

## **Glossary of Color and Press Terms**

### **Abnormal Color Vision**

Defective color vision ("color blindness"), which may take the form of protanopia (red and bluish green confusion); protanomalous deficient in red response for certain color mixtures); deuteranopia (red and green confusion); deuteranomaly (deficient in green response for certain color mixtures); tritanopia (blue and yellow confusion); and monochromatism (no discrimination of hue and saturation).

### **Absorption**

The taking up of light energy by matter and its transformation into heat. Selective absorption of the range of wavelengths comprising white light produces colored light.

### **Achromatic**

The term used to refer to white, grays, and black which have no hue.

### **Actinic**

Describes the ability of light to produce changes in materials exposed to it, such as photographic emulsions.

### **Actinic Density**

The density of a color, relative to a density positive gray scale, when recorded on a given photographic emulsion.

### **Additive Color Process**

A means of producing a color reproduction or image by combinations of blue, green, and red colored lights, such as in color television systems.

### **Additive Primaries**

Blue, green, and red lights of high saturation, which when mixed together in varying combinations and intensities can produce any other color.

### **Additivity Failure**

A common condition of printing ink on paper where the total density of the overprinted ink films is not equal to the sum of the individual ink densities.

### **Adjacent Color**

The visual influence of a color area on an adjacent color. This effect is especially strong when the adjacent color area is relatively large and has high saturation.

### **Afterimage**

Sensation that occurs after the stimulus causing it has ceased. Because of cone fatigue, the colors of the afterimage may be complementary to those registered initially.

### **Airbrushing**

Retouching of prints or artwork by dyes or pigments sprayed on with high-pressure air from a small hand-held sprayer.

### **Alpha Channel**

An 8-bit channel reserved by some image-processing applications for masking or additional color information.

### **Analog**

Electrical signals of continuously variable frequency or intensity. These signals can be generated by photocells or photomultipliers and are related to the density of an original. Many color scanners use analog circuits.

### **Apochromat**

A lens used for color separation work. This lens will bring the red-, green-, and blue-light bands of the spectrum to the same point of focus.

### **Apparent Trap**

See Trapping.

### Artifact

A visible indication (defect) in an image, caused by limitations in the reproduction process.

### Balanced Process Inks

A set of process inks of which the ratios of the blue and green actinic densities of the cyan and magenta are equal, enabling the use of only one color correction mask for the yellow.

### Banding

A visible stair-stepping of shades in a gradient.

### Benzidine yellow

See Diarylide Yellow.

### Black

The absence of color; an ink that absorbs all wavelengths of light.

### Black-light

A source rich in ultraviolet and low-frequency blue radiation source.

### Black printer

The plate used with the cyan, magenta, and yellow plates for four-color process printing. Its purpose is to increase the overall contrast of the reproduction and, specifically, improve shadow contrast. Sometimes called the key plate. The letter K is often used to designate this color. See Full-Scale Black and Skeleton Black.

### Blanket

A fabric coated with natural or synthetic rubber that is wrapped around the blanket cylinder of an offset press. It transfers the inked image from the plate to the paper.

### Brightness

1. The amount of light reflected from a surface.
2. A paper property, defined as the percentage reflection of 457 nanometers (nm) radiation.
3. The intensity of a light source.
4. When used to describe color, this term means highly saturated.

### Bronzing

In process-color printing, the effect that appears when the toner in the last color (often black) migrates to the surface of the printed ink film, causing a change in the spectral aspect of surface light reflection.

### Bump Exposure

A brief no-screen exposure that supplements the main exposure when making a halftone. The effect is to compress the screen's density range without flattening tonal detail. The technique produces a full range of halftone dots from short-density-range copy and can also be used to expand highlight or shadow tonal separation, depending on whether negatives or positives are being made.

### C print

A term used by some to describe any reflective color print. The term was used to designate a particular Eastman Kodak integral tripack color print material.

### Calibration bars

On a negative, proof or printing piece, a strip of tones used to check printing quality.

### Camera-Back Masking

A single-stage color correction process where the processed masks are placed in turn over unexposed separation film in the camera back before producing the separation negatives.

### Camera-Ready Art

Any artwork or type that is ready to be prepared for printing.

### Carbon black

The pigment commonly used in black inks. Toners are usually combined with this pigment in the ink formulation to make the black ink more neutral.

### CC filter

Color compensating filter, a high transmittance filter used to correct the color balance of transparencies. CC filters are available in six colors and several strengths.

### Characteristic Curve

Graphical representation of the relationship between the exposures given to a sensitized material and the corresponding image densities produced under specified development conditions .

### Chroma

The degree of saturation of a surface color in the Munsell System.

### Chromaticity Diagram

A graphical representation of two of the three dimensions of color. Intended for plotting light sources rather than surface colors. Often called the CIE diagram.

### Chrome

A term used to describe a color transparency. It is a contraction of brand names such as Kodachrome, Fujichrome, Ektachrome, or Agfachrome.

