate, blanket, or impression).

dampeners, *n*—rollers that carry the fountain solution from water fountain to lithographic plate.

dampening mechanism, *n*—see **dampening system**.

dampening solution, *n*—see **fountain solution**.

dampening system, *n*—any mechanism or system employed on an offset press to apply fountain solution, or its equivalent, to a lithographic plate.

deflocculation, *n*—the dispersion of pigment clusters, or “flocks,” into smaller units in an ink. **NAPIM**

delamination, *n*—the separation of layers of a laminate. **NAPIM**

desensitize, *n*—treating non-image areas of a lithographic plate to make them water receptive and ink-repellent. **NAPIM**
v—chemical treatment of non-image lithographic plate areas to make the areas ink-repellent.

DISCUSSION—This is usually accomplished with a solution of gum, such as gum Arabic.

densitometer, *n*—an instrument that measures the intensity of light reflected from a surface. It is used as a control instrument to check the uniformity and intensity of print color. **NAPIM**

developing ink, *n*—a non-drying, greasy ink composition specifically formulated for use in initial fixing or subsequent renewal of the image on a lithographic plate. **NAPIM**

die stamping (see also **intaglio**), *n*—an intaglio process specifically intended for the production of letterheads and cards by printing from lettering or other designs engraved into copper or steel. **NAPIM**

dilatancy (shear thickening), *n*—the increase in apparent viscosity with increasing shear. **NAPIM**

diluent, *n*—a liquid with little solvent power that is used to thin or cut an ink or varnish. **NAPIM**

direct-image master, *n*—a lithographic plate that is imaged by a mechanical marking device.

dispersing agent, *n*—see **wetting agent**.

dispersion, *n*—a uniform distribution of solid particles in a vehicle, generally obtained by mixing or milling. **NAPIM**

distributing roller, *n*—a roller which conveys ink from the fountain to the form roller of a press. **NAPIM**

distributor rollers, *n*—rollers that break down and distribute the ink.

doctor blade, *n*—a device that scrapes off the excess ink or lacquer from the surface of an etched cylindrical roll just prior to printing, leaving the “cells” filled with ink or lacquer.

DISCUSSION—In gravure printing, the doctor blade scrapes excess ink or lacquer off an engraved printing cylinder. In flexographic printing, the doctor blade removes excess material from the anilox roll.

dot, *n*—the individual element of a halftone. **NAPIM**

doubletone ink, *n*—a type of printing ink which produces the effect of two-color printing with a single impression. **NAPIM**

DISCUSSION—Also referred to as duotone. These inks contain a soluble toner which bleeds out to produce a secondary color.

drawdown, *n*—a film of ink deposited on a substrate to allow evaluation of the undertone and masstone of the ink. **NAPIM**

drier, *n*—(1) a substance, usually an organometallic compound, that accelerates the rate of drying of an oxidation-curable printing ink.

(2) organic metal compounds which are soluble in oily vehicles that serve to catalyze the transfer of oxygen from the air to the vehicle of the ink, thereby accelerating ink drying through oxidation and polymerization. **NAPIM**

drier dissipation, *n*—a loss in catalytic power of a drier due to a physical absorption or a chemical reaction with certain pigments. **NAPIM**

drop on demand ink jet, *n*—a nonimpact printing method in which ink droplets are emitted only when required for imaging. **NAPIM**

dry color, *n*—a pigment in dry or powder form. **NAPIM**

dry offset, *n*—a process in which a metal plate is etched to a depth of approximately 0.006 in. making a “right-reading” relief plate (see also **letterset**). **NAPIM**

DISCUSSION—Ink from the plate is transferred to the offset blanket and then to the paper without the use of water.

drying of ink, *n*—the conversion of an ink film to a solid state, accomplished by oxidation, evaporation, polymerization, penetration, gelation, precipitation, and combinations of these processes. **NAPIM**

drying oil, *n*—oil that possesses the property of hardening to a tough film by oxidation and polymerization. **NAPIM**

drying time, *n*—the time required for an ink to form a tack-free surface after being applied to the substrate. **NAPIM**

ductor roller, *n*—(1) the roller which is in intermittent contact with the fountain roller and transfers ink to the distribution system of the press. **NAPIM**

(2) an ink or water roller that alternately contacts the fountain roller and the distributing roller.

DISCUSSION—On a lithographic press it is also the roller which transfers the fountain solution to the dampening rollers.

duotone, *n*—printing of images where two colors (for example, with the inks black and gray) are printed from one original where differing screen angles, tone values, and tonal gradations are selected. **Kipphan**

DISCUSSION—Due to the better tonal gradation, a duotone print creates a better three-dimensional effect than a single-color print and is near to photographic quality.

duplex printing, *n*—term for printing on both sides (face and back/front and reverse side printing) mostly used in connection with NIP processes (see also **perfector**). **Kipphan**

dye, *n*—coloring material that is soluble in a vehicle or solvent. **DISCUSSION**—Pigments are insoluble.

effluent, *n*—waste material, such as liquid industrial refuse, or sewage, discharged into the environment (generally refers to water pollution). **NAPIM**

efflux cup, *n*—a simple device used to measure viscosity in terms of the number of seconds required for a cup of known volume to empty through an orifice of known size.

