SPE COUNCIL REPORT

By John Copp

The latest SPE Council meeting was held October 3 in Dusseldorf. A number of points of interest were discussed by the Council and various Committees. Gail Bristol, SPE Manager of Section Division Services, made a presentation of developing a fund raising program for SPE. This program would solicit donations from individuals and companies for use in SPE programs. Council voted in favor of implementing this concept.

SPE has its own World Wide Web home page at HTTP://WWW.BBSNET.COM/SPE. A vote was taken on whether the Society should have a policy on World Wide Web pages that represent SPE interests. It was decided that SPE should review all pages content before they can be official SPE sites.

Formation of Subdivisions in Europe is now being tested by the international Committee and the Engineering Properties and Structures Division.

CAD PEOPLE

By John Copp

The purpose of this column is to inform you of changes in the lives and careers of CAD people. Please input those positive change to John Copp ((517) 6366-9281) so we can keep everyone informed.

JOHN WOODS, formerly of Ampacet, has accepted a position as Director Technology for Teknor Apex's concentrate division in Rhode Island.

CHANDRAHAS "PETE" PATEL is now Technical Manager for Carolina Color in Lancaster, TX.

DON DEEM has become Director of Technical Services of Teknor-Apex following the sale of Accurate Color to Teknor. Don has been having health problems recently. I'm sure he would appreciate a call or a letter.

BRUCE MULLER, former owner of Accurate, is acting as a consultant to Teknor-Apex.
JIM COOK, formerly of Dayglo, has accepted the position of Technical Market Manager with Radiant Color, and continues to reside in the Cleveland area.

CAD folks don’t seem to retire and remain idle. Currently on the retired list and still very active are:

BOB CHARVAT - Consultant, book editor and Professor of Color.

BILL DAWES - Color Consultant and World Wide Wed expert. See Bill’s Web home page at HTTP://WWW.COLORPRO.COM/~COLOR/

JERRY HUNGERFORD is retired from Amoco Fibers and is now Products Inc.

JACK BLAKEMAN is retired from PPG, but is also consulting and working for a plastics recycle company.

FRANK FASANO is working full time as a representative of Jaysynth, Dyechem Ltd., and India based manufacturers of pigment and dyes.

Soon to be retired in 1996 are:
BILL BARTSCH of Ciba Pigments and JOHN HACKMAN of Shepherd Chemicals.

TOM STEGER of Shepherd Chemicals is not retiring, but is expecting his first child sometime soon.

CAD Q&A - Technical Tips and Information for our Members

We are instituting a Question/Answer segment for our members, beginning with the next issue of our Newsletter. If you have questions regarding any aspect of color and appearance of polymers and polymer systems, we would very much like to hear from you. Questions will be addressed by CAD members in a “Tech Tips” type of format. Inquiries from the most general to the very specific are fair game for this forum.

Please address your questions to either of the persons listed below. We look forward to hearing from you!

D.A. Holtzen
E. I. duPont deNemours & Co.
Chestnut Run Plaza
Building 709
Centre Road
Wilmington, DE 19880-0709

A.H. Reid, Jr.
E. I. duPont deNemours & Co.
Iler Research Center
1 Quality Lane
New Johnsonville TN 37134

1997 RETEC CALL FOR PAPERS

BY GARY E. BEEBE

The 1997 RETEC will be a joint meeting with the ISCC (Inter-Society Color Council). The ISCC annual meeting will be September 14 and 15, 1997; the CAD RETEC on September 16 and 17, 1997. There will be a joint social event on Monday, Quantification: Adding Value September 15, 1997. We would encourage CAD members to come early and participate in the ISCC meeting. The location is the Marriott Hotel at Baltimore’s Inner Harbor. The theme of the CAD meeting will be “Color With Instruments”. The very popular format of breakout workshops with the major instrument suppliers will be utilized at this RETEC so there will be the added benefit of hands-on training. Abstracts for papers are due December 1, 1996 with final papers due June 1, 1997. Abstracts should be sent to either:
Sandra Davis
Quantum Chemical
Allen Research Center
11530 Northlake Drive
Cincinnati, OH 45249
Tele: (513) 530-4162
FAX: (513) 530-4403
or
Johnny Suthers
Eastman Chemical Corporation
P. O. Box 511
Building 65F
Kingsport, TN 37662
Tele: (423) 229-3263
FAX:(423)229-4205
This year’s CAD ANTEC has a lot to offer! Two sessions were held on Tuesday, May 8, at the Indiana Convention Center in Indianapolis. The theme this year was “Color, Concerns, and Measurement.” Both sessions were well attended, even though the total attendance for this ANTEC was down slightly from last year. If you were unable to attend and would like copies of the papers, please contact SPE at (203) 775-0471.