### Chrome Yellow

An inorganic pigment that is primarily lead chromate, used for making opaque yellow inks.

### CIE

Commission Internationale de l'Eclairage, a standards-setting organization for color measurement.

### CIE Diagram

See Chromaticity Diagram.

### Cleanliness

Synonym for high saturation.

### CLUT

Color look-up table.

See Look-up Table.

### CMYK

(cyan, magenta, yellow, black) The subtractive primaries, or process colors, used in color printing.

### Color Balance

The combination of yellow, magenta, and cyan needed to produce a neutral gray. Determined through a gray balance analysis.

### Color Bars

See Color Control Strip.

### Color Blindness

See Abnormal Color Vision.

### Color Cast

The modification of a hue by the addition of a trace of another hue, such as yellowish green, pinkish blue, etc.

### Color Chart

A printed chart containing overlapping halftone tint areas in combinations of the process colors. The chart is used as an aid to color communication and the production of color separation films. The charts should be produced by individual printers using their own production conditions. See Foss Color Order System.

### Color Circle

A GATF color diagram used for plotting points as determined by the Preucil Ink Evaluation System. The dimensions are hue error (circumferentially) and grayness (radially). See Preucil Ink Evaluation System, Color Triangle, Hue Error, Grayness.

### Color Control Strip

Small patches of color solids, overprints, tints, and resolution targets for the purpose of monitoring printing

press performance. Sometimes called color bars.

#### Color Conversion

A color transparency made from a color reflection original. A conversion is made for the purpose of allowing a rigid reflection copy to be color-separated using a drum-type scanner, or for any of the other reasons listed under color duplicating.

#### Color Correction

1. A photographic, electronic, or manual process used to compensate for the deficiencies of the process inks and the color separation process.
2. Any color alteration requested by a customer.

#### Color Duplicating

The process of making a duplicate transparency from an original transparency for purposes of retouching, color cast adjustment, density range normalization, image assembly, or reproduction scale adjustment. Color duplicates are sometimes called dupes.

#### Color Gamut

The range of colors that can be formed by all possible combinations of the colorants of a color reproduction system.

#### Color Hexagon

A trilinear plotting system for printed ink films. Adapted for the printing industry by GATF, the method was originally developed by Eastman Kodak. A color is located by moving in three directions (at 120 degree angles) on the diagram by amounts corresponding to the densities of the printed ink film. The diagram is generally used as a color control chart, particularly for detecting changes in the hue of two-color overprints.

#### Color Proof

A printed or simulated printed image of the color separation films. The colorants used are selected so that the proof will produce a close visual simulation of the final reproduction.

#### Color Quality Index

See Color Rendering Index.

#### Color References

A given set of inks printed at specified densities or strengths on a given substrate, used for color control.

#### Color Rendering Index

A measure of the degree to which a light source, especially a fluorescent light, under specified conditions, influences how the perceived colors of objects illuminated by the source conform to those of the same objects illuminated by a standard source, which is usually some aspect of daylight. Also called color quality index.

#### Color Reproduction Guide

A printed image consisting of solid primary, secondary, three and four-color, and tint areas. It is primarily used as a guide for color correction of the defects of the printing ink pigments and the color separation system. The guide should be produced under normal plant printing conditions.

#### Color Scanner

See Scanner.

#### Color Separation

The process of making film intermediates from the color original to record the red-, green-, and blue-light reflectances. These films are used to prepare the cyan, magenta, and yellow printing plates. A black separation is also made.

#### Color Sequence

The color order of printing the yellow, magenta, cyan, and black inks on a printing press. Sometimes called rotation or color rotation.

#### Color Temperature

The temperature, in degrees Kelvin, to which a black body would have to be heated to produce a certain color radiation. 5,000 K is the graphic arts viewing standard. The degree symbol is not used in the Kelvin scale. The higher the color temperature, the bluer the light.

### Color Transparency

A positive color photographic image on a clear film base. It must be viewed by transmitted light. Sizes range from 35-mm color slides up to 8x10-in. (203x254-mm) sheet film transparencies .

### Color Triangle

A GATF color diagram based on the Maxwell Triangle for plotting points as determined by the Preucil Ink Evaluation System. The dimensions are hue error (circumferentially) and grayness (radially). Color masking, color gamut, and ink trapping may be determined from the diagram by using simple geometric techniques. See Preucil Ink Evaluation System, Color Circle.

### Colorimeter

An optical measuring instrument designed to respond to color in a manner similar to the human eye.

### Comp

Comprehensive artwork used to present the general color and layout of a page.  
See Color Proof.

### Continuous Tone

Variation of density within a photographic or printed image, corresponding to the graduated range of lightness or darkness in the original copy or scene. Sometimes referred to as contone.

### Contone

See Continuous Tone.

