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Standard Terminology for Printing Inks, Materials, and Processes[1]

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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 and health practices and to determine the applicability of regulatory limitations prior to use.*

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
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 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. 1988 [3]
Kipphan: *Handbook of Print Media Technologies and Production Methods*, Kipphan, Helmut: Springer 2001

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:*

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**

[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.

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

(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 Northeastern 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 **ultraviloet 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.

fluorescent pigments, *n*—colorants consisting of a solid solution of a fluorescent dye in resins; they have medium to poor fastness properties.

flushing, *n*—a method of transferring pigments from dispersions in water to dispersions in oil by displacement of the water by the oil, with the resulting dispersion known as flushed color. **NAPIM**

flying (misting), *n*—a condition where a fine mist or spray of ink is thrown off rapidly moving ink rollers. **NAPIM**

foil, *n*—very thin (less than 6 mil) metal such as aluminum. **NAPIM**

DISCUSSION—Above 6 mil, the thin metal is called a sheet.

form roller, *n—(1)* the roller in the ink distribution system of a printing press which is in direct contact with the printing plate and transfers the ink to the plate. **NAPIM**

(2) ink or water rollers that contact the lithographic plate on an offset press.

fountain, *n—(1)* a reservoir for ink or water. *(2)* the ink reservoir on a printing press (in lithography it is also the reservoir for the dampening solution). **NAPIM**

fountain roller, *n*—the roller that revolves in the ink fountain (*in lithography* it is also the roller that revolves in the dampening solution). **NAPIM**

fountain solution (dampening solution, etch), *n—(1)in lithography*, usually a mixture of water, acid, buffer and a gum to prevent the non-printing areas of the plate from accepting ink. **NAPIM**

(2) the chemical solution carried in the water fountain of the offset press and used to keep non-image areas of the lithographic plate free of ink.

fugitive color, *n—(1)* colorant that changes color in a few days or weeks, or that bleaches white in less than 18 months, when exposed behind glass to sunlight. **D5383**

(2) pigments or dyes which are not permanent, and change or lose color rapidly when exposed to light, heat, moisture or other conditions. **NAPIM**

furnace black, *n*—a form of carbon black obtained by decomposing natural gas or petroleum oil, or both, under controlled conditions in a furnace and precipitating the pigment in special chambers. **NAPIM**

galley, *n*—a shallow metal tray used for holding type. **NAPIM**

galley proof, *n*—a proof taken of type standing in a galley before it is made up into pages. **NAPIM**

gel, *n*—a state or condition in which an ink or vehicle has a jelly-like consistency. **NAPIM**

Gilsonite, *n*—a black, asphaltic, resinous material found in Utah and Colorado used in manufacturing black printing ink. **NAPIM**

gloss, *n—(1)* perception based on the physical, optical property of a surface to reflect projected light more or less specularly. **Kipphan**

(2) reflection of light from a surface. **NAPIM**

gloss, distinctness-of-image, *n*—perceived sharpness of images reflected by an object surface. **D4449**

gloss meter, *n*—an instrument used to measure the specular (mirror) reflectance from a surface at a given angle. **NAPIM**

gold ink, *n*—a printing ink whose principal pigment consists of bronze powder. **NAPIM**

grain, *n*—arrangement or direction of fibers in a material such as paper or wood. **NAPIM**

grain direction, *n*—see **machine direction**.

graining, *n—in lithography*, abrading the surface of metal plates to achieve greater water receptivity. **NAPIM**

gravure (rotogravure), *n*—one of the methods of printing using the intaglio process, where the ink is placed in cells below the plate surface.

DISCUSSION—The size and depth of the cells are varied in accordance with the image. The engraved cells are filled with ink in the printing process and the ink is then transferred to the substrate.

gravure impression roller (presseur), *n*—gravure impression cylinder used for gravure printing, consisting of a steel core covered with an elastomer coating. **Kipphan**

DISCUSSION—It presses the substrate against the plate. An electrostatic charge on the impression roller fosters the transfer of the ink out of the cells on the gravure cylinder and onto the substrate.

gravure ink, *n*—a low-viscosity pigmented coating suitable for printing from an engraved, recessed image area.

gray scale, *n*—a strip of standard gray tones ranging from white to black, placed at the side of the original copy during photography to measure the tonal range obtained. **NAPIM**

grind gauge or grindometer, *n*—metal block in which two wedge-like troughs are accurately machined and numerically graduated from the maximum depth to zero depth. **NAPIM**

DISCUSSION—Inks are placed in the troughs and drawn toward the zero mark with a finely machined scraper blade. The point at which scratches or interruption of the smooth ink film appears is the designation of the fineness-of-grind.

grit, *n*—the coarse foreign particles in printing inks and coatings, often of irregular shape, that are hard, abrasive, and resistant to disintegration.

guide rollers, *n*—those rollers whose function is to control and transport the paper or substrate through the press.

gumming up, *n*—applying a solution of gum arabic, or its equivalent, to the metal lithographic plate to prevent oxidation and to protect it from damage during washout, make-ready operations, or plate storage.

halftone, *n*—an image in which various density levels are represented by corresponding sizes of dots printed in a uniform pattern. **NAPIM**

halftone dot, *n*—picture element of a screen, for instance, circular, elliptical, diamond or square-shaped. **Kipphan**

DISCUSSION—Below the middletone, the halftone dots are isolated in the image areas. Above approximately 50 % area coverage the dots connect with each other.

