



Date: Thursday,
November 17, 2015
**SCE Energy Education
Center**
6090 N. Irwindale Ave.
Irwindale, CA 91702

Registration/Breakfast
9:00 a.m. - 9:45 a.m.

Symposium:
9:45 a.m. - 3:00 p.m.

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SPE/SCE ENERGY SYMPOSIUM

Energy Efficient Plastics Operation

TOPICS:

- Energy Efficient Plastics Operation – New developments - Overview
- Energy Efficiency Program updates and benefits (rebates, incentives, etc.)
- Lunch and Networking
- Panel discussion - Plastics Industry Trends and Hot Topics
- Tour of SCE Energy Education Center

TOPIC	TIME	SPEAKER/CONTACT
Registration Breakfast	9:00 to 9:45	SPE
Welcome Remarks	9:45 to 10:00	Edison
Energy Efficient Plastics Manufacturing Operation Overview	10:00 to 10:55	Vishu Shah, Consultek
Energy Efficiency Program updates and benefits (re- bates, incentives, etc.)	11:00 to 11:55	Edison
Lunch and Networking	12:00 to 1:00	
Panel discussion – Plastics Industry Trends and Hot Topics	1:00 to 2:30	Juergen Giesow, Arburg David Erling, Niagara Bottling Paul Delaney, Edison
Tour of SCE Energy Education Center	2:30 to 3:00	Edison

Adjourn

...continued on page 2



continued from page 1...

Cost: Compliments of Southern California Edison & So. Cal. SPE

Registration: Preregistration Required

Register online at www.socalspe.org

For more information please call or email:

William Moore – William.Moore@sce.com

626-815-7284

Monica Shors – Monica.Shors@sce.com

714-895-0687

Vishu Shah – vishu@consultekusa.com

909-465-6699

Speaker / Panelists Biography

Vishu Shah – Consultek Consulting Group

Vishu H. Shah is President of Consultek Consulting Group, a consulting firm specializing in Business Growth strategic planning and new product/Technology strategy development. His 35 years of extensive practical experience in plastics Industry includes positions as president and cofounder of Performance Engineered Products – a custom injection molder, Senior Plastics Engineer of Rain Bird Corporation and NIBCO Inc. His areas of expertise include product design, processing, automation, materials, rapid prototyping, tooling, failure analysis and testing. He is the author of Handbook of Plastics Testing and Failure Analysis and has taught various plastics related subjects throughout his career. Currently, he is teaching classes covering, Plastics Theory and Practice, Scientific Molding, Product Design and Tooling at CAL POLY, Pomona. An active, involved professional, he is a senior member, past president of So. Cal. SPE section, SPE Honored Service Member and also a board member of SPI Western Moldmakers Division. Vishu is a graduate of UMass Lowell where he received B.S. and M.S. degree in Plastics Engineering.

David Erling I Facilities Compliance Manager I Niagara Bottling

Chemical Engineer working for Niagara Bottling as the Facilities Compliance Manager. My role oversees utility, cooling water, electrical, and building maintenance compliance and vendor management for all plants across the country. In addition to this, my team manages energy rebates and energy efficiency projects. My team maintains compliance for all support equipment and support systems, but not production equipment.

Paul Delaney – Edison International

Paul Delaney has been an energy and energy efficiency professional for 35 years, and is currently a Senior Engineer at Southern California Edison. He is responsible for evaluation of new technologies that can reduce power demand and energy consumption for Edison industrial, manufacturing and agriculture customers. Mr. Delaney was a former Vice President for the American Utility Network and National Account manager for Edison Source. He is experienced with the de-regulation of the electricity industry in California. Prior to this, he was a Senior Energy engineer for the US Navy and provided engineering support for naval shore facilities worldwide.

Mr. Delaney holds a BS in Environmental Engineering from California Polytechnic State University at San Luis Obispo, CA, and is a member of ASHRAE, ASME and SME.

Juergen Giesow – Arburg

Juergen Giesow, Ph.D, started in 1983 as an apprentice at a Packaging company to become a Certified Process Technician. After the 3 year program he stayed with the company and became a shift leader. In 1989 he went back to University for Plastic Engineering in Troisdorf Germany. After finishing this program Juergen joined ARBURG at the head Quarter facility in Germany to become a trainer. As part of that he went through an elaborate training program and spent some time in every department of the company for a total of 16 month. After years in the training department at ARBURG he started to travel to the US in 1996 to set up an Application Engineering department. In 1998 he moved to the US and became an ARBURG US employee. In 2002 Juergen moved to CA to become the Regional Manager for ARBURG for the Western 13 states. Juergen has more than 25 years in the Plastic Industry and has presented dozens of papers.