### Contrast

Differences between light and dark tones, including the visual relationship of the tonal values within the picture in highlight, middletone, and/or shadow tones.

### Copy

Any material furnished for reproduction. For color printing it may be a color photograph (print or transparency), artist's drawing, or merchandise sample. Sometimes called original copy.

### Cromalin

A color proofing system that uses powdered pigments instead of ink.

### Cyan

The subtractive transparent primary color that should reflect blue and green and absorb red light. One of the four process-color inks. Sometimes called process blue.

### DCS

See Desktop Color Separation

### Densitometer

An electronic instrument used to measure optical density. Reflection and transmission versions are available.

### Density

The ability of a material to absorb light. Expressed as the logarithm (base 10) of the opacity, which is the reciprocal of the transmission or reflection of a tone.

### Desaturated Color

A color that appears faded, printed with too little ink, or as though white had been mixed with the colorant.

### Desktop Color Separation

An electronic color separation format that creates five PostScript files for each color image.

### Diarylide Yellow

A strong organic pigment, frequently used in yellow process inks. Formerly benzidine yellow.

### Diffuse Highlight

The lightest highlight area that carries important detail. Normally, these areas are reproduced with the smallest printed tone value.

### Digital

The use of discrete pulses or signals to represent data. In digital imaging systems, 256 steps are normally used to characterize the tone scale. Some color scanners use digital circuits.

### Direct Screen Color Separation

A system of producing color separation negatives or positives directly from the original. Each film is color separated and screened in one step.

### Dithering

A technique of filling the gap between two pixels with another pixel having an average value of the two, to minimize the difference or add detail to smooth the result. Often used when a full range of colors is not available.

### D-max

Maximum density that can be achieved in a given photographic or photomechanical system.

### D-min

Minimum density that can be achieved in a given photographic or photomechanical system.

### Doctor blade

A metal blade or knife (used in the gravure process) that removes ink from the surface of the gravure cylinder, leaving ink only in the recessed cells. A doctor blade is also used on some flexographic presses to remove ink from the surface of the anilox roll.

### Dot area

The proportion of a given area which is occupied by halftone dots. Usually expressed as a percentage.

### Dot etching

A manual technique for chemically changing the dot size on halftone films, for purposes of color correction or adjustment of individual areas. Similar techniques can be used for adjusting continuous-tone images on film or areas on metal relief or intaglio image carriers. Can be localized or general.

### Dot gain

The change in size of a printing dot from the film to the presssheet. Usually expressed as an additive percentage. For example, an increase in dot size from 50% to 60% is called a 10% gain. Dot gain has a physical component-- the gain in the dot area--and an optical component--the darkening of the white paper around the dot caused by light scatter within the substrate.

### Double Overlay Masking

See Two-Stage Masking.

### Doubling

A printing defect in halftone imaging processes that appears as a faint second image slightly out of register with the primary image.

### Drum Scanner

A color scanner on which the original is wrapped around a rotary scanning drum. See scanner.

### Dry Back

The change in density of a printed ink film from wet to dry caused by the penetration of ink into the substrate.

### Dry etching

A technique for creating selective or overall change in dot areas manipulating contact printing exposures onto photographic material.

### Ductor Roller

On an offset press, the transfer roller that carries the ink from the fountain to the roller train.

### Dupe

See Color Duplicating.

### Duplicate Transparency

A transparency created by color duplicating.

## Dye

A soluble coloring material, normally used as the colorant in color photographs.

## Dye Transfer

A method of producing color prints, first involving the making of red-, green-, and blue-filter separation negatives, and then the subsequent transfer of yellow, magenta, and cyan images from dyed matrices.

## Editorial Modifications

Changes requested by the customer to change a particular color in the reproduction so it is unlike the original.

## Electronic Color Correction

The process of correcting color on a color scanner or similar electronic imaging system.

## Electronic Masking

A simulation of photographic color correction masking by the circuits of a color scanner. Area drop-out masks are also made by electronic methods.

## Electronic Planimeter

A device used for the visual and mathematical evaluation of dot area. The equipment includes a microscope, a television camera and receiver, and a small computer.

## Elliptical Dot Screen

Halftone screen with an elliptical dot structure. Designed to avoid the sudden jump between midtone densities where the corners of square dots join. Elliptical dot screens help to reduce image graininess.

## Emulsion

The coating of light-sensitive material (silver halide) on a piece of film.

## Feedback Control Chart

An image produced on a printing press that supplies information to the color separation department for producing color separation films. Gray balance charts, color charts, and color reproduction guides are examples of feedback control charts.

## Filter

A transparent material characterized by its selective absorption of light of certain wavelengths. Used to separate the red, green, and blue components of an original when making color separation films.

## First-Surface Reflection

Light scattering from the surface of a printed ink film.

## Five- and Six-color Printing

A photomechanical variant of the subtractive color reproduction process that uses additional chromatic colors such as pink, light blue, or red in addition to colors similar to the process primaries. It expands the color gamut but is rarely used.