DISCUSSION—Examples include Zahn, Shell, and Ford cups.

elastomer, *n*—any rubber-like substance or polymer. **NAPIM**

electron beam (EB) curing, *n*—(1) conversion of a coating from its application state to its final use state by means of a mechanism initiated by electron beam radiation generated by equipment designed for that purpose. **D5403**

(2) conversion of a wet coating or printing ink film to a crosslinked solid film by the use of electron beam radiation.

electrostatic assist (ESA), *n*—a method of applying a high-voltage, low amperage, charge to the gravure impression roll, significantly improving ink transfer during printing to minimize print defects. **NAPIM**

electrostatic printing, *n*—non-impact printing based on electrostatic principles, involving the use of a dielectric image, stencil, or facsimile scanning ion source to form the image. **NAPIM**

emulsification, *n*—in lithography, a condition resulting from the distribution of fountain solution in the ink. **NAPIM**

DISCUSSION—Improper emulsification will produce poor printing.

emulsifying agent, *n*—a chemical used to facilitate the preparation of emulsions and to improve their stability. **NAPIM**

emulsion, *n*—a mixture of two mutually insoluble liquids in which one liquid is finely distributed as droplets in the other. **NAPIM**

energy curing, *n*—see **electron beam curing** and **ultraviolet curing**.

ester gum, *n*—the glycerol ester of rosin, used as an ingredient in certain printing ink varnishes. **NAPIM**

etch, *n*—see **fountain solution**.

etching, *n*—in lithography, the use of acidic substances to produce a surface in the non-printing areas of a metal plate that is receptive to the fountain solution but not to the ink. **NAPIM**

DISCUSSION—In engraving, a treatment with acid or by mechanical means to make certain areas considerably lower than the surface of the engraving.

evaporation, *n*—the changing from the liquid to the gaseous or vapor state, as when the solvent leaves the printed ink film. **NAPIM**

exempt volatile compound, *n*—organic compound recognized by the United States Environmental Protection Agency as not participating significantly in atmospheric photochemical reactions.

DISCUSSION—Acetone is an example.

extender, *n*—a transparent or semi-transparent white pigment, or a varnish that is used to alter the color strength of an ink without affecting its hue. **NAPIM**

exudation, *n*—the migration of solid material(s) to the surface of a film. **NAPIM**

fade resistance, *n*—the ability of a printed ink to resist changes in optical density on exposure to light, moisture, chemicals, or other external condition.

fading, *n*—the change of strength or color on exposure to light, heat or other influences. **NAPIM**

felt side (wire side), *n*—the top (smoother) side of the sheet in paper manufacturing, opposite the wire side; the usual side for printing. **NAPIM**

filler, *n*—inert substance in a composition to increase the bulk, strength, or lower the cost, or both. **NAPIM**

film, *n*—cast or blown organic polymer as a flexible material of a thickness not exceeding 0.010 in.

DISCUSSION—In excess of 0.010 in. thickness, such material is usually called sheet or sheeting. **NAPIM**

film former, *n*—a material which, when printed, provides a continuous layer.

fineness of grind, *n*—(1) a measure of the size and prevalence of oversize particles in a printing ink dispersion. **D1316**
(2) the degree of dispersion of a pigment in a printing ink vehicle usually measured on a grindometer or grind gauge. **NAPIM**

finish, *n*—the degree of gloss or flatness of a print or surface. **NAPIM**

first down color, *n*—in a multicolor printed material this is the first color printed on the substrate. **NAPIM**

flexographic ink, *n*—a low-viscosity, pigmented coating suitable for printing from a raised resilient image area.

flexography, *n*—a typographic form of printing using resilient plates, anilox rollers, and low-viscosity inks.

DISCUSSION—The solvents used are mainly alcohols or water, or both, and the coloring materials are pigments or soluble dyes. Flexography is commonly used for packaging, printing on paper, carton, cardboard, and polymer films. Flexography can also be used for newspaper printing. Energy-curable inks can also be used in flexography.

flocculation, *n*—the aggregation of pigment particles in the ink to form clusters or “flocks,” which may result in a loss of color strength and a change in hue. **NAPIM**

flooding, *n*—(1) an excess of ink on the printing plate caused by feeding too much ink from the fountain.

(2) the separation of one pigment from the others on the surface of a printing ink.

flow, *n*—the property of ink causing it to level out as would a true liquid. **NAPIM**

DISCUSSION—Inks of poor flow are classed as short or buttery in body, while inks of good flow are said to be long in body.

fluorescent ink, *n*—ink that exhibits a very brilliant effect through the use of substances designed to emit visible light under the influence of shorter wavelength light.