The best paper for the CAD ANTEC 96 goes to Bruce Mulholland of Hoechst-Celanese titled, “Color Concerns in Polymers and Blends.” The award for best paper is a plaque and a $500 honorarium. The award will be given at the 1996 CAD RETEC meeting in St. Louis on October 1 and 2. Congratulations Bruce for another fine job!

Special thanks to all the authors who participated in this year’s CAD ANTEC, and for their excellent presentation.

As chairman of the 1996 RETEC in St. Louis, I would like to inform you the CAD division has custom designed a program based on your input. Suggestions received from previous technical programs offered ideas such as the inclusion of more international representation, academia, and educational demonstrations. The facility was also chosen based on your suggestions. The following gives you a sampling of what to expect in October, a program that is educational with a twist of entertainment.

This year’s RETEC has an international flair which involves presentations from three companies located across “the big pond”, as well as authors from diverse nationalities representing global corporations. A research paper from Rutgers University titled, “Quantitative Characteristics of Powder Mixing Processes” by Dr. Fernando Muzzio will add a spice of academia, and Terra Community College will prove acadaemia can be entertaining as well as educational, with the help of Bob Charvat, by presenting a special visual effects demonstration titled, “Color - You Gotta See It to Believe It!” (and when you do see it, you will believe it). We have also added some tools for the trade by providing a demonstration by Chemical Abstract Service, and a presentation of a paper titled, “Internet for the Polymer Chemist”. As a primer to the 1997 ANTEC, which has the theme “Saving Planet Earth”, a panel has been assembled to discuss the latest environmental coming under file, “Chlorine: The Next Element to Disappear from the Periodic Table”.

To address the concerns of the facility, the Hyatt at Union Station provides everything under one roof, starting with the Metrolink, a new light rail mass transportation system located at Lambert International Airport. I highly recommend using the Metrolink, it is clean, safe, convenient and inexpensive. One dollar gets you to the Union Station in 30 minutes, and there are departures every 10 minutes. The hotel is on the National Register of Historic Hotels. “A city within a city”, spanning over 100 acres. This urban marketplace contains more than 100 specialty shops, stores and restaurants (fine dining and informal dining), a 10-screen
cinema, a one-acre lake, a biergarten, and a comedy club. Literally under roof from the airport to your room, to the conference rooms, to the suites, to the restaurants and to the shops. The shops at the mall will also offer 10% discounts for SPE attendees.

A well dispersed program is planned, consisting of presentations from manufacturers of pigments, dyes, resins, additives, concentrates, hardware, software, and equipment in conjunction with universities and colleges. It is designed to educate and entertain an audience of scientists and non-scientists alike. I hope you will enjoy the program that you helped design. I look forward to seeing you there.

Bob Charvet receiving $20,000 scholarship donation to Terra Tech "In memory of John R. "Jack" Graff.

Dr. Fred Simon of FTS, Inc. accepting a speaker's gift from Jan Moore, Quantum

A Unique, Highly Transparent, Yellow Pigment for Polyolefin Fibers - Roger Reinicker, CIBA
Can you find Bill Bartch in this picture?

Toxic Use Reduction Approach to Formulation - Robert Swain, Chroma

A Complete Solution for Computer Color Formulation - David Mowery, MacBeth

1996 RETEC Dedication Plaque "In memory of John R. "Jack" Graff being presented by Terry Golden to Mrs. Christiane Graff and daughter Stephanie Graff Silk
TOXIC USE REDUCTION

OR

HAVE YOU BEEN TOLD THE TRUTH ABOUT

HEAVY METALS?

Robert Swain
Chroma Corp.

TOXIC USE REDUCTION or TUR involves all aspects of risk associated with toxics — not just by-products and waste. Pollution prevention is becoming the preferred means of compliance amidst the environmental community. TUR is a concept that may require industry to re-think their products. TUR is an expression - a new buzz word created by the environmental community that we will hear frequently through the balance of this decade. Two key words that also need to be brought into focus are TOXIC and POLLUTION. TOXIC finds its roots in both Latin as a poison and in Greek as an arrow poison. POLLUTION is defined as the contamination of the environment with man-made waste.

Can toxic pollutants be generated at the various stages of the life of a product? Can we convert these pollutants into non-toxic useful products? Do we need to assess the overall toxicological or ecological risk? In the pigmentation of plastics there are five stages where risk assessment evaluation may be applied. They include:

- Manufacturing of pigment
- Compounding of colors
- Fabrication of plastic part
- Use of part
- Part disposal

Let's take a look at the first stage of risk assessment and focus on the family of cadmium pigments. Nowhere in the world will you find a cadmium mine. The chemistry of CADMIUM is very similar to the chemistry of ZINC - wherever you find zinc you will also find cadmium. In the zinc manufacturing process a toxic by-product is generated that contains elemental (unbound) cadmium. In our domestic production of 3,000,000 lbs. (per year) of cadmium pigment we convert over 2,000,000 lbs. of toxic soluble waste into an insoluble, non-toxic form that is useful to society. Put in terms that are more easily understood, we convert 2,000,000 lbs. of unbound cadmium into 3,000,000 lbs. of the bound form. This is an example of Toxic Use Reduction far beyond the wildest dreams of the environmental community!

In the production of 3,000,000 lbs. of cadmium pigments the industry generates less than 3 lbs. of cadmium in the unbound or elemental form. If the environmentalist/regulator is successful in choking off the use of cadmium pigments and forces the industry to shut down, how would they propose to deal with the 2,000,000 lbs. of toxic waste generated by the zinc industry? From an ecological point of view, we should all be promoting wide-spread use of these pigments. You be the judge — would you prefer to cope with 3 lbs. of unbound cadmium contained in the pigments or 2,000,000 lbs. of toxic waste?

Similarly, in the manufacture of lead based pigments, the industry uses 10 million lbs. of recycled elemental lead in the manufacture of 30 million pounds of lead chromate and lead molybdate.

Here is a second example of TUR in reverse. We are converting soluble, toxic, recycled, elemental (unbound) lead into an insoluble, non-toxic (bound) form. Shouldn't the environmentalist, the regulator, and the media be looking for ways to help us grow this industry?
Have you ever wondered why there is such a cloud of confusion around the topic of heavy metals? If someone asked, could you define the term heavy metal? Searching seven different references I found seven different definitions as follows:

- Webster says heavy metal is one whose specific gravity is 5.0 and over
- Chemical Dictionary #1 - a metal of atomic weight greater than sodium
- Another Chemical Dictionary - must react with fatty acids to form soaps - specifically aluminum, calcium, cobalt, and zinc.
- EPA says heavy metals are elements of higher atomic weight including but not limited to arsenic, cadmium, copper, lead, mercury, manganese, zinc, chromium, tin, thallium, and selenium.
- FDA in 21CFR 82.5 refers to heavy metals as those precipitated as sulfides as silver, arsenic, bismuth, cadmium, copper, mercury, lead, antimony, and tin.
- CONEG Model Bill for Toxics in Packaging refers to HEAVY METALS cadmium, mercury, lead, and hexavalent chromium.
- California Integrated Pollution Control Board defines heavy metal as arsenic, antimony, barium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium
- Chicago downtown defines heavy metal as the rock groups Metallica, Guns and Roses

While this may appear confusing to us, imagine how it would be perceived by an uninformed media fueling the fire of public misconception. It's no wonder that confusion reigns supreme within the legislative and regulatory circles.

But while no two sources are in agreement on their definitions we do find some common denominators to be present amidst all definitions. These include:

- All the chemicals are elements
- All are in the unbound form
- These forms are soluble and bioavailable
- They are only toxic when and if their concentration exceeds a specific threshold

Once these elements are reacted with other elements, new compounds are formed. By definition a chemical compound is a product comprised of two or more elements. These compounds possess entirely new chemical characteristics and properties.

Before we examine a few of these chemicals we may want to ask Why haven’t we been told the truth about heavy metals? Are you aware they exist in two forms? Has anyone in our industry ever tried to explain the differences between the BOUND (or the insoluble form) and the UBOUND (or soluble) form? As an industry our educational efforts are shabby at best.

When was the last time you read a news article or a feature advising you that lead existed in both good (bound) and bad forms (unbound)? Have you been told that the unbound forms are readily soluble and the bound forms can be 100,000 fold less soluble? That is what we find if we compare the solubility and bioavailable characteristics of the most soluble form of lead with the least soluble form.

White lead carbonate is one of the more soluble and toxic forms of lead. Years ago this pigment was used to prepare white house paints. These paints are no longer manufactured and the pigments have not been manufactured in 40-50 years. Lead Chromate and Moly Orange are examples of the bound forms of lead. They are ordinarily yellow and orange pigments that are insoluble and non-bioavailable. There are special forms of these pigments that are very inert that are encapsulated in glass. Yet legislators and the media continue to identify the childhood lead exposure problem with the broad inaccurate label of “lead based paint.”

To create favorable public perception would be easy with a well planned program supported by all sectors of our society. In the past 20 years the medical profession has educated the general public that cholesterol exists in two forms — a good form and a bad form. Low density is commonly referred to as “bad” cholesterol and high density is the “good” type. In the 4000 years following the discovery of lead we, as a society, still perceive lead pigment to carry a negative image. We also appear to be content to make no attempt to alter this image. While in reality lead exists in both the bound and unbound forms.

The lead in pigmentary lead chromate is chemically bound, insoluble, non-extractable, and non-migratory. Let us examine at the UNBOUND lead content of this pigment.

"UNBOUND LEAD CONTENT"

<table>
<thead>
<tr>
<th></th>
<th>ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Chrome Yellow</td>
<td>&gt;200ppm</td>
</tr>
<tr>
<td>Silica Encapsulated</td>
<td>20ppm</td>
</tr>
</tbody>
</table>

If lead chromate is used as a colorant in plastic at a level of 1% these 200 parts per million of unbound lead are locked into the polymer and become non-bioavailable. Extraction tests performed on yellow polypropylene molded parts using EPA’s TCLP testing procedures exhibits less than 0.1 parts per million of unbound toxic elemental lead. Here is an analogy to illustrate how safe these pigments are.

The amount of elemental unbound lead found in one spent automobile battery is estimated at 8 lbs. To equal the same level of unbound lead in plastic parts pigmented with lead chromate would require 175,000,000 lbs. of plastic packaging.

Cadmium pigments on the other hand contain a much lower level of unbound elemental cadmium - less than 1 part per million. Our entire domestic production of 3,000,000 lbs. of cadmium pigments contain less than 3 lbs. of unbound cadmium.

These raw cadmium pigments can be disposed of in an ordinary landfill. The EPA has determined that they pose no health hazards if the UNBOUND cadmium content is less than 1 part per million.
The second stage to apply risk assessment is in the compounding of colorants based on these pigments. We are presently operating our plant environments to comply with OSHA requirements. The current cadmium standard for cadmium pigment is 200mg/m² and this is another area where the cloudy Jessicaes have gathered. OSHA has blocked meaningful input from the pigment manufacturing sector. While OSHA and EPA are charged with a similar toxicity mission, the test procedure used by OSHA measures both the bound and the unbound forms of these heavy metals. If you compare the test procedures of both agencies you will find the OSHA test procedure overstates the toxicity of unbound cadmium nearly 800,000 greater than the EPA test procedure. (In ten the magnitude of difference is only 2300 fold)! Have we magnified the risk we are trying to control?? There is no record of personnel health problems at the pigment manufacturing locations where employees are not exposed to the cadmium environment all day long. In our plastic colorant industry personnel exposure is only on an intermittent basis and there are no records of personnel health problems. Many companies dealing with lead pigments have adopted programs to monitor the blood lead level of the workforce.

Our third stage of risk assessment deals with the fabrication process. In response to the '92 OSHA standard to establish a lower permissible exposure limit for cadmium (both the unbound and the bound forms combined), a strategy was developed by General Electric to obtain plastic processing fume data from molding operations. The data was intended to help determine whether Manganese-containing pigments volatilize at recommended processing temperatures. Medium to high levels of cadmium based pigments were evaluated in four different engineering polymers as follows:

<table>
<thead>
<tr>
<th>RESIN</th>
<th>GRADE</th>
<th>CADMIUM CONTENT (% BY WEIGHT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valox</td>
<td>420SEG</td>
<td>1.82</td>
</tr>
<tr>
<td>Cycolac</td>
<td>T</td>
<td>1.62</td>
</tr>
<tr>
<td>Noryl</td>
<td>EN265</td>
<td>1.38</td>
</tr>
<tr>
<td>Lexan</td>
<td>143</td>
<td>1.67</td>
</tr>
<tr>
<td>Ultem</td>
<td>1000</td>
<td>1.43</td>
</tr>
<tr>
<td>Lexan</td>
<td>121R</td>
<td>0.00</td>
</tr>
</tbody>
</table>


Sampling was conducted at four stations on an injection molding press namely the drool area, the nozzle area, the mold vent area, and the work area around the injection press.

Air sampling and specimen testing were in accordance with OSHA standards. Results from this investigation did not generate cadmium pigments above the proposed action level of 2.6mg/m². The data also indicated that these inorganic substances did not volatilize at recommended processing temperatures for these plastic resins.

Personally, I am unaware of any other studies conducted in the plastic fabrication sector as I also am unaware of any risks or problems encountered from using bound forms of pigments heavy metals in the coloration of plastic polymers.

As you have noticed from the foregoing, we have had controls placed on the "non-problem" products and the "non-problem" areas of our business. In the remainder of my talk I'd like to deal with the risks associated with both the use and the disposal of plastics parts simultaneously.

Eighteen states have enacted TOXICS IN PACKAGING legislation within the past five years. Toxic and pollutants are most popular topics among the legislative group. By attacking these intangibles, they can create an image of productivity without alienating any segment of their constituency. Most of these bills were patterned after the CONEG Model Bill. CONEG at that time was a coalition of 12 Northeastern governors, 8 public interest groups, and 12 industrial company members.

CONEG did not allow meaningful input from industries which produce the substances they were proposing to regulate. So what did the 17 states get?? They got a bill that is confusing and vague, inefficient, varies from state to state and contains enforcement procedures that are both ill defined and impossible to regulate.

Why is the CONEG Model Bill so confusing? The intent is very clearly and simply stated. . . to reduce toxics in packaging. But they failed to distinguish between the bound and the unbound forms of the heavy metals. The environmental community turned to a study of heavy metal consumption in our country prepared by Franklin Associates for the EPA. This report lists several metals as the soluble or unbound type. As a result the language in the CONEG Bill deals only with the bound or the elemental forms of the heavy metals. The CONEG Coalition was of the opinion that all pigments and forms of these heavy metals were toxic and in the unbound state. In reality, the pigments and forms of these heavy metals are the safest forms in which those metals can exist. The use of these pigments comply with both the intent of the Bill and the certification levels prescribed by most of the states legislation.

**CONEG MODEL BILL**

"HEAVY METALS IN PACKAGING"

- **INTENT:** To reduce toxics in all packaging
- **TOXINS INVOLVED:** UNBOUND cadmium
- **UNBOUND Lead**
- **UNBOUND Mercury**
- **UNBOUND Hexavalent Chromium**
LEVELS FOR CERTIFICATION:

- 600 ppm by weight 1/1/92
- 250 ppm by weight 1/1/93
- 100 ppm by weight 1/1/94

As you consider pigment systems for new products, feel free to include a complete palette of inorganic colors. For the record let’s examine how much of a risk this poses.

FOR THE RECORD
ANALYSIS OF UNBOUND LEAD AND CADMIUM EXTRACTED FROM PP

<table>
<thead>
<tr>
<th>PIGMENT</th>
<th>CONC. WT. %</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Chromate</td>
<td>0.08</td>
<td>&gt;0.1 ppm</td>
</tr>
<tr>
<td>Kolor</td>
<td>1.70</td>
<td>&gt;0.1 ppm</td>
</tr>
<tr>
<td>Cad Yellow</td>
<td>.88</td>
<td>0.005 ppm</td>
</tr>
<tr>
<td>Cad Red</td>
<td>.98</td>
<td>0.007 ppm</td>
</tr>
</tbody>
</table>

Plastic parts pigmented with the bound forms of these heavy metals exhibit unbound metal extraction far below the 100 ppm level required for CONEG certification. It is readily apparent that these materials can be considered as T.U.R. and used with no risk of contributing to pollution of ground water in a landfill.

Does incineration of plastic parts pigmented with the bound forms of heavy metals present a hazard? The California Integrated Waste Management Board issued a Draft Report in September 1994 on a study they performed entitled Heavy Metals in Packaging. While this study failed to separate the bound from the unbound forms, it still concluded:

- No threat to ground water contamination
- all MSW incinerator ash is treated and disposed to mitigate H/M migration
- No cause for alarm
- No additional studies warranted

Furthermore, in December of ‘92 the American Plastics Council advised us of a memo from EPA Administrator William K. Reilly stating “that protecting the environment and promoting resource recovery from non-hazardous solid waste are best served by exempting MWC ash from hazardous waste regulation.”

The C.E.O.s of corporate America, including major chemical & plastic companies, have allowed themselves to become pawns of public perception. They have opted to neglect their leadership roles in educating the public that heavy metals exist in both safe and unsafe forms. They have followed the paths of least resistance - many of them adopting mission statements that treat all heavy metals as if they existed only in the unbound state. This has done little to align public perception with good scientific fact. With the rapid emergence of the Responsible Care Initiative in the Chemical Manufacturing Association, we believe many C.E.O.s will identify the ecological & economical benefits to be realized by encouraging widespread use of these bound forms of heavy metals.

The truth about heavy metals is simply:

- Heavy metals exist in two forms
- Good form and bad form
- 100,000 fold-magnitude of solubility differences between the good and bad forms
- Heavy metals should be candidate pigments to formulate colorants to comply with the concept of Toxic Use Reduction and Responsible Care.

For those that have been directed to discontinue the use of heavy metals by your Management (or by your legal department), please ask them for a “second opinion.” Bear in mind that when they reached their decision to take this action they were not aware that the pigment manufacturing process consumes such huge quantities of toxic waste, that it requires less energy to compound concentrates based on these pigments, and it requires less energy to fabricate injection molded parts pigmented with these colors. The “fringe benefits” are they are more economical to purchase, can be molded faster using less energy, and less parts exhibit warpage and better dimensional control. Your management and/or legal department should welcome the opportunity to provide you with a second opinion.

Our industry can demonstrate that when we apply the principles of risk assessment to the five stages of the life cycle of pigmented plastic parts we pass each stage with flying colors. Pollution prevention starts by expansion of the use and manufacture of these pigmented forms of bound heavy metals. And don’t act like Pinocchio, when someone asks you about heavy metals - let the world know the truth... and the truth is they exist in the bound and unbound forms.

(REV 5/12/95)
A full palette of heavy metal free organic and FDA compliant pigments for polymers...

Monastral® quinacridone pigments

Cromophtal® and Irgazin® high performance pigments

Irgalite® classical pigments

Call your local Technical Representative or Customer Service Department
Ciba Pigments
Ciba-Geigy Corporation
345 Water Street
Newport, DE 19804-2434
800-431-2777
302-633-2000

High Temperature inorganic Pigments

- Copper Chromite Black
- Nickel & Chrome Tita
tates
- Cobalt Blues & Greens
- Manganese Violet/Cobalt Violet
- Manganese & Iron Titanate Browns

The Shepherd Color Company
Telephone: (513) 874-0714  Fax: (513) 874-5061

Advanced Color Measurement Software
Represented By:
C. Withington Co., Inc.
16 Pelham Parkway
Pelham Manor, New York 10803
Telephone: (914) 738-4877
Fax: (914) 738-2855

Pigments, Dyes for Plastics

Performance Products from Engelhard

Specialty Mineral Products:
SATINTONE® calcined kaolin • ASP® hydrous kaolin

TRANSLINK® surfonic treated kaolin

Attapulgite-based Products:
ATTAGEL™ thickeners

Harsin® Color Products:

METEOR® and METEOR® Plus complex inorganic pigments
Organic pigments • AURASPERSE® aqueous dispersions
AURACRYL™ industrial waterborne dispersions

GALLERY ONE™ SF solvent-free universal dispersions
Lead chromate pigments • Low-soluble cadmium pigments

101 Wood Avenue, Iselin, NJ 08830-0770
(908) 206-6000

With Ciba, you can count on the highest level of research and development,
product quality and customer service of any company in the business.

Ciba Additives
800 431 2360
In NY 914 785 4461

Organic Pigments and Dyes for Plastics and Fibers

MILES

Organic Products Division
Mobay Road
Pittsburgh, PA 15205-9741
Phone: (412) 777-7883

A New Generation
- Organic Pigments
- Micro TiO₂

Phone 800-631-8387
Fax 201-777-4198

DAICOLOR-POPE, INC.

40 Webro Road, Clifton, NJ 07012

ColorSoft®

Advanced PC Software for Formulation,
Color Measurement and Batch Correction • Interfaces
with color instruments from most manufacturers.

ColorTec

P.O. Box 386
74 Main Street
Lebanon, NJ 08833
(908) 236-2311
Fax (908) 236-7865
Kerr-McGee TiO₂
It's the White that's Right

Nature meets her match with
AFFLAIR®
Lustre Pigments

World Leader in Pearlescent Pigments

Tioxide
The world's word for white.

Tioxide Americas Inc.
2001 Butterfield Road, Suite 601
Downers Grove, IL 60515
Tel # (708) 663-4900  Fax # (708) 663-4901

PLASTICS COLOR-CHIP
OVER 35 YEARS
EXPERIENCE
PRODUCERS OF DRY COLOR AND CONCENTRATES
SOMERSET, NEW JERSEY
908-469-5600 • 800-526-3938
Asheboro, NC  Calumet City, IL  Kent, OH
800-247-7428     800-922-9936     800-723-6339

COOKSON
PIGMENTS
High - Quality Pigments
for Plastics
256 Vanderpool Street
Newark, N. J. 07144
(201) 242-1800
TEL. 820-497
FAX. (201) 242-7274

REEDSPECTRUM
A division of Sandoz Chemicals Corporation
Specializing in color and additive concentrates for all Engineered Thermoplastic Applications.
MA • MI • MN • GA

TECHMER
PM POLYMER MODIFIERS
QUALITY FORMULATION OF
COLOR & ADDITIVE CONCENTRATES
18420 LAUREL PARK ROAD
RANCHO DOMINGUEZ, CA 90220
(310) 632-9211

#1 QUALITY CIRCLE
CLINTON, TN 37716
(615) 457-6700

THE WORLD'S LEADING
INNOVATOR OF HIGH QUALITY
PEARLESCENT PIGMENTS
& IRIDESCENT COLORS

DAY-GLO COLOR CORP. (216) 391-7070
4515 ST. CLAIR AVENUE CLEVELAND, OHIO 44103
FLUORESCENT
PIGMENTS FOR PLASTICS

Macbeth®
USA 800-MACBETH.
Canada 800-421-COLOUR.
ISIHARA CORPORATION (U.S.A.)

- TiO₂ - Ultra-fine TiO₂
- Nickel Titanates - Chrome Titanates

600 Montgomery Street
San Francisco, California 94111
Tel: (415) 421-8207
Fax: (415) 397-5403

TOYO INK AMERICA

INTEGRATED INK TECHNOLOGY

910 Sylvan Avenue
Englewood Cliffs
New Jersey 07632
Phone: (201) 568-8660
FAX: (201) 569-2455

QUALITY ORGANIC PIGMENTS
PIGMENT DISPERSIONS

MELCO
ENGRAVING, INC.

- Mold Texturing - Glass Beading - Chemical Engraving - Pattern Development
- Mold Repair - Stamping - Plaque Run - Sand Blasting

1809 Rochester Industrial Dr.
Rochester Hills, MI 48309
(313) 656-9000
1-800-GRAINER

*SUCCESS IN THE FINISH, DEPENDS ON WHERE YOU START!

SunChemical

Sun Chemical Corporation
Pigments Division
4526 Chickering Avenue
Cincinnati,
Ohio 45232-1960
(513) 681-5950
FAX: (513) 681-3778

Organic Pigments
- Dry Color
- P.E. Flush Color
- Presscake

Plasticolors, Inc.

Colorant Dispersions

2600 Michigan Avenue
P.O. Box 816
Ashtabula, Ohio 44004
TEL: 216-927-5137
FAX 216-992-3613

Plasticolors
Where Art Meets Technology

CHROMA COLORS

- DRY COLORANT
- TOLL COMPOUNDING
- PELLET CONCENTRATES
- PRE-COLOR

CUSTOMER SERVICE: (815) 385-8777
ORDER PROCESSING: (815) 385-2288

CHROMA CORPORATION

(815) 385-8100
FAX (815) 385-1518
3900 DAYTON STREET
McHENRY, ILLINOIS 60050-8378

Made in America,
Respected Worldwide

- Dry color-standard and custom blends.
- Advanced color matching.
- High-ratio color concentrates.
- Fast service coast-to-coast.

GENERAL COLOR & CHEMICAL COMPANY, INC.

Bridge Street • P.O. Box 7
Minerva, Ohio 44657
(216) 966-4166 • FAX: (216) 966-5680

Color Pigments

INORGANICS
Nickel & Chrome Titanate Yellows
Iron-Free Browns • IR Blacks
Cobalt Blues & Greens
Ultramarine Blues & Violets

COLOR DIVISION, Ferro Corp., P.O. Box 6550
Cleveland, OH 44101 • (216) 641-8580 • FAX: (216) 641-8831

Pigments/Dyes/Additives

BAF Corporation
1255 Broad St.
Clifton, NJ 07014
(201) 365-3499
Tech Service: (518) 472-8381

BASF

Coatings & Colorants
In plastics, you can count on DuPont Ti-PURE® TiO₂ to make the grade!

Write or call:
Du Pont Ti-PURE
Chestnut Run Plaza
Building 709
Room 104
Wilmington, DE 19880
1-800-441-9442

Ti-PURE is a DuPont registered trademark for its titanium dioxide. Only DuPont makes Ti-PURE.

HARWICK CHEMICAL CORPORATION
The Customers' Company™

Stan-Tone® Colors
for Plastic and Rubber:
Paste, MB, VC, VCP,
Dry Pigments, WD

Phone (216) 798-9300
Fax (216) 798-0214

KEMIRA KEMIRA PIGMENTS INC
ANATASE AND RUTILE GRADES
COMBINE EXCEPTIONAL QUALITY
AND VERSALITILITY WITH
HEADS-UP PERFORMANCE
UNEQUALLED IN TODAY'S MARKET.
CALL TOLL-FREE 1-800-4-KEMIRA

QUALITY PIGMENTS
FOR PLASTICS
Comprehensive range of Ultramarine and
Manganese Violet pigments.
PREMIER and PRESTIGE ranges designed
specifically for colouration of plastics.

HOLLIDAY PIGMENTS
Available from our exclusive US agents:
W.C.D. Inc., 1000 COOLIDGE STREET, SOUTH PLAIN FIELD,
NEW JERSEY 07080 - 1000.
TELEPHONE: 908 5916100 FAX: 908 7573488

NEWSLETTER SPONSORS
The Color and Appearance Division would like to thank the companies and individuals for their generous financial support and sponsorship of the CAD newsletter. The Division's Board of Directors Newsletter Committee are grateful for your interest and encourage your continued participation. For information on sponsorship of future issues, please contact: Mr. Joseph Cameron, GE Plastics, P.O. Box 68, Washington, WV 26181. Telephone (304) 863-7473, FAX (304) 863-7156.
Are your COLORS giving you enough bang for the buck?

Get a burst of color enhancement from AlliedSignal's high performance additives.

- Intensify colors
- Improve dispersion
- Increase processibility
- Raise output rates
- Cut formulation costs

AlliedSignal Inc.
Performance Additives
Morristown, NJ, USA
201-455-2679 / 800-451-9961

Heverlee, Belgium
32-16-391-211

Singapore
65-775-2133

When you need a TiO₂ product with high performance, choose TiONA® TiO₂ pigments.

SCM Chemicals.
Today. Tomorrow. Always.

7 St. Paul Street
Suite 1010
Baltimore, MD 21202
1-800-638-3234

Dallas, Texas Seminars
The Society of Plastics Engineers' seminar series will be held at the Radisson Park Central Hotel in Dallas, Texas on September 9-12, 1996. Fourteen seminars have been scheduled covering topics such as: Materials and Processing, Injection Molding, Extrusion, Melt Rheology, PVC, Part Design, Color Science, Light Piping, and Polymer Blending.

Plastics Fracture and Failure Prevention Courses
The Society of Plastics Engineers and L.J. Broutman & Associates, LTD. are co-sponsoring a Plastics Fracture Workshop and Two Courses on Failure Analysis/Prevention by Stress Analysis Courses at the Guest Quarters Suite Hotel in Chicago, Illinois on September 16-20, 1996. A two-day Plastics Fracture Workshop is scheduled for September 16 and 17; a two-day Plastics Failure Analysis/Prevention and Testing seminar is scheduled for September 18 and 19; and a one-day Failure Prevention of Plastic Parts by Stress Analysis Methods seminar is scheduled on September 20.

SPC in Extrusion and Injection Molding Workshop
The Society of Plastics Engineers is sponsoring a three day SPC Extrusion and Injection Molding Workshop on September 23-25, 1996 at the Embassy Suites @ Rivercenter in Covington, Kentucky/Cincinnati, OH. The basic principles of SPC will be covered with examples to real extrusion and injection molding operations. Extrusion and injection molding technology will also be covered with emphasis on development of a thorough understanding of how the extrusion and injection molding process works. Some more advanced statistical techniques, such as design of experiments, regression analysis, response surface methodology, will be briefly covered without going into too many statistical details. On the afternoon of September 24th, attendees will be taken to Cincinnati Milacron where they will observe the extrusion and injection molding process, monitor the process or product parameter, and obtain a control chart from the data from the process and learn how to use that data to determine process capability.

For further information contact:
SPE, Education Department,
14 Fairfield Drive,
Brookfield, CT 06804
(203) 775-0471, FAX (203) 775-8490
ASTM PUBLICATIONS NEWS

ASTM Standards on Color and Appearance Measurement, 5th Edition
50% New and Revised Since 1994 Edition.
This new edition contains 90 of the latest ASTM Standards as well as 9
ISO and ISO/CIE standards used in appearance analysis for a variety of
materials and products.
704 Pages (1996); Soft Cover
$99 List; $89 ASTM Members
Order #: PCN 03-512096-14
Tele.: (610) 832-9585

Color and Light Part 40
by Fred W. Billmeyer, Jr. and
Harry K. Hammond, Ill
Authorized Reprint from ASTM
Manual 17, pp. 447-469.
Good general document, suitable to
give to customers and new
employees, contains 55 references.
< $10 ASTM Publication
Tele.: (610) 832-9585