halftone inks, *n*—inks formulated for good reproduction of fine detail such as halftone dots on coated stock, generally having high tinctorial strength and finely dispersed. **NAPIM**

halo effect, *n—(1)* piling up of ink at the edges of letters and dots. *(2)* the colored or sometimes uncolored areas adjacent to them, caused by the spread of colored or uncolored vehicles. **NAPIM**

hand, *n*—the tactile property of a fabric. **NAPIM**

head margin, *n*—the space between the edge of the image and the gripper edge of the press sheet.

heat seal, *n*—a method of uniting two or more surfaces by fusion under controlled conditions of temperature, pressure and dwell time. **NAPIM**

heat set ink (heatset ink)**,** *n*—letterpress and lithographic ink which dries under the action of heat by the evaporation of their high boiling solvent. **NAPIM**

heat transfer printing (thermal printing)**,** *n*—transfer of a printed image from a carrier to a receiving substrate by the use of heat. **NAPIM**

DISCUSSION—In the typical process, ink is made up of sublimable dyes in conventional ink vehicles, the carrier is paper, and the receiving substrate is a synthetic fabric.

heavy bodied inks, *n*—inks of a high viscosity or stiff consistency. **NAPIM**

helio-klischograph, *n*—a method of engraving gravure cylinders using an electronic scanning system. **NAPIM**

DISCUSSION—This system transmits a signal modulated by the density of a positive copy to a diamond cutting head doing the engraving mechanically rather than by chemical etching.

*hiding power***,** *n*—see **opacity** or **covering power**.

highlight, *n—(1)* the light or open areas of a halftone print. **NAPIM**

(2) the bright tones of a positive image and the corresponding areas of the negative (film). **Kipphan**

hot melt ink jet, *n*—a form of ink jet printing using hot melt inks that solidify very quickly on paper and exhibit excellent dot shape, contrast, edge definition, and holdout characteristics. **NAPIM**

hue, *n*—one of the attributes of color which is determined by its dominant wave length (more commonly referred to as shade). **NAPIM**

hybrid technology/process, *n*—the linking of various, normally separate technologies within one functioning unit, for example, the combination of analog and digital technology or, in the case of print media production, the combination of various print technologies in a single production system (for example, offset and flexographic printing or offset and NIP technology). **Kipphan**

hydrophilic, *n—(1)* in *lithography*, the property of a substance that makes it more receptive to water and fountain solutions than to oils and inks. **NAPIM**

(2) water-receptive (*in offset printing*, the non-image areas on the printing plate that are repellent to ink (oleophobic)). **Kipphan**

hydrophobic (lipophilic)**,** *n—(1)* water-repellent (*in offset printing* the image areas on the printing plate that are receptive to ink (oleophilic)). **Kipphan**

(2)in lithography, the property of a substance that makes it more receptive to oils and inks than to water and fountain solution. **NAPIM**

idler rollers, *n*—rollers in the inking device of a lithographic duplicator that are rotated by frictional contact with gear-driven rollers.

image carrier, *n*—appliance whose surface is prepared in such a way that the selected areas transfer ink to the substrate (directly or indirectly via an intermediate carrier).
Handbook of Print Media Technologies and Production Methods, Helmut Kipphan, Springer 2001

imitation gold ink, *n*—a simulated gold ink that uses aluminum powder to produce the metallic luster and a transparent yellow colorant to produce the color. **NAPIM**

impression, *n*—the printing pressure necessary for ink transfer. Also refers to a single print. **NAPIM**

impression cylinder, *n*—the cylinder on a printing press that holds the material being printed against the printing plate or blanket. **NAPIM**

indelible ink, *n*—an ink used on cloth to withstand laundering. **NAPIM**

infrared drying (IR drying)**,** *n*—drying of printing inks by the use of infrared radiation. **NAPIM**

inhibitor, *n*—a compound that retards or stops a chemical reaction, such as corrosion, oxidation, or polymerization. **NAPIM**

ink, *n*—a solid, liquid, or paste material which generates visually perceivable information when applied to a surface by a printing process.

ink-form roller, *n*—the roll in an offset press that delivers ink to the lithographic plate in the lithographic copy process.

ink fountain, *n*—the reservoir on a printing press which supplies ink to the inking rollers. **NAPIM**

ink jet printing, *n*—a printing process where ink droplets are emitted from a nozzle onto a substrate. **NAPIM**

ink receptivity, *n*—that property of a substrate which causes it to accept or absorb ink, or both. **NAPIM**

ink splitting, *n*—during the transport of printing ink over the rollers of an inking unit, it is divided or split between two rotating rollers. **NAPIM**

DISCUSSION—This ink splitting is influenced by the pressure and the ink film thickness between the rollers, the consistency and tack of the ink, rotational speed of the rollers, etc. Wetting properties and adhesion forces also influence the ink splitting.

*Inkometer***,** *n*—see **tack meter**.

inorganic pigment, *n*—a colorant that is not carbon-based, except for carbon black.

DISCUSSION—Examples include titanium dioxide, iron oxide, and aluminum flake.

insert ink, *n*—a heatset ink used to print on lightweight coated paper, typically for magazine printing.

intaglio, *n*—a printing process, such as gravure and engraving, in which the image or design is recessed below the non-image areas of the engraving, plate or cylinder. **NAPIM**

integrated-fountain system, *n*—a system that delivers both the ink and fountain solution to the offset lithographic plate by the same form roller.

iodine number, *n*—*(1)* a number that indicates the relative drying potential of vegetable oils (the higher the number, the faster the drying and oxidation). **NAPIM**
(2) in the carbon black industry, a measure of the surface area, and thus the particle size, of carbon black pigment.