## Flat Color

A solid or tint area devoid of tonal variation. The color may be achieved by the use of overlapping halftone tints, a special ink mixture, or a single halftone tint. See screen lint.

## Flat Etch

A chemical technique to change the size of the dots over the entire halftone film image.

## Flatbed Scanner

A color scanner on which the original is mounted on a flat scanning table. See scanner.

## Fluorescence

The emission of light following the absorption of light of a shorter wavelength. Added to the light reflected by the color in the normal way, fluorescence gives an extra brightness. Often occurs through the conversion of ultraviolet radiation into visible radiation. Can occur in printing inks, papers, or original photographs, artwork, or retouching dyes and pigments.

## Foss Color Order System

A printed color chart that features color order, visually equal tone spacing, compact design, and full-range

black treatment.

#### Fountain Blade

On an offset press, the strip of flexible steel that forms the bottom of the ink fountain. The fountain roller forms the other side of the ink trough. Moving the blade- closer to or farther away from the fountain roller controls the thickness of the ink film across the roller.

#### Four-color Printing

A subtractive color reproduction process that uses yellow, magenta, cyan, and black colorants.

#### Full-Scale Black

A black printer that will print in all tonal areas of the reproduction from the highlight to the shadow.

#### Gamma

The ratio of the density range of a negative to the density range of the original. Also, the ratio of the density range of the reproduction to the density range of the original. A gamma of 1.0 means that the tones in the reproduction show the same separation as those in the original.

#### GCR

See Gray Component Replacement

#### Gloss

Physical characteristic of a surface. A high gloss is suggestive of a polished surface that has the effect of reducing first-surface reflections and increasing the density range of the image.

#### Grain

Silver salts clumped together in differing amounts in different types of emulsions. Generally speaking, faster emulsions have larger grain sizes.

#### Graininess

Visual impression of the irregularly distributed silver grain clumps in a photographic image, or the ink film in a printed image.

#### Gray Balance

The values for the yellow, magenta, and cyan that are needed to produce a neutral gray when printed at a normal density. When gray balance is achieved, the separations are said to have correct color balance. Gray balance is determined through the use of a gray balance chart. See color balance.

#### Gray Balance Chart

A printed image consisting of near neutral grid patterns of yellow, magenta, and cyan dot values. A halftone black gray scale is used as a reference to find the three-color neutral areas. The dot values making up these areas represent the gray balance requirements of the color separations. The gray balance chart should be produced under normal plant printing conditions. See Gray Balance.

#### Gray Component Replacement

The process of reducing the smallest halftone dot in areas where yellow, magenta, and cyan all print, together with quantities of the other two colors sufficient to produce a neutral gray, and replacing that neutral with black ink.

#### Gray Scale

An image containing a series of tones stepped from white to black that is used for monitoring tone reproduction. A gray scale is a photographic image in either transparent or reflective form. Sometimes called a step wedge or step tablet.

#### Gray Wedge

An image that varies continuously from white to black that is used for monitoring tone reproduction. It is a form of gray scale but does not have discrete tone steps. Often used for color scanner setup.

#### Grayness

In the Preucil Ink Evaluation System, the lowest of the three (red, green, and blue) densities expressed as a percentage of the highest. Percentage grayness =  $L/H \times 100$ .

#### Halftone

Image in which the range of tones consists of dots of varying area but of uniform density. Creates the illusion of continuous tone when seen at a distance. The normal imaging technique for reproducing tones by lithography, letterpress, flexography, and screen printing.

#### Halftone Tint

An area covered with a uniform halftone dot size to produce an even tone or color. Also called tint or screen tint.

#### Hard Copy

A tangible image such as an original, a proof or a printed sheet.

#### Hering Theory

A theory of color vision proposed during the nineteenth century by the German physiologist and psychologist Ewald Hering. Hering regarded yellow and blue, red and green, and black and white as pairs of opponent colors, where one member of each pair is perceived at a time.

#### High Key

A photographic or printed image in which the main interest area lies in the highlight end of the scale.

#### Highlight Mask

Generally, a light negative image that is registered with a normal density continuous-tone negative for the purpose of enhancing highlight tone contrast.

#### Highlights

The lightest areas in a reproduction. See Diffuse Highlight and Specular Highlight.

#### HLS

Color model based on three coordinates: hue, lightness (or luminance) and saturation.

#### HSV

Color model based on three coordinates: hue, saturation and value (or luminance).

#### Hue

Quality or sensation according to which differences of wavelength of radiant energy, such as blue, green, yellow, and red, are visually perceived.

#### Hue Error

In the Preucil Ink Evaluation System, the amount of the largest unwanted absorption of a process ink, expressed as a percentage of the wanted absorption content. Red-, green-, and blue-filter densitometer readings are made of a given color and used to compute the hue error with the following equation: Percentage hue error =  $(M-L/H-L) \times 100$  where H = the highest density reading, M = the middle, L = the lowest. The term is used to indicate departure from the ideal hue for a process ink.

