



SOCIETY OF  
PLASTICS ENGINEERS

# The SPE Press

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August 2015

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

## Western Plastics



TRADE FAIR  
Anaheim, CA

**AUGUST 13, 2015**

Hosted by The Southern California  
Society of Plastics Engineers



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 13, 2015. 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

**1:00-4:00PM**

Seminar 1: **Practical Guide to Material Selection**

Speaker: Eric Larson, Art of Mass Production

Seminar 2: **Design Challenges...Tackled Successfully!**

Speaker: Jim Peña, President, INOVA Design, Inc.

Seminar 3: **Successful Molding of High-End Engineering Thermoplastics**

Speaker: Jim Kostakes, Entec Polymers

### Exhibits

**4:00-7:30PM**

Local suppliers and resources for the Plastics Industry

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

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**Dinner****5:30-7:00PM**

- Buffet dinner in the exhibit hall
- Network with colleagues during the dinner

**Raffle Prizes**

- Proceeds support our local SPE Scholarship and Plastics Training Programs

**Location****The Phoenix Club** [click here](#)

1340 S. Sanderson Ave. Anaheim, CA

The Phoenix Club, one of the largest venues in Orange County, encompasses 6.2 acres of banquet halls, festival grounds, patio gardens and two restaurants. Inspired by German heritage and tradition to create a European charm has made it one of the most popular places in the region. Exit Ball Road off the 57 freeway and head east. Right on Phoenix Club Drive. Right on Sanderson Ave.

**Registration:** [click here](#) for online registration**INCLUDES: Seminars, Trade Fair Exhibit Hall and Dinner****Advanced purchase non member \$ 40.00 per person****Advanced purchase SPE member \$ 30.00 per person**

\$ 50.00 day of event register at door

**Schedule**

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

1:15PM to 2:00PM **"Seminar 1"**2:15PM to 3:00PM **"Seminar 2"**3:15PM to 4:00PM **"Seminar 3"**

4:00PM to 7:30PM **Trade Fair - Meet your local suppliers and see what's new in the industry!**

5:30PM to 7:30PM **Dinner - Buffet dinner in the exhibit hall**



**For more information contact:**  
Vishu Shah, Consultek 909-465-6699

***This event is hosted by the  
Society of Plastic  
Engineers, Southern  
California section.***

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## SEMINARS

**2015 Seminar schedule will be comprised of three intense sessions focusing on Material Selection, Design and Processing.**

### Seminar 1: 1:15-2:00 PM

#### Practical Guide to Material Selection

Material selection is a difficult task. Regardless of whether the material in question is wood, metal, stone, or plastic, selecting the proper material for a given application is a complex process. Before one even begins thinking about the materials, one must consider performance requirements, the manufacturing processes involved, cost targets (and constraints), environmental concerns (in-use and post use), regulatory agency requirements, and often cultural and political considerations as well.

When it comes to thermoplastics, the task gets even more complex. One must consider chemical families, grades, versions, property data (and/or the lack thereof), testing and verification, agency approvals, sourcing and supply chain issues, and proper processing. On top of that there is the thankless tasks of evaluating property data, combing databases and material data sheets to find the highest value of one specific property in order to determine the “best” material for the application.

In this presentation, the book author will review some of the traditional methods of material selection, and provide some insights and guidance on making the process more manageable.

**SPEAKER:** Eric Larson

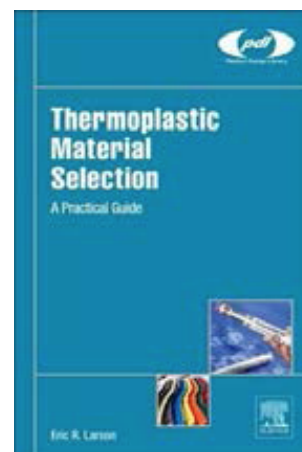


ART of MASS PRODUCTION



Eric R. Larson is a mechanical engineer with over thirty years' experience in plastics design. He has helped develop products ranging from boogie boards, water basketball games, and SCUBA diving equipment to disposable lighters, cell phones, and hand-held medical devices. His training and experiences have given him a unique background in materials technology, manufacturing processes, and cutting edge product development. A graduate of The University of Michigan, Eric spent his early career in the sporting

goods industry. It was his first encounter with mass production, and the cost constraints of the consumer market. He then spent 10 years working as an application engineer for DuPont Engineering Plastics, where he provided expertise on material selection and plastic part design to a select group of major manufacturers. For the past twenty years he has worked as a consulting engineer, helping Companies Bridge the gap between development and production. Some of the products he has helped bring to market include washing machines for Whirlpool, power tools for Skil®, cell phones for Motorola and Nokia, and the Humalog® / Humulin® insulin pen for Eli Lilly. In 2006 he founded Art of Mass Production, an engineering consulting company based in San Diego, California. AMP provides services to manufacturing companies in the consumer electronics, wireless, and medical device industries. Eric is also moderator of the blog site [plasticsguy.com](http://plasticsguy.com), where he writes about plastics technology, and its effect on people and the planet. His newest book, *Plastics Materials Selection: A Practical Guide*, is scheduled for release in 2015.



**SEMINAR 2: 2:15 - 3:00 pm****Design Challenges....Tackled successfully!****SPEAKER:** Jim Peña, President INOVA DESIGN, Inc.**iDIVE: Taking a touch screen device to new depths**

Using digital devices underwater would bring marine science into the 21st century. Data collection and related tasks are currently complex and time consuming due to lack of modern tools. Use of a digital device, like an iPad, would make work a lot more efficient and a little more fun...or a lot more.

The challenge was to invent a system allowing underwater researchers, marine biologists, and underwater explorer's to ditch the archaic underwater pencil and paper, and the tedious process of manually recording data into spreadsheets after a dive. How can an iPad, especially the touch screen, be used underwater...at any depth?

The design and development process involved clean sheet ideation and concept development exercises. The tasks to create practical designs from these concepts

considered the budget, the user interface, the manufacturing process, material selection, assembly and testing criteria, making an aesthetic impact, and the environment in which the device would be used.

The resulting product is multi-patent pending and the only underwater touch screen device known to exist. Testing to 100 meter depth has been successfully completed and has caught the attention of Apple, who subsequently used the product in their "What's Your Verse" advertising campaign, where Apple touts the far reaching places and applications people have used their products.

We will walk through the design process, the challenges, the inspiration, and finally the result of the brain damage invested in this ground breaking product.

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**SEMINAR 3: 3:15 - 4:00 pm****Successful molding of high-end engineering thermoplastics****SPEAKER:** Jim Kostakes Entec, Polymers

Many molders shy away from high temperature thermoplastic materials after hearing horror stories from their peers and associates. They smell, are too difficult to mold, you need special screws and barrels, you need special heating/cooling equipment, they are really expensive and you make too much scrap. All true and untrue comments if you don't understand the nature of the resin, why it needs to be processed correctly, and are not committed to make it work.

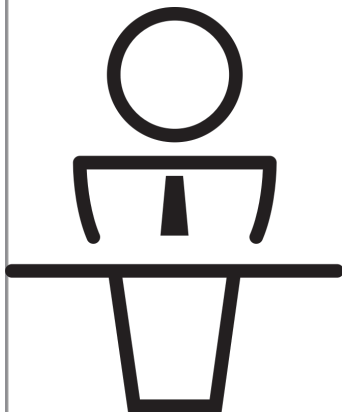
Jim has been in the plastics industry for over 40 years. He started at Borg Warner Automotive working on new product development. When gas prices doubled there was no emphasis on new products so the position was eliminated.

Jim then began working in the custom molding side as an engineer, estimator, Molding and Plant Manager. After nine years Jim was approached by Monsanto to join the Technical Department as a technical service engineer. In 1995 Monsanto sold their plastics business, with the exception of nylon, to BASF. Jim went to BASF as a technical service engineer but found his way back to Solutia in 1997. In 1999 Solutia and Dow formed an alliance. Jim was now a Dow employee in the TS&D department focusing on nylon growth. In 2002 the alliance was dissolved and Jim returned to Ascend, formerly known as Solutia. In 2006 Jim joined Entec Polymers as a Senior Plastics Engineer.