DISCUSSION—Higher carbon black iodine numbers indicate greater surface area and smaller particle size.

iron oxides, *n*—a series of compounds of oxygen and iron occurring naturally or manufactured, used as printing ink pigments. **NAPIM**

DISCUSSION—They vary in hue from yellow to brown, to red, to black. Some iron oxides have special properties that make them useful in magnetic printing inks.

jet, *n*—term used to describe the blackness or intensity of the masstone of black or near black inks. **NAPIM**

kaolin, *n*—see **China Clay**.

KB Value (Kauri Butanol Value), *n*—a measure of the solvent power of hydrocarbon solvents and oils using a kauri gum-butanol reagent. **NAPIM**

DISCUSSION—The values range from 20, which is a poor solvent, to 105, which is an excellent solvent.

kraft (see also **sulphate pulp**), *n*—a chemical wood pulp made by the sulphate process, or paper or paperboard made from such pulp (brown in color, unless bleached). **NAPIM**

lacquer, *n*—*(1)* a clear or pigmented resin solution whose film formation depends on the evaporation of the volatile solvent, imparting glossy, decorative features. **NAPIM**
(2) a coating composition that is based on synthetic thermoplastic film-forming material dissolved in organic solvent that dries primarily by solvent evaporation. **D16**

DISCUSSION—Typical lacquers include those based on nitrocellulose, other cellulose derivatives, vinyl resins, acrylic resins, etc.

lake, *n*—a pigment made by precipitation of a soluble dye on an inorganic white base. **NAPIM**

laminate, *n*—a structure made by bonding together two or more layers of material, usually with an adhesive. **NAPIM**

lampblack, *n*—a carbon black pigment prepared by the incomplete combustion of vegetable oils, petroleum, or asphalt materials, used to achieve a dull, black ink. **NAPIM**

leading, *n*—[pronounced *leeding*]—front or top edge as leading edge of lithographic plate or blanket.

leafing, *n*—a phenomenon where metallic pigments form a layer parallel to the surface of the print producing a high metallic luster. **NAPIM**

length, *n*—the characteristic of an ink to be stretched out into a long thread without breaking.

DISCUSSION—Long lithographic inks have good flow in the fountain and distribute easily on the ink rollers. **NAPIM**

letterpress (typography), *n*—a process of typographic (raised type) printing, generally using oil-based inks. **NAPIM**

letterset, *n*—a printing process using a metal relief plate from which the image is transferred to the substrate via a blanket cylinder. (See also **dry offset**.) **Kipphan**

leveling, *n*—the process whereby a film of liquid coating flows out after application so as to minimize any surface irregularities such as brush marks, orange peel, peaks, or craters, that have been produced by the mechanical process of application

lightfastness (colorfastness), *n*—the resistance of printed or colored material to the action of sunlight or artificial light. **NAPIM**

lipophilic, *n*—see **hydrophobic**.

lithographic inks, *n*—relatively high viscosity inks formulated with aliphatic solvents or vegetable oils, or both, which will not attack rubber blankets and rollers, based on chemistry that provides controlled emulsification with aqueous fountain solutions.

DISCUSSION—Lithographic varnishes for use in quickset sheetfed and heatset applications must have very limited solubility between the resin and weak oil/solvent phases. Traditional lithographic inks are emulsified with aqueous fountain solutions, but in some instances can be emulsified with tap water. In other instances, the lithographic ink does not require the use of a fountain solution or water (see **waterless ink**).

lithographic plate (master), *n*—a planar printing surface where the non-image area is water receptive and the image area is ink receptive.

lithography, *n*—*(1)* a process of planographic printing involving two different areas on the plate, one receptive to ink, the other receptive to fountain solution. **NAPIM**
(2) the process of printing from a plane surface on which the image to be printed is ink receptive and the non-image area is water receptive (and therefore ink repellent). (See also **offset**.)

livering, *n*—an irreversible increase in the body of inks as a result of gelation or chemical change during storage. **NAPIM**

machine direction (grain direction), *n*—the direction of a substrate parallel to its forward movement on the fabrication machine (the direction at right angles to this is called the Cross Direction). **NAPIM**

magnetic inks, *n*—inks made with pigments which can be magnetized after printing and the printed characters later recognized by electronic reading equipment. **NAPIM**

makeready, *n*—the preparation and correction of the printing plates and all aspects of the printing press, before starting the printing run, to insure uniformly clean impressions of optimum quality; all preparatory operations preceding a production run.

masstone (masscolor, toptone), *n*—*(1)* the reflected color of a bulk ink. **NAPIM**
(2) the color of a material that is thick enough to mask any background. **D2066**

master, *n*—see **lithographic plate**.

metallic ink, *n*—ink composed of aluminum or bronze powders in varnish to produce gold or silver color effects. **NAPIM**

metamerism, *n*—a condition under which colors match under one light source but do not match under another light source. **NAPIM**

Meyer bar(or rod), *n*—a metal rod wound with a fine wire around its axis, used to draw an ink down evenly and at a given thickness across a piece of paper or other substrate. **NAPIM**

microwave drying, *n*—drying of printing inks by the use of very short waves of electromagnetic energy.

mileage (coverage), *n*—the print area covered by a given quantity of ink at a target optical density.

DISCUSSION—Mileage is typically reported in m^2/gram.

misting, *n*—see **flying**.

mixing white, *n*—a white ink, either transparent or opaque, used in making tints. **NAPIM**

moisture-set ink, *n*—ink that dries or sets by precipitation caused by the absorption of moisture.

