Richard W. Harold
Curriculum Vitae

Richard W. Harold is a consultant on color and appearance technology. He manages the group, *Color and Appearance Consulting LLC*, licensed in the Commonwealth of Virginia. The range of services includes color and appearance measurement, applications engineering, consulting, and custom educational training programs. He is also a member and consultant with *Avian Group USA.*

Mr. Harold received his B. S. degree in chemistry from the University of South Florida (Tampa) in 1965. He was a research chemist for the Mary Carter Paint Company (Tampa, Florida) from 1965-1967 where he was responsible for paint formulation research and color control. From 1967-1970, he was the Color Control Coordinator for the Harshaw Chemical Company (today known as Engelhard Corporation), Color Pigment and Dye Division (Louisville, Kentucky), where he was responsible for implementing color measurement and developing color control tolerances. He was Associate Director at Hunter Associates Laboratory (Reston, Virginia), a manufacturer of color and appearance instrumentation, from 1970 – 1998 where he was responsible for applications engineering, color and appearance research, consulting, and educational programs. He was Senior Color Scientist at the Graphic Arts Technical Foundation (Sewickley, PA) from 1998 – 2000. He served as a consultant on color and appearance applications and education for BYK-Gardner USA (Columbia, MD) from 2000 to 2003.

Mr. Harold is a Chartered Colourist and Fellow of the Society of Dyers and Colourists (U. K.). He is Chairman of the International Organization for Standardization (ISO) Committee TC 38/SC-1 and Convener (Chairman) of Working Group 7 (Colour Measurement). He is Chairman of the AATCC International Test Methods Committee (C2-S1) and Chairman of the USA Technical Advisory Group (TAG) for ISO TC 38. He is the Liaison Officer to ISO TC-87 (Colour Notations). He is Vice-Chairman of the American Society for Testing and Materials (ASTM) Committee E12 on Color and Appearance. He is actively involved in the work of ASTM, ISO, the Inter-Society Color Council (ISCC), and the U.S. National Committee of the C.I.E.

Mr. Harold has lectured extensively and has published numerous technical papers on the subjects of color and appearance technology and has co-authored with Richard S. Hunter, *The Measurement of Appearance, Second Edition*.

Color and Appearance Seminar
On-Site Seminar Content

On-Site seminar can include, but are not limited to, the following subjects. Please check those you wish to include in the presentation to your group. List addition desired topics on Information Form.

☐ What makes up appearance; understanding the basics

☐ Background on numerical specification for color and appearance

☐ Color and color difference scales – the latest recommendations

☐ Single number indices, such as whiteness and yellowness

☐ How to select and implement industrial tolerances for raw materials and finished products; includes use of the CMC and CIE ΔE2000 formulas

☐ Correlation of visual observation to instrumental measurement

☐ Descriptions of different instrument geometries: sphere d/8°– specular component included vs. excluded; 45°/0° and 0°/45°; goniophotometers and goniospectrophotometers – the choices, applications and limitations for each

☐ Review of gloss, distinctness of image, luster, and fluorescence

☐ How to apply color difference information to make color adjustments

☐ Useful methods to improve measurement precision; sample presentation and preparation

☐ Standards – proper care and multiple uses

☐ Practical experiments illustrating proper measurement techniques

☐ The effect of different lighting conditions on the perceived color of a single specimen (color constancy), and the effect on an apparent “color match” of a pair of specimens (metamerism). A customer supplied light box is required for this demonstration.

☐ Available Color Blindness Test – Farnsworth-Munsell 100 Hue Test for testing color vision anomalies. *Note: This test is a demonstration only and does not replace those performed by licensed professional optometrists.* (Time required: 10 – 15 minutes per person)

☐ “Hands-on” practice of the proper methods of color and appearance measurement and instrument operation

Color and Appearance Seminar

"Practical Applications for Industry"

This one-day seminar is intended both for the novice, who needs to quickly "get up-to-speed", and those more experienced, who would like to keep abreast of new developments and technology.

Your instructor is Richard W. Harold, Color and Appearance Consulting LLC, a member of Avian Group USA. His background includes paint and coatings chemistry, pigment & dye manufacturing and color control, and working with Richard S. Hunter in teaching color & appearance science and the instrumental applications for a broad array of industries including paints, coatings, plastics, textiles, foods, architectural materials, cosmetics, pharmaceuticals, graphic arts and forensics.

Subjects that will be covered include:

- Understanding the Nature of Appearance
- Interaction of Light, Object, Observer
- Development of Numerical Specifications for Color
- Process of Color Vision
- Scales for the Measurement of Color Difference
- Selection and Implementation of Industrial Tolerances
- Latest Developments in Pass/Fail Decisions
- Standard Viewing Conditions for Visual Judgments
- Analyzing Appearance – Gloss, Haze, and Distinctness-of-Image
- Analyzing Color – Spectrophotometers – 0°/45° or sphere d/8°?
- Appearance Research – Goniophotometers & Goniospectrophotometers
- Fluorescence
- Instrumental Applications & Proper Measurement Techniques
- Standards – Proper Care and Usage
- Precision, Repeatability, Reproducibility, Accuracy
- Color Vision Testing
- Demonstrations, Questions & Answers

Participants are urged to bring samples of their own products for either classroom discussion or private consultation.

For further information, please call Richard W. Harold – Color and Appearance Consulting LLC at (703) 709-5453

Color and Appearance Seminar
On-Site Information Form

Name(s) of Contacts: _____

Company Name: _____

Shipping Address: _____ Billing Address:_____
_____ _____
_____ _____

Telephone: _____ Fax: _____

Method of Payment: __Check
__Purchase Order _____

Requested Date of Seminar: _____
Alternative Date(s): _____

Seminar Starting Time:_____
Lunch Start Time: _____ Lunch Period: 30 min 45min 1hour
Seminar Ending Time: _____

Number of Attendees: _____ (Course materials will be prepared for this number.)

What products do you work with? _____

What appearance aspects concern you? color_____ haze _____ gloss _____
other_____

What instruments does your company currently own and are you using them? _____
_____
_____

Please indicate on accompanying form those subjects you wish covered. List any additional subjects here: _____
_____

Can you supply a projector that can be hooked to a computer? If so, please list type_____
_____

Can you supply a projection screen? _____ podium _____ flip chart _____

Please indicate approximate time allotment for the following(i.e. # hours, ½ day, etc)
Lecture Presentation_____
Application Discussion/Testing _____
Hands-on Instrument Training _____
Discussion Time_____

Can you supply an instrument(s) for the hands-on session:_____
_____

Other comments: _____
_____
_____