Morning Session – Day 1

Basic Software Functionality

- ❑ Selecting a Database
  - o Remember instrument geometry
  - o QA database vs. Formulation database
- ❑ Instrument Calibration
- ❑ Formulation Mode vs. QA Mode
- ❑ Standard Entry (same function as QA)
  - o Tolerancing
    - ▪ How does it effect any matches
      - Ill/obs selection
      - SPIN/SPEX selection

Performing a Combinatorial Match

- ❑ Defining the Match Parameters
  - o Selecting a calibration set
  - o Selecting colorants
  - o Setting parameters
    - ▪ Colorants per formula
    - ▪ Always use white, black, waste
    - ▪ Fixed Add
  - o Saving and loading colorant groups
- ❑ Performing a Match (Use the table top as a standard)
  - o Setting Options
    - ▪ Fixed Load
    - ▪ Fixed Opacity / Film Thickness
    - ▪ Substrate
  - o Formula results
    - ▪ Changing graphic display
    - ▪ Viewing various formulas from the list
- ❑ Review & Test

Morning Break

Evaluation of Matches

- Choosing the Right Match
  - Using the Sort Criteria
    - DE – Delta E
    - MI – Metamerism Index
    - CFI – Curve Fit Index
    - CRI – Correctability Index
    - %LD – Percent Load
    - %OP – Percent Opacity
    - Cost / Combinations
  - Advanced formula view with additional sort criteria
    - DE – P
    - DE – S
    - DE – T
    - MI – 2
    - CFI - 2
  - Selecting a match
    - Based on calculated values (sorted)
    - Based on users experience

- Adjusting a Formula
  - Manually
    - Selecting a component
    - Using the scroll bars
    - Entering desired percentages
  - Automatic
    - Selecting a component
    - Fixing a specific color direction (L*, a*, b*, C*, h°)
  - Saving modified formula

- ❑ Scaling the Formula Output – Report
  - o Paint/Plastic
    - ▪ Formula Mode
      - Oz/Shots
      - Wt/Vol
      - Dry or paste / colorant
    - ▪ Formula scaling – Paint/Plastic
      - Total
      - Vehicle/Resin
      - Colorants
  - o Ink
    - ▪ Formula Mode
      - Light
      - Heavy
      - Concentrate
    - ▪ Formula scaling
      - Total
      - Extender
      - Inks
  - o Textiles
    - ▪ Formula scaling
      - Total
      - Dye bath
      - Colorants
  - o Output of formula
    - ▪ Printing
    - ▪ Exporting
    - ▪ Dispensing

- ❑ Independent Practice

- ❑ Review & Test

Lunch Break

Return in One Hour

Afternoon Session – Day 1

Some Definitions

- Defining Sample Types
  - Match – computer generated formula
  - Trial – measurement of a batch with known formula
  - Sample – measurement without a known formula – QA

- Defining Some Ink Terms (Ink class only)
  - Light – press ready
  - Heavy – needs solvent
  - Concentrate – separate components

Performing Formula Corrections

- Create a Standard and Match
  - Use the Visual Color Difference brochure
    - Create the "blue" center chip as standard
    - Generate a combinatorial match and save
    - Measure the "Light Tolerance" as a Trial
      - Select formula
      - Enter actual weights – an absolute MUST DO!

- Generating a Correction
  - Select the Trial
  - Run correction
  - Selecting options
    - Batch Add Mode
    - Use Correction Factors
    - Minimize DE to meet max Add of
    - Minimize Add to meet max DE of
  - Adding additional colorants/inks
  - Adjusting the formula
    - Manual
    - Auto
  - Saving the formula

- ❑ Formula Report – Batch Add
  - o Amount of existing material
  - o Desired batch size
  - o Formula output
    - ▪ Printing
    - ▪ Exporting
    - ▪ Dispensing

- ❑ Independent Practice

Quick Correct

- ❑ Correcting a sample (no formula)
  - o Select a sample (not a trial)
  - o Run correction
  - o Select Colorant Set & possible colorants/inks
    - ▪ Select all colorants/inks
    - ▪ Select “best guess” of colorants/inks
  - o Evaluate results
  - o Save & report formula

- ❑ Using the Quick Correct Wizard
  - o Measure Standard
  - o Measure Sample
  - o Select Colorant Set & possible colorants/inks
    - ▪ Select all colorants/inks
    - ▪ Select “best guess” of colorants/inks
  - o Evaluate results
  - o Save & report formula

- ❑ Independent Practice

- ❑ Review & Test

Afternoon Break

Using Your Existing Standards & Trials

- Formulate from Trial
  - Select a standard to match
  - Run Formulate From Trial
  - Select option
    - DE for trial selection
    - Date
    - Customer
    - Tags
    - Colorant Set
  - Do search
  - Evaluate results
  - Select match and output

- Entering Pre-existing Trials / Batches
  - Create / select standard
  - Measure trial / batch
  - Click on Formula
    - Click on colorants/inks
    - Select colorants/inks used in trial / batch
    - Enter amounts
  - Trial / batch now available for Formulate from Trial

- Search Standards
  - Find standard
  - Measure & find

Waste Work-off

- ❑ Waste from Trial (not available in FMI or FMII)
  - o Select trial
  - o Database, Waste From Trial
  - o Name the waste

- ❑ Use Quick Correct function
  - o Measure Standard
  - o Measure waste as the trial
  - o Run correction

Queuing Formulations

- ❑ Using the formulation Queue
  - o Adding formulations to the requests queue
  - o Formulating the queue
  - o Viewing the results

Wrap-up

- ❑ Independent practice
- ❑ Questions
- ❑ Review & Test

Morning Session – Day 2 (FM2001, InkMaster, and X-RiteColor Master FMIII level users only)

Theory of Color Matching – Presentation

- ❑ Understanding how my computer can mix color
  - Kubelka & Munk
    - Who are they
    - What is their theory
  - Absorption & Scattering (K & S)
    - What are they
    - Determining K & S for colorants/inks
    - Determining K & S of standards
    - Matching math
  - Saunderson's correction factors
    - k1 – external reflectance factor
    - k2 – internal reflectance factor
  - Dealing with negative K & S values
    - Sample adjustment
    - Adjusting k1 & k2
  - Sample preparation
    - Proper letdown levels
    - Number of levels per colorant/ink

- ❑ Types of Calibration Sets
  - Dual Constant Math – Relative
    - With white
    - Without white
  - Dual Constant Math – Absolute
    - With white
    - Without white
  - Single Constant Math
    - Reflection
    - Transmission
  - Multi-Flux Math

- ❑ Review Sample Preparation Guides

- ❑ Review & Test

Morning Break

Entering a Calibration Set

- ❑ Choosing the Type of Calibration Set
  - o Choose the appendix for your database type
    - ▪ Appendix A – Paint/Plastic containing white
    - ▪ Appendix B – Paint/Plastic doesn't contain white
    - ▪ Appendix C – Ink single constant
    - ▪ Appendix D – Ink multi-flux
    - ▪ Appendix E – Textile
- ❑ Walking Through Database Entry
  - o Instructor demonstration for each type used by class attendees
- ❑ Review & Test
- ❑ Hands-on Database Entry
  - o Create calibration set – using appendix
  - o Create colorants/inks – using appendix

Lunch Break

Return in One Hour

- ❑ Independent Practice
  - o Continue entering colorants
  - o Create additional calibration sets
    - ▪ Use different database type if applicable

Testing a Calibration Set

- ❑ Create Standards with Cross-mixes (knowns)
  - o Measure in as standard
  - o Enter actual formula in note field

- ❑ Match Cross-mixes
  - o Do combinatorial formulation
  - o Check formula % against actual
  - o Manually adjust formula equal to actual
    - ▪ Check DE predicted
  - o Adjust colorants as needed
    - ▪ Remove letdowns
    - ▪ Adjust k1 or k2

- ❑ Review & Test

Afternoon Break

Advanced Database Tools

- ❑ Entering Waste
  - o As a colorant
  - o From trial

- ❑ Duplicate Calibration Set

- ❑ Secondary Calibration Set
  - o Enter name
  - o Measure samples
    - ▪ Vehicle/Resin/Substrate
    - ▪ Colorant/black letdown

- Formulation Options
  - Calibration level interpolation
    - Use total %
    - Use individual %
    - Combination of both
  - K/S extrapolation
    - Flat
    - Linear
    - Auto
  - K/S reporting
    - Negative values
    - Report decreasing K/S with increasing concentration
  - Allow negative add in correction
  - Max allowable DE for a match
  - Max iterations for convergence
  - Enable dispenser report
    - Save file as
    - Button label
    - Prompt for file name option

Wrap-up

- ❑ Independent practice
- ❑ Questions
- ❑ Review & Test
- ❑ Getting HELP from X-Rite
  - o Use the web:
    http://www.xrite.com/contact/ContactUs.asp
  - o WebEx Study Halls
    http://www.xrite.com/support/webinars.asp
  - o Send E-Mail to:
    mailto:CASupport@xrite.com
  - o Try the Bulletin Board:
    http://www.xrite.com/helpdesk/bulletinboard.asp
  - o Contact Customer Service by phone:
    888-826-3042 (US & Canada only)
  - o Send a Fax to:
    616-534-0723

APPENDIX A

Creating a Colorant File – Paint/Plastic CONTAINS White

- Creating a Calibration Set
  - Identify calibration set
    - Name, supplier, notes & tags
  - Select application (Paint or Plastic)
  - Formulation characteristics
    - Method (Two-Constant)
    - Vehicle/resin (contains white)
    - K&S values (relative or absolute)
  - Setting k1 & k2
  - Vehicle/Resin properties
    - Strength
    - Paste
    - Cost
    - Density / WPG
    - Min/max vehicle/resin loading
  - Components (optional)
    - Identify up to 6 components (vehicles, additives, solvents, etc.)
      - Name
    - Component properties
      - Density/WPG, cost, % in vehicle/resin
      - Check if used in vehicle/resin and/or used in colorant
      - Vehicle/resin components must equal 100%
  - Vehicle/Resin cal data
    - Measure a sample of the vehicle/resin

APPENDIX A – cont.

- Creating Colorants
  - Identify colorant
    - Name, supplier, type (other, black, white, waste), notes & tags
  - Colorant properties
    - Density / WPG
    - Cost
    - Strength
    - Paste
    - Min/max loading
  - Components (optional)
    - % of each concentrate component
  - Calibration data
    - Masstone or black letdown
    - Enter % colorant in white letdown
      - Click Add & repeat for next letdown
    - Click measure all and measure samples
      - Use contrast ratio when needed
    - View K vs. concentration and evaluate
    - Click verify to test letdowns

APPENDIX B

Creating a Colorant File – Paint/Plastic DOESN'T Contain White

- Creating a Calibration Set
  - Identify calibration set
    - Name, supplier, notes & tags
  - Select application (Paint or Plastic)
  - Formulation characteristics
    - Method (Two-Constant)
    - Vehicle/resin (doesn't contain white)
    - K&S values (relative or absolute)
  - Setting k1 & k2
  - Vehicle/Resin properties
    - Cost
    - Density / WPG
    - Min/max colorant loading
  - Components (optional)
    - Identify up to 6 components (vehicles, additives, solvents, etc.)
      - Name
    - Component properties
      - Density/WPG, cost, % in vehicle/resin
      - Check if used in vehicle/resin and/or used in colorant
      - Vehicle/resin components must equal 100%
  - Cal. White
    - Identify white
      - Name, notes & tags
    - White properties
      - Cost, density/WPG, strength, paste, min/max
    - Calibration data
      - Enter % white in vehicle/resin and measure

APPENDIX B – cont.

- Cal. Black
  - Identify black
    - Name, notes & tags
  - Colorant properties
    - Cost, density/WPG, strength, paste, min/max
  - Calibration data
    - Black letdown – enter % black in vehicle/resin
    - Enter % black & % white in white letdown
      - Click Add & repeat for next letdown
    - Click measure all and measure samples
      - Use contrast ratio when needed
    - View K vs. concentration and evaluate
    - Click verify to test letdowns

❑ Creating Colorants

- Identify colorant
  - Name, supplier, type (other, black, white, waste), notes & tags
- Colorant properties
  - Density / WPG
  - Cost
  - Strength
  - Paste
  - Min/max loading
- Components (optional)
  - % of each concentrate component
- Calibration data
  - Masstone (100% colorant, 0% black) or black letdown
  - Enter % colorant and % white in white letdown
    - Click Add & repeat for next letdown
  - Click measure all and measure samples
    - Use contrast ratio when needed
  - View K vs. concentration and evaluate
  - Click verify to test letdowns

APPENDIX C

Creating a Colorant File – Ink Single Constant

- Creating a Calibration Set
  - Identify calibration set
    - Name, supplier, notes & tags
  - Select application - Ink
  - Formulation method
    - Single constant
  - Setting k1 & k2
  - Set film thickness
  - Substrate
    - Enter name and measure
  - Extender properties
    - Cost
    - Density / WPG
    - Min/max colorant loading
  - Heavy ink components (optional)
    - Solvent density and cost
    - % added to clear (extender)
  - Concentrate components (optional)
    - Identify up to 6 components (vehicles, additives, solvents, etc.)
      - Name
    - Component properties
      - Density/WPG, cost, % in extender
      - Check if used in extender and/or used in ink
      - Extender components must equal 100%

APPENDIX C – cont.

- Creating Inks
  - Identify ink
    - Name, supplier, type (other, black, white, waste), notes & tags
  - Ink properties
    - Density / WPG
    - Cost
    - Strength
    - Min/max loading
  - Components (optional)
    - % solvent added to heavy ink
    - % of each concentrate component
  - Calibration data
    - Enter % ink in letdown
      - Click Add & repeat for next letdown
    - Click measure all and measure samples
    - View density vs. concentration and evaluate
    - Click verify to test letdowns

APPENDIX D

Creating a Colorant File – Ink Multi-Flux

- Creating a Calibration Set
  - Identify calibration set
    - Name, supplier, notes & tags
  - Select application - Ink
  - Formulation method
    - Multi-flux
  - Setting k1 & k2
  - Set film thickness
  - Substrate
    - Enter name and measure
  - Extender properties
    - Cost
    - Density / WPG
    - Min/max colorant loading
  - Extender calibration data
    - Measure over black, over white, substrate
  - Heavy ink components (optional)
    - Solvent density and cost
    - % added to clear (extender)
  - Concentrate components (optional)
    - Identify up to 6 components (vehicles, additives, solvents, etc.)
      - Name
    - Component properties
      - Density/WPG, cost, % in extender
      - Check if used in extender and/or used in ink
      - Extender components must equal 100%

APPENDIX D – cont

- Creating Inks
  - Identify ink
    - Name, supplier, type (other, black, white, waste), notes & tags
  - Ink properties
    - Density / WPG
    - Cost
    - Strength
    - Min/max loading
  - Components (optional)
    - % solvent added to heavy ink
    - % of each concentrate component
  - Calibration data
    - Enter % ink in letdown
      - Click Add & repeat for next letdown
    - Click measure all and measure samples
      - Over black
      - Over white
    - View k vs. concentration and evaluate
    - Click verify to test letdowns

APPENDIX E

Creating a Colorant File – Textile

- Creating a Calibration Set
  - Identify calibration set
    - Name, supplier, notes & tags
  - Select Application – Textile batch or Textile printing
  - Formulation method
    - Single constant
  - Setting k1 & k2
  - Set film thickness
  - Substrate
    - Enter name and measure
  - Extender properties
    - Cost
    - Density / WPG
  - Extender components (optional)
    - Identify up to 6 components (additives, solvents, etc.)
      - Name
    - Component properties
      - Density/WPG, cost, % in extender
      - Check if used in extender and/or used in colorant
      - Extender components must equal 100%

APPENDIX E – cont

- Creating Colorants
  - Identify colorant
    - Name, supplier, type (other, black, white, waste), notes & tags
  - Colorant properties
    - Density / WPG
    - Cost
    - Strength
    - Min/max loading
  - Components (optional)
    - % of each concentrate component
  - Calibration data
    - Enter % colorant in letdown
      - Click Add & repeat for next letdown
    - Click measure all and measure samples
    - View density vs. concentration and evaluate
    - Click verify to test letdowns