#### Hurvich-Jameson Theory

See Opponent-Process Model.

#### Indirect Color Separation

The making of halftone screen negatives or positives from continuous-tone separation positives or negatives. Two steps are used, one for separation of color values, the other for the screening of tone values.

#### Ink Film Thickness

Thickness of the film of ink printed on a substrate. There is no simple relationship between this term and density, although the two are related.

#### Ink trap

See Trapping.

#### Integral Tripack

Photographic film or paper with three main emulsion layers coated on the same base. Each layer is sensitive to one primary color of light. During processing, a subtractive primary color dye image is formed in each layer.

#### Intensity

Synonym for color saturation.

### Interimage Reflection

The passage of light between layers of ink and the substrate. Can contribute to additivity failure and other printed image characteristics.

### Jones Diagram

A graph that presents steps in objective tone reproduction from the original to the separation negatives and the printed sheet. The relevant information at each stage is linked to the next by plotting the graphs on a quadrant in such a way that the influence of each successive step is displayed. Named after its inventor, Lloyd Jones.

### Joystick

An input device for an electronic color imaging system. The amount and direction of travel will alter the image qualities in some predetermined manner.

### Kelvin (K)

Unit of temperature measurement starting from absolute zero, which is equivalent to -273 Celsius. Used to indicate the color balance of a light source.

### Key

1. In photography. the emphasis on lighter or darker tones in a print; high key indicates prevalence of light tones; low key, prevalence of dark tones.
2. See Black.

### Knockout

A shape or object printed by eliminating (knocking out) all background colors. Contrast to Overprinting.

### Light Pen

An input device used in conjunction with a video display. The pen is touched to the display screen to identify the point to be processed .

### Lightness

Property that distinguishes white from gray or black, and light from dark color tones.

### Lightness/Dot Gain trade-off

The attempted balance of minimal dot gain and optimum image density by adjusting ink film thickness. Thin ink films will produce low dot gain along with light solids. Thick ink films will produce darker solids along with increased dot gain.

### Lithol Rubine

A reddish pigment used for making magenta inks. This pigment has relatively poor blue-light reflection.

### Look-up Table

A table, stored in computer memory, that contains the dot sizes needed to reproduce given colors. The processed input signals of certain color scanners are used to search the table to find the values that will produce the color represented by the signals.

### Low Key

A photographic or printed image in which the main interest area lies in the shadow end of the scale.

### LUT

See Look-up Table.

### Lux

Metric unit of illumination.

### Magenta

The subtractive transparent primary color that should reflect blue and red and absorb green light. One of the four process-color inks. Sometimes called process red.

### Masking

The process of making light photographic images, called masks from the original or a photographic image, for the purpose of color correction, contrast reduction, tonal adjustment, or detail enhancement. See Two-Stage Masking, Single-Stage Masking, Unsharp Masking, Highlight Masking, Electronic Masking.

### Masking Equation

A set of linear formulas used to determine the mask strength required for color correction. They are based on the unwanted absorptions of the colorants and assume perfect additivity and proportionality.

### Masstone

Color of ink in mass. Often differs from the printed color of the ink.

### Matte

A dull surface that scatters the specular component of light, thus causing the underlying tone to appear lighter. Lacking gloss or luster.

### Maxwell Triangle

Equilateral color triangle devised by James Clerk Maxwell in 1851 to show the composition of the ranges of colors produced by additive mixtures of red, green, and blue light.

### Mechanical Dot Gain

See Dot Gain.

### Metameric Color

A color that changes hue under different illumination. If two colors match under one illuminant but differ under another, their spectrophotometric curves are different.

### Metamerism

The process where a change in illuminant will cause visual shift in a metameric color.

### Metamers

Colors that are spectrally different but visually identical for a specified viewing condition.

### Midtones or Middletones

The tonal range between highlights and shadows.

### Modeling

The apparent detail in a picture that shows an article has surface texture or relief, such as the surface of an orange.

### Moire

An interference pattern caused by the out-of-register overlap of two or more regular patterns such as dots or lines. In process-color printing, screen angles are selected to minimize this pattern. If the angles are not correct, an objectionable effect may be produced.

### Mottle

Uneven color or tone.

### Munsell System

A method of classifying surface color in a solid. The vertical dimension is called value, the circumferential dimension is called hue, and the radial dimension is called chroma. The colors in the collection are spaced at subjectively equal visual distances.

### Murray-Davies Equation

A formula for calculating printed dot area based on densitometer measurements. The resulting calculations are for total dot area, including the optical and physical aspects. See Yule-Nielsen Equation.

### Nanometer

Unit of wavelength of electromagnetic radiation. Equivalent to 10-to-9th power meters. Visible light wavelengths range from 400-700 nanometers.

