



The SPE Press

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April 2015

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

Date: Thursday, April 16, 2015

Jagerhaus Restaurant
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Registration: 5:30 PM
6:00 PM Dinner & Presentation



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SPE Dinner Meeting NPE-ANTEC Recap



By the time you read this, over 60,000 Plastics Professionals from all over the world will have taken advantage of this unique opportunity presented only once in three years to see the latest in plastics innovation and access emerging technologies that shape the future of plastics industry, network and listen to the scientists and experts present technical papers. National Plastics Exposition, known as NPE, hosted by SPI and Annual Technical Conference known as ANTEC hosted by SPE were held in Orlando in March. This was the largest NPE ever in terms of exhibit space!

At NPE, every sector of the industry was represented, so no matter what kind of business you're in, or what kind of products you make, you were able to find what you needed. Visitors were able to source 2,000 leading suppliers, and saw and test the full range of technology solutions for every phase of plastics processing including machinery, chemicals and additives, resins and compounds, design engineering system, software,

molds and dies, and more. The show featured more than 400 Exhibits with Machinery in Full-Scale Operation.

At ANTEC, the meeting included the largest presentation of peer-reviewed technical papers about plastics in the world, with over 700 submissions in sessions running all day from Monday thru Wednesday. Each event boasted technical and business presentations on new and updated technologies, panel discussions and tutorial sessions. Networking events and student functions provided attendees with face-to-face interaction with expert representatives from the largest industry segments.

If you were one of the few professionals unable to attend these events, no worries. We have put together an hour long presentation covering all the latest and the greatest technologies and innovations. The topics include new developments in machinery, materials, tooling technologies,

Continued on page 2

Advanced registration is requested. Register online at www.socalspe.org or complete the registration form and send by email socal.spe.news@socalspe.org or fax 909-625-2847



Pre-register online or with this form and save \$\$ (at door price \$45.00)

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| | Total | \$ _____ .00 |

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Dinner Meeting From page 1

design, rapid prototyping, auxiliary equipment, and much more. The presentation will include short video clips describing the new technologies and innovations as well as samples and other related materials.

SPEAKER . Vishu H. Shah is a graduate of University of Massachusetts Lowell with Bachelors and Masters Degree in Plastics Engineering. He is also an author of Handbook of Plastics Testing and Failure Analysis. An active member of SPE, his career spans more than 40 years in Plastics

industry. As a President and cofounder of a custom Injection Molding business, he was responsible for entire manufacturing operation. As a Consultant and Expert Witness, he has worked extensively with companies throughout the world and with many Law firms in the area of failure analysis.

Over 1000 students have taken advantage of the seminars and short courses he has conducted along with current Plastics Engineering Certificate program at Cal-Poly Pomona.

President's Message

I am proud to say this is the first official SoCal SPE electronic newsletter. It has been a long time coming and we are now sending all SoCal SPE newsletters through the internet. Your SoCal SPE Board and I are looking forward to hearing what you think. We are always open for comments.

I have been attending a lot of Conventions and OEM meetings these past two months and I am excited about what I am hearing. The forecast for plastics is bright. Projects are hitting fast and hard. I look forward to the rest of 2015. Many resin prices are low and everyone seems to be taking advantage of this.

NPE has come and gone. I am hopeful that those of you that attended had a successful trip. We have another 3 years before the next NPE.

We had another successful Education Night held at Cal Poly Pomona. Two High Schools participated and we had essay winners from both. This is a very important event for SoCal SPE. We get a chance to motivate high school boys and girls to research the positives of plastic. The incentive is a first, second and third place financial award from \$500 to \$100. The schools also receive a matching check. The students, their parents and attendees were provided with dinner and a tour of the Cal Poly Engineering and Plastics Lab. Professor Victor Okhuysen presided over the event. Victor is also a SoCal SPE Board member.

We look forward to seeing you at the next SoCal SPE meeting. We will be highlighting new and exciting releases from equipment to raw materials. If you were not able to attend NPE this year, now will be your chance to catch up with what is new in THE EXCITING WORLD OF PLASTICS.

Regards,

Richard Hays

Southern California SPE President

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Tech-tips

A question that is asked very often is the following: If one uses the Decoupled Molding technique (service mark of RJG Inc), should you fill the mold 95-98% full by volume or by weight?

I begin my answer with a statement: Scientific Molding is NOT following a set of procedures but is understanding the science behind molding. (You do not have to do a viscosity curve on every mold. Using the technique of decoupled molding is not implementing Scientific Molding; Decoupled Molding just one very small step of Scientific Molding)

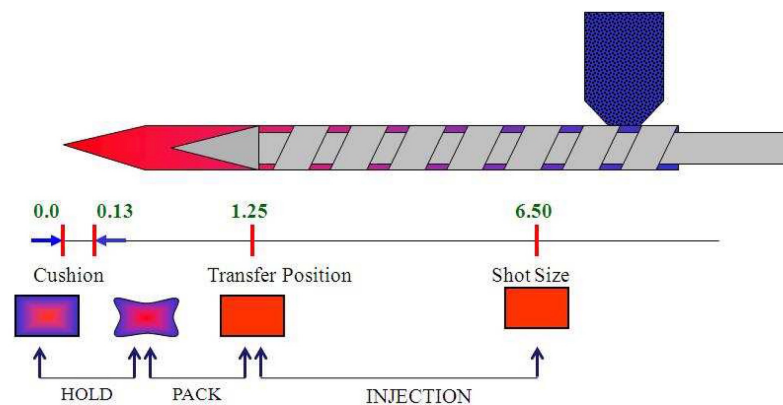
Going back to the question, let me give you my theory on filling the part less than full. As the plastic melt cools down it shrinks. As it shrinks the volume reduces. Molten plastic is injected into a cold mold

where the melt begins to cool down as soon as it touches the mold. Therefore we need to get the plastic inside the cavity as soon as possible. This is the injection phase. In the injection phase, we fill the mold cavity with molten plastic. But if we stop there, the plastic will shrink and the part that is ejected out of the mold will have sink. To compensate for the shrinkage and eliminate the sink, the second stage called the pack stage is applied. During this stage, the plastic must enter the cavity at the rate of the shrinkage that is occurring. The third stage is the hold stage that is applied such that more plastic does not get into the cavity nor does the plastic that is under tremendous pressure get out of the cavity. It is applied till the time the gate freezes off. So in summary, we fill the cavity, compensate for the shrink and hold till gate freeze.

Injection Phase - 95-98% by Weight or Volume?

When we say 'fill the cavity' – in theory we need to fill it up a 100% with molten plastic ... and that is where the problem arises. Plastic melt is highly compressible like a ball of rubber bands. So we do not know if the volume of plastic that was injected into the mold was equal to a 100% of the volume of the cavity or was it more than a 100%. It could have very well been more than a 100% since the melt could have been compressed. Compressed melt is not desirable since it can lead to issues such as stress and flash in the parts. For that reason, the mold must be filled just a little less than a 100% and then the pack and hold should be turned on. That is where the number of 'less

that 100%' comes from. An added benefit of this is also to slow down the injection speed before hitting the point of transfer into pack and hold to achieve consistency of the point of transfer. It is like slowing down at the traffic light before coming to the light and not



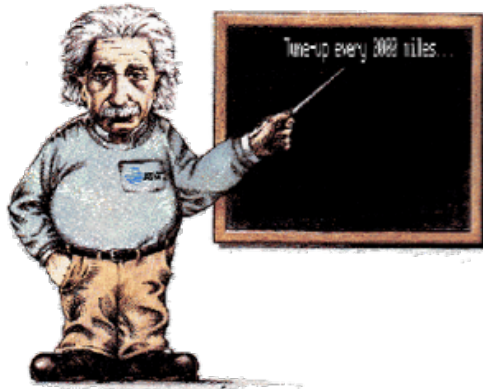
slamming on the brakes at the zebra crossing.

So does it then matter if we are going to transfer by weight or volume? To begin with, $Weight = Volume \times density$. (Congratulations! You have made it this far! Thanks for reading & learning. Please send an email to Suhas below to get a complimentary cell phone holder). Since the melt density is going to be constant, 95% by weight = 95% by volume! I think the question is answered. It does not matter. This can get confusing in some situations:

- On thick parts you may fill the skin first and then the inside will get packed out. So there is not visual sign of the less than 100% in injection.

Continued on next page

Cont'd from page 2



- On thick parts once the skin is fully filled, the vents are closed and there may still be air inside the cavity. So you may need to inject slowly to vent out the air and then pack and hold. In this case a 'visual short' may be the way to go. This may appear to be 98% short by volume but may be only 90% by weight.
- On thin parts, since there is not much shrinkage a 98% by volume will be very close to 98% by weight.

Comments on the % number: So should it be 95% or 98% or why can it not be 90%? The answer is that there is no definite number that

must be followed. Here are some general guidelines:

1. The thinner the part, try to use closer to 100%. In some cases, where there are very thin sections such as filter mold I was working on, I had to get 100% of the material in there in the injection phase with no pack and hold pressure but with some hold time to seal off the gate.
2. As the part gets thicker get closer to the end of the fill, slow down and then pack and hold.
3. For better consistency slow down before hitting the transfer position. On one mold, I reduced the speed at 85% full part and transferred to pack and hold at around 97%.
4. For crystalline materials that freeze off fast, the number should be closer to a 100%. Amorphous materials are more forgiving.
5. Whatever method you follow, record the fill only part weight on the process sheet and duplicated it every time the mold goes into production. This will

give you the most consistency.

Suhas Kulkarni

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Suhas Kulkarni is the President of FIMMTECH, a consulting firm that specializes in services related to injection molding. He earned his Masters in Plastics Engineering from the University of Massachusetts, Lowell and a Bachelors in Polymer Engineering from the University of Poona, India. He has 22 years of experience as a process engineer. His main area of expertise is Scientific Processing for Injection Molding. Based on his experience, he has developed a custom software called Nautilus, that aids the complete process development routine to production release.

Suhas teaches a plastics and molding course at the University of California, San Diego and is a contract faculty at the University of Massachusetts at Lowell. He is also an author of the book 'Robust Process Development and Scientific Molding' published by Hanser Publications.

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ON BOARD WITH NGAB

The NEXT GENERATION ADVISORY BOARD is SPE's "Go To" committee regarding social media, networking, and plastics industry updates specifically designed to meet the needs of the newest generation of plastics professionals. NGAB consists of young professionals from all corners of the plastics industry with a mission to relate new generations with each year's advancing technologies. Our fun and innovative activities provide contacts and industry knowledge for our younger peers throughout their collegiate and professional careers. By the year 2020, we envision the establishment of NGAB to be the main outlet of new leaders. Our grassroots efforts today will help us to re-create a plastics society that will be an invaluable tool for all current and future generations.

In 2014 we achieved our goals at ANTEC Las Vegas and are anticipating achieving even greater things at ANTEC @ NPE 2015 in Orlando. Below is our list of upcoming events designed to give guidance and familiarity as you progress through our industry. Visit our online website now for more information on sponsorship and registration! Looking forward to seeing there!

Mission Possible
The Plastics Race
Student Poster Sessions
Panel Discussions
NextGen Celebration Night
Plastics University
Student Speed Interviews

<http://www.4spe.org/Events/Content.aspx?ItemNumber=20667&navItemNumber=20670>

Ashley Price
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Membership Chair Southern California Section

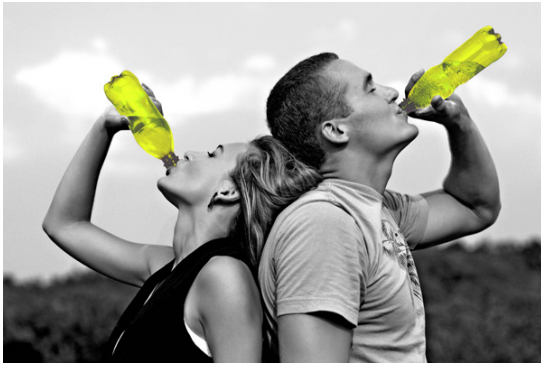


The Southern California sector of SPE is always on the hunt for Young Professionals and Students associated with the plastics industry.

We want to officially welcome and say thank you to the following young professional and student members.

Kyle Ferrier
Colin Fowler

Andres Garcia
Samantha Hong
Derek Horvath
Kyle Lynn
Matthew McDaniel
Alexander Mouschovias
Thomas Mumford
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