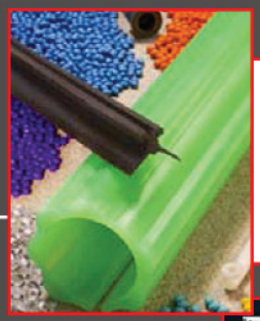
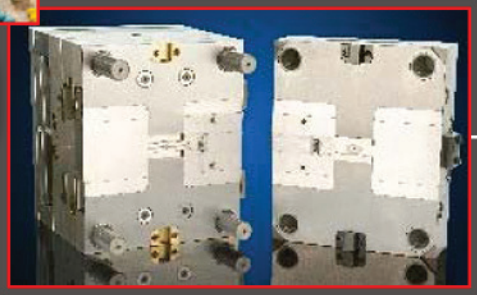
Spring 2015 | No. 98





MOLDING VIEWS

Brought to you by the Injection Molding Division of the Society of Plastics Engineers

Chair's Message

Workforce Development

The term "Workforce Development" is a term that keeps coming up when I meet with companies in the injection molding industry. How do we attract skilled employees, provide them with opportunities to grow and develop, and keep them in our organization? Companies may look to provide their own in-house training, whether through DVD's or hands-on laboratories, or a combination of both. Other opportunities for professional trainers also exist. With this need for continual professional development in mind, the Injection Molding Division (IMD) set out to provide workforce development

In This Issue:

This Month's Features:

Chair's Message Continued

opportunities at the SPE ANTEC, held in conjunction with the National Plastics Expo (NPE) in Orlando, FL from March 23-25, 2015.

ANTEC has long been known as the largest technical conference on plastics in the world. Cutting-edge academic and industry research is presented to advance the knowledge in materials, design, and processing. This year is no different, with IMD sessions ranging from nanotechnology to materials to processing. However, the IMD has worked this year to emphasize the applied side of technology. Industry experts have been assembled for two extra sessions involving a panel discussion regarding the failure of molded plastic parts, and a 7-part tutorial session, aimed at the industry practitioner. These sessions are great workforce development opportunities.

I have personally attended ANTEC for many years and feel it is instrumental in staying up-to-date regarding the advancements in the plastics field. This year, we hope many of our members will see added value in their membership, with what ANTEC has to offer regarding technology which can be applied in the future, and technology which can be applied directly after returning home. This exceptional program could not have happened without extensive work from the ANTEC IMD Technical Program Chair, Raymond McKee, as well as Pete Grelle and Jeremy Dworshak, who served as paper reviewers. Thanks to everyone involved for putting together such a great program.

I would also like to invite everyone to the IMD reception on Tuesday, March 24th at 5:30 in Executive I Ballroom in the Rosen Centre, which is connected to the Orange County Convention Center via a pedestrian sky bridge. Please join us and our sponsors for a great evening of networking!

Lastly, thank you to everyone who has helped me along the way as chair of the IMD. It has been a great year and I am looking forward to seeing everyone in Orlando!

Adam Kramschuster
IMD Chair

Industry Events Calendar

Click the show links for more information on these events!

March 2015

ANTEC® Orlando

Orlando, FL

www.4spe.org

March 23-27

NPE2015: The International Plastics Showcase

The International Plastics Showcase is the world's most important plastics trade show and conference of the year—bringing together every sector of the plastics industry, including end markets. Showcasing the latest technology, trends, equipment and running equipment for every phase of plastics processing, you are sure to find your solution.

http://www.npe.org

March 25

Speed Interview - Company Registration (Interviewer)

The SPE Next Generation Advisory Board (NGAB) is pleased to offer its annual Student Speed Interview Session on Wednesday, March 25, 2015 during ANTEC® @ NPE 2015. Sponsored by SPE and the NGAB, this session is for students ready to enter the workforce or for those interested in a lucrative internship opportunity.

www.4spe.org

April 2015

April 21-23

PMTS: Precision Machining Technology Show

Columbus, OH

PMTS is the only show in North America dedicated to the Precision Machining industry. With more than 260 exhibitors displaying equipment, products and services to more than 5,000 attendees; PMTS is an international gathering of the manufacturing professionals who are moving the industry forward
http://www.pmts.com

May 2015

May 5

10th Annual AUTO EPCON

Detroit-Troy Marriott Hotel-Troy, MI

The Automotive Engineering Plastics Conference (AutoEPCON) features technical presentations on the newest advances in materials technology, predictive engineering, process enhancements, and application developments for thermoplastic and thermoset engineering plastics for the automotive industry. Tabletop exhibits are also on display throughout the event. The registration fee includes the Conference Program Book, which contains abstracts of the presentations, as well as lunch, refreshments, and a reception, which provides further networking opportunities for all who attend. In addition, this one-day multi-session Technical Conference and Exhibition includes plenary and keynote addresses from industry leaders.
www.4spe.org

May 14

Extrusion Minitech

www.4spe.org

June 2015

June 17-18

Amerimold 2015

Amerimold is an annual tradeshow and technical conference that addresses the business development, best practices and networking interests of the plastic injection mold manufacturing industry.
http://www.amerimoldexpo.com

Webinars

BE UP-TO-DATE WITH THE LATEST INFORMATION.
VISIT OUR WEBINARS.

Purging for Blow Molding: Basics

Regardless of blow molding application or platform, all molders experience forces to keep scrap rates and total costs down, while keeping quality high. Commercial purging compounds (CPCs) allow molders to changeover with less resin, less scrap, and less labor. CPCs are also extremely effective in fighting contamination, be it carbon or color contamination. Keep your margins healthy by implementing a purging program.

Improve Ink, Adhesive & Coating Bonding to Plastics with In-line Plasma & Flame Surface Treating