DISCUSSION—The vehicle consists of a water insoluble resin dissolved in a hygroscopic solvent. Drying occurs when the hygroscopic solvent has absorbed sufficient moisture, either from the atmosphere, substrate, or external application to precipitate the binder.

moisture vapor transmission rate (MVTR), *n*—the rate of gaseous water transmission, usually through packaging material, expressed in weight per unit area per unit time. (Sometimes called water vapor transmission rate or WVTR.) **NAPIM**

muller (Hoover Muller), *n*—an instrument used to disperse small quantities of pigment in vehicle for testing purposes.

DISCUSSION—The dispersion action is produced by a pair of ground glass plates, one stationary and one rotating.

MVTR, *n*—see **moisture vapor transmission rate**.

news ink, *n*—ink designed to print on newsprint and used for newspapers.

DISCUSSION—Newspapers are typically printed by a coldest process, but can also be printed with heatset inks.

newsprint, *n*—the type of paper generally used to print newspapers.

DISCUSSION—Newsprint is a low grammage paper (40 to 52 g/m^2) made from mechanical wood pulp, often with significant recycled content. It is either unsized or lightly sized and has little to no mineral loading.

NIP, *n*—see **non-impact printing**.

non-drying oils, *n*—oils that do not form dry surface films via oxidation or polymerization when exposed to the atmosphere.

non-impact printing (NIP), *n*—an imaging process where the image is formed by electrostatic, electrophotographic, ink jet, or any other process where the substrate does not make contact with an imaging surface during ink or toner application.

OCR inks, *n*—see **optical character recognition inks**.

offset, *n*—*(1)* form of printing in which the ink is transferred from the printing plate to a rubber blanket and subsequently to the substrate. **NAPIM**

(2) a printing process in which the inked impression from a printing plate is transferred to a rubber blanket and then transferred to the paper being printed. (See also **lithography**).

offset press, *n*—an indirect rotary press having a plate cylinder, a blanket cylinder, and an impression cylinder.

offsetting, *n*—see **setoff**.

oil absorption, *n*—the quantity of oil which is required to completely wet a specific weight of a given pigment. **NAPIM**

on-press proof, *n*—sample print on a printing system in a small run length that shows the result of the reproduction process, whereby the technology of the proofing system corresponds to the printing process used for the print run/job. **Kipphan**

opacity (see also **covering power**) , *n*—*(1)* the ability of an ink to obliterate or hide the underlying surface by preventing the transmission of light or color through the ink film.

(2) the property of paper to minimize the show through of printing from the backside or the next sheet. **NAPIM**

(3) the degree of obstruction to the transmission of visible light. **Kipphan**

opaque ink, *n*—an ink that does not allow light to pass through it and has good hiding power. **NAPIM**

Optical Character Recognition Inks (OCR Inks), *n*—inks composed of low reflectance pigments, such as carbon black, which can be read by optical scanners (OCR readers). **NAPIM**

DISCUSSION—Non-readable inks, though visible to the human eye, cannot be read by OCR readers, because they present insufficient reflectance contrast to the machine.

Optical Mark Recognition Inks (OMR Inks), *n*—similar to OCR inks, optical scanners detect the presence of bar marks rather than data characters (OMR is generally less demanding in print quality than OCR, but more demanding in positional accuracy and space). **NAPIM**

organosol, *n*—a suspension of resin particles in organic solvents, typically made with vinyl resins, solvents and plasticizers. **NAPIM**

overprint, *n*—the printing of one impression, ink or varnish, over another. **NAPIM**

overprint varnish, *n*—a clear varnish applied over a printed surface to improve its gloss or scratch resistance, or both, slip, etc. **NAPIM**

oxidation, *n*—*in printing*, the combination of oxygen with the vehicle of the ink to yield a dry film. **NAPIM**

penetration, *n*—the ability of a liquid (ink, varnish, or solvent) to be absorbed into the paper or other printing substrate. **NAPIM**

perfecting press, *n*—a printing press that prints both sides of paper in one operation. **NAPIM**

perfector, *n*—printing press with a sheet-turning device enabling both the front and reverse side of the substrate to be printed in one pass (in particular machines based on the NIP technology are referred to as duplex printers). **Kipphan**

permanent ink, *n*—ink which does not readily fade or change color when exposed to light and weather. **NAPIM**

permanent violet, *n—(1)* a light resistant, tungstated or molybdated methyl violet pigment used in printing inks. *(2)* carbazole violet. **NAPIM**

pH, *n—(1)* a numerical designation denoting acidity or alkalinity of a liquid, usually important for compatibility and stability in use. *(2)* the negative logarithm of the hydrogen ion concentration in a liquid (in moles/litre).

DISCUSSION—A pH of 7 is neutral. Acidity increases from 7 to l; alkalinity increases from 7 to 14. Conventional anionic water based inks and coatings are typically at an alkaline pH, although cationic water based inks and coatings (having an acidic pH) are also commercially available.

phase change inks, *n*—solid inks which must be melted and applied on a hot press; these inks solidify again on contact with unheated paper.

photoinitiator, *n*—a substance which, by absorbing light, becomes energized into forming free radicals and promotes polymerization of reactive monomers and oligomers. **NAPIM**

photopolymer, *n*—plastic that is cross-linked (hardens) under the influence of light. **Kipphan**

photosensitizer, *n*—a substance which, by absorbing light, passes its energy to another substance which then reacts. **NAPIM**

pigment, *n*—the fine solid particles of colorant used to give color to printing inks; they are substantially insoluble in the vehicle and in water. **NAPIM**

pitch, *n*—a solid or semi-solid material of an asphaltic nature used in ink to add flow or length. **NAPIM**

planography, *n*—a printing process in which the image and non-image areas lie in the same plane of the plate.

plasticizer, *n—(1)* a substance added to paint, varnish, or lacquer to impart flexibility. **D16**