## President's Message

The Annual Education Golf outing is behind us and the Western Plastic Trade Fair is in the near future. This year we have some new exhibitors and returning exhibitors. The booths and tables will be assigned for prime locations according to when you register for a booth or table top. Be sure to register now so you can have a prime location.



We will have three speakers again this year. You can go onto the [Socalspe.org](http://Socalspe.org) website to register and read about the topics to be discussed this year.

Don't forget the fantastic opportunity to network with your customers in a relaxed atmosphere. Dinner will be delicious as always. The raffle prizes will prove to be another great event during and at the end of the Trade Fair. Be sure to get your tickets when you pick up your badge.

The Southern California Society of Plastic Engineers will announce the newly elected President and President Elect for the upcoming two years beginning September 2015.

Rick Hays  
Senior Account Manager  
Thermoplastic Industry Manager  
Rubber Industry Manager  
Advanced Materials Group

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## The College of the Extended University Cal Poly, Pomona

### Plastics Engineering Technology Certificate Program

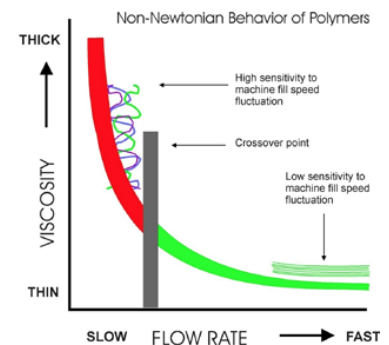
#### Scientific Injection Molding - Fall 2015

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.



#### 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



**Dates:** Saturday, September 19 & 26, 2015 **Time:** 8:00 AM to 5:00 PM

**Location:** Cal Poly Pomona

**Instructor:** Vishu H. Shah, Consultek Consulting Group [www.consulteksa.com](http://www.consulteksa.com)

**Fee:** \$375 non-credit

**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](http://www.ceu.csupomona.edu)

**For more information call:** College of the Extended University 909-869-2288

**Or Instructor :** Vishu Shah 909-465-6699



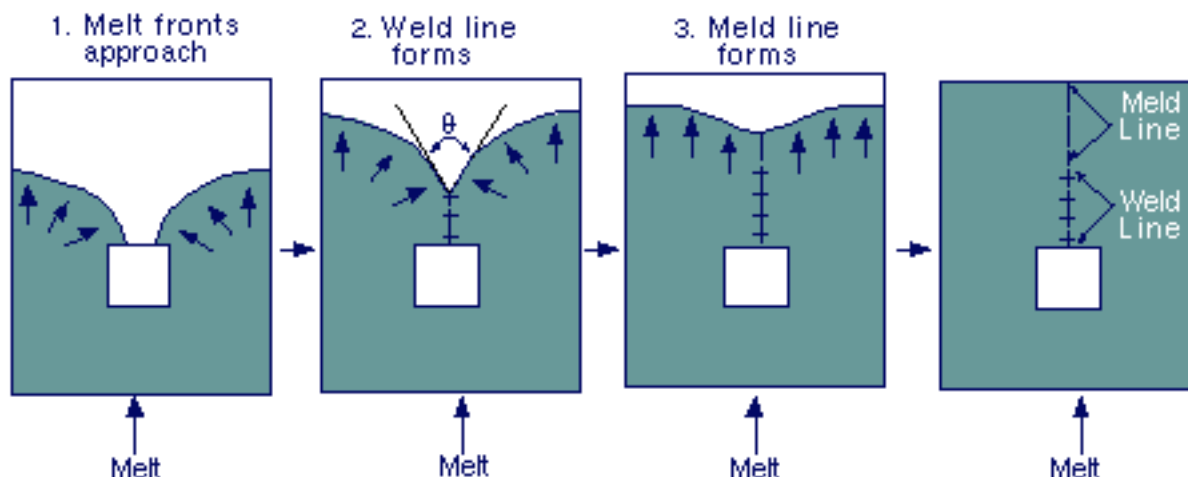
## UPCOMING COURSES

Winter 2016 **Plastics: Theory and Practice**

Spring 2016 **Plastics Product Design and Tooling For Injection Molding**

### *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*



**Over one thousand industry professionals have taken advantage of this career advancement opportunity!**



# 33rd Annual SPE Southern California Golf



Can you imagine our section has been holding this fund raiser since 1982? The Tourney is a very strong

tradition in this community. This event is our section's primary fundraiser for the year.

This year the Tourney was held at The Sierra La Verne Country Club. The day was splendid and the weather perfect. This well-wooded mature course was prepped and ready, with its fairways sparkling like new green carpets. The greens were smooth and ready to accept your balls.

There were the putting greens to



sharpen up on and the driving range to tune up that swing prior to the start time.

The first tee faces a pond  $\frac{3}{4}$  of the way to the green. Many an adventurous golfer has found their ball in the water. This was the start of the day's adventure. This challenging, but fair course, played well for our golfers.

The section wants to thank all of the Tee sponsors and a special thanks to Crafttech for their Flag Sponsorship. These sponsors are the key to funding educational events such as Scholarships, High School Essay contest and student discounts to all of our events.

The event was a little low on players this year. I spoke to many who could not attend. The date seems to conflict with vacations, graduations and weddings. The board is looking at alternate dates and venues. All of the members I was able to speak with loved the course. Some would have liked to try a venue perhaps in Orange



County. Perhaps you can forward your suggestions to me. [kerryk@piustech.com](mailto:kerryk@piustech.com)

The dinner was great with a choice of steak or salmon. We held a raffle at which every one took home a prize. This was a great day of golf and a warm friendly meal with folks we see each year.

Make plans to join us next year. Let's keep this 30+ year tradition thriving.

Kerry Kanbara  
Golf Chair



# Tech-tips

## Understanding and Applying the “Pack and Hold” Concept

By  
Suhas Kilharni  
President  
Fimmtech

There are three phases during the filling of the mold. They are as follows:

1. **The Injection Phase:** In theory, during this phase the cavity is fully filled with molten plastic. However since plastic melt is compressible, in practice one does not know if the mold is 100% filled with molten plastic or is filled more than a 100%. For this reason the mold is typically filled to about 95 – 98% in the injection phase.
2. **The Pack Phase:** During this phase additional plastic is further injected into the cavity to compensate for the shrinkage that is occurring in the plastic that was injected in the Injection Phase. This is a pressure and velocity controlled phase.
3. **The Hold Phase:** Once the required amount of plastic is injected into the cavity, it must be held in there till the gate freezes off. This is a time controlled phase.

In most cases molders do not differentiate between the pack phase and the hold phase and will typically have only one pressure setting and one time setting for both phases. They call this collective phase as the hold phase. The optimization of this phase is done by the gate seal study where the part weight is plotted against time. Once the gate freezes off the part weight stays constant. The processor adds a second or so to the time where the part weight stabilizes and

sets this as the gate seal time. See Figure 1 where the part weight stabilizes at 6 seconds and therefore the hold time on the machine is set to 7 seconds.

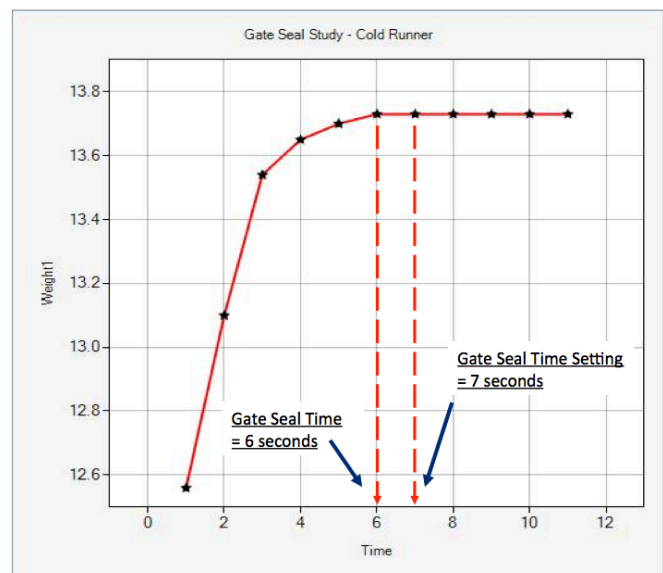
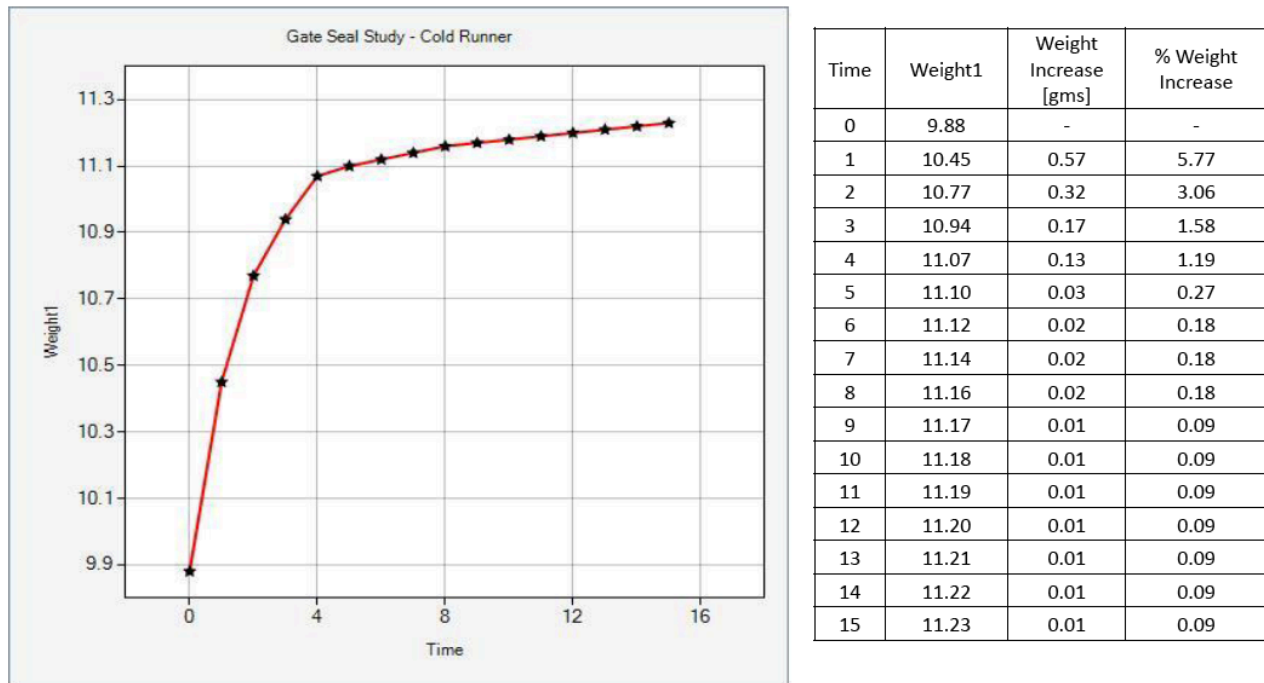


Figure 1: Gate Seal Graph

In some cases, such as in case of softer materials or larger gate sizes, the part weight does not stabilize within a practical time limit of molding cycle times. This is also true in cases of hot runners and valve gated systems. Adding more time than required does nothing else other than pack the gate area when the rest of the part is already below the no flow temperature of the plastic. In such cases the same study mentioned above will yield a graph as shown in Figure 2 where the part weight does not stabilize.

continue on page 10



**Figure 2: Gate Seal Graph for softer materials, large gates, hot runners and valve gate systems**

In such cases where gate is not seen the phases of pack and hold must be differentiated from each other. In the pack phase the required amount of plastic must be injected and in the hold phase this plastic must be held in there till the gate freezes off. If the hold phase is terminated before the gate is frozen then the pressurized plastic the cavity will flow back out of the cavity often causing sink and/or dimensional variations and issues. (This is the reason that a molder will notice sink on parts with high pack and hold pressures. When the molder lowers the pressure the sink disappears often baffling the molder since it is opposite to what he expects.)

Following is the procedure that has been used for optimizing the pack and hold times. It is best to illustrate this with an example. Consider the graph shown in Fig 3. This is the same graph in Figure 2. It can be observed that at about 5

seconds there seems to be a change in the slope of the graph. In other words, the % increase of part weight with incremental hold time seems to be lower compared to that before 5 seconds. We therefore can consider that the part has reached the required part weight or in other words the pack phase has been completed. It is similar to visualizing when one is packing his travel bag where initially clothes can be placed in till the bag seems physically full but the remaining clothes can only be put inside after compressing the clothes that were first put in. As the bags are filled more and more, lesser and lesser amounts of clothes can be placed in there. So after the initial quick fill further additions slow down. The pressure used during this initial phase can now be considered as the pack pressure and the time that this pressure is applied for as the pack time.

continue on page 11

Going back to the travel bag example, once we have packed the required amount of clothes we must now zip it up in order to hold the clothes in there. If not, the bag top or cover will not be able to keep the clothes in there. Similarly, once the required amount of plastic is now present inside the cavity it must be held in there. This is done by applying another pressure setting that will be lower in value than the pack pressure for a time until the part weight stabilizes or in other words the gate freezes off. Checking to see how many people are actually reading this article. Please can you send me an email and simply say pack and hold, thanks. The target part weight here will be the same part weight that was obtained at the end of the pack time. The following procedure will better illustrate the steps.

Procedure for determining pressures and times for pack and hold phases.

*Note:* Optimization of this phase is Step No. 5 in the 6-Step Study for Process Optimization. It is therefore assumed that the previous 4 steps have been completed. Please refer to [www.fimmtech.com](http://www.fimmtech.com) for info on the 6-Step study.

*Procedure:* We will refer to the same info in the graph in Fig 2 starting from the steps to generate the graph.

1. Set only one pressure collectively for the pack pressure and hold pressure. We will call this as the compensation pressure. Therefore Compensation Pressure = Pack Pressure + Hold Pressure. As an arbitrary value, let us consider this pressure to be 8000 psi plastic pressure.
2. Set only one time collectively for the pack time and hold time. We will call this as the compensation time. Therefore Compensation Time = Pack Time + Hold Time. As an arbitrary value, let us consider this time to be 15 seconds.
3. Set the compensation time to zero and generate a graph of Part Weight versus Compensation Time up to 15 seconds. (Fig 2).
4. Observe the graph and the part weight table to estimate where the change in the part weight begins to slow down. A change in the slope of the graph can be seen. In Fig 3 this time can be considered as 5 seconds. Based on this Pack Pressure = 8000 psi and Pack Time = 5 seconds  
Record the part weight and this will be the 'Pack Only Part Weight' = 11.10 gms.
5. Initially we only had set one value for pressure and time and called it compensation pressure and time. We split the compensation pressure and time into two and identify them as pack pressure, pack time, hold pressure and hold time. Therefore on the molding machine we will now add another pressure and time profile. The first will be the pack and the second will be the hold. Set the first pressures to 8000 psi and the first times to 5 seconds.
6. The second set of pressures are the hold pressures and hold time. Since the compensation time was set to 15 seconds, the pack time was set to 5 seconds set the hold time to 10 seconds ( $15 - 5 = 10$ ).
7. Set the hold pressures equal to the value of pack pressures = 8000 psi and mold parts.
8. Record the part weight. This should be the same as the 15 second value above and should therefore be equal to 11.23 grams. It will be higher than the Pack Only Part Weight of 11.10 gms.

continue on page 12

9. Drop the hold pressures in convenient steps of about 250 psi and keep checking the part weight at every reduction. The pressure at which the part weight equals the pack only part weight of 11.10 grams will be the holding pressure. In this example, the value was 5250 psi.

10. Next reduce the hold times in steps of 1 second and note the time where the part weight drops below 11.10 grams. In this example, this time setting was 3 seconds since at 3 seconds of hold time the part weight was 11.08 grams. This means that at 3 seconds the plastic is coming back out from the cavity. Add a

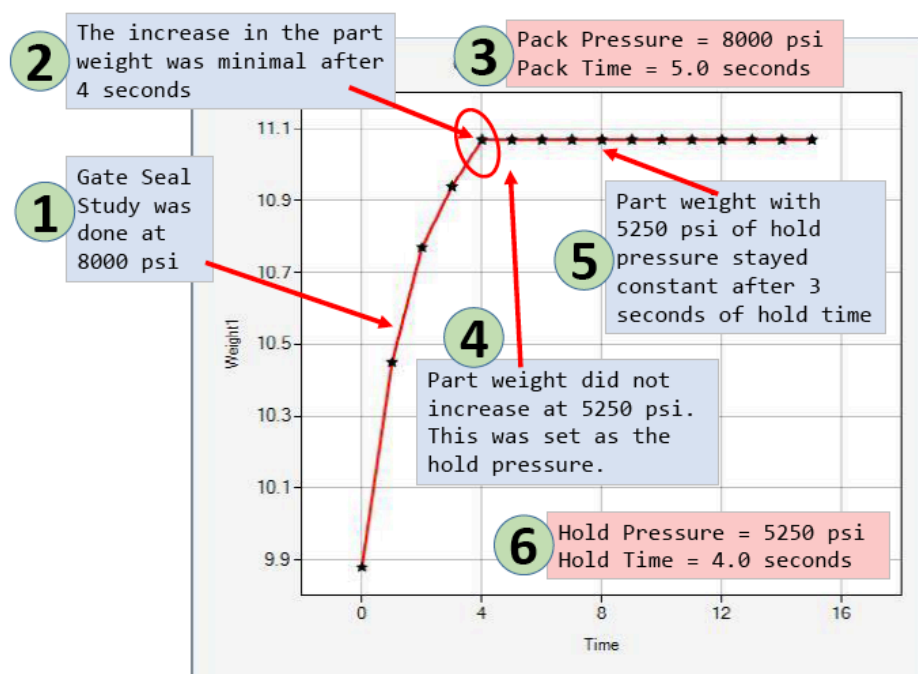
second to 3 seconds making this time 4 seconds which will bring the part weight back up to 11.10 grams. This time will be the set holding time.

The results are summarized in Figure 3.

Final Settings:

- Pack Pressure = 8000 psi
- Pack Time = 5 seconds
- Hold Pressure = 5250 psi
- Hold Time = 4 seconds

Happy Molding! Please send your questions and comments to [suhas@fimmtech.com](mailto:suhas@fimmtech.com)



Time	Weight1	Weight Increase [gms]	% Weight Increase
0	9.88	-	-
1	10.45	0.57	5.769
2	10.77	0.32	3.062
3	10.94	0.17	1.578
4	11.07	0.13	1.188
5	11.07	0	0
6	11.07	0	0
7	11.07	0	0
8	11.07	0	0
9	11.07	0	0
10	11.07	0	0
11	11.07	0	0
12	11.07	0	0
13	11.07	0	0
14	11.07	0	0
15	11.07	0	0

Figure 3: Final Settings for the Pack and Hold phases

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## SoCal People

This is a new feature for our news letter. 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. Please forward all of your gossip to me, Kerry Kanbara, [kerry.kanbara@gmail.com](mailto:kerry.kanbara@gmail.com)

### Forrest Rose

Forrest Rose ran both the Northern California and Phoenix molding facilities of Harbor Plastics, for the past 5 years. The company was sold last year so Forrest has chosen to join us here in southern California.



Forrest was deeply involved with the molding industries for many years and in fact was a principal design engineer for Newberry molding machines, when we still made machines in the US.

Forrest has just joined ProPlas Technologies in Garden Grove, Ca. Forrest has a love of exotic cars and boating. Garden Grove will allow him to continue his love for both.



**Western Plastics Trade Fair**  
**August 13, 2015**  
**Anaheim, CA**

### Photos from previous Trade Fairs





## SPE Southern California Leadership

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