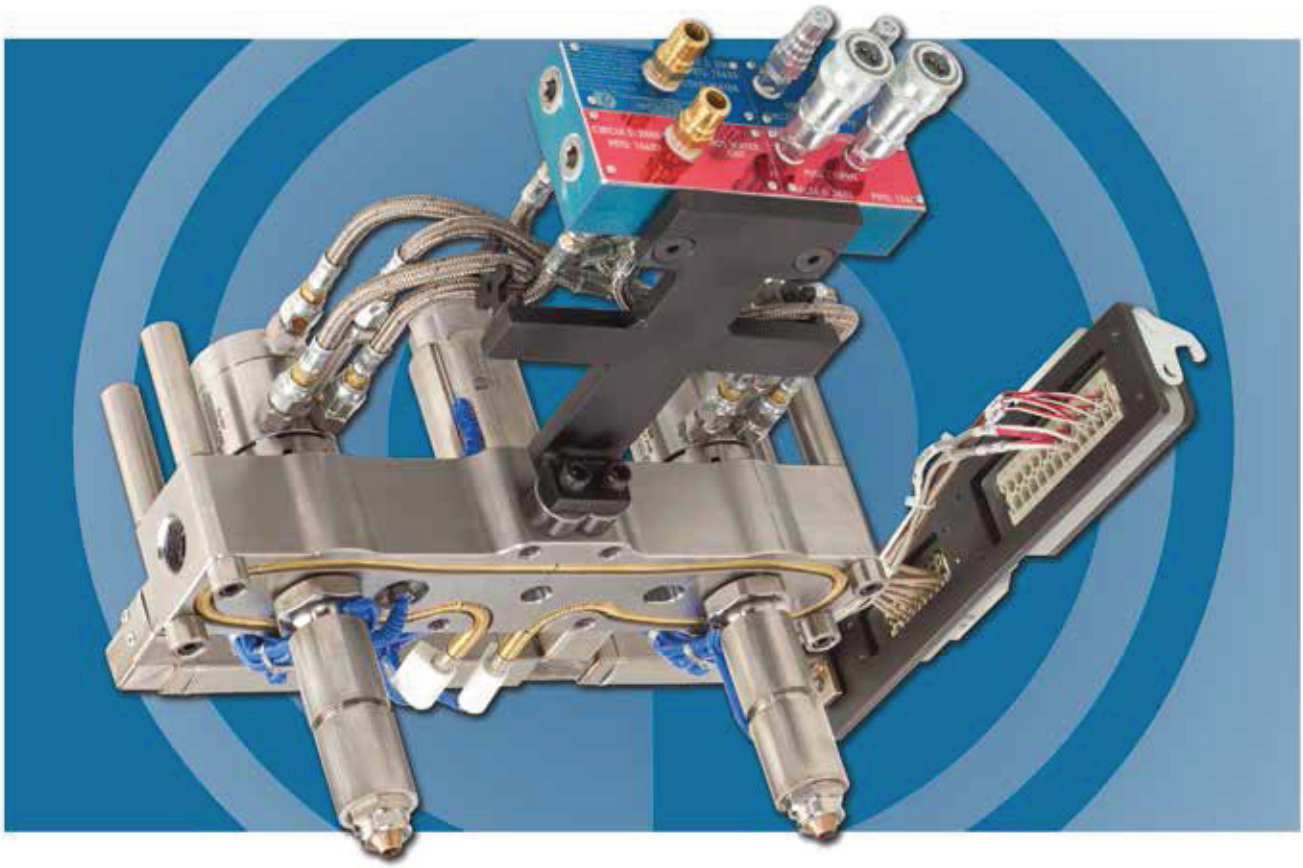
Discover how atmospheric plasma and flame surface treaters are providing manufacturers with green and economical solutions for improving adhesion on plastics. Learn how to eliminate hazardous chemicals, expensive chemistries and laborious processes with in-line surface treatment.

What To Do When Experiencing Color Streaking, Degredation and Contamination

Nancy Mitchell, Technical Product Manager at Dyna-Purge, wants you to stop purging and start planning. Nancy will share what the most common problems are for molders when purging, and how proper planning is the key to success. Let Nancy guide you through the most common pitfalls and learn how selecting the proper product and procedure will lead to better and more sustainable results.

How to Avoid the Most Common Injection Molding Problems Before They Start

The 3rd webinar in the Dyna-Purge series, presented by the Doctor of Scientific Molding, John Bozzelli. If you are experiencing degradation, time consuming color changes or high levels of scrap, let John share with you his expertise on how to avoid these problems altogether.



WHO'S BRINGING NEW LEVELS OF PERFORMANCE TO COMPACT HOT RUNNER/MANIFOLD SYSTEMS?

At Plastic Engineering & Technical Services, we are.

We define performance. For nearly 30 years, we've helped our customers to produce more efficiently, with lower cycle times and lower per unit costs.

Our new compact stainless steel, modular unitized system features flexible heaters that can be utilized on multiple designs, so you don't have to stock custom bent heaters. Our new drop heaters provide more uniform heating and feature smaller pockets and no clamps. They have in-line flow restrictors for better process repeatability, and no over-pressurizing the cylinders. It all adds up to a reduced sized hot runner system, shorter heating times and better tool performance.

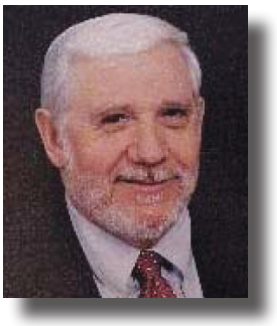
We deliver value. We complement our hardware with leading-edge analytical tools, including Moldflow® and MOLDEX3D software. We'll work with you on design issues and optional gating solutions before the mold or hot runner manifold system is ever built. Use us for the mold flow analysis and the manifold build, and we'll do whatever it takes to make your hot runner/manifold system work to your complete satisfaction.

We're committed to your success. Find out more.
Call us today at 248.373.0800 or visit us at www.petsinc.net.

PLASTIC ENGINEERING & TECHNICAL SERVICES, INC.
Performance. Value. Delivered.

Ask the Experts: Bob Dealey

Circulating Oil in a Mold for Mold Temperature Control



Q: ***Todd from Michigan inquired:***

"Where can I locate information regarding circulating oil in a mold for mold temperature control?"

Bob Dealey, owner and president of Dealey's Mold Engineering, Inc. answers your questions about injection molding.

Bob has over 30 years of experience in plastics injection-molding design, tooling, and processing.

You can reach Bob by e-mailing molddoctor@dealeyme.com

A: I do not know of any reference material that contains such information. Let me check with some of my colleagues. What are your temperature targets, the length of the mold temperature control lines, diameters and any other information you can share.

Response by Todd: We have an existing mold that has 6mm diameter cooling lines where the longest integral line is about 50 inches. This is a mold designed for glass filled Polycarbonate (PC), but due to the product's failing some customer tests, a change is being made to a 30% glass filled PPS (Polyphenylene sulfide) that has another compound added to improve cold weather properties. Due to the crystalline structure of the PPS we will need to run the molds around 350°F. Our concern is if the oil will circulate well enough in the water lines designed for PC and water.

Response to Todd: Asking around it looked like we ran into a stone wall comparing oil vs water flow in mold temperature control channels, until I contacted Jay Shoemaker from Autodesk. Jay, the most knowledgeable flow analysis person I know, authored the book, Moldflow Design Guide.

The book lists the Reynolds Number as it relates to laminar or turbulent flow.