(2) liquid or solid additives used to impart flexibility to a hard, rigid polymer such as PVC or nitrocellulose. **NAPIM**

plastisol, *n*—a suspension of resin particles in a plasticizer, similar to an organosol, but containing no solvents. **NAPIM**

plate cylinder, *n*—the rigid roller to which the printing plate is attached.

polyethylene, *n*—a synthetic resin of high molecular weight resulting from the polymerization of ethylene gas under pressure, frequently used as a film for packaging or as a wax additive in inks and coatings.

polypropylene, *n*—a synthetic resin of high molecular weight resulting from the polymerization of propylene gas, frequently used as a film for packaging. **NAPIM**

polyvinyl chloride (PVC)**,** *n*—a family of resins produced by polymerization of vinyl chloride; most PVC resins are copolymers of vinyl chloride with small amounts of vinyl acetate. **NAPIM**

polyvinylidene chloride (PVdC)**,** *n*—a thermoplastic produced by the polymerization of vinylidene chloride, also known as Saran.

DISCUSSION—PVdC provides an excellent oxygen and moisture vapor barrier.

pre-etching, *n*—the chemical treatment of the surface of a metal plate by the plate maker, prior to application of the photosensitive coating, to permit the more perfect removal of coating from non-image areas.

presensitized plate, *n—in photomechanics*, a metal or paper plate that has been precoated with a light sensitive coating, for example, a presensitized lithographic plate. **NAPIM**

primer, *n*—colorless varnish with low viscosity, used as a base coat on the substrate (to improve wetting and bonding). **Kipphan**

DISCUSSION—Primer is applied prior to the actual varnish to enhance the gloss, particularly in connection with UV varnishes or prior to the application of glue for improved adhesion.

printability, *n*—a collective assessment of the ability of an ink-substrate-press combination to produce printed material of a suitable quality.

printed ink film, *n*—thin layer of a printing ink deposited onto a substrate by means of a laboratory or production printing press, occasionally by a drawdown or roll-out technique. **D5010**

DISCUSSION—Printed matter is the usual medium by which inks are tested for appearance properties, drying, and resistance to various agents.

printing ink, *n—(1)* any fluid or viscous composition of materials, used in printing, impressing, stamping, or transferring on paper or paper-like substances, wood, fabrics, plastics, films or metals, by the recognized reproductive processes employed in printing, publishing and related services. **NAPIM**

(2) a colored or pigmented liquid or paste composition that is applied by printing machinery. **D6687**

(3) a colored or pigmented liquid or paste composition that dries to a solid film after application as a thin layer by printing machinery. **D16**

printing plate, *n*—a surface carrying a design by which the ink is ultimately transferred directly or indirectly to the material to be printed. **NAPIM**

printing press, *n*—a mechanical device which applies ink to a surface, reproducing the pattern or design on the printing plate. **NAPIM**

printing substrate, *n*—material onto which ink is deposited in the production of printed matter. **D5010**

DISCUSSION—Printing substrates include paper, paperboard, plastic film, glass, and metallic surfaces.

process colors (for four-color printing)**,** *n*—yellow, cyan, magenta, and black (see C, M, Y, K). **Kipphan**

process ink, *n*—ink used in the modern method of reproducing illustrations by the halftone color separation process; the colors used are yellow, magenta (red), and cyan (blue), used with or without black. **NAPIM**

progressive proofs(see**Color Proofs),** *n—in color separation*, a series of proofs of a color process reproduction pulled in each color, and in combinations of two, three, and four colors; used to indicate color quality and as a guide for printing. **NAPIM**

proof (proofing)**,** *n—(1)* a test photographic print or trial impression taken in a printing process and inspected for correction or examination.

(2) a process used for quality control in prepress and printing regarding color reproduction, register, text and image layout, or as a specimen for the production run. **Kipphan**

DISCUSSION—Proofs are differentiated into analog and digital according to the type of original. Analog proofs are produced photomechanically from films that have been exposed, for instance, using color foils. Digital proofs are produced using a NIP technology-based color printer (normally based on ink jet or thermal sublimation processes) from the digital data file. The expected print result on a production press should be reproduced as accurately as possible. This is supported/achieved by using color management systems (see **on-press proof**).

proof press, *n*—a device used to prepare test prints, either in a laboratory or production environment.

quickpeek, *n*—a simple laboratory device from which reproducible offset or letterpress ink films can be obtained. **NAPIM**

quick-setting ink, *n*—ink for letterpress and offset that dries by either filtration, coagulation, selective absorption, or often a combination of these with some of the other drying methods. **NAPIM**

DISCUSSION—The vehicles are generally special resin-oil combinations. After the ink has been printed, these combinations separate into a solid material which remains on the surface as a dry film and an oily material which penetrates rapidly into the stock.

receptor, *n—(1)* film or paper of standard abrasiveness onto which material removed from the specimen is deposited during the abrasion testing process. *(2)* printed paper from which material is removed onto the specimen that has a higher degree of abrasiveness than the receptor (in case of testing abrasiveness). **D5181**

reducer, *n*—a varnish, solvent, oil or waxy or greasy compound that is employed to reduce tack or viscosity of an ink for use on the press. **NAPIM**

register, *n—(1)* positional accuracy of the print images on the front and reverse side of a print sheet in relation to one another. *In perfecting*, the term perfecting register is also used.

(2)in multicolor printing the position of the color separations relative to one another (color register).

(3) term used for the positional accuracy of the color separations on the printed product with reference to the outer edges of the sheet or web section. **Kipphan**

(4) when a design or form is printed in parts, as in multiple colors, all colors are required to match exactly (when they do, they are "in register"). **NAPIM**

DISCUSSION—Circumferential register is used for the direction in which the substrate runs, for example the plate cylinder revolves; lateral register is at right angles to it.

*relative tinting strength***,** *n*—see **color strength**.

repeat, *n*—the printing length of a plate cylinder as determined by one revolution of the plate cylinder gear. **NAPIM**

resin, *n*—a solid or semi-solid organic substance used as a binder in printing ink vehicles. **NAPIM**

DISCUSSION—Examples include rosin ester, nitrocellulose, and polyamide.

retarder, *n—in flexography, gravure and heatset printing*, a high boiling solvent added to ink to slow the evaporation rate.

reverse print, *n*—print on the underside of a transparent film. **NAPIM**

roller, *n*—any of various rotating member, free or gear-driven in an offset press whose function is to transfer, apply, or spread fluids onto the cylinders or to guide the paper through the printer. (See also **ductor roller, form roller, fountain roller, guide rollers**, etc.)

roll-out, *n*—ink spread for test or sampling purposes by use of a hand roller. **NAPIM**

rosin, *n*—a natural soft resin obtained after removing the turpentine from the sap of a southern pine tree (gum rosin); also obtained from logs and stumps of the same tree by solvent extraction (wood rosin). **NAPIM**

*rotogravure***,** *n*—see **gravure**.

rub tester, *n*—an instrument used for the measurement of rub or scuff resistance of a printed design.

run, *n*—the printing of the specific number of copies required on a particular job.

run length, *n*—number of copies to be printed in a print job. **Kipphan**

*Saran***,** *n*—see **polyvinylidene chloride**.

scratch, *n*—in measuring the fineness of dispersion of a printing ink, a depression at least 10 mm in length in the surface of a grind gage drawdown.

DISCUSSION—A scratch develops when a particle (or agglomerate) is trapped between the blade and the bottom of the path and is drawn along by the blade.

screen, *n—(1)in printing*, this refers to those areas of a plate or the print made from it in which tonal gradations are reproduced. **NAPIM**

(2) area broken down into printing and non-printing picture elements (halftone dots or lines) where the size or number, or both, of dots per area varies according to the tone values of the original. **Kipphan**

DISCUSSION—The two main kinds of screening are amplitude-modulated and frequency-modulated screening. Screening a continuous-tone original to generate a halftone image is today predominantly an electronic process.

screen frequency (screen definition, screen ruling)**,** *n*—number of print picture elements such as halftone dots and screen lines per unit length in the direction that yields the greatest value, measured in cm^{-1} or lines per inch (lpi). **Kipphan**

DISCUSSION—In a 60 lines/cm (150 lpi) screen (typical value in offset printing), 60 halftone/screen cells formed by screen lines lie within a length of 1cm.

screen process printing (silk screen printing)**,** *n*—a process by which an image is transferred to a substrate by squeezing the ink through the unblocked areas of a metal or fiber screen. **NAPIM**

scumming, *n*—sensitization of the non-printing areas of a lithographic plate resulting in undesirable adhesion of the ink to these areas. **NAPIM**

setoff (offsetting)**,** *n*—an undesirable transfer of ink from the printed sheet to the back of the sheet following in the pile or to the back of the web in the rewound roll. **NAPIM**

setting of ink, *n*—the initial phase of the drying process wherein printed sheets, though not fully dry, can be handled without smudging. **NAPIM**

shade, *n—(1)in ink manufacture*, commonly used as a synonym for hue. *(2)* in some color systems, a gradation of color resulting from the addition of a small amount of black or a complementary color. **NAPIM**

*shear thickening***,** *n*—see **dilatancy**.

shear thinning, *n*—the decrease in viscosity with increasing shear rate (exhibited by most printing inks). **NAPIM**

shelf life, *n*—the resistance of a material to deterioration from oxygen and ozone in the air, from heat and light, or from internal chemical action; the length of time that a material will remain in a usable condition under specified conditions of storage.

shortness, *n—(1)* that property of a printing ink which is characterized by a lack of flow; opposite of length. **NAPIM**

(2) the property of a non-Newtonian fluid that prevents it from being drawn into a filament. **D4040**

signature, *n—(1)* used to mark the first and last page of the folded sheet (for example, 17 and 32 for the second folded sheet in 16-page format) to support the correct location and sequence during finishing to produce book blocks (several folded sheets collated and bound).

(2) term commonly used for a print sheet which when folded and cut forms a group of pages. **Kipphan**

(3)in web printing and binding, the name given to a printed sheet after it has been folded. **NAPIM**

DISCUSSION—The signature is normally removed when trimming the block.

*silkscreen printing***,** *n*—see **screen process printing**.

silver ink, *n*—a printing ink whose principal pigment consists of aluminum powder or flakes. **NAPIM**

size, *n—(1)* the treatment of paper or board to provide desired functional characteristics, such as improved printability, water repellency, grease resistance, etc.

(2) an ink that dries with a sticky surface that will hold metallic or other powders. **NAPIM**

sleeve, *n*—lithographic plate or blanket sleeve, which allow the cylinders to roll smoothly against one another since they eliminate the cylinder gaps which are normally present on the circumference of the cylinder.

DISCUSSION—Sleeves enable continuous printing and reduce trim waste since image-free areas can be avoided.

slip compound, *n—in ink manufacture*, this refers to an additive for an ink that imparts lubricating qualities to the dried ink film. **NAPIM**

DISCUSSION—Waxes and silicone derivatives are common slip compounds.

slip sheet, *n*—a sheet of paper placed between two freshly printed sheets to prevent setoff or blocking. **NAPIM**

slur, *n*—a condition caused by slippage at the moment of impression between any two of the following: paper, printing plate or blanket. **NAPIM**

smearing, *n*—the spreading of ink over areas of the plate or substrate, or both, where it is not wanted. **NAPIM**

SNAP (Specifications for Newsprint Advertising Production)**,** *n*—a set of standards for all stages in the newsprint advertising promotion printing process, from creating the original through separation, proofing, and printing, designed to ensure consistent results.

soap resistance, *n*—the relative ability to withstand the action of soap; a property required of inks used in printing soap wrappers and labels for liquid soap containers. **NAPIM**

softening point, *n—(1)* the temperature at which a substance changes from a hard material to a softer and more viscous material. *(2)* for a substance that does not have a definite melting point, the temperature at which viscous flow changes to plastic flow.

DISCUSSION—The softening point is indirectly a measure of the molecular weight of the resin. In general, the higher the softening point, the greater the molecular weight will be. Softening point is often determined by the Ring-and-Ball method (see Test Methods D6493).

solid, *n*—a printed area uniformly and completely covered with ink. **NAPIM**

solvent, *n*—a material, usually a liquid, capable of dissolving another substance, usually a solid, to form a solution. **NAPIM**

solvent release, *n*—the evaporation of a solvent during ink drying, frequently influenced by the type of polymers and solvents in the ink. **NAPIM**

solvent retention, *n*—the degree to which the solvent in the ink, intended to evaporate during the drying process, is left in the ink film. **NAPIM**

DISCUSSION—Too high solvent retention may give an odor to the packaged products. Also, high solvent retention may result in blocking of the prints.

speckle, *n*—protuberance of particles above the surface of a grind gage drawdown. **D1316**

DISCUSSION—Speckles occur at gage depths greater than those at which scratches occur and are caused by oversize particles that are not hard enough or of the proper size to produce scratches.

specular gloss, *n*—the perception by an observer of the mirror-like appearance of a surface.

spot color, *n*—special colors, used in addition to or instead of process colors (C, M, Y, K) to enable the printing of special hues without mixing the primary colors; often also the only chromatic ink used in black-and-white printing. **Kipphan**

spreading, *n*—a thickening or enlarging of printed areas caused by bleeding or lateral movement of ink. **NAPIM**

squalene oil, *n*—an organic liquid ($C_{30}H_{50}$ unsaturated aliphatic hydrocarbon) that imitates the action of skin oil. **D5909**

stand oil (see **linseed oil**), *n*—a drying oil which has been partially refined by allowing certain impurities to settle out after heat treatment, generally used in the United Kingdom to describe linseed oil. **NAPIM**

stock, *n*—paper or other material to be printed. See also **substrate**. **NAPIM**

stringiness, *n*—the characteristic of an ink which causes it to draw into filaments or threads. (NAPIM)

stripping, *n*—a condition in which the ink fails to adhere to and distribute uniformly on the metal rollers of the press. **NAPIM**

substrate, *n*—*(1)* the base material which is coated or printed. **(NAPIM**

(2) the material onto which the ink is applied; see also **stock**.

supercalender, *n*—a calender stack, not part of the paper machine, with alternate metal and resilient rollers, used to produce a high finish on paper. **NAPIM**

SWOP (Specifications for Web Offset Publications), *n*—a set of standards for color separation films and color proofing developed for those involved in publications printing. **NAPIM**

DISCUSSION—The SWOP standards help magazine printers achieve accuracy when color separations from many different sources are printed on one sheet.

sympathetic ink, *n*—a novelty ink which becomes visible only after special treatment. **NAPIM**

synthetic "paper", *n*—non-cellulosic "paper" that is film-based. **NAPIM**

DISCUSSION—The main plastics used for this purpose are polystyrene, polypropylene, high-density polyethylene and polyvinyl chloride.

tabset ink, *n*—a low tack heatset ink used for printing on newsprint, typically for Sunday newspaper circulars.

tack, *n*—*(1)* a relative measurement of the cohesion of an ink film which is responsible for its resistance to splitting between two rapidly separating surfaces. **NAPIM**

(2) a function of the force required to split a thin fluid film of a printing ink or vehicle between two rapidly separating surfaces; it is a rheological parameter indicative of internal cohesion of the fluid. **D4361**

(3) a property of printing inks that describes the cohesion that exists between particles of the ink film, the force required to split an ink film or, in other words, its stickiness. **Kipphan**

tack meter (tackmeter), *n*—a roller type of meter used to measure the tack of an ink in terms of the torque developed by a system of rotating ink-wet rollers. **NAPIM**

Tackoscope, *n*—see **tack meter**.

tap out, *n*—a spot of ink applied to paper by a finger using tapping action to distribute the ink to approximately printing film thickness. **NAPIM**

tensiometer, *n*—an instrument used to measure surface and interfacial tensions of liquids. **NAPIM**

thermal printing, *n*—see **heat transfer printing**.

thermography, *n*—printing process in which the ink, while still wet on the sheet, is dusted with a resinous powder that adheres to the ink, after which the sheets are put through a heating process which causes the particles of powder to fuse together with the ink, giving a raised effect to the letters which simulates steel-die engraving. **NAPIM**

thermosetting ink, *n*—an ink which polymerizes to a permanently solid and infusible state upon the application of heat. **NAPIM**

thinner, *n*—solvent, diluent, low viscosity oil or other vehicle, or both, that is added to ink to reduce consistency or tack. **NAPIM**

thixotropy, *n*—the property of a liquid or plastic material which involves a reversible decrease of viscosity with time as the material is agitated or worked, generally attributed to a loose structure of the dispersed solid particles which breaks down under agitation. **NAPIM**

tinctorial strength, *n*—see **tinting strength**.

tint, *n*—*(1)* a light color made by adding a large amount of extender or opaque white to a small amount of toner or colored ink.

(2) a color which appears lighter because it has been printed in a dot or line pattern rather than as a solid. **NAPIM**

tinting strength (tinctorial strength), *n*—a measure of the effectiveness with which a unit quantity of a colorant alters the color of a colorless material.

toner, *n—(1)* a highly concentrated pigment or dye, or both, used to modify the hue or color strength of an ink; also the "ink" in electrostatic printing. **NAPIM**

(2) an organic pigment that does not contain inorganic pigment or inorganic carrying base. **D16**

toptone, *n*—see **masstone**.

transparent inks, *n*—inks which lack hiding power and permit transmission of light, thus allowing previous printing or substrates to show through. **NAPIM**

trapping, *n—(1)* printing a wet ink film over previously printed ink. *(2)* spreads or chokes in reproduction technology when generating the image (see **spreads**).

DISCUSSION—Dry trapping is printing wet ink over dry ink. Wet trapping is printing wet ink over previously printed wet ink.

two pot (two part), *n*—inks or coatings in which two reactive components are mixed together, typically just prior to printing. **NAPIM**

typography, *n*—see **letterpress**.

ultraviolet (UV) curing, *n—(1)* conversion of a coating from its application state to its final use state by means of a mechanism initiated by ultraviolet radiation generated by equipment designed for that purpose. **D3732**

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

undercolor removal (UCR), *n*—the reduction of dot percentages of cyan, magenta, and yellow inks in dark neutral areas and replacing the lost density by means of a heavier black plate. **NAPIM**

undertone, *n—(1)* the color of a thin film of ink as seen on a white background.

(2) the appearance of an ink when viewed by light transmitted through the film. **NAPIM**

(3) the color of a thin layer of pigment-vehicle mixture applied on a white background. **D16**

varnish, *n—(1)* fluid compositions comprising one or more of the following: oils, resins, solvents, driers and waxes, used either as a vehicle or to cover surfaces. **NAPIM**

(2) a liquid composition that is converted to a transparent or translucent solid film after application as a thin layer. **D16**

vehicle, *n—(1)* the liquid portion of a paint or printing ink (anything that is dissolved in the liquid portion of a paint or printing ink is a part of the vehicle. **D16**

(2) the portion of a printing ink that excludes the colorant. **D6687**

(3) the liquid portion of an ink that holds and carries the pigment and provides workability and drying properties and binds the pigment to the substrate after the ink has dried. **NAPIM**

viscometer, *n*—an instrument used to measure the rheological behavior of inks or coatings.

viscosity, *n*—the tendency of a material to resist deformation or flow. **NAPIM**

VOC (volatile organic compound), *n*—any organic compound that can significantly participate in photochemical reactions. Many solvents used in the printing industry are among those chemical substances that are subject to governmental regulations because of VOC emissions. **NAPIM**

volatility, *n*—the ease with which a liquid or solid passes into its vapor state. **NAPIM**

washout, *n*—test that is designed to determine the amount of unwanted residue in an ink or coating. Material is diluted and passed through a fine mesh screen.

washout inks, *n*—inks used on textiles which are easily removed by washing. **NAPIM**

washup, *n*—the process of cleaning the rollers, form or plate and even the fountain of a press. **NAPIM**

water-based coating, *n*—a coating in which the principal volatile constituent is water. See also **water-reducible coating**. **D16, NAPIM**

water-based inks (waterbased inks), *n*—inks containing a vehicle whose binder is water soluble or water dispersible. **NAPIM**

waterless ink, *n*—an ink used on special lithographic plates where the non-image area does not require the application of fountain solution or water to render it ink-repellent.

water-reducible coating, *n*—a coating that can be reduced in viscosity by the addition of water. **D16,** D01.55

water vapor transmission rate (WVTR) (see **moisture vapor transmission rate**), *n*—the rate of moisture transmission through packaging materials. **NAPIM**

web, *n*—a roll of any substrate that passes continuously through a printing press. **NAPIM**

web temperature, *n*—the temperature of the web in the oven (or dryer) as differentiated from the oven air temperature. **NAPIM**

wet-on-wet printing, *n*—printing in multicolor presses. The printing of the second or another ink takes place on the previous ink, which has not yet dried. **Kipphan**

wet printing (or wet on wet printing), *n*—printing over a previously printed wet film. **NAPIM**

wetting, *n*—the interaction between the surface of a liquid and the surface of a solid or another liquid. **NAPIM**

DISCUSSION—The wetting properties depend on the surface tension of liquids and the interfacial tension between liquid and solid, or between the liquids.

wetting agent (dispersing agent), *n—(1)* material added in small amounts in ink formulations to assist in incorporation and dispersion of solid material (usually pigment) in the ink vehicle.

(2) material added in small amounts in ink formulations designed to reduce surface tension and improve the ability to print on high surface energy substrates.

wipe-on plate, *n—in offset lithography*, a plate on which a light— sensitive coating is applied with a coating machine. **NAPIM**

wire side, *n*—see **felt side**.

'with-machine' direction, *n*—the axis of a specimen that is parallel to the direction of mill rolling or extrusion, or other surface-finish texture. **E430**

work and tumble, *n*—to print one side of a sheet of paper, then turn the sheet over from gripper to back, using the same side guide and plate to print the other side. **NAPIM**

work and turn, *n*—to print one side of a sheet of paper, then turn the sheet over from left to right and print the other side.

WVTR, *n*—see **water vapor transmission rate**.

5. Keywords

5.1 printing; printing ink materials; printing ink processes; printing inks