### Neugebauer Equations

A set of linear equations used for calculating tristimulus values of halftone color mixture combinations, when the dot areas of the contributing colors are known.

### Neutral

Any color that has no hue, such as white, gray, or black.

NM

Abbreviation for nanometer. See Nanometer.

Nonreproducible Colors

Colors in an original scene or photograph that are impossible to reproduce using a given set of colorants, because they are outside the gamut of the system.

Normal Key

Photographic copy in which the main interest area is in the middletone range of the tone scale or distributed throughout the entire tone range.

Off-Press Proofing

See Prepress Proofing.

OK Sheet

An approved press sheet that is intended for use as a quality guide for the rest of the production run.

Opacity

Describes a material's lack of transparency. In photography, it is defined as the reciprocal of the fraction of light transmitted through, or reflected from, a given tone. For printing ink, it is defined as the ink's ability to hide or cover up the image or tone over which it is applied.

Opponent-Process model

A theory of color vision that has been refined by Leo M. Hurvich and Dorothea Jameson. The theory assumes the existence of long, medium, and short wavelength cone receivers linked to cells that process stimuli in an opponent manner. It contains elements of the Young-Helmholtz and Hering theories.

Optical Density

The light-stopping ability of a photographic or printed image expressed as the logarithm of its opacity, which in turn is the reciprocal of the reflection or transmission.

Optical Dot Gain

See Dot Gain.

Optimum Color

A reproduction that represents the best compromise within the reproduction capabilities of a given printing system.

Original

A photograph, artist's drawing, or merchandise sample submitted for reproduction by the photomechanical process. Sometimes called original copy.

Ostwald System

A system of arranging colors in a color solid. The colors are described in terms of color content, white content, and black content. The solid appears as two cones, base to base, with the hues around the base, and with white at one apex and black at the other.

Overprint color

A color made by overprinting any two of the primary yellow, magenta, and cyan process inks to form red, green, and blue secondary colors.

Pantone Matching System

A system of solid ink color mixing, based on eight colors plus white and black. Not to be used for the specification of process dot percentage combinations. Mixed colors were referred to as PMS colors. The term PMS is no longer used by Pantone.

Pastel Colors

Soft or light colors usually in the highlight to midtone range.

Peaking

An electronic edge enhancement effect that produces the appearance of increased image sharpness.

Photomultiplier

Highly sensitive form of photocell for transforming variations in light into electric currents. Used in many color

scanners for creating the input signals to the computing circuits.

#### Phthalocyanine

A pigment available in a green shade or blue shade. A combination of the two is often used to create the cyan ink for process-color printing.

#### Pigment

An insoluble coloring material in finely divided form. Usually the colorant in printing inks.

#### Pixel

Picture element. The smallest tonal element in a digital imaging or display system.

#### PMS

See Pantone Matching System

#### Posterization

The deliberate constraint of a gradation into visible steps as a special effect.

#### Premask

An auxiliary mask used in the two-stage masking system to obtain color-correcting masks without contrast-reducing aspects. See Two-Stage Masking.

#### Prepress Proof

A color proof made directly from electronic data or film images.

#### Press Proof

A color proof produced on either a regular printing press or a special proof press.

#### Preucil Ink Evaluation System

A color evaluation system developed by Frank M. Preucil. A reflection densitometer is used to measure a printed ink film through Wratten #25, #58, and #47 filters relative to the substrate. These measurements are converted into hue error and grayness parameters for plotting on color diagrams. See hue error, grayness, color circle, color triangle.

#### Primary Colors

Colors that can be used to generate secondary colors. For the additive system, these colors are red, green, and blue. For the subtractive system, these colors are yellow, magenta, and cyan.

#### Process Blue

See Cyan.

#### Process-Color Reproduction

A printed color reproduction using the three process inks or the three process inks and black.

#### Process Ink Gamut-chart

A color chart for comparing the gamut or color limits that can be produced from any given ink set and substrate combination.

#### Process Inks

A set of transparent yellow, magenta, and cyan inks used for full-color printing. A black ink is also included in a four-color process ink set.

#### Process Red

See Magenta.

#### Progressive Proof

A set of press proofs that includes the individual colors, interspersed with overprints of the two-, three-, and four-color combinations in their order of printing. The proofs are used by printers on single-color presses as an aid when printing process-color work.

#### Proof

A prototype of the printed job that is made from plates (press proof), film, or electronic data (prepress proofs). It is generally used for customer inspection and approval before mass production begins. See Press Proof, Prepress Proof, Color Proof.

### Proportionality Failure

A common condition in halftone color printing where the ratio of red- to green- to blue-light reflectance in halftone tints is not the same as that in continuous ink solids.

### Purity

A synonym for saturation.

### Quality

When applied to printed images, it could mean:

1. The aesthetic aspect, influenced largely by the creativity and knowledge of the designer,
2. The technical aspect, the way the original is processed through the photomechanical system
3. The consistency of the printed image.