Ask the Experts: Bob Dealey Continued

The formula is: Re = pUd/n
Where:
Re = is the Reynolds Number
P = is the density of the fluid
U = velocity
d = is the diameter of the channel
N = is the dynamic viscosity of the fluid

When the Reynolds Number is: greater than 4,000 Turbulent Flow is accomplished; between 2,300 and 4,000 it is called Transition Flow; is between 100 and 2,300 it is referred to as Lamina Flow; and below 100 it is called Stagnated Flow. Obviously you want to be in or above the Turbulent Flow range, the higher the Reynolds number the better the transfer of heat. The source for this information is from: Moldflow Design Guide.

Jay was interested enough to help us out and ran some simulated trials. He ran water at 50 and 80°F and oil at 100 and 400°F. Not knowing the grade of oil, a Mobiltherm was selected. A Reynolds Number of 10,000 was selected to make the comparison. Surprisingly, Turbulent flow for your described mold temperature control channel is achievable in hot oil.

Comparing the oil at a 10,000 Reynolds Number it's obvious that the cooler oil requires a much higher pressure than the hot oil due to viscosity changes. For example, oil at 100°F requires 45.9 psi to achieve a Reynolds number of 10,000 in you scenario. The same conditions with 400°F oil require less than 10 psi to achieve the same Reynolds number.

I hope this is of help to you. I certainly learned a lot by researching the flow of oil. As a rough comparison, it appears that oil is about three times more viscous than water.

Bob Dealey
MoldDoctor@dealyME.com

SPE ANTEC® 2015

@ NPE2015 produced by SPI

Join us...

IMD ANTEC Reception

March 24th, 2015

Please join your colleagues and celebrate plastics at the
Injection Molding Division (IMD) ANTEC 2015 Reception in Orlando, Florida.
Gather with fellow industry professionals for an evening of great food and even greater company.

When: March 24th, 2015
Where: Executive I Ballroom, Rosen Centre, Orlando, FL
Time: 5:30 pm

Sponsored by: AUTODESK.

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Stressing About STRESS

Simple Physics of Failure: It's all About the Stress

How do we begin to relieve mold STRESS? By asking the right questions:

Please submit any questions or comments to maintenance expert **Steve Johnson**, *Operations Manager for ToolingDocs LLC, and owner of MoldTrax.*

Steve has worked in this industry for more than 32 years. E-mail Steve at steve.johnson@toolingdocs.com or call (419) 281-0790.

Q: I have many breakdown issues that stop or slow down my production. Coupled with mold changes and in-press work we can't seem to gain ground on being more proactive. We are all stressed out with so many day-to-day problems that I don't know where to start.

A: The failure (breakage or wear) of all things mechanical comes from STRESS — yes, just like stress affects our personal health it also effects our mold's health.

The stress from molds travels fast and far. Unscheduled mold stops, breakdowns, part defects, missed shipments — pick your poison. Bottom line is we are paid to deliver quality parts, on time, to our customer. When we get efficient at this, the company grows and everyone should prosper as a result. But when molds stress and stop, we stress and jump — right into fire fighting mode. We do whatever it takes to get it back up and running. We don't have time to take a preventative angle at this time. Just fix it.

Listing all the variables in molding a part that could make stressing, for man and mold, is overwhelming. Worse for a skilled tradesman is existing in a reactive maintenance culture where we work our craft in a spontaneous and unplanned manner. This has become an accepted philosophy of work at companies who "fire fight" for a living.

It is so deeply rooted and thriving in spite of all the PC advancements and maintenance software available today, that the reactive maintenance culture has created its own set of values. We use these unwritten guidelines as a means to gage our

Ask the Experts: Steve Johnson Continued

maintenance performance — and it feels like a perfectly fine strategy. Why? Well, it's all we have ever done. And when a fire is put out what do we do? We celebrate! We award a couple of hero cookies, feel good for a moment and then wait for the next one. Fire-fighting breeds "not knowing" something as a palatable excuse whenever a mold breaks down, or molded parts fail specifications. The "tool" required to stop these repeating issues are contained in your past, historical work orders along with the ability to quickly and accurately summarize and sort the data into an actionable plan. Not happening. Takes too long.

Maintenance Information is a Tool

Our maintenance habits, culture and skill levels that we attain are directly related to the capability and quality of the tools we use to perform them. Sure, a pry bar or a wrench can serve as a hammer, but you will not always hit what you are aiming at because they weren't designed for that purpose. Similarly, you also can't use historical journal entries in work orders as a tracking tool to summarize, count, look for patterns and trends or understand corrective actions because it wasn't designed for that. Most maintenance software systems are designed to be generic, so they do a lot of things — but nothing particularly well — kind of like a Swiss Army knife. I have a Swiss Army knife, but I don't use it on molds because the right tools work better.

Ask the Experts: Steve Johnson Continued

Only One Way

There is only one best way to get maximum value from your tools, and that is by having the right ones for the job, and then learning how to use them correctly.

First you must accurately track (through the use of standardized terms) ***exactly*** what your most frequent Unscheduled mold stops and most frequent part defects are. There are many other things that need to be tracked and measured, but these two are the most important and will give you the most bang for your buck. There are only 24 hours in a day. In order to attain more proactive time, we ***must*** reduce reactive issues.

Once a target is identified (mold stop or defect), we must remove as many potential root cause variables as possible. First make sure the methods and techniques used during the run/repair cycle are as consistent as possible. We must be able to rule out random variables that are people induced to avoid being led down the wrong trail.

Once we are confident in the consistency of our methods, continued measurements will be more revealing towards the actual root cause of the mold stop or defect.

Ask the Experts: Steve Johnson Continued

The next step is to develop mold (specific) metrics we want to measure or compare, and below is a list of factors (there are many more) that could be examined to see how they relate to each other, and to see if there are any trends or patterns that point to a root cause.

- Presses
- Run times
- Cycles
- Defects suffered
- Tooling required
- Labor hours used
- Resins
- Processes
- People.

It is essential that we continue to collect, measure, report, target and correct these aspects, and it takes commitment and discipline. It takes using accurate records daily to create better maintenance plans. It is ongoing and ever present — not cyclic or "fire" related. Without a plan and without the right tools, it's simply too overwhelming.

We can only develop techniques and procedures to minimize or stop the stress by having a better understanding of what issues the STRESS is causing. Then we use that information to attack those at the top of our list.

To learn more, contact Steve Johnson by calling(419) 281-0790, or visit www.ToolingDocs.com.

Feature: The True Definition of Permanent

By Jason Brownell / VP Sales
Polyfuze™ Graphics Corporation

The True Definition of Permanent.

The word "permanent" is used to describe decorating methods for injection molded PE and PP, but what does that really mean?

Do a Google search of the word permanent and you'll find the following definition: "lasting or intended to last or remain unchanged indefinitely". In some areas of life this definition is fine, but in the world of decorating injection molded polyethylene and polypropylene, a portion of this definition poses a couple of challenges:

"Intended to last or remain unchanged…"

1) Claiming that a decorating method is "intended to last" is not exactly reassuring. If the goal is to have a permanent graphic on your polyolefin part, "intended to last" doesn't get the job done.