PRESIDENT'S MESSAGE



Our last event of 2015 is the SPE/Edison Symposium on "Energy Efficient Plastics Operation" to be held on November 17th at the SCE Education Center in Irwindale. Lunch will be provided and the program is free of charge but pre-registration is required. You can find more details on this symposium in our website and I invite you to attend.

The year has really flown by and it is hard to believe we are already in November and Thanksgiving is just around the corner. As we enter the Thanksgiving season, it is the time for us to reflect on what we've accomplished this year. We are thankful for those achievements; from giving scholarships to young people, to a successful trade fair, and many other events in our section. Personally, I am thankful for so many things. I have a wonderful and healthy family, a great work team, and the opportunity to help our clients continue on the path towards doing more business. And I am especially thankful for our dedicated board members who selflessly volunteer their time to strengthen and grow the SoCal SPE section. Lastly, we encourage you to get involved in our local section, and we invite you to attend our seminars and participate in our board meetings. If you have any suggestions or creative ideas that would help our section to grow, we like to hear from you.

Happy Thanksgiving to all,

Tuan Dao
President, SoCal SPE
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CAN YOU HELP A HIGH SCHOOL STUDENT YOU KNOW GET \$500 FOR THEMSELVES AND \$500 FOR THEIR SCHOOL WHILE LEARNING ABOUT PLASTICS? YES!

"WONDERS OF PLASTICS" ESSAY CONTEST FOR 2016 NOW OPEN

The Southern California Section of SPE is opening the 2016 Wonders of Plastics essay contest. The objective of the contest is to raise awareness and education about the positive aspects that plastics play in society today.

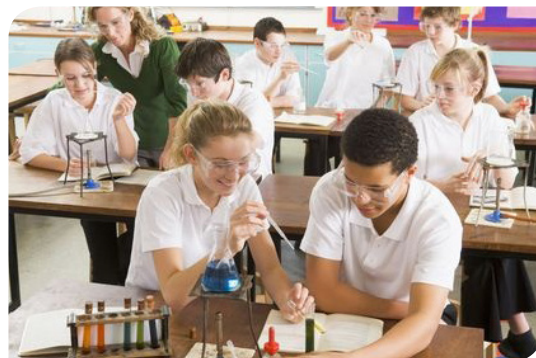
Any high school student in the section region may enter. Thus, as a member, if you know any high school student (son/daughter, grandchild, neighbor, etc) that is eligible, please forward the information to them. The region goes north to San Luis Obispo County, south to the Mexico border and east to the Arizona border.

The essay topics are open to be chosen by the student, they just have to be related to the positive aspects of plastics in our world. Some topics have been the benefits of plastics in medicine, energy savings, plastics recycling, etc. Our goal is to expand the students' plastics knowledge by their submission of original and well researched papers. Again, any plastics related topic of their interest will do! How plastics

rockets helped me learn about science? Sure!

In the past, the Southern California Section has awarded over \$15,000 in prizes to students with over \$15,000 match to their schools. The school decides where the money goes, the Section just writes the check. The donations to schools have typically gone right back to support science classes.

[Click here](#) for instructions and submission form. Any questions, please contact Victor Okhuysen at vfokhuysen@copp.edu and put "Essay Contest" on the subject line.



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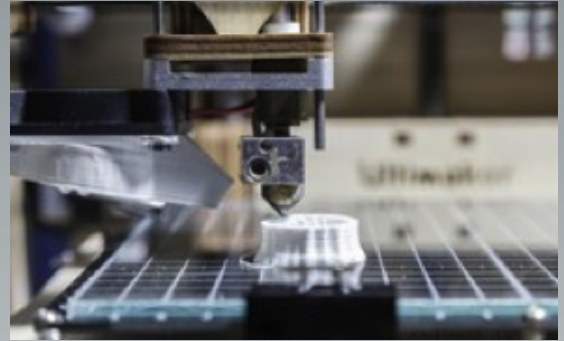
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FOR YOUR INFORMATION

ABS or PLA: Which 3D printing filament should you use?

Perhaps the most important part of 3D printing is using the right material for your print job. When considering what building material to use, there are numerous factors to consider, including strength, flexibility, accuracy, and special conditions the material may require in order to print properly and accurately. ABS and PLA are the two types of materials 3D printers currently use, but the differences between the two aren't immediately apparent. This raises the question: which one is best suited for your 3D printing needs?

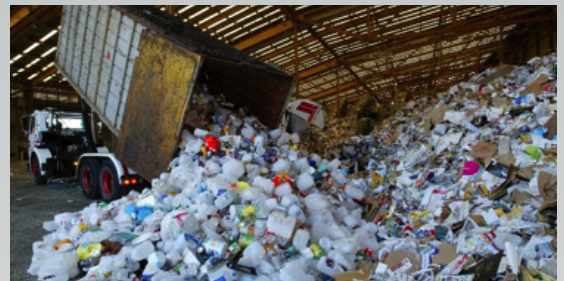


Read more: <http://www.digitaltrends.com/cool-tech/abs-vs-pla-3d-printing-materials-comparison/#ixzz3nZMLMNvp>

Ignoring one simple step can make all of your efforts to recycle useless

A single half-empty soda bottle can contaminate an entire load of recyclable plastic at the processing plant, sending thousands of pounds to the landfill instead of being recycled.

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Read more: <http://www.4spe.myindustrytracker.com/en/article/68608/ignoring-one-simple-step-can-make-all-of-your>



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WAYS TO PREVENT OR CORRECT WARPAGE

Tech Tips by
Tuan Dao, BSCHE, MSME

The subject of warpage is a complex and difficult one. It affects the final dimension of the part and its tolerances. From the part design standpoint, warpage is the effect of non-uniform shrinkage between two or more areas of a part, pulling against each other with a “drawstring” effect. It is nearly impossible to predict the extent of warpage with so many variables. One thing you can be certain, however, is that warpage will occur if the wrong part design or improper molding technique is used.

Bear in mind that this discussion is limited to distortion caused by internal stresses – not caused by external forces. Obviously, a molding can be bent out of shape by non-uniform ejection or by an undercut that doesn’t release properly or by dropping a hot molding into a box on top of other hot molded parts. Always eliminate such possible external sources of distortion. Don’t automatically assume that the problem is caused by post molding warpage.

Chief Causes of Differential Shrinkage

Correcting or preventing warpage requires an understanding of the factors that can cause differential shrinkage. These include mold temperature, cooling rate, melt temperature, flow orientation, differences in thicknesses, cavity pressure, and lack of venting. Any one or a combination of these factors can cause the shrinkage imbalance that leads to warpage. A point to remember is that any factor which can cause warpage may also be the means for correcting the problem. For example, localized pressure differences in a part might correct warpage due to uneven wall thickness.

Warpage Factor No. 1: Cooling Rate

Non-uniform heat transfer from the part to the metal mold is one of the major causes of warpage. There are several possible reasons for this unbalanced heat transfer which are discussed below:

- **Mold Temperature** – The higher the mold temperature, the higher will be the shrinkage of the part. That’s because slower cooling allows greater stress relaxation and higher density of the resin in the part. If one face of the mold is hotter than the other, the part will shrink more on the hotter side due to this slower cooling. Unbalanced shrinkage will pull the part concave on the hotter face (Figure 1).

However, as with all general rules, there are exceptions in which the warpage behaves differently than expected. This is usually the result of part design or ejection technique counter-balancing other factors.

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Non-Uniform Cooling Causes
Non-Uniform Shrinkage

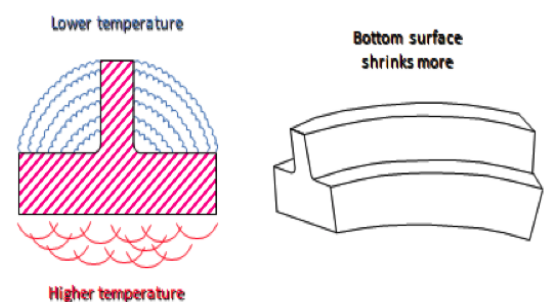


Figure 1

...continued from page 6

- Heat Transfer Capacity** – The nature of the heat flow path may restrict the amount of heat that can be transferred. For example, there is little or no chance for transferring heat from the tip of long core pin to the mold base. Unless cored for cooling, pins that project into the cavity more than about 5 times the pin diameter are apt to be 50 to 100°F (30-60°C) hotter than the rest of the mold. This can cause warpage and may cause part sticking and ejection problems. Another restricted heat flow problem occurs at molded ribs, as illustrated in Figure 2.

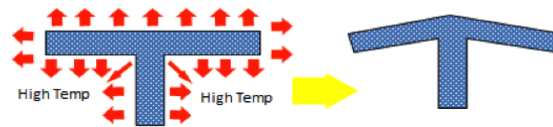


Figure 2

Slower cooling at the junction of the wall and rib results in higher shrinkage around the rib area than on the opposite side of the part. Deflection then occurs as shown.

- Metals for Mold Construction** – Warpage can occur in molds where metals of different thermal conductivity are used in different part of the mold. The result is much the same as that described above under the heading “Mold Temperature”. Cast beryllium copper, often used for complex cavity parts, has a much faster heat transfer rate than tool steel. Thus warpage may take place even though the surface temperatures of the two halves of the mold are exactly the same.

Warpage Factor No. 2: Section Thickness

Molders know from experience that mold shrinkage is proportional to thickness. Unfortunately (for the molder), this basic fact is often ignored during part design. A part that is designed with variations in section thickness will certainly warp or retain molded-in-stresses unless these areas of the part can shrink independently. This is a major cause of warpage and, in many cases, the only solution is redesign the part.

Warpage Factor No. 3: Flow Orientation

During cavity filling, the flow of the resin through an outside envelope of semi-rigid resin results in viscous shear, locking in lines of stress radiating from the gate (Figure 3). These localized stresses can influence the distribution of molding shrinkage. As Figure 3 shows, for unreinforced resin, the part is likely to shrink more in the direction of flow than across it. This effect causes large run-out of edge-gated gears or warpage of center-gated parts that are bar-shaped.

Warpage Factor No. 4: Pressure Distribution

The pressure drop through the cavity in long, thin sections can produce high pressure near the gate which

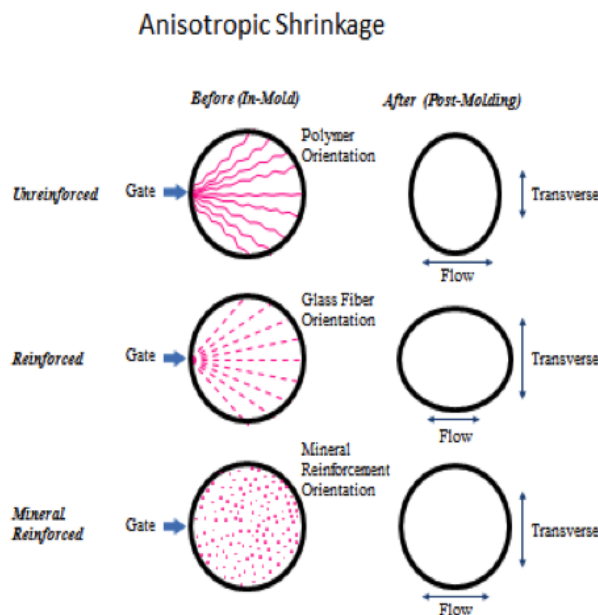


Figure 3

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Sprue-gated disc may have a potato chip warpage. That's because the shrinkage around the outside (an area of lower pressure) is greater than in the center (where there is higher pressure) which results in buckling. Reducing the time on the booster timer can often help reduce the high pressure "packing" around the gate.

Warpage Factor No. 5: Non-Uniform Melt Temperature

The volume occupied by the melt increases with temperature, that is the density of the melt decreases as temperature increases. Therefore, the shrinkage on cooling depends on the melt temperature. If there are temperature differentials between the first part of the shot and the last, differences in shrinkage may cause warpage. Such a condition may occur if the machine can't melt resin fast enough as cycle is shortened, or if the heater bands cause hot or cold spots in the cylinder.

Conclusion: Check the True Cause

A warpage problem is mostly solved when the true cause is recognized. While the molder can employ several techniques for correcting a warpage problem, the place to start is with the part designer. There is a great need to impress upon him (or her) the importance of preventing warpage. In a poorly designed part, it is usually quite difficult to correct warpage problems. In addition, other properties of the final parts may suffer because of the molding conditions required to correct the warpage.

Tuan Dao, BSChE, MSME., has over 30 years' experience in plastic engineering. He was formerly with DuPont Company, Engineering Plastics Division. Tuan is currently a consultant and teaching Plastic Engineering courses at the University of California, San Diego, Extension. He can be reached at (714) 692-9492.

Summer Internship – Opportunity to help a student

I am a Plastic and Polymer Engineering student studying at Ferris State University. I currently have my associates and I am working on obtaining my bachelors in the major by 2017. I have previously interned in the industry at Matrix Manufacturing. At Matrix I worked closely with the engineers to help advance new projects into launch. I have three years of hands on processing including; injection molding, extrusion, blow molding, thermoforming, and compression molding. I am currently working in the Ferris State plastic's facility with the lab technician to troubleshoot any problems occurring within the facility. Also I have helped install and set up newly obtained injection molding machines. My objective is to obtain a summer internship that will challenge me as well as help expand my knowledge of the industry. I would like to obtain a position that would allow for me to grow with the company and develop a relationship for a long term and potential full time employment. Although my experience this far has been limited to processing I express interest throughout the industry including; tool design, quality, processing, and sales.

Contact:

Ryan Lee • Email: Leer14@ferris.edu • Phone: (989)992-9506

SoCal People Watch

This is a newsletter feature where we will note changes of positions, opening of new companies, interesting facts about our plastics community and humorous stories told in good taste about our members.

Skip Humphrey – CEO of International and long time SPE Board member recalls two color molding at his dad's factory, R. C. Molding, New Hyde Park, New York. These two color beach pails were manufactured on two DeMattia 300 ton plunger (screw injection machines were not available until the early 1960's) injection molding machines. The sleeve was molded on a two cavity mold and when the press opened the sleeves were transferred to the second machine that was place operator facing the first machine, the operator then placed the two sleeves on the cores and that machine made the white webbing and the bottom. The sleeves were always bright fluorescent colors. As a teenager I was often on the molding floor relieving operators for their breaks. Now we have multi color molding being done on a single multi injection unit machine with rotating molds.



This was "high tech" molding in that era.



Ed Contreras - Edco Plastics, Inc., Anaheim, CA. Ed was kind enough to mold and print those nice license plate frames ("PLASTIC IS FANTASTIC" on the bottom and 'SOCIETY OF PLASTIC ENGINEERS') given in our literature bags at this year's Western Plastic Trade Fair. We really appreciate it when our community members step up for us.

Eric Larson – "The iDive, the world's first functional touchscreen housing for underwater use, was recently awarded the First Place Prize in the Collegiate Division of the 2015 Plastics Design Competition sponsored by The International Association of Plastics Distribution (IAPD). The conference was held Sep 21-24 in San Diego. Jim Peña and Eric Larson, the San Diego based engineering team responsible for the development of the iDive, gave a presentation on its development to IAPD convention delegates, which highlighted the importance of collaboration in the development process. (Those of you who attended the Western Plastics Trade Fair may remember the presentation that Jim gave on the design challenges involved in the development of the iDive. SPE member Eric Larson also gave a presentation on plastic material selection.) "

Please send your input to me at: kerry.kanbara@gmail.com

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Everything is Bigger in Texas

On the weekend of October 16th 2015 the **Next Generation Advisory Board** held their first retreat in Houston, Texas. For three intense days, a group of thirteen young professionals from all over the country discussed the future of SPE and how our society will thrive in our ever-changing environments.

Meeting face to face brought forth a mixture of promotional ideas and technical insights geared towards attracting new members and setting a platform standard for how NGAB presents itself.

Just three years back, NGAB had only three members. Fast-forward to 2015 and we now have twenty-three members from all ranges of the plastics industry. Employees from notable companies like Boeing, Braskem, Nike, PolyOne, TE Connectivity and many more. Our mission states, "Drive IT, social media, and training activities that will recruit & retain young professionals, convert them into future leaders, and ensure a more sustainable future for SPE". We are involved and we are leaders. Let us break thresholds by reaching out and inspiring future leaders in our grand collaboration in building a more interconnected, better world.

The team is excited to see these BIG plans come alive at **ANTEC INDY 2016**. We know these events we will host will not only continue to give better support to our students and young professionals, but also add to the many benefits of being a part of the Society of Plastic Engineers.

Want to know more about the **Next Generation Advisory Board**? Please contact Ashley Price at aprice@ethorn.com.

By:

Ashley Price

Horn Company – Account Manager

Chair – Next Generation Advisory Board

Membership Chair –

SPE Southern California Section



UPCOMING COURSES

The College of the Extended University Cal Poly, Pomona



<https://www.ceu.cpp.edu/courses/cert/EM/PET.html>

Comments Provided by Students

- ▶ Great course, very instructional...love the PowerPoint notes
- ▶ The instructor uses examples that are relevant to my industry/field
- ▶ The overall explanation of the basics of Plastics was very clear and concise, explained in plain English without having to use big and sophisticated words to explain theory or function
- ▶ The course's major strength was instructor's ability to relate to real life experience
- ▶ Very Practical – I highly recommend to anyone new to plastics industry
- ▶ Hand-outs are great, I refer to them on regular basis

Winter 2016

Plastics: Theory and Practice

Spring 2016

Plastics Product Design and Tooling For Injection Molding

PLASTICS 101 - Theory and Practice

Winter 2016

This course is designed to introduce students to basic concepts and techniques used throughout the plastics industry. The objective is to expose everyone to the fundamentals of Plastics, product design, basic processing techniques, secondary operations and tooling. The attendees will be given handouts showing How and Where to get more detailed information on

variety of Plastics related-topics. This course would be valuable to all technical, scientific and engineering personnel, either entering field of plastics or interested in broadening their knowledge of materials and processing techniques. It is also suitable for individuals in plastics sales, marketing, purchasing, and quality assurance.

Plastics Product Design & Tooling for Injection Molding

Spring 2016

The first portion of this combined course provides an overview of the design process for injection molded plastics parts. The emphasis is on concurrent engineering practices, which leads to elimination of barriers between various engineering groups, toolmaker and manufacturer. The student will learn about importance of proper material selection, part design process, part design fundamentals, manufacturing (moldability) considerations, design for assembly,

tooling considerations, rapid prototyping techniques and testing. Students are encouraged to share their knowledge of product design success/failure stories in a group discussion format. Design fundamentals discussed are applicable to parts designed for all plastics processing techniques. In the tooling portion of the course the emphasis is on, types of molds, mold material selection, various mold components, mold design principles, cooling, venting, draft

considerations, shrinkage, mold polishing, and tool surface enhancements techniques. Topics such as use of simulation software to enhance mold design, how to improve productivity, reduce down time, and lower maintenance costs by optimizing tooling design will be covered in detail.

For more information call the college at 909-869-2288 or Instructor Vishu Shah at 909-465-6699.

SPE Southern California Leadership



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Society of Plastics Engineers

6 Berkshire Blvd., Suite 306
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Membership Application

PH: 203-775-0471 • Fax: 203-775-8490
www.4spe.org • membership@4spe.org

Contact Information *Please print clearly*

First Name (Given Name)		Middle Name
Last Name (Family Name)		
Company Name/University Name (if applicable)		
Mailing Address is: <input type="checkbox"/> Home <input type="checkbox"/> Business		Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female (for demographic use only)
Address Line 1		
Address Line 2		
Address Line 3		
City		State/Province
Country	Zip/Postal Code	Phone
Preferred Email (This will be your member login and is required for usage of online member services)		
Alternate Email		
Date of Birth (Required for Young Professional membership)		
Graduation Date (Required for Student membership)		Job Title

Membership Types *Check one*

- ☐ **Student: \$31** (Graduation date is required above)
- ☐ **Young Professional: \$99** (Professionals under the age of 35. Date of birth is required above)
- ☐ **Professional: ~~\$144.00~~ \$129** (Includes \$15 new member initiation fee)

Choose 2 *free* Technical Division and/or Geographic Section Member Groups. →

1. _____ 2. _____

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

1. _____ 2. _____

3. _____ 4. _____

Dues include a 1-year subscription to *Plastics Engineering* magazine—\$38 value (non-deductible). SPE membership is valid for 12 months from the date your membership is processed.

Payment Information Payment must accompany application. No purchase orders accepted.

☐ Check Enclosed Amount _____

Charge: ☐ Visa ☐ Mastercard ☐ American Express Expiration Date: _____

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Amount Authorized: _____ CSC#: _____ Last 3 digits from the back of MC/Visa.
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Payment by Wire Transfer Instructions

You **must** include account number + ABA number + bank fees.

Please include the Member ID# and Name so we may apply payment to the correct person.

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The SPE Online Member Directory is included with membership. Your information is automatically included unless you indicate otherwise.

- ☐ Exclude my email address from the Online Membership Directory
☐ Exclude all my information from the Online Membership Directory
☐ Exclude my address from 3rd party mailings

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.

Signature _____ Date _____

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# _____