



The SPE Press

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July 2016

The Southern California Section of the Society of Plastics Engineers
Local information on resources and education available to plastics professionals

Western Plastics Trade Fair

**Date: Thursday,
August 11, 2016**

The Phoenix Club
1340 S. Sanderson Ave.
Anaheim, CA

*If attending seminars check-
in is 1:00PM, Trade Fair
opens at 4:00PM*

Register Now!

**About the Western
Plastics Trade Fair**

Register online NOW!

The Western Plastics Trade Fair is the processors choice for networking with local suppliers. We hope you will join us and your fellow colleagues on AUGUST 11, 2016. See you at the Fair!

Objectives

- Networking - Bring local Plastics Processors together
- Enhance a local vendor to processor supply chain
- Effectively introduce new products and services to the Plastics Processor
- Bring awareness to Plastics related educational courses in Southern California
- SPE based seminars - The latest in productivity improvement technology

Seminars

Renowned speakers and educators who specialize in the plastics industry

12:30-1:15PM Registration

1:15-2:00PM

Seminar 1: **Understanding the Changes ISO 13485:2016 Standard**

Speaker: Bob Mehta- ASQ Fellow

2:15-3:00PM

Seminar 2: **WHAT EXACTLY IS "SCIENTIFIC MOLDING"? (Demystifying The Scientific Molding Misconceptions)**

Speaker: Vishu Shah, Consultek Consulting Group

3:15-4:00PM

Seminar 3: **Avoiding Performance & Process issues by Optimum Part Design**

Speaker: Tuan Dao, Polymer Engineering Group

Exhibits

4:00-7:30PM

Local suppliers and resources for the Plastics Industry

- Additive and color suppliers
- Material suppliers
- Auxiliary equipment suppliers
- Machinery manufacture
- Secondary services
- Job locating/placement services
- Educational materials
- Molding supplies
- Overseas markets
- Software programs
- Rapid prototype suppliers
- Educational services - colleges
- Insurance services
- Finance and banking resources
- and MORE

Dinner

5:30-7:00PM

Raffle Prizes

Proceeds support our local SPE Scholarship and Plastics Training Programs

PRESIDENT'S MESSAGE

When I am writing this letter, our Annual Golf Outing is just one week away. This is one of our major fund raising event of the year. Funds raised help support our Plastics education program which reaches most high schools in our local areas. We expect a good turnout for this event and we would like to express our thanks and appreciation to our vendors who support and make this event a success.

Our next event of the year is the Western Plastics Trade Fair (WPTF) on August 13th that we have been preparing for the past several months. We invite your participation in setting up a booth or table top at the Trade Fair. The seminar this year at the Trade Fair has one well known keynote speaker Bob Mehta who is an expert in Medical Molding and FDA Regulatory. I personally love to attend his talk. So if you have questions on The FDA Regulatory in Medical Molding then this is the seminar you don't want to miss.

We look forward to hearing from you and seeing you at one of our many upcoming events

Tuan Dao
President, SoCal SPE
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MEMBERSHIP SPOTLIGHT

SoCal SPE Wants YOU to Become a Member

The SPE Southern California Section is, for a limited time, offering one FREE registration to a single, exclusive local technical event for those who sign up for an SPE Membership! To be eligible for this special offer, visit our website @ socalspe.org to check out the event calendar and register as an SPE Member! Once a member, you will be sent a voucher to bring to the SoCal SPE event of your choice! Offer also applies to expired memberships. Don't let this opportunity pass you by, become an SPE member today!

For questions, contact Ashley Price at 562-217-1377 or aprice@ethorn.com.

SAVE THE DATE

Western Plastics**TRADE FAIR**
Anaheim, CA**AUGUST 11, 2016**Hosted by The Southern California
Society of Plastics Engineers

Western Plastics Trade Fair 2015



George Epstein Scholarship Award 2016

The **George Epstein Scholarship Award** was established in 1984 as a tribute to his many contributions to plastics both commercially and educationally. Since inception, the Southern California SPE Section has awarded over \$33,000.00 in scholarships. The award is open to student members or son/daughter, grandsons/granddaughters of a member in good standing of the Society of Plastics Engineers, Southern California Section.