2) The term "remain unchanged" is also worth further discussion because everything changes to some degree over time. If a graphic is applied to an injection molded part and it is exposed to outdoor elements for a number of years, the part itself will undergo a slight amount of change over time.

Based on the definition above, people in the plastics industry should ask themselves what permanent really means when it comes to decorating injection molded polyethylene (PE) and polypropylene (PP) parts.

Throughout the history of the plastics decorating industry, there has been a limited number of methods available for decorating PE, PP and other olefin based products. These methods include in mold labels (IML's), hot stamp foils, heat transfers, stickers, screen printing and pad printing. All of these decorating methods vary in one way or another, but the one thing they each have in common is susceptibility to removal and color fading over time. It's a fact that all traditional decorating methods are topical, so they are susceptible to removal or fading following prolonged exposure to environmental elements.

So which plastic decorating method comes closest to being permanent?

Rather than spending time to reformulate or modify old decorating methods, one US based company has committed itself to the development of totally new technology. Polyfuze Grapics™ Corporation of Clarkdale, Arizona recently used its 30 years of polymer graphic knowledge to create a new method for decorating injection molded plastic. This method is called

Feature: The True Definition of Permanent Continued

Polyethylene Fuzed Graphics. Instead of trying to get an ink based, topical graphic to "stick" to the surface of a PE and PP product, Polyfuze Graphics™ Corporation developed a new graphic comprised of pigmented plastics, not inks. The company's first product is called Polyfuze Graphics™. This new innovative graphic literally "fuses" into the injection molded PE and PP product, becoming a permanent part of the product itself.

Polyfuze Graphics™ are applied with traditional hot stamp equipment, with a combination of heat and pressure, the graphic and PE or PP part become fused together. The graphic and part will then cool together to form a single permanent welded bond. Although the process uses standard hot stamp machinery, the heat, time and pressure for the application of Polyfuze Graphics™ is different from traditional decorating methods. The application requires 450F at the silicone die face, this will require the hot stamp machine to be set at 550°F (due to the nature of silicone). Although the heat required for the application of Polyethylene Fuzed Graphics is higher, dwell time is around .5 to 7 seconds per part depending on the injection molded PE or PP part. However, pressure requirements for the Polyfuze Graphic™ are significantly less than traditional methods. Whereas hot stamp foil requires 400 psi, Polyfuze Graphics™ require just 75 psi. This provides the enormous benefit of being able to apply a much larger graphic with a smaller tonnage hot stamp machine.

Back to the Topic of Permanent

Because Polyethylene Fuzed Graphics, like the new Polyfuze Graphics™, "fuse" to become a permanent part of the injection molded PE and PP product, they possess unmatched ability to withstand removal. All other decorating methods previously available try to "stick" to the surface of PE and PP. To make a case for this new decorating technology, the creators want one statement to be very clear, "***All polyolefin parts are subject to some type of change over time when exposed to excessive sunlight and weathering. By the same token, all plastic decorating methods fail to some degree when exposed to pressure washing, chemicals, cuts or tape test. Our goal was to create an all new decoration technology for PE and PP that is 100% permanent and will remain in place for the life of the product. With the development of the Polyfuze Graphic™ we succeeded in that goal.***"

Feature: The True Definition of Permanent Continued

To support the claim that their graphic application is 100% permanent, Polyfuze Graphics Corporation invested extensive time to compile compelling test data.

Polyfuze Graphic Test Summary

- Tape Test D3359-09 Crosshatch: 100% Passed Tape Test
- QUV Accelerated Weatherometer Test: 2,000 hour cycle, 8 hour 70°C (158°F) with an Irradiance of 1.4 hours at 50°C (122°F) condensation: 100% Passed Tape Test
- Heat Test at 77°C (170°F) for 120 hours: 100% Passed Tape Test
- Low Temperature Impact Resistance Test: 10 lbs. at -40°C (-40°F): 100% Passed Tape Test
- Flex Test: 240 hours of continuous flexing at 21°C (70°F): 100% Passed Tape Test
- Heat Cycle Test: 2 hours at -40°C (-40°F), 2 hours at 77°C (170°F): 100% Passed Tape Test
- Pressure Wash Test: 3 minutes at 1,200 psi, 49°C (120°F) maximum temperature, 90 degree nozzle angle at six inch distance: 100% Passed Tape Test
- Chemical Test: 21 °C (70°F)

Type	Time Hours	Tape Test Result
Gasoline	168	100% Passed Tape Test
Diesel Fuel	168	100% Passed Tape Test
2 Cycle Engine Oil	168	100% Passed Tape Test
Lacquer Thinner	168	100% Passed Tape Test
Brake Fluid	168	100% Passed Tape Test
Turpentine	168	100% Passed Tape Test
Kerosene	168	100% Passed Tape Test
Muriatic Acid 20 Baume 31.45%	168	100% Passed Tape Test
Alkali Solution (pH 13)	168	100% Passed Tape Test
Salt Water	720	100% Passed Tape Test
Water Immersion	720	100% Passed Tape Test

Beyond having unsurpassed durability the Polyfuze Graphic™ can be manufactured with fine line detail and is available as a single-color or multi-colored graphic. These features are good for companies trying to decorate injection molded PE and PP, however, beyond improvements to print quality and long-term durability performance, it is also important to note that the application process associated with Polyethylene Fuzed can even result in a dramatic drop in scrap rate. It can be so forgiving to uneven surfaces that the operators themselves are often surprised how easy they are to apply.

Feature: The True Definition of Permanent Continued

In the event that a PE or PP part reaches the end of its life cycle, the Polyfuze Graphic™ can be recycled along with the part because it is the same material.

Traditional decorating methods make the claim that they are "intended to last" because that's the best they can do. Since Polyethylene Fuzed Graphics are the only decorating method with the ability to "fuse" with injection molded PE and PP on a sub-surface level, they have redefined the term permanent for anyone committed to the decoration of injection molded olefin based products.

Polyfuze Graphics™ Corporation, is an affiliate of Mold in Graphic Systems® which has 30 years in the plastics decorating business as a leader for decorating rotationally molded polyethylene products.