### Random Proof

See Scatter Proof.

### Real-Time

Computing at a speed that can produce results without a noticeable delay.

### Reflection Copy

An opaque original, photographed using reflected light.

### Reflex Blue

Used as a toner in black inks to neutralize the brownish tinge of carbon black pigments.

### Resolution

The ability to separate adjacent small details either visually, photographically, or photomechanically.

### Retouching

The art of making selective manual or electronic corrections to images.

### Rhodamine

A bluish red pigment used for making magenta ink. The Y or yellow shade of the pigment is normally selected. Has the best blue-light reflectance of the commonly used magenta pigments.

### Rosettes

The patterns formed when halftone color images are printed in register at the correct angles.

### Rotation

See Color Sequence.

### Rubine magenta

See Lithol Rubine.

### Saturation

The dimension of color that refers to a scale of perception representing a color's degree of departure from an achromatic color of the same brightness. The less gray a color contains, the more saturated it is.

### Scanner

A color separation device that electronically processes images point by point through circuits that color correct, manipulate tones, and enhance detail.

### Scatter Proof

Generally a press proof, containing many images placed randomly on the substrate. Also called a random proof.

### Screen Angle

The angle at which the rulings of a halftone screen are set when making screened images for halftone process-color printing.

### Screen Ruling

The number of lines per inch, in each direction, on a halftone screen.

### Screen Tint

A halftone screen pattern of all the same dot size that creates an even tone.

#### Secondary Colors

Colors that are produced by overprinting pairs of the primary subtractive colors. The subtractive secondary colors are red, green, and blue. Same as overprint colors.

#### Sensitivity Guide

A narrow, calibrated continuous-tone gray scale with each tone scale numbered.

#### Separation Films

Three photographic negative or positive images recording the red, green, and blue components of the colors of the original. A fourth image is usually produced through all three filters for the black printer.

#### Separation Filters

Red, green, and blue filters each transmitting about one-third of the spectrum and used when making color separations.

#### Setoff

The undesirable transfer of wet ink to the following sheet in the delivery pile.

#### Shadow Mask

Generally a light positive image that is registered with a normal density continuous-tone positive for the purpose of enhancing shadow tone contrast.

#### Shadows

The darkest areas in a reproduction.

#### Sharpness

The subjective impression of the density difference between two tones at their boundary.

#### Shoulder

The upper, convex end of the characteristic curve of a photographic emulsion where equal log exposure increases show decreasing density differences as its slope gradually diminishes to zero.

#### Single-Stage Masking

A process where a light photographic image that has been produced through one filter is registered with an image that has been produced with a different filter for the purpose of correcting for the unwanted absorptions of the printing inks. The process also reduces contrast of the masked image.

#### Skeleton Black

A black printer that will print only the darker half of the gray scale from the middletones to the shadow areas.

#### Slur

A directional dot distortion effect that can occur in halftone printing. A round dot would appear elliptical in shape.

#### Soft Copy

An image on a video display terminal.

#### Spectral Response

The manner in which the eye responds to visible radiation. Often used to describe how the light-sensitive component (photomultiplier or film) in a color separation system responds to visible and invisible radiation.

#### Spectro-Photometer

An instrument for measuring the relative intensity of radiation throughout the spectrum that is reflected or transmitted by a sample.

#### Spectro-Photometric Curve

A graph showing the reflectance or transmittance of a sample as a function of wavelength

#### Specular Highlight

The lightest highlight area that does not carry any detail, such as reflections from glass or polished metal. Normally, these areas are reproduced as unprinted white paper.

#### Spot Color

Localized nonprocess ink color. May be printed as a supplemental color.

#### Staging

The process of applying protective lacquer or varnish to a negative or positive image in preparation for selective dot etching. Can cause staging lines, especially when applied in areas of soft-focus detail.

#### Standard Inks

A set of process inks made to the color specifications of a standards-setting organization. Common in the publications industry for proofing advertising reproductions, but otherwise uncommon .

#### Standard Viewing Conditions

A prescribed set of conditions under which the viewing of originals and reproductions are to take place, defining both the geometry of the illumination and the spectral power distribution of the illuminant. For the graphic arts, the standard specifies 5,000 K color temperature, 90 color-rendering index, transparent gray surround with transparencies, and viewing at an angle to reduce glare.

#### Star target

A circular test image containing alternating light and dark wedge shapes that meet at a point in the center of the target. A common target for monitoring dot gain, slur, and doubling on press. Also used for evaluating resolution of a given photographic or photomechanical system.

#### Step Wedge or Step Tablet

See Gray Scale.

#### Straight Line

Region of constant slope of the characteristic curve of a photographic emulsion where density is directly proportional to the logarithm of exposure.

#### Stripping

The preparation and assembling of film prior to platemaking.

#### Substrate

The paper or any other generally flat material upon which an image is printed.

#### Subtractive Color Process

A means of producing a color reproduction or image by combinations of yellow, magenta, and cyan colorants on a white substrate.

#### Subtractive Primaries

Yellow, magenta, and cyan dyes or pigments, at least two of which must be transparent. When combined in various intensities or areas (dots), they can produce any other color.

#### Superadditivity

The opposite of additivity failure. Occurs when the total density of overprinted ink films exceeds the sum of the ink densities.

#### Tack

The resistance to splitting of an ink film between two separating surfaces, i.e., stickiness. To improve trapping in wet-on-wet printing, the ink being printed should have a lower tack than the ink that was printed before it.

#### Texture

1. A property of the surface of the substrate.
2. Variation in tonal values to form image detail.

See Modeling.

#### Three-Color Strength

The combination of solid yellow, magenta, and cyan areas on a color control strip. This color will normally appear slightly brown.

#### Tinctorial Strength

The concentration of colorant in a printing ink.

#### Tint

1. A halftone area that contains dots of uniform size, that is, no modeling or texture.
2. The mixture of a color with white.

#### Toe

The lower, concave end of the characteristic curve of a reflection photographic emulsion where exposures are not recorded as proportional densities.

#### Tone

Any variation in lightness or saturation while hue remains constant.

#### Tone Reproduction

A term that relates the density of every reproduced tone to the corresponding original density. This may be facilitated by the use of graphical techniques.

#### Toner

Pigments that are added to printing inks as supplemental colors, used to get greater tinctorial strength.

#### Transmission

An original that must be viewed by transmitted light.

#### Transparent Ink

An ink that contains a vehicle and a pigment with the same refractive index. Excluding the selective color absorption, these inks will allow light to be transmitted through them without loss.

See Opacity.

#### Trapping

The ability of an ink to transfer equally to unprinted substrate and a previously printed ink film. Apparent trap is measured via the equation:

$$\text{Dop} = D1/D2 \times 100$$

where D1 = the density of the first-down color, D2 = the density of the second-down color, and Dop = the density of the overprint, all measured through the filter complementary to the second-down color.

#### Tristimulus Colors

Three color stimuli that, when used in appropriate proportions, will closely match any given color. In practice, red, green, and blue lights are used. Their composition may range from monochromatic spectral lines to bands of wavelengths, each of which comprises about one-third of the visible spectrum.

#### Two-Stage Masking

A color correction process. A full-range positive premask is made from one separation negative and combined with another separation negative for the purposes of making a final mask that, when returned to the first negative, will correct for some of the unwanted ink absorptions without lowering contrast. A total of three pre masks and three final masks are usually made. Usually called the Double Overlay Method in Australia and Britain.

#### UCR

See Undercolor Removal

#### Ultraviolet

Invisible, electromagnetic radiation of a shorter wavelength (10--400 nanometers) than blue. Can create fluorescence effects with the appropriate materials.

#### Undercolor Removal (UCR)

A technique used to reduce the yellow, magenta, and cyan dot percentages in neutral tones and replacing them with increased amounts of black ink.

#### Undertone

Color of ink printed in a thin film.

#### Unsharp Masking

A light transparent photographic image that is deliberately unsharp. The mask is combined with the sharp image from which it was made, thus enhancing the sharpness of subsequent images made from the combination.

#### Unwanted colors

Colors that should not be in three of the patches of a Color Reproduction Guide; for example, yellow in cyan, blue, and magenta. Sometimes called white colors.

#### Value

Term used in the Munsell System to describe lightness.

#### Wanted colors

Colors that should be in three of the patches of a Color Reproduction Guide; for example, yellow in red, yellow, and green. Sometimes called black colors.

#### Wavelength

Quantitative specification of kinds of radiant energy.

#### White

1. The presence of all colors.
2. The visual perception produced by light of relatively high overall intensity and having the same relative intensity of each wavelength in the visible range that sunlight has.

#### White Colors

See Unwanted Colors.

#### Wratten

Comprehensive range of photographic filters manufactured by Eastman Kodak Company.

#### Xenon lamp

A powerful light source used for camera illumination, color scanning, and in some optical radiation measuring instruments.

#### Yellow

The subtractive transparent primary color that should reflect red and green, and absorb blue light. One of the four process-color inks.

#### Young-Helmholtz Theory

The theory of color vision proposed by Thomas Young in the early nineteenth century that our judgments of color are based on the functioning of three kinds of receptors in the eye, each having peak sensitivities in the red, green, and blue parts of the spectrum, respectively. H. L. F. von Helmholtz elaborated on this theory.

#### Yule-Nielsen Equation

A modification of the Murray-Davies equation to compensate for light scatter within a substrate when measuring printed dot area. This equation calculates the physical dot area. zone theory

See Opponent-Process Model.

#### Zooming

The process of electronically enlarging an image on a video display terminal to facilitate electronic retouching.