Color Printing Variables

graphic reproduction

- Image Surface
  - Grain
    - Highlight
    - Shadow
- Variation in the Sensitivity
  - Dot Gain or Loss
  - Ink Holding & Transferability
- Machine Variability in Developing and Etching
- Quality of Input Material
  - Spectral Characteristics
    - Filters — Wide & Narrow band
    - Films — Spectral response
- Light Source
- Screen Angle
- UCR — 400, 280, 240 200, 120, 100° and Black Printer
- Screen Ruling 150-85
- Grey Scale — A.M.B. Middle Tone Shift

plate

(connects to graphic reproduction variables above)

paper

- Opacity
  - Color
- Porosity
  - Absorbancy & Uniformity of Absorption
  - Moisture Content
- Smoothness Roughness
  - Gloss
  - First Surface and Internal Reflections
- Elasticity
  - Impression Tolerance Paper Compressibility
    - Thickness/ Caliper
- Surface — chemistry of coating and sizing

water

- Amount of Water in Ink and Vice Versa
  - pH
    - Alkali
    - Neutral
    - Acid
  - Purity of Water
- Amount of Water on Plate

ink

- Opacity
  - Transparency
- Gloss
  - Ink Fountain Solution Balance
  - Ink Emulsification
- Ink Dryer Composition
- Tack
  - Viscosity
  - Dynamic Viscoelasticity
- Elasticity
- Color Sequence
- Ink Formulation "Properties" and Composition of the Vehicle
- Pigment and Particle Size
- Drying Time — Setting Time
  - Ink Level
  - Optical Effective in Printed in Layers
    - Single Color Paper
    - Over Printed Layers
- Shift Ink Amount — Volume of Ink Feeding
  - Balanced Inks — Greyness, Hue, Error, etc.
- Temperature
  - Cohesion & Adhesion

human

- Physical Attributes — Able to perceive line tones, hues, etc. To judge accurate register and alignment. To make fastidious adjustments.
- Mental Aptitudes — Mechanically minded, ability to understand and adapt to new methods & machines, intelligent, highly motivated and a perfectionist.
- Trained — To notice variations in plate, inks and the running of the presses, etc. Confident in handling equipment & materials, meticulous in attending to detail.

printing processes

- Mechanical Properties
- Printing Speed — Rate
  - Packing
    - Impression
    - Squeezeout
  - Machine Construction "Geometry" Composition of Rollers — Cylinder Diameter Gears (quality, dimensional stability, finishing & shape of the teeth) Bearer to bearer Ink, Train, cooling system NOTE: More gears than needed is better than too few
  - Impression Intervals
  - Printing Intervals
- Printed Dot
  - Gain — 1/C–6-10% 2/C–10-15% 4/C–16-20%
  - Deformation — • slurring • doubling • offsetting
- Relaxation Time
- Printing Units
  - 1/C
  - 2/C
  - 4/C
  - Convertible
  - Perfecting 1C-2C
- Printing Sequence
  - Humidity Moisture
- Drying Temperature — Press room temperature Machine temperature Temperature on Inking System
  - Water Composition — for Fountain Solution Water effects on half-tone dots and trapping
- Press Mechanical Condition
  - Printing Process — Letterpress Gravure Offset
- NIP– Impact Area
  - Blanket
  - Shockwave theory Vibrational theory Cavitation theory Ink film splitting Ink transfer Ink trapping