For more information contact:
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jasonbrownell@tattooyourplastic.com

Polyfuze™ Graphics Corporation
999 Highway 89A, PO Box 1650 • Clarkdale, Arizona 86324
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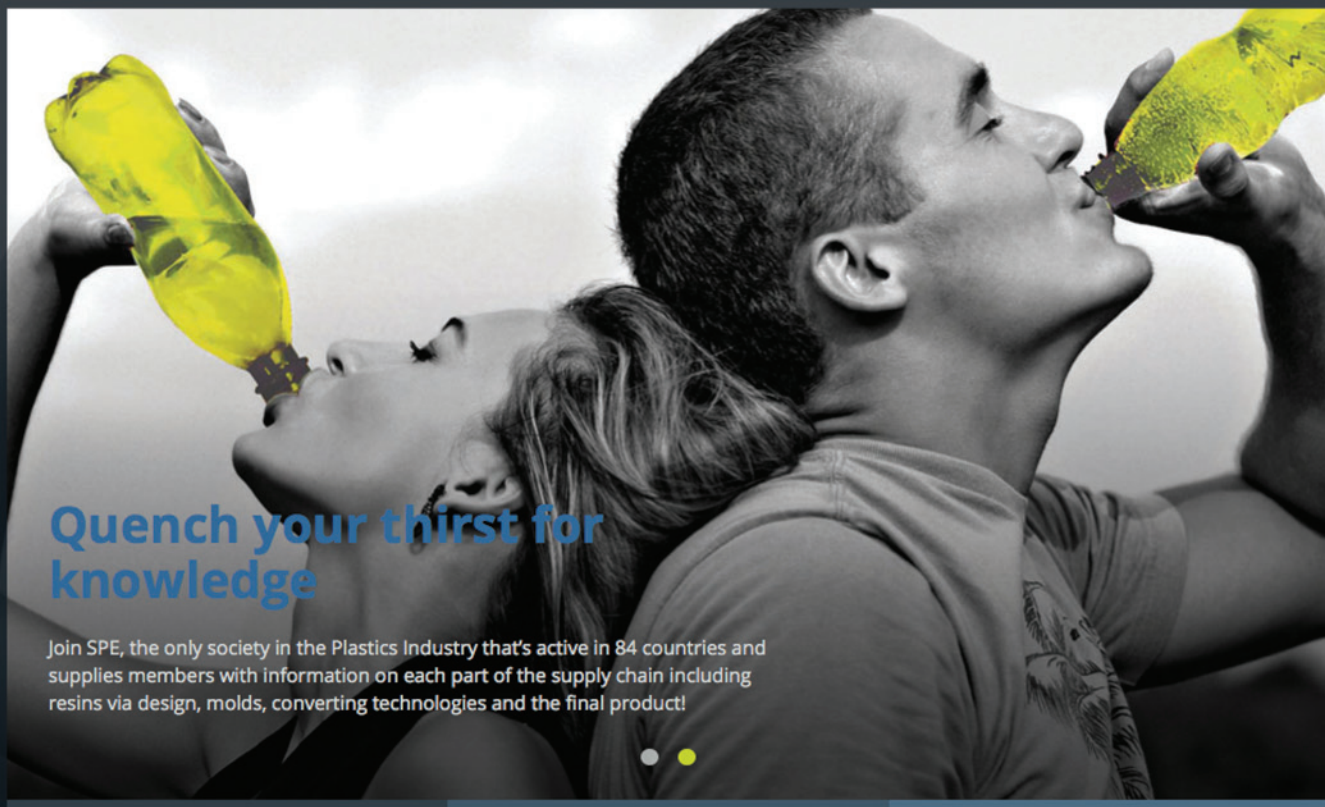


Upcoming Events

FOAMS® 2014
September 8 - 11, 2014
12th International Conference on Foam Materials & Technology Tutorial (Sept. 8-9)

News

Amine Catalyst-Free PU System Reduces Cockpit Odor
June 26, 2014 in Plastics Today
What's claimed to be the first viable amine
ne (PU) foam
ve interior
nched by Dow

Technical Resources

Toughening Epoxy with Liquid and Preformed Powdered Rubber
Phase-separation-formed submicron liquid rubber and preformed powdered nanoscale rubber fillers balance the mechanical and thermal properties of epoxy resin nanocomposites.

4spe.org

By Robert Knaster
robert.knaster@syncrospeed.com

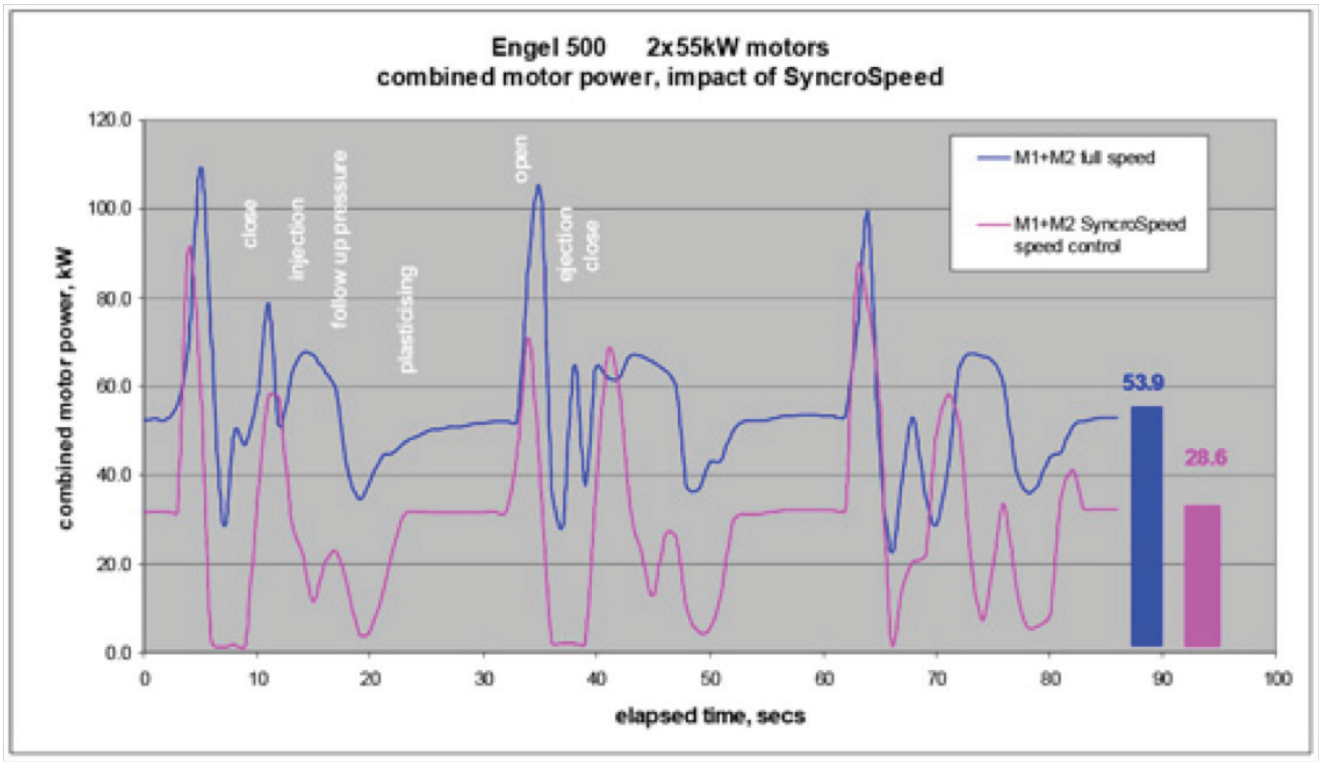
What is SyncroSpeed?

SyncroSpeed is a retrofit control system installed on plastic injection molding machines (IMMs); its purpose is to improve the machine's operating energy efficiency. The system includes a variable speed drive (VSD or inverter) which is used to regulate the speed of the pump motors. Controlled in the correct way, reducing motor speed can result in a considerable reduction in motor power consumption while at the same time maintaining full productivity (cycle time) and process consistency (part quality); that is what SyncroSpeed does.

Induction electric motors are used on all conventional hydraulic machines, selected for their ruggedness, low purchases cost and low ongoing maintenance. These motors run at a fixed speed and drive the hydraulic pumps, but most of the time the machine operations does not need all the oil from all the pumps. Machine manufacturers use various techniques for the management of the over-production of oil, the excess volumes must be returned back to the oil reservoir, but all with varying degrees of inefficiency. A far more efficient method would be to continuously regulate the speed of the electric motor, so the pumps produce just the right volume of oil that is needed at any instant; this is the purpose of SyncroSpeed.

SyncroSpeed comprises electronics hardware and control software components. All hardware is bought from recognized leading global suppliers and is assembled in an industrial steel enclosure. The software supports unique and highly sophisticated elements of control,developed through the needs and experiences of working with most of the popular makes and models of injection molding machines around the world.

The savings results depend on several factors…the plastic injection molding machine brand and model, the



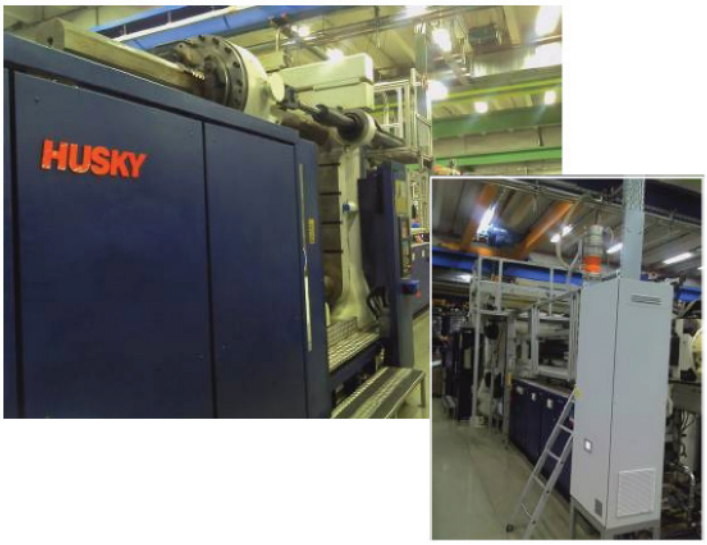
Feature: What is SyncroSpeed Continued

form of the molded component, and the material being processed. Typical energy savings are between 25%-45%, with some exceptional results exceeding 70%. In paractical terms, SyncroSpeed is the best technology, it finds and delivers the energy saving on any hydraulic press. When the bottom line is all about reducing energy and operation costs…SyncroSpeed is the premium tool to make those reductions and is best deployed on larger motors that are planned to be in production for most hours of the year.

Ruggedness and reliability are underpinned by robust design and build, adherence to prevailing standards and codes, together with a high specification of all key components. The control and physical configuration offers four escalating levels of system by-pass to rapidly manage any minor or major event that may affect production capability. The remote monitoring system links SyncroSpeed installations with the CCS bureau in England to support real time monitoring, data-logging, program updates and troubleshooting.

SyncroSpeed 135 HP 2-motor system installed on a Cincinnati 723t.

The SyncroSpeed team offer a great deal of know-how and experience. We are ready to assess your stock of injection molding machines, analyze the savings potential, and offer an effective program of attack on the unseen wasted energy associated with your machines. We have installations from Korea to California on most popular makes of IMM including Krauss Maffei, Engel, Windsor, Stork, Cincinnati, Van Dorn, Sandretto, Negri Bossi, Toshiba, Mitsubishi, Haitian, LG.



SyncroSpeed 135 HP 2-motor system installed on a Cincinnati 723t.

The Value of SyncroSpeed…This is all you Need

Peak Performance:

The deep integration of SyncroSpeed control with the host IMM controller provides all the data to support energy saving strategies throughout the entire cycle of the machine. Together with our really smart software, the deep integration puts performance well ahead of less featured systems. Low-grade interfacing cannot monitor the IMM in detail and does not manage the energy savings in detail.

Really Smart Software:

Fifteen years of continuous improvement and the experience of hundreds of machines of most flavours, the SyncroSpeed software sees all the IMM activity so there are no hidden opportunities of energy savings that can slip by.

Feature: What is SyncroSpeed Continued

Transparent Installation:

Once installed and commissioned, the SyncroSpeed system automatically responds to the setup of each job, without further manual adjustments job after job.

More Smart Software:

Motors, pumps, couplings all have to be protected rather than abused. The SyncroSpeed software optimizes the savings without harsh control that will lead to early failure of vital components.

Bullet Proof Components:

We source all key hardware from recognized global manufactures, standing with reputations for reliability, performance, innovation and technical backup.

An Information Center:

The touchscreen HMI lets you navigate several screens that provide all the necessary data concerning the status of the SyncroSpeed system and the energy savings being realized. Password hierarchy of course and it comes in full color.

Feature: What is SyncroSpeed Continued

Remote Monitoring and Support:

With internet access to our SyncroSpeed installations, status and performance is monitored from our bureau in England. We can troubleshoot and make software fixes, download other software changes and upgrades. If you need information about SyncroSpeed utilization and performance, we can upload data and assemble your report.

Four Levels of Bypass:

IF things were to go wrong, you need to know that production will not be compromised. Our installations have four escalating levels of bypass: depending on the severity, your IMM is backed-up and running with a few keystrokes within an hour.

Compliance and Quality Assurance:

From design, through build, to installation, we work to relevant directives, standards and codes. We are ISO 9001 registered, it's all part of what we do.

Performance Guarantee:

Not only is the entire system offered with a 12 month guarantee but energy saving performance is guaranteed too. We will tell you how much savings you can expect from our SyncroSpeed installations and in most cases underwrite a minimum performance.

Installation Schematics and User Manuals:

Documentation is important and seems obvious to be included in the supply. Up front we can provide examples of the depth and detail we go to. Rest easy that you'll get them once the job is complete.

Vendor Skill Set:

When it comes to innovative and effective solutions for industrial automation and control, the team at CCS Technology have a great deal to offer with a combined strength of 200 years in design of control hardware and software. We'll tackle most jobs involving control of speed, motion or position.

A Complete Job:

Our price covers all supply, delivery to your door, installation and verification, and covers the training, schematics and manuals too. In fact, all that you need for a complete, assured and successful energy saving project.

For more information contact Robert Knaster at robert.knaster@syncrospeed.com

IMD Best Paper

Prof. Dr.-Ing. Ch. Hopmann, Dipl.-Ing. M. Schöngart
Institute of Plastics Processing (IKV) at RWTH Aachen University, Germany

Dynamic Heating of Injection Molds Using an External High Power Diode Laser Scanner

By using dynamic mold temperature control in injection molding, parts with special features such as functional micro structures or high gloss surfaces can be produced in a one-step process. Due to limitations of available mold heating techniques, an innovative system using an externally robot-guided laser scanner was developed and implemented at the Institute of Plastics Processing (IKV) at RWTH Aachen University. High heating rates, a focused, discrete heating of specific cavity areas and the flexible, mold independent set-up are key aspects of the technology.

Introduction

In the field of thermoplastic materials, the thermal conditions during the molding process have a significant influence on the achievable part quality [1-3]. On the one hand, a high mold temperature — depending on the specific material — during the filling period is often advantageous. For example, the delay of the boundary layer solidification caused by the low temperature gradient between polymer and mold enables the precise molding of micro structures, the creation of high gloss surfaces or the production of parts without visible weld

		Internal	External
Alternating tempering using fluids	Fluid	▪ Water ▪ Oil ▪ Steam ▪ CO_2	
Continous fluid temperierung with temporary additional heating	Conduction	▪ Cartridge heater ▪ Ceramic heater	
	Radiation	▪ Laser	▪ Infrared ▪ Laser
	Induction	▪ Integrated inductor	▪ External inductor

Figure 1. Classification of techniques for the variothermal temperature control of injection molds.

IMD Best Paper Continued

lines at the surface [4-6]. On the other hand, low mold temperatures are necessary to achieve a fast cooling and a short cycle time. This conflict of aims can be dissolved by the variothermal mold temperature control, which actively heats and cools the mold surface in every cycle. Due to the wide range of possible applications, several competitive techniques haven been developed and established in the past [7].

An overview of these techniques and the employed physical mechanisms is given in **Figure 1**. However, these available variothermal tempering methods are often not used despite the proven positive effects on the molded part quality. This is due to procedure-specific disadvantages, such as increased cycle times and costly mold modifications.

For these reasons, the goal of this work is to provide a process technology for a fast and flexible heat-up of the cavity surface without a modification of the injection mold. The set-up of an experimental system and first experiments aiming at a fundamental knowledge of the process are presented in this paper.

Set-up of the Experimental System

For the investigation of the laser based dynamic mold heating, an experimental system was developed and set-up at IKV. Since a cyclic thermal process requires identical temperature profiles in every cycle, a main requirement was the seamless integration of the heating period into the fully automatic process. An external set-up with a robotguided laser scanner was chosen, as it makes it possible to apply the dynamic heating to any mold without modification.

As laser source, a fibre-coupled high power diode laser unit type LDF 1500-2700 by Laserline GmbH, Mülheim-Kärlich/Germany, with a maximum beam output power of 2.7 kW was used. Major advantages of diode lasers are the compact installation size, the wave length (940-980 nm) which is well absorbed by steel surfaces and the possibility of coupling the laser power into a flexible beam wave guide. The laser unit can be placed next to the injection molding machine. The radiation is guided through a flexible beam wave guide with a diameter of 1.5 mm and a length of 10 m directly in to the laser scanner. In the laser scanner (type Rhino 31, Arges GmbH, Wackersdorf/Germany), the beam is expanded to a diameter of 30 mm, moved by the x-y scan head and finally focused by the f-theta-lens to a spot size of 4.3 mm in focal length of 160 mm. For different spot diameters, the scanner can easily be operated in defocus by changing the working distance. The maximum working area is 260 x 260 mm2; galvanometer driven mirrors enable a highly dynamic beam movement with a maximum scanning velocity in the working plane of 8.000 mm/s.

The laser scanner is guided by a 3-axis-handling robot W721 by Wittmann Robot GmbH, Schwaig/ Germany. With a positioning tolerance of 0.1 mm and a maximum load of 10 kg, this robot, usually employed to handle molded parts after demolding, is well suited for carrying the laser scanner into the heating positions between the halves of the open injection mold. The basis of the set-up is a two-platen fully hydraulic injection molding machine CX 160-1000 by KraussMaffei Technologies GmbH, Munich/Germany. Laser unit, laser scanner control, robot and injection molding machine are connected via interfaces to realize a fully automatic process. The experimental plant with the laser scanner in heating position is shown in **Figure 2**.

IMD Best Paper Continued

In order to analyze the heating and cooling process and the influence of the different laser parameters, an experimental mold half with a planar cavity surface was developed. A cooling channel layout for the conventional water cooling was designed that ensures a homogenous base temperature level. To record the surface temperature profile, thermocouples type K with a diameter of 0.5 mm where placed below the surface. To analyze the planar temperature profile as well as the depth profile, different distances between the thermocouple and the surface where chosen (from 0.5 mm to 2.5 mm).

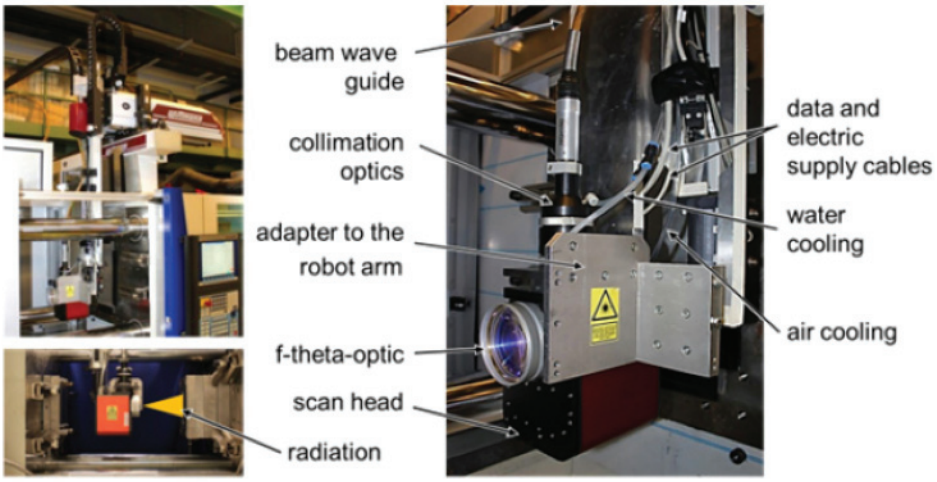


Figure 2. Set-up of the experimental system.

Thermal Analysis of the Heating and Cooling

To gain a fundamental understanding of the influence of the different laser parameters on the temperature profile during heating and cooling, a thermal analysis was performed. Initially, the analyzed parameters and their relation are introduced. Subsequently, the resulting temperature profiles at the cavity surface at different energy densities in the heating period as well as in the cooling period are examined.

The major parameters during heat-up are laser power, radiation time, spot diameter and the diameter of the heated area. Previous investigations showed, that especially circular and elliptical geometries with a steady movement of the laser beam are favorable for a homogenous heating. Rectangular geometries can lead to an overheating due to the discontinuous movement of the laser beam in the corners and are therefore neglected in the experiments. Furthermore, to heat up circular areas, an irradiation of a ring geometry is sufficient. It could be shown, that the area within the ring and a certain area outside the ring are also heated up by thermal conduction in the lateral plane. Preliminary tests were performed to clarify that the beam velocity has no influence on the resulting temperature profile. Since the heating geometry is irradiated quasi-simultaneously several times, the frequency of the laser beam passing a certain spot on this geometry has no impact. For this reason, the maximum beam velocity was used.

In order to be able to compare the results of experiments performed with different geometries, diameters and heating times, not the laser power, but instead the area-related energy density E was varied. This dimension, which combines the presented parameters, is defined as follows:

$$E = \frac{P \cdot t}{2\pi \cdot R \cdot d} \qquad (1)$$

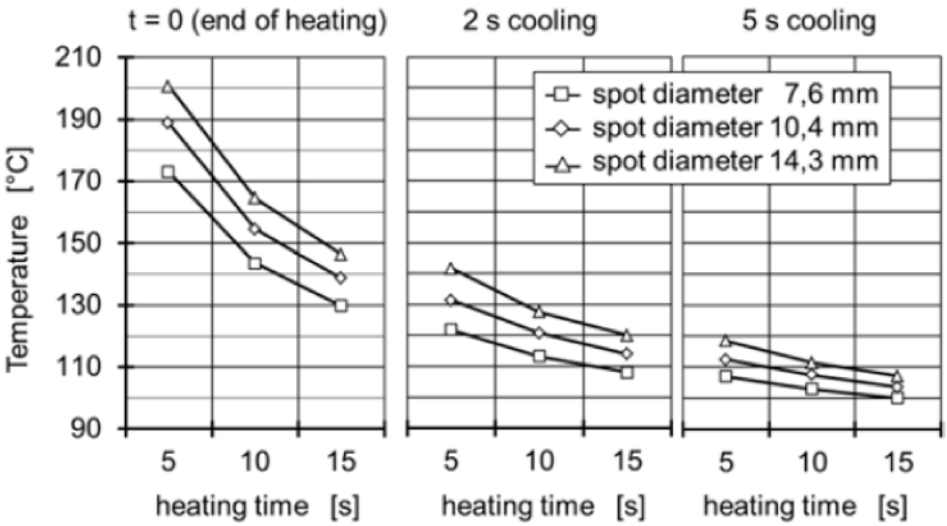
IMD Best Paper Continued

where *P* is the laser power, *t* the heating time, *R* the radius of the heated area and *d* the laser spot diameter. The energy density can be understood as the integrated up absorbed radiation energy over the entire heating period in relation to the area.

In the first part of the experiments, the influence of the heating time and spot diameter was investigated. The heating time was varied between 5 and 15 s; the spot diameter was varied between 7.61 mm and 14.3 mm; the radius of the heated area was held constant at 20 mm.

Figure 3 shows the resulting temperatures directly at the end of the heating period as well as 2 s and 5 s after the end of the radiation. This is of special interest for the injection molding process, as the moving-out of the scanner and the closing of the mold typically take a few seconds. The start of the injection phase is typically within this time-frame.

Figure 3. Maximum temperatures at the end of heating.



It is obvious, that a shorter heating time at a constant arearelated energy density leads to a higher temperature at the end of the heating period. This can be explained by thermal conduction that already takes place in the mold during the external heating. At longer heating times, more heat is discharged to the cooling channels. Therefore, at the end of the heating less energy is present and the maximum temperature is lower.

The spot diameter has a positive influence on the achievable maximum temperature. Larger diameters lead to higher temperatures within and outside the irradiated ring geometry, since a greater area is heated up irectly. This leads to a lower temperature gradient around the measuring spot, causing less conduction of heat and a slower loss in temperature. The heated area can be understood as a heat reservoir. However, this effect is much lower than the influence of the heating time.

In a further series of experiments, the area-related energy density was varied in order to analyze its influence on the temperature profile. Spot diameter and radius of the heated geometry were held constant (d = 10.4 mm; R = 20 mm). The heating time was set to 15 s. The basic mold temperature was held constant at 90°C in all experiments. It was shown in a test series that an increase in basic mold temperature does not affect the heating and cooling behavior, but only shifts the overall temperature level. The difference between minimum

IMD Best Paper Continued

and maximum temperature (exceed temperature) stays constant for a given combination of heating time and energy density regardless of the base temperature. The resulting temperature profiles are shown in **Figure 4**.

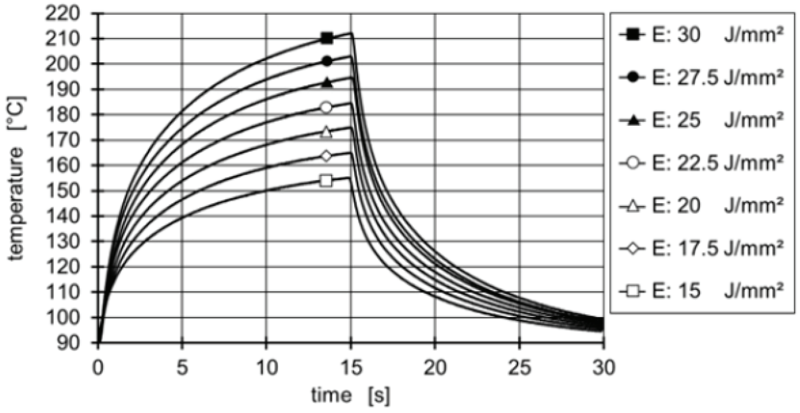


Figure 4. