Chairman’s Message

Dear SPE Color and Appearance Division Members,

Our annual ANTEC® conference is quickly approaching. This year’s technical conference will be held at the Duke Energy Convention Center in Cincinnati, OH from April 22-24. There is a full schedule of technical presentations and exhibitors. Please visit www.4spe.org to register for the conference. The CAD technical sessions will be both in the morning and the afternoon of Monday April 22. Our division has contributed $2000 for students to travel to ANTEC® to broaden their educational experience. Mr. Scott Heitzman from Sun Chemical is the CAD Chair for our Monday sessions.

Our division has been very busy through the winter months. After a very successful RETEC®, we have been busy updating the website with many great improvements to come. Our Division was recognized for two very prestigious awards from SPE. First, our division won the Gold Pinnacle Award, which is the highest achievement that SPE recognizes for a division. It is a reflection of our division’s outstanding commitment to both the goals of SPE and serving our members. This award was earned by every member of the entire division, and we should be very proud. Secondly, our division has earned the Communication Award, which is more focused on the way we continue to improve the way we both communicate and serve our members. Congratulations to Tracy Phillips and her team of wonderful volunteers.

Please visit www.specad.org to vote for your Board of Directors. Elections are currently being held until March 24, and 9 openings need to be filled from an excellent list of candidates.

One of the primary purposes of our Division is education. To that end, we sponsor several $4000 scholarships each year. Applications are available on-line at www.specad.org for the 2013-14 school year. Please contact George Rangos if you have any questions about our scholarships.

I would like to thank you for your support for the past year. I have enjoyed making many new friends and professional connections. My term ends at the conclusion of ANTEC® 2013, and I hope to continue to serve CAD for many years to come. I would like to introduce Ann Smeltzer from Clariant as your next Chair for the 2013-14 year.

Best Regards,
Jim Figaniak
CAD Chairperson
We are proud to announce the results of the 2013 elections for the CAD Board of Directors. The results are as follows:

<table>
<thead>
<tr>
<th>Candidate</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott Aumann</td>
<td>EMD Chemicals Inc.</td>
</tr>
<tr>
<td>Doreen Becker</td>
<td>A Schulman</td>
</tr>
<tr>
<td>Paul Bykowski</td>
<td>G.B. Consulting</td>
</tr>
<tr>
<td>Scott Heitzmann</td>
<td>Sun Chemical Corporation</td>
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<tr>
<td>Nathan Karszes</td>
<td>Nubiola</td>
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<tr>
<td>Tracy Phillips</td>
<td>Uniform Color</td>
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<tr>
<td>Tom Rachel</td>
<td>Tronox LLC.</td>
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<tr>
<td>Jim Rediske</td>
<td>Lanxess Corporation</td>
</tr>
<tr>
<td>Roger Reinicker</td>
<td>BASF</td>
</tr>
<tr>
<td>Brian West</td>
<td>Techmer PM</td>
</tr>
</tbody>
</table>

Congratulations, and thanks to all who committed to run for office!

Ann Smeltzer,
Chair-Elect

The Color and Appearance Division of SPE strives to educate, train, inform and to provide professional interaction opportunities to the global community involved in visual performance and aesthetics of plastics.

If you are interested in helping to sponsor the SPE/CAD Newsletter please contact:

SCOTT AUMANN
Phone: 912 210 0175   Email: Scott.Aumann@merckgroup.com.
The Color and Appearance Division (CAD) commits to the publishing of at least three newsletters a year (four, if there is sufficient material to justify the extra issue). Each newsletter is electronically distributed to our membership of nearly 1,000). Each sponsor’s art directly links to the company’s website.

In addition, we print one of these newsletters on 80# gloss coated stock. All electronic versions are also posted on the SPE website where it available for anyone to download.

For the small donation of $300 per year, we offer a business card sized (2 x 3.5 inches) mention in our newsletter,

We currently have the following slots available for sponsorship:

(2) 2 x 3.5 inch or (1) 4 x 3.5 inch

If interested in learning more, please contact:

SCOTT AUMANN  Phone: 912.210.0175
Email: Scott.Aumann@merkgroup.com
Councilor’s Report

The Winter 2012 Remote Council Meeting for SPE was held on December 5, 2012, with a primary purpose being to vote on the budget.

Budget - A series of budget review conference calls were held prior to the Council meeting to present the budget in a detailed manner. For the development of the 2013 budget, the developers used an estimate of 13500 members. While this will result in a decrease in the revenue from memberships, the budget expects that there will be an increase in overall revenue due to ANTEC® being handled solely by SPE and revenues from other conferencing, specifically international events, including the proposed China TopCon. The changes in expenses over previous years include additional funds to address the IT issues as discussed during the Fall 2012 Council meeting, expenses related to the international conferencing, and additional staffing to support the Europe and China offices. As proposed, the budget results in a net income to the organization of about $12,500, as compared to the expected 2012 shortfall of $11,800. The proposed budget was approved by the Council.

International conferencing – As included in the budgeting discussion, there is an increased emphasis on SPE conferences outside of North America. After having started with an ANTEC® style conference in Europe in 2011, ANTEC® Mumbai was scheduled to start within a week of the Council meeting. The schedule included 180 papers and the organizers were optimistic about the attendance, anticipating nearly 500 attendees. Additional international conferences are being planned for 2013 and beyond, including another ANTEC® style meeting in Europe (EUROTEC), the proposed China TopCon and the announced ANTEC® style meeting in Dubai.

The next Council meeting will be Sunday, April 21, in Cincinnati, Ohio.

Respectfully submitted,

Sandra Davis
CAD Councilor

Invitation to Attend Our CAD Board Meetings

The Color and Appearance Division regularly holds Board of Director (BOD) meetings at the ANTEC® and the CAD RETEC®. In addition, a Summer BOD meeting is typically held about 6 weeks prior to the next CAD RETEC®.

The Summer meeting is scheduled in various locations. A Winter BOD meeting is held in January. The Winter meeting is typically held at a site of a future RETEC®.

Any SPE CAD members who wish to attend are welcome at these meetings. If interested in attending the next Board meeting, please contact the Division Chairperson for more information.

Disclaimer:
The information submitted in this publication is based on current knowledge and experience. In view of the many factors that may affect processibility and application, this data/information does not relieve processors from the responsibility of carrying out their own tests and experiments, neither do they imply any legally binding assurance of certain properties or of suitability for a specific purpose. It is the responsibility of those to whom this information is supplied to ensure that any proprietary rights and existing laws and legislation are observed.
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DOM 653 Program
Ad_retec09_v2:  7/22/09  2:17 PM  Page 1

Please visit the websites of the sponsors listed in this newsletter by clicking on web address included in their sponsorship space.

Thank you!
Pearlescent parts molded where the plastic flows in different directions as the part fills appear light or dark depending on where the light source is relative to observers. Therefore, if parts are positioned side-by-side with opposing or different flow directions, they will appear to be a color mismatch.

The weld-line on pearlescent parts is always darker because it actually has fewer particles and the ones in the weld-line orient perpendicular to the surface thus giving a “deep well” effect regarding light reflection. Visually what happens is that less light is reflected back to your eye from the weld-line region because only the edges of the platelet-like particles are available or positioned to return the light rays. And, of course, the edges have much less reflective area than the platelet surfaces so that region appears darker.

Pearlescent pigments are made up like a multi-layered “cake” where the “cake” layer is transparent and the “icing” layer is a translucent light filter. The pearlescent pigment cake is quite brittle and can easily fracture. When the pearlescent pigment is sheared during compounding and processing many of the platelets are broken into smaller flakes. If the same formulation is compounded with equipment having too greatly different mixing shear forces, the one processed at the higher shear will end up having smaller particles hence lower brightness. The only way to compensate for this is to always formulate with two different pearlescent pigment particle sizes. That way you can change the ratio of large versus small flake size to fix a mismatch. This also facilitates use of rework material. During processing it is important to balance shear forces of all assembly parts for the same reasons. It is impossible at this stage to change the pigment particle size ratio. However, judicious use of part regrind can achieve similar control of appearance.

The transparency [or lack thereof] of the substrate polymer plays a key role in the appearance of pearlescent colors. Where two different polymer compounds are required, for physical property reasons, if they differ in opacity [or optical density] it may be impossible to obtain an exact color match. Likewise, if the polymers have the same opacity but are very different in melt viscosity an exact color match might not be achieved since the differing viscosity leads to changes in shear forces.

If one is clever enough to read between the lines of the above paragraphs, it should be clearly obvious the same situation will exist with the use of metallic flake pigments. A subsequent observation is the above techniques are very effective if a competitive situation exists where a color matcher is trying to block others from making a competitive offering to a matchmaster accomplished by using different size metallic flakes.

Inclusion of abrasive pigments in a color formula can cause color variation as the pearlescent or metallic pigments will be exposed to additional kneading/shear action. Pigments such as Carbon Black, Mixed Metal Oxides, and etc. and high opacity fillers/additives should not be used in pearlescent and/or metallic flake containing formulas due to their high opacity.

Once again the black art of the clever “Color Mischief” source is brought to light! The source insists on remaining completely anonymous to be sure no physical harm or abuse might result.

IN FOLLOWING NEWSLETTERS LOOK FOR MORE “STORIES OF COLOR MISCHIEF”!
COLOR COMES ALIVE – The 51st Annual CAD RETEC® will be held September 22-24 at the Marriott Waterfront in Baltimore, MD. Join us as we meld the vibrant sights and sounds of Baltimore’s beautiful Inner Harbor District with the premier technical conference devoted specifically to the color and appearance of plastics.

We’ll kick off CAD RETEC® 2013 with Bob Charvat’s day-long “Coloring of Plastics” tutorial scheduled for Sunday, September 22 (separate registration required). Bob is one of the founding members of the Color and Appearance Division, a Fellow of the Society, and enjoys SPE Emeritus status. His seminars are not only educational, but very entertaining! “Coloring of Plastics” is intended for the technician, manager and/or professional who does not feel satisfied or comfortable with his or her current level of knowledge or understanding of color, colorants and color matching. This tutorial will be significantly vital to those desiring an understanding of colorants and colorant performance when the attendee may not necessarily be directly involved in the day-to-day specialized activity and issues of coloring plastics. The “Coloring of Plastics” tutorial is well suited for people in many different roles, including technical, manufacturing, sales and marketing, and laboratory personnel.

At our Sunday evening opening reception say hello to old and new friends as we enjoy the music of our own in-house band Color Eye Blind. The Color and Appearance Division is the only Division (that we know of) with its own house band, made up of talented members from within the Division. Color Eye Blind’s music tends toward the blues-classic-southern rock genre, so it is best played loud. Guest musicians and vocalists from the CAD audience are a regular feature. If you listen carefully you’ll be quite entertained by the lyrics, which are often changed to reflect subjects related to the coloring of plastics. Color Eye Blind first appeared at CAD RETEC®1998 in Cleveland, OH where they played during the Welcome Reception at the Rock and Roll Hall of Fame and Museum. CAD RETEC®2013 will mark the 15th anniversary of this first appearance.

The conference proceedings begin on Monday morning immediately following breakfast. We are proud and extremely honored this year to have as our keynote speaker Dr. Jeremy Nathans, Professor of Molecular Biology and Genetics at Baltimore’s own Johns Hopkins University. Dr. Nathans will speak about color vision deficiencies and why we see color the way we do. Monday afternoon, tune in to the New Technology Forum, which allows exhibitors to showcase their companies and their products or services, followed by a networking reception to be held in the tabletop area. Throughout the conference listen to industry experts explain the latest innovations and developments related to the color and appearance of plastics. And be sure to stick around for a fabulous array of door prizes to be raffled off immediately after the last paper. With attendees from all corners of the earth and from all areas of expertise within the plastics industries, myriad opportunities are available for professional networking.

The Baltimore Marriott Waterfront will serve as the host hotel for CAD RETEC®2013. Located in Inner Harbor East, the Baltimore Marriott Waterfront sits on the water’s edge. You’ll enjoy the spectacular views of the Baltimore Harbor, as well as, easy access to the city’s finest shopping and restaurants, just steps away. Choose from over 50 dining options within a few blocks of the hotel or explore the National Aquarium, the USS Constellation, the Maryland Science Center, and so much more. You’ll also appreciate the short drive to BWI airport or to the Amtrak station. It’s also the only hotel where you can hail a water taxi to whisk you to the many waterfront attractions.

The room block is now open and hotel reservations are being accepted. To reserve your room go to https://resweb.passkey.com/go/SpeCadRetec2013Conf. The conferences page on our website www.specad.org is under construction at the time of this writing. Check back often as new updates will be available shortly.

COLOR COMES ALIVE – What an appropriate theme for CAD RETEC®2013! Lively technical discussions, good friends, and great value are just a few reasons why CAD RETEC® should be topmost on your list of must-attend Conferences this year. See you in Baltimore!

For more information about CAD RETEC® 2013 contact Tom Rachal at tom.rachal@xxtronox.com. (remove the xxx from the email address before corresponding)
The Endowment Scholarship Program offered by the Color & Appearance Division of the Society of Plastics Engineers awards up to five scholarships each year to students who have demonstrated or expressed an interest in the coloring of plastics industry. The students must be majoring in or taking courses that would be beneficial to a career in this industry. This would include, but is not limited to, plastics engineering, polymer science, coloring of plastics, chemistry, physics, chemical engineering, mechanical engineering, industrial design and industrial engineering. All applicants must be in good standing with their colleges. Financial need is considered for most scholarships.

Undergraduate and graduate scholarships range up to $4,000 annually. Scholarships are awarded for one year only, but applicants may apply for a re-award for each year they are enrolled in school.

**Scholarship Eligibility**

1. Applicants for these scholarships must be full-time undergraduate students in either a four-year college or a two-year technical program or enrolled in a graduate program.
2. All applicants must be graduates of public or private high schools.

**Scholarship Criteria**

1. Applicants must have a demonstrated or expressed interest in the coloring of plastics industry.
2. Applicants must be majoring in or taking courses that would be beneficial to a career in the coloring of plastics industry.
3. An applicant must be in good academic standing with his or her school.
4. Preference is given to student members of SPE and also to students who have a parent(s) as a member of the Color & Appearance Division of the SPE.
5. Financial need of an applicant will be considered for most scholarships.

**Application Procedure**

To be considered for a scholarship from the Color & Appearance Division Endowment Scholarship Program, applicants must complete an application available at [WWW.SPECAD.org](http://WWW.SPECAD.org) and return it to the address specified on the application by June 1, 2013. All applications submitted must include:

1. A completed application form.
2. Three recommendation letters: two from a teacher or school official and one from an employer or non-relative.
3. A high school and/or college transcript for the last two years.
4. An essay by the student (500 words or less) telling why the applicant is applying for the scholarship, the applicant’s qualifications, and the applicant’s educational and career goals in the coloring of plastics industry.

Please feel free to contact George Rangos at rangosg@ferro.com or at 724 229 5371 with any questions.

All scholarships will be paid directly to the recipients' schools. The Color & Appearance Division Endowment Scholarship Program will not award scholarships to applicants who are not qualified and reserves the right to not award a scholarship in a given year if it so chooses.
Dear Members:

Just a reminder that you can view past and current BOARD MINUTES on the SPECAD website.

We do not typically publish the minutes in the electronic versions of our newsletter, but they are always available for our members to view from our website. The site is not completely current at this time, as we are in the process of giving it a makeover and new launch in January.

Click here for the link to view: http://www.specad.org/index.php?navid=28
On-Line Plastics and Coloring of Plastics at Terra State Community College

A very distinctive feature of the Terra plastics program is its ability to provide “distance learning” (online) courses to students who may reside too far from the Fremont, Ohio campus to participate in full time day or evening classroom activities. This distance learning program has successfully served students globally, as well as locally, for several years.

We all know people within the industry (technicians, sales staff, new hires, etc.) that have no color education to speak of. One aspect of Terra’s program that can benefit many of the newer, or under-educated, members of our industry is its internet based, three course certificate program. It is a relatively low cost, no travel, flexible program that the employee can complete anywhere, on their schedule. The three courses provide solid background knowledge for anyone working in the many segments of the coloring of plastics industry. The three courses are:

- **Introduction to Color**
  - Introductory course on color theory
  - Basic background knowledge for anyone working with color
- **Colorants for Plastics**
  - The study of colorant types and their incorporation into polymer materials
  - More in depth treatment than in Intro Class
- **Introduction to Plastics**
  - Introductory course on plastics
  - Polymer types, properties and processing

Courses are an excellent opportunity for newer color matchers, quality control technicians, production technicians, and others to learn more about the coloring of plastics. These courses are also good for people with industry experience, since many of them have learned on-the-job. This is a good opportunity for them to learn the theory behind what they do every day. Students completing this certificate can expect benefits including:

- Quicker color matches
- Better understanding of pigments and their use
- Prevention color problems
- Solve color problems quicker
- Quicker batch corrections in production
- Better understanding of color at processors
- Cost savings

For more information, contact Jamie Przybylski, Program Professor at 419.559.2459 or toll free 866.ATTERRA, ext. 2459 or email jprzybylski@terra.edu

**Distance Learning Courses Offered**

**Section VI**  **PET 1100 Introduction to Plastics**  (3 Credits)
- Fees: $450 Ohio students/$700 out-of-state
- Books: Approximately $200
- Offered Fall 2013 (August 19 – December 13)
- Offered Spring 2014 (January 13 – May 8)

**Section VI**  **PET 1240 Introduction to Color**  (3 Credits)
- Fees: $450 Ohio students/$700 out-of-state
- Books: Approximately $200
- Offered Fall 2013 (August 19 – December 13)
- Offered Spring 2014 (January 13 – May 8)

**Section VI**  **PET 2320 Colorants for Plastics**  (4 Credits)
- Fees: $600 Ohio students/$900 out-of-state
- Books: Approximately $150
- Offered Spring 2014 (January 13 – May 8)
Choosing the Right Blue!
Scott Heitzman, Global Product Manager
Sun Chemical Performance Pigments

When it comes to creating blue colors using organic pigments, today’s formulators have a limited, but high functioning selection to choose from—specifically phthalocyanine (pcn) and indanthrone blue. Pigment Manufacturers have developed a new range of indanthrone pigments for polymers and coatings. This article will review this new Alpha Crystal of Pigment Blue 60 versus the “next best alternatives.”

A range of high performance pcn blues were used for comparison to these new PB 60’s. Be aware that all PCN blues are not alike chemically and performance in application. The products used in this study are tailor made pigments that are designed for a specific application. Thus two sets of pigments were used in this study—a set containing pigments for plastics and a set for coatings. This includes a variety of crystals forms and stabilization methods for the pcn.

The chemical structures for pcn blue and indanthrone can be seen in Figure 1. All of the pcn and indanthrone pigments have the same or similar structure to those displayed. Most are altered in performance and color by the crystal structure. The method of stabilization for these polymorphous pigments accounts for differences in the chemical structure and performance in application. This is displayed by the chlorine substituent used to stabilize the pcn Pigment Blue 15-1.

These organic pigments, in general are two times smaller than their inorganic counterparts. Both are robust molecules that have fastness properties that out perform their particles size. The pcn accomplishes this with its large aromatic structure and the indanthrone with its rigid fused polycyclic form. The crystal form or shape can also have an impact on dispersion, shear resistance and flocculation. In general, platelets and rod particles are easier to disperse and have fewer tendencies to flocculate than those that are isometric. In Figure 2a,b,c, the photomicrographs show the differences between the chemical pigment types and the plastics and coatings versions. Note the Plastics PB 60 (figure 2c) with rod shaped primary particles ~0.1 to 2µm long, 0.03 µm wide and the Coatings PB 60 (figure 2b) with much smaller particles ~0.04-0.08 µm. This is by design as the larger particles are needed for dispersion in the lower shear plastics applications and the smaller particles provide the transparency and strength required in coatings.

Figure 1

Figure 2a PB 15:2 stabilized
Particle size distribution is also important. Disc centrifuge is commonly used in evaluating pigments. The particle size sample preparation for disc centrifuge 10.0mg of sample that is dispersed in DI water. Then about 1 ml is then injected into the disc centrifuge.

The mode (peak) is the particle size. It’s common to report the median weight diameter (or D50). Since these are distribution by weight the larger particles can be overestimated in the overall distribution relative to the smaller particles. Thus, this is a relative weight distribution. Since larger particles weigh more, they count more by weight than equal number of smaller particles. There is no direct relationship between the size (height) of the bands within a distribution and the actual amount of particles of that size. This is a motivating factor to also consider photomicrographs.

The particle size data in Figure 3a,b,c is broken into a set for coatings(a), plastics(b) grades and a comparison between the two(c). As seen in the photomicrographs, the plastics grades are slightly larger to provide the required ease of dispersion. Coatings products are driven to a smaller size to provide required transparency. In the plastics set, the PB 60 has a mode of 275nm as compared to the red shade phthalocyanine blues at 300-600nm respectively. In the coatings set the PB 60 is much smaller with a mode of 73 nm.
In the polymer or plastics formulations, PB 60 is used for its ability to provide a spectral match to its higher volume use that is in exterior coatings. They formulate very red shade blues, provide added light fastness, warpage and bleach resistance. The following data sets review results of tests comparing options. The product set includes:

PB 15:1 stabilized
PB 15:1 HemiCl
PB 15:1 MonoCl
PB 15:4 stabilized
PB 60 Alpha Crystal

Nylon heat stability testing is conducted using 0.1% pigment with 1.9% TiO2. The compound is mixed and extruded. A base chip is molded at 260° C. Temperatures are then raised in 15-30° C increments and the resulting chips are measured versus the base chip. Color difference is reported in DE CIExLab and used for comparison. All products performed well and are considered commercially acceptable. In nylon for fiber and injection molding applications. This is an area where performance differences are greatly influenced by the process(s) used in production of the masterbatch and the end use material. Thus, larger spreads in performance are seen throughout the chemical types and stabilization methods. This result for this set of products was tightly grouped. Quality, type and percentages of stabilizers used in the phthalo blue vary from supplier to supplier – thus the spread can be larger and not follow typical expectations.

Bleach testing is conducted on molded nylon chips containing 0.1% pigment with 1.9% TiO2. Chips are submerged in a 3% NaOCl solution for 24 hours. Color difference readings are taken versus the unsubmerged portion of the chip and reported in DE CIExLab for comparison. All products demonstrated little color change after 24 hours.

Warpage testing is conducted in HDPE on a 2% pigment compound that is extruded and then molded. Color chips are placed in an oven at 100° C for 72 hours and are measured versus an unpigmented control chip. Delta L and Delta W numbers of less than ±5 may be considered as low warp; however, numbers of less than ±3 are preferred. PB 60 outperformed all but the heavily stabilized PB 15:4.

#### Table: Pigment Type and Color Differences

<table>
<thead>
<tr>
<th>Pigment Type</th>
<th>Delta L</th>
<th>Delta W</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.B. 60</td>
<td>-1.73</td>
<td>0.52</td>
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<tr>
<td>P.B 15:1</td>
<td>10.5</td>
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<td>4.67</td>
<td>6.3</td>
</tr>
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<td>P.B 15:1</td>
<td>1.46</td>
<td>2.1</td>
</tr>
<tr>
<td>P.B 15:4</td>
<td>2.6</td>
<td>0</td>
</tr>
</tbody>
</table>

Delta L and Delta W numbers of less than ±5 may be considered as low warp; however, numbers of less than ±3 are preferred.

Color data was compiled using nylon “tint” chips containing 0.1% pigment with 1.9% TiO2 and “masstone” chips containing 0.5% pigment. Figure 4a displays the photo of the masstone and tint chips. The a* versus b* color plots also exhibit the same trend. It is important to note the large difference in color between the three (3) red shade blues! Keep in mind when specifying pigments. PB 15:1’s are not all the same in performance or color. They are made to meet specific specifications.

The color in the photo transitions from green to red. The “jet” and very red masstone explain why the Blue 60 Alpha Crystal is valued in thin cross-section applications like film and fiber. Truly a unique color point, that is difficult to reach with blends of other pigments.
In coatings formulations, PB 60 is used by itself and mixtures with pcn to provide a wide range of solid and metallic red-shade blue. It is noticeably redder than the pcn and is thus used to tint or where a reddish shade is desired. PB 60 provides better light fastness than historical blends of violet pigments and pcn (the weak component being violet). It is reported to provide higher solids formulas due to its lower rheology. Its transparency has made it the “go to” blue for metallic and effect coatings. The following data sets review results of application tests comparing the next best alternatives.

The product set includes:

PB 15:6
PB 15:2
PB 15:2 stabilized
PB 60 Alpha Crystal

Color data is from an acrylic enamel test (a general solvent borne test). A grind vehicle is milled with pigment and then let down at 5 parts pigment 95 parts white for the tint, figure 5a. The figure 5b is a* versus b* color plot for masstone or 100% pigment. The figure 5c is a photo of the displays. It is clear the advantage or differentiation of the PB 60.
Solvent bleed is tested on a gram of pigment enclosed in filter paper and suspended in the test solvent. Pigment is submerged for 16 hours at room temperature. Color change of the solvent is expressed on a 1-5 Gray Scale where indicates poor resistance and 5 represents no change. All samples in the coatings set were 4-5 in Acid, Alkali, butyl acetate, methyl ethyl ketone and xylene.

In conclusion, whether you need the performance advantages in polymers or coatings, the products are available. Take a close look at both the color gamut you require as well as the aspects that are critical to quality.

As mentioned previously; all pigments in a chemistry or listed with a Pigment Index Name i.e. PB 15-1… are not the same. They are often made to different specifications, use different stabilization methods or quality as well as percentages. Newly developed Pigment Blue 60 can offer advantages in both performance and color gamut extension. The range of Phthalocyanine Blue is at the industry’s largest. So, with all the available blue to choose from... do your homework and choose the right product for your specific application. It’s rare for one blue to meet all your needs.

Although data presented above is believed to be correct, Sun Chemical makes no guarantee to its accuracy, completeness or reliability. It’s important to evaluate pigments in your specific test procedures, loadings and end use applications to assure “fit for use.”

References

KGaA, Weinheim, 2004
Required Information for Processing & Coloring Plastics

M2   MONDAY MORNING   APRI L 22

8:30   Options for Your High Volume Color - Blue
Scott Heitzman, Sun Chemical
If you are coloring plastics for packaging, fiber, or automotive blue is going to one of, if not your highest volume color. When it comes to creating blue colors using organic pigments, today’s formulators have a limited, but high functioning selection to choose from—specifically phthalocyanine (pen) and indanthrone blue. Pigment Manufacturers have developed a new range of indanthrone pigments for polymers and coatings. This article will review the new Alpha Crystal of Pigment Blue 60 as compared to the “next best alternatives.” You will have all the information you need to select the right blue for your high volume color – blue.

9:00   Halogen-Free Organic Pigments: Considerations for Selecting a Colorant
Michael Willis, Sun Chemical
Certain organic pigments contain aryl-halides and alkyl-halides as part of the chromophore structure and in some cases unintentional halogenated byproducts from the manufacturing process. Halogenated compounds can be sources for persistent and bioaccumulative dioxins depending on end-of-life cycle processing and are the subject of certain electronic industry standards. Requests for non-halogenated pigments are also trending in the pigments industry. CI or CAS chemical structures provide an expedient way to determine if an organic pigment contains halogen atoms. Analytical testing is required to parenthetically characterize any organic pigment as halogen-free in accordance with established electronic industry standards. This paper does not provide any original work or experimental findings but is rather intended to provide the reader considerations for organic pigments in view of industry initiatives and legislation aimed at protecting the environment.

9:30   Analysis of Organic Colorants in Plastics
Constantinos Nicolaou, Sun Chemical Corporation
The use of analytical techniques for analyzing organic colorants in plastics is described. These include spectroscopic and chromatographic techniques such as mass spectrometry (MS), visible spectroscopy (UVVis), FTIR, and high performance or ultra-performance liquid chromatography (HPLC, UPLC).

10:00   Review of Titanium Dioxide Ability to Scatter Light
Philipp Niedenzu, E.I. DuPont
One of the most popular pigments used for plastic film applications is titanium dioxide, TiO₂. Titania-based pigments are popular because of several desirable properties. For example, TiO₂ is preferred in plastics applications because it is nontoxic and a relatively inert material. In addition, TiO₂ does not migrate in a polymer matrix and generally does not require large shear forces to disperse it into a polymer melt when properly treated. TiO₂ morphology can be adjusted so as to attenuate different wavelengths of light for plastic end uses. This attenuation is often referred to as “opacity” within the TiO₂ industry. This paper describes the relationship of opacity as a function of titanium dioxide concentration, the thickness of the plastic matrix and the opacity performance.

10:30   Considerations Regarding the EN13900-5:2005 Determination by Filter Pressure
Justin Abel, Sun Chemical
With the increasing demands on masterbatches the DIN EN13900-5 standard has been used as a more stringent and objective indicator of dispersion quality in a polymer matrix. Introduced within the last 7 years this method is being widely adopted in the industry. This paper will examine the history and the key components needed to assess the dispersion of a colorant in a masterbatch as well as equipment considerations.
Sustainability, Spectrophotometry & Coloring; Pathways to Success

M22 MONDAY AFTERNOON

1:30   Creating Sustainable Growth by Incorporating Sustainable Development Behavior in Supplier Selection

Larry Nitardy, ComAssist

There are clear signs for companies with sustainable development cultures. When they are combined with a set of stewardship behaviors that drive sustainability, they make great suppliers. We have identified seven distinct stewardship behaviors that can be broken down into contributors to the Triple Bottom Line aspirations of every company focused on their on sustainable growth. For the environmental bottom line, consider "touch"; for societal goals, consider the behaviors such as "teach, treat and tout"; and for the profit driver, focus on behavior resources such as "time, talent and treasure". These seven behaviors have attributes that can, and should be evaluated and measured as we chose our suppliers. In our presentation, we take a look at each separately to give us insight into the complete value a supplier can deliver.

2:00   The Response of Highly Loaded Polylactic Acid Masterbatches Containing Pigmentary Titanium Dioxide

Joy Bloom, E.I. DuPont de Nemours

The use of bio-based polymers continues to gain commercial acceptability. With this growth, the need to impart opacity, whiteness, UV protection and printability to commercial articles is becoming more critical. Titanium dioxide (TiO2) is typically the pigment of choice to meet these criteria. While TiO2 is traditionally delivered as a highly loaded masterbatch, it is well known that many bio-based polymers are sensitive to masterbatch processing conditions. Understanding whether bio-based polymers are tolerant of the processing conditions used in high solids loading without significant performance degradation is the subject of this paper. Using polylactide (PLA) as a model system, the compounding performance of highly loaded TiO2-PLA masterbatches is discussed.

2:30   High Temperature Aesthetic Grade Liquid Crystal Polymers for Consumer Applications: Not Just For Connectors Anymore

Mark Tyler, Ticona

For many years the use of high flowing engineered resins, such as Liquid Crystal Polymer (LCP), have been used for very detailed and intricate parts in the electronics and connector industries where function and performance far outweigh any need for coloristic attributes. Today we find the uses of such resins extending out to more visible consumer products that need the performance and functionality of the LCP with the additional demand of excellent aesthetics. This paper looks to show where the coloring of LCP and the producing of aesthetically pleasing parts has brought LCPs from behind the scenes to center stage for the consumer products industry.

3:00   Low Gloss, Low Emission UV Stabilized Polyacetal Copolymer (POM)

Bruce Mulholland, Ticona

Automotive OEMs have increasingly become more interested in monitoring cabin air quality inside the vehicle. This leads to the need for further understanding and testing of emissions from the various materials including plastic parts. In addition, styling trends for automotive interiors continue to demand low gloss appearances. This paper explores how both demanding requirements can be met through the development of a low gloss, low emission POM material.
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