Awardee: Clinton Stark



Clint has been interested in pursuing a plastics career since he joined Cal Poly Pomona. In this vein he has distinguished himself in the materials and processes classes, particularly in the portions that dealt with plastics injection, tooling, thermoforming and materials. He augmented his plastics education by attending all the courses in the Plastics Engineering Technology Certificate at CPP taught by Vishu Shah. He also assisted Vishu in the revision of his Plastics Testing and Failure Analysis book. In his Manufacturing Engineering curriculum Clinton also learned how to implement lean processes and other manufacturing management topics in addition to project planning and technical aspects such as GD&T and CAD/CAM. For his Senior Capstone Project, he led a team that redesigned the product and process for a component that included insert molding and overmolding using moldflow and actually building two separate two cavity tools.

Clint is an SPE student member and has also attended many SPE events such as Technical Meetings and plant tours. He is recognized by many of the regulars. During college he worked at ISC Engineering for 4 years where he specialized in low production insert molding. He performed product design and development and improvement of manufacturing systems through lean implementation, kanban and related processes.

There is no question that Clint has resin instead of blood running through his veins and that he will be an asset to the plastics industry. He graduated on June 12, 2016 and will begin a new position with Prestige Mold. He plans to work towards a Project Management Professional certification.

He would like to thank his Mom and Dad as well as Lori Stark and Eric Grohsgal for all their support during college. He would also like to thank the staff at ISC Engineering for the opportunities afforded to him as well as the SPE Southern California Chapter for their welcoming spirit towards students.

Helpful Answers to Good Questions from Molders

Tuan Dao

Many molders have posed some interesting and very pertinent questions involving molding techniques. Periodically we interrupt the flow of single-subject articles to answer some recurring questions of general interest. This is such an article.

Question: *What are probable causes of unmelt and how do you troubleshoot them?*

The most probable cause of unmelt is a machine of inadequate melting capacity. The screw and barrel being used are just not capable of keeping up with the shot size on the cycle chosen. Here are a couple of things to watch for:

1. Is the stroke of the screw over $\frac{1}{2}$ of the available injection stroke? On slow cycles, this is not a problem. But on fast cycles, the resin may be in the cylinder so briefly that it cannot melt completely. Also, the screw retracts further in the cylinder, and does a less efficient melting job during the last few turns. That's because the screw channel, which is in the rear of the heating cylinder, does little or no shear "working" of the resin. The screw begins viscous shear heating of the blend of melt and pellets only after the pellets are far enough into the heating cylinder to begin melting on the bore of the cylinder.
2. Is the proper screw being used? If the screw is too deep-flighted in the front end, it may not adequately "work" the resin, with the result that unmelt can pass into the shot. A general purpose screw can mold almost any thermoplastic on slow cycle, but as cycle time is reduced, so is the time available for transferring heat from the walls of the heating cylinder. Without the heat generated by the screw and its drive motor, control of melt temperature is lost.

Increasing the screw speed will probably make the situation worse. The faster the unmelt passes through the screw and into the reservoir of melt in front of the screw, the less time there is for heating in the relatively thin space between the screw channel and the cylinder wall. Any melting that is done in front of the screw is at the expense of the temperature of the melt resin already there. Moreover, the heat transfer rate at that point is relatively slow.

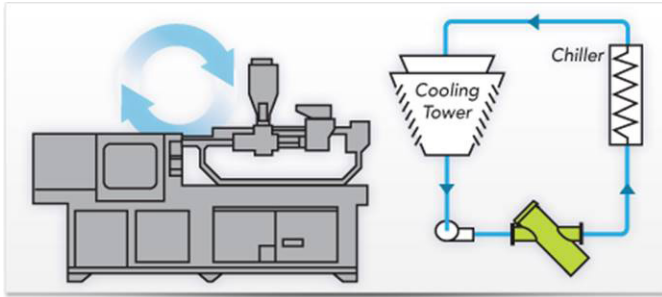
3. Consider these additional checkpoints:
 - Can the rear zone temperature be increased?
 - Can the heat from a hopper dryer be used to preheat the resin?
 - Is the resin still cold, having just come in from a cold warehouse?
 - Will back pressure help?
 - Is the heating cylinder L/D ratio too low? (Note that 16 to 1 length to diameter ratio is minimum for crystalline resin molding)



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Question: *What is the effect of chiller circulators on molded part properties?*



The effect is more pronounced in crystalline materials. Crystalline materials are fast freezing resins. Thus it is logical that the colder the surface of the mold, the faster the surface of the plastic will solidify. What happens to the overall properties of the part will depend on how cold the surface is and how thick the part is.

The faster a crystalline resin is solidified, the less dense it is. This is due to the fact that growth in crystallinity is stopped by the sudden quench effect of the chilled mold surface. For example, homopolymer acetal, the melt density at about 1.20 grams/cc would go to a solid density of about 1.42 grams/cc if the part is allowed to cool slowly. Sudden quenching might stop it at 1.35 grams/cc or less. In a part of 1/8" or greater, this quenching effect may be limited to the outer surface of the part, with the rest of the part wall of a high density. For a part of 1/16" or thinner, the quenching effect may go completely through the part wall.

The state of incomplete crystallinity may be acceptable in one molded part and not in another, depending on its design and end-uses. It can also cause some strange effects. For example, there is a case of a molder who was molding small connectors of nylon for wire terminals using a chilled mold. The connectors had spring-type coupling latches. He found that after ejection and cooling, the latches were very soft, not springy. One might think: the colder the mold, the stiffer the latches. Actually, the solution to increasing the springiness of this thin, integral spring latch was to raise the mold temperature. Inspection showed the thin section of the latch to be almost transparent, meaning low crystallinity. This, in turn, means low stiffness. By raising the mold temperature, the thin section became more crystalline and, therefore, a stiffer latch resulted. Nylon coil forms are also subject to distortion because they are so thin. A cold mold can make them extremely soft.

A cold mold can have another effect: post mold shrinkage. A rapidly cooled part molded in crystalline material will have a lower density and will shrink less. Thus, the part comes out of the mold larger than the same part coming from a hot mold. After a time at room or elevated temperatures, the part will continue to shrink until a stable level of crystallinity is reached and the part may be too small. For close tolerance parts and stable dimensions molded in crystalline materials, the surface temperature of the mold should be in the range of 180°F to 200°F. On fast cycles, a chiller may be needed to keep mold surface from exceeding 200°F. Thin-walled highprecision parts may require annealing for maximum stability, even when using hot mold.

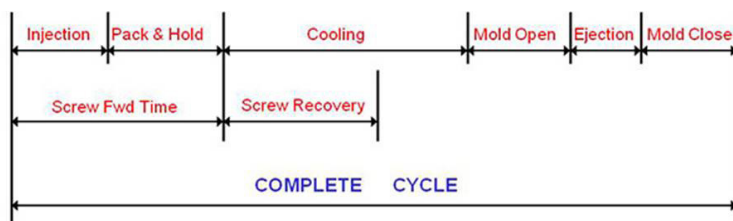
It is true that chiller circulators may shorten cycle time. But they should be used only after testing the parts under end-use conditions. This will help ensure that use of the circulator has not caused weak weld lines, post mold shrinkage or other in-service problems.

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Question: *What are the advantages of two-step injection pressure and how is the cycle set up?*

The ability to use more than one pressure setting is advantageous in solving molding problems and reducing operating costs. By programming the change from high pressure to a lower pressure, problems such as overpacking near the gate, warpage, mold flashing, etc., can be reduced or eliminated. Lower electrical power demand can result from using high injection and clamp pressures only when needed. Many machines control pressure and injection speed from the same timer or limit switch, and this is quite satisfactory for most molding jobs. Usually the machine high pressure is available at the same time as fast injection speed. In fact, to get fast injection, high injection pressure may be necessary.



Now a word about cycle set up. After the mold is filled, there is certainly no need for "booster"

because fast fill is halted. Since the plastic can't go any further, longer "booster" time will only waste electricity. At the same time, there is usually no need for full injection pressure...

only enough to assure good part "pack-out". Molding acetal or nylon for instance, the pressure may drop to 2/3 or less, depending on part shrinkage and other molding conditions. Switching to low speed fill and lower second stage pressure at the point where the part is nearly filled can help prevent distortion, overpacking at the gate, tunnel gate breakage, sprue sticking, mold core pin deflection and other problems. Some suppliers are selling a device that will accomplish these changes by sensing the pressure in the mold cavity and switching at the desired pressure. Since this device requires only minor changes in electrical circuit, installation is relatively simple. The device may easily pay for itself in better molding and possibly shorter cycles.

Some machines can operate on a reverse pressure cycle, that is, the first stage pressure is lower than the second stage. This is sometimes used to allow rapid filling of parts in a mold that has tendency to flash. After the parting line surface has frozen and sealed, the pressure can be raised to pack-out the part with minimum flash.

Tuan Dao. MSME: Formerly with DuPont Polymers. He is a technical consultant with Polymer Engineering Group and currently teaching Plastics Engineering at the University of California-San Diego, Extension.

33rd Annual Golf Tournament - June 23, 2016

Our golfers enjoyed our return to the exclusive **Sierra La Verne Country Club**. Located in the rolling foothills of the majestic San Gabriel Mountains, the course offers a cool climate surrounded by great natural beauty.



Southern California Section, Society of Plastics Engineers

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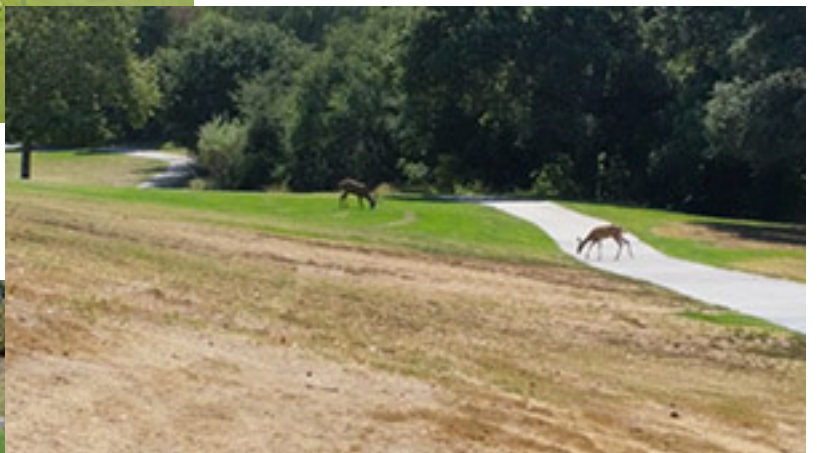
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We thank this year's sponsors for their generosity in helping us provide educational services to students and members. The monies will be used for our scholarships, High School Essay awards and student discounts for our regular meetings.



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Communications Excellence Award



Southern California Section Receives Communications Excellence Award



The Communications Excellence Award program was established in 2009 to recognize Sections, Divisions, and Special Interest Groups that implement effective communication practices.

The Southern California Section has also earned the 2016 Communications Excellence Award. The purpose of the award is to recognize Sections, Divisions and Special Interest Group (SIGs) that carry out highly effective communications with their groups and, optionally, with other parts of the Society during the course of the SPE year. It is intended to recognize all types and forms of communications as opposed to being focused on one medium or method of communication and information delivery.

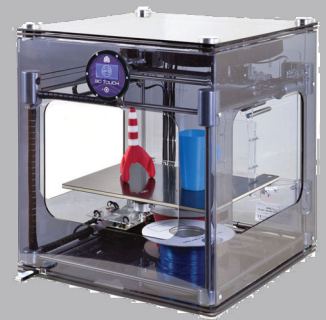


May Technical Dinner Meeting

Table Top 3D Printing

Our May meeting covered table top 3D printing. There were two featured speakers.

Miodrag Micic, of Cerritos college gave a fine presentation about the history of 3D printing from Stereo lithography (often called SLA or SL), through Fused Deposition Modeling (FDM) and on to Direct Metal Laser Sintering (DMLS/DMLM).



SLA is the use of laser curing of thin layers of epoxy done in a rising pool of polymer. This is a slow process with very brittle plastic. The parts are visually great but are not functional.

FDM is the application of thin layers of molten (extruded) plastic. This process is relatively quick and results in a durable sample. This is the most common Table Top system.



SMLS is the process of laser Sintering thin layer of powdered metal. This is up and coming technology for complex parts and Mold Cavities and cores.

Brenden Macias, of makersome.com brought in several FDM machines to visualize the process. Parts were printed at the meeting which underlined the capabilities of these inexpensive systems. Brenden also explained the software used to print the parts. While the printing system is very straight forward, success only happens when the operator understands the needed support structures used to

support the part as it is being printed.

You may visit his web site at www.makersome.com

SoCal SPE did a poor job of letting members know about this program. The speakers noted that they would be willing to do the program again next year. If you are interested in having another Table Top Printing meeting, let me know. Kerry Kanbara kerryk@piustech.com 909 906 2332



The Chain is a new online community platform developed by the Society of Plastics Engineers to enhance networking and collaboration with plastics professionals around the world. It provides tools for individuals to share information, ask for help, discuss problems, exchange lessons learned, search for information... or simply stay connected with colleagues in the industry.

People logging into The Chain are given access to all of these features and more—and they've been joining and logging in at a fast rate since the platform officially came online in early 2015.

Tech Talk is by far the most popular forum. Plastics professionals from around the world are coming together to discuss current issues felt by many engineers, exchanging ideas on how to tackle these problems moving forward. As Tech Talk becomes more well-known and popular this will be the premier source of information and trouble-shooting for plastics professionals around the world. Tech Talk is proving to be the Place where members can go for help solving problems, making recommendations, and general industry knowledge on a variety of technical topics. There are currently numerous ongoing discussions covering subject matter ranging from material applications, testing methods, and operational challenges to industry innovations.

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At the NPE show in March, SPE launched a free “e-Membership”—available to any professional with an interest in plastics and polymers. The e-Membership gives an individual full access to Tech Talk and SPE Café, and read-only access to the Career Central forum. All of these benefits are free as part of the SPE e-Membership.

Individuals also have the option of a Premium membership, which provides full access to all of the forums in The Chain, access to the largest technical library in the plastics industry, networking access to 20,000+ contacts worldwide, registration discounts to SPE conferences, subscription to *Plastics Engineering* magazine, and so much more, for the traditional yearly rate.

With the official opening to the world-wide plastics industry, SPE expects this platform to grow exponentially in the coming years as the reference platform for plastics technology. Expectations are that in the near future people will say: “You have a technical issue in plastics? Go to The Chain and you’ll find the answer!”

“I DECIDED TO GO ON THE CHAIN AND POST A TECHNICAL QUESTION ABOUT AN ISSUE/ PROBLEM WE ARE TRYING TO SOLVE ABOUT A PRODUCT.... I HAVE TO SAY THAT THE RESPONSE HAS BEEN FANTASTIC. NOT ONLY DID PEOPLE RESPOND WITHIN THE CHAIN AND POST THEIR COMMENTS AND SUGGESTIONS, I RECEIVED EMAILS AND ALSO PHONE CALLS FROM A VARIETY OF PEOPLE... THAT WERE WILLING TO OFFER UP POTENTIAL SOLUTIONS.... I AM HOOKED.”—KIMBERLY RUSH DIRECTOR OF R&D AND REGULATORY, POLYFORM PRODUCTS CO. INC.”

Check it out for yourself at <http://thechain.4spe.org/home>



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UPCOMING COURSES

The College of the Extended University Cal Poly, Pomona



Fall 2016

Scientific Injection Molding

COURSE CONTENT:

- ▶ *Polymer Basics, Plastics Materials and Flow Characteristics*
- ▶ *Part Design Fundamentals*
- ▶ *Overview of Basic Injection Molding Process*
- ▶ *Drying, Material Mixing, Coloring, Regrind Usage*
- ▶ *Major Process Variables*
- ▶ *Decoupled Molding, Universal Set Up Sheet*
- ▶ *Tooling Considerations, Venting, Cooling, Ejection*
- ▶ *Cycle Time Optimization and Troubleshooting Techniques*
- ▶ *Mold Flow Analysis*
- ▶ *How to Improve Productivity*
- ▶ *Modern Injection Molding Operation*

Plastics Engineering Technology Certificate Program

Dates: Saturday, September 17th & 24th, 2016

Time: 8:00 AM to 5:00 PM

Location: Cal Poly Pomona

Instructor: Vishu H. Shah, Consultek Consulting Group www.consulteksa.com

The course emphasis is on scientific approach to a somewhat complex injection molding process in order to simplify and eliminate basic misunderstanding about processing techniques employed today throughout the industry. Students will learn the importance of understanding polymer basics, material flow properties, viscosity-shear rate curve, and major plastics variables in molding, decoupled molding techniques, data analysis and interpretation.

The course will cover fundamental and scientific approaches to material drying, venting, cooling, use of regrind, how to prepare

universal set-up sheet, cycle time optimization, tooling considerations, etc. Use of modern tools and techniques such as mold flow analysis, cavity pressure transducers, and data acquisition tools along with troubleshooting techniques will also be covered.

Registration by Telephone

Students may call the College of the Extended University at 909.869.2288 to be placed on the class roster; fees must be paid to guarantee a seat in any class. Students may register by telephone with MASTERCARD or VISA.

Registration by Internet:
www.ceu.csupomona.edu

For more information call:

College of the Extended University
909-869-2288

Or Instructor : Vishu Shah 909-465-6699

The logo for the University of California, San Diego, featuring the text "UC San Diego" in white serif font on a blue rectangular background.

PLASTIC ENGINEERING – PART DESIGN FOR INJECTION MOLDING
(Course Code AMES-40168) Section ID 116806

University of California – San Diego, Extension.
July 16 – August 20, 2016

Expanding Skills in Plastic Part Design for Injection Molding

Plastics have increased their penetration of engineering applications that push the limits of part design, molding techniques and processing ranges. Plastic parts, often complex and large, are calling for better quality control and dimensional tolerances. Resin families and compositional variations have proliferated. Growth in the plastics industry has led to a constant influx of new people from other technologies who need to begin developing skills in the field of engineering plastics. People working in the industry need a good working knowledge of plastic part design.

Who Should Attend?

The course is primarily for designers, engineers, and technicians directly involved with making parts out of plastics. However, those in related activities ranging from management, purchasing, and quality control can benefit from the course by developing a better appreciation and understanding of the process of designing a plastic product.

Course Content

- Process of product design
- Fundamentals of plastics. Strength of materials, non linear considerations
- Materials selection in product design
- Molding and tooling considerations in part design
- General principles of part design. Short term loads, long term stress exposure
- Creep and relaxation in part design. Understanding safety factors in design.
- Dimensional analysis in part design
- Assembly techniques: design of snap-fit, press-fit, fasteners, ultrasonic, vibration welding, heat staking, adhesive bonding.
- Prototyping

Time/Dates: Saturdays, 9:30 AM-2:00 PM, July 16 – August 20, 2016 (6 mtgs)

Location: UC San Diego Extension. University City Center. UCC310

Contact: <http://extension.ucsd.edu/> or Tony Babaian tbabaian@ucsd.edu

Instructor: Tuan Dao, MSME. Consultant, Polymer Engineering Group, Inc. Formerly with DuPont Co., Engineering Polymers, has 30+ years experience in part design, mold design and molding techniques.

SPE Southern California Leadership



SPE Leadership		
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Director: Michael Espinosa, Triangle Sales	909-957-7412	michael@trianglesalesinc.com
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Director: Matthew Dauphinee, Mission Plastics	909-947-7287	mdauphinee@missionplastics.com
Director: Michael Espinosa	909-957-7412	michael@trianglesalesinc.com
Director: Matthew Dauphinee	909-947-7287	mdauphinee@missionplastics.com
Director: Suhas Kulkarni	760-525-9053	suhas@fimmtech.com
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Society of Plastics Engineers

6 Berkshire Blvd., Suite 306
Bethel, CT 06801-1065 USA

Membership Application

PH: 203-775-0471 • Fax: 203-775-8490
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Choose 2 *free* Technical Division and/or Geographic Section Member Groups. →

Additional groups may be added for \$10 each. Add Special Interest Groups at no charge.

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By signing below, I agree to be governed by the Bylaws of the Society and to promote the objectives of the Society. I certify that statements made in the application are correct and I authorize SPE and its affiliates to use my phone, fax, address and email to contact me.

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Technical Division Member Groups - Connect with a global community of professionals in your area of technical interest.

- Additives & Color Europe - D45
- Applied Rheology - D47
- Automotive - D31
- Blow Molding - D30
- Color & Appearance - D21
- Composites - D39
- Decorating & Assembly - D34
- Electrical & Electronic - D24
- Engineering Properties Structure - D26
- European Medical Polymers - D46
- European Thermoforming - D43
- Extrusion - D22
- Flexible Packaging - D44
- Injection Molding - D23
- Medical Plastics - D36
- Mold Making & Mold Design - D35
- Plastics Environmental - D40
- Polymer Analysis - D33
- Polymer Modifiers & Additives - D38
- Product Design & Development - D41
- Rotational Molding - D42
- Thermoforming - D25
- Thermoplastic Materials & Foams - D29
- Thermoset - D28
- Vinyl Plastics - D27

Geographic Section Member Groups - Network with local industry colleagues.

- ☐ Alabama/Georgia-Southern
- ☐ Asean*
- ☐ Australia-New Zealand
- ☐ Benelux
- ☐ Brazil
- ☐ California-Golden Gate
- ☐ California-Southern California
- ☐ Caribbean
- ☐ Carolinas
- ☐ Central Europe
- ☐ China
- ☐ Colorado-Rocky Mountain
- ☐ Connecticut
- ☐ Eastern New England
- ☐ France
- ☐ Hong Kong
- ☐ Illinois-Chicago
- ☐ India
- ☐ Indiana-Central Indiana
- ☐ Israel
- ☐ Italy
- ☐ Japan
- ☐ Kansas City
- ☐ Korea
- ☐ Louisiana-Gulf South Central
- ☐ Mexico-Centro
- ☐ Michigan-Detroit
- ☐ Michigan-Western Michigan
- ☐ Middle East
- ☐ Nebraska
- ☐ New Jersey-Palisades
- ☐ New York
- ☐ North Carolina-Piedmont Coastal
- ☐ Ohio-Akron
- ☐ Ohio-Cleveland
- ☐ Ohio-Miami Valley
- ☐ Ohio-Toledo
- ☐ Oklahoma
- ☐ Ontario
- ☐ Oregon-Columbia River
- ☐ Pennsylvania-Lehigh Valley
- ☐ Pennsylvania-Northwestern Pennsylvania
- ☐ Pennsylvania-Philadelphia
- ☐ Pennsylvania-Pittsburgh
- ☐ Pennsylvania-Susquehanna
- ☐ Portugal
- ☐ Quebec
- ☐ Spain
- ☐ Taiwan
- ☐ Tennessee-Smoky Mountain
- ☐ Tennessee Valley
- ☐ Texas-Central Texas
- ☐ Texas-Lower Rio Grande Valley
- ☐ Texas-North Texas
- ☐ Texas-South Texas
- ☐ Tri-State
- ☐ Turkey
- ☐ United Kingdom & Ireland
- ☐ Upper Midwest
- ☐ Utah-Great Salt Lake
- ☐ Virginia
- ☐ Washington-Pacific Northwest
- ☐ West Virginia-Southeastern Ohio
- ☐ Western New England
- ☐ Wisconsin-Milwaukee

*Asean: Indonesia, Malaysia, Phillipines, Singapore, Thailand, Cambodia, Laos & Vietnam

Special Interest Groups - Explore emerging science, technologies and practices shaping the plastics industry. Choose as many as you would like, at no charge.

- Advanced Manufacturing / 3D - 033
- Bioplastics - 028
- Failure Analysis & Prevention - 002
- Joining of Plastics & Composites - 012
- Marketing & Management - 029
- Non-Halogen Flame Retardant Tech. - 030
- Plastic Pipe & Fittings - 021
- Plastics Educators - 018
- Plastic in Building and Construction - 027
- Quality/Continuous Improvement - 005
- Radiation Processing of Polymers - 019
- Reaction Injection Molding - 032
- Thermoplastic Elastomers - 006

Recommended by (optional) _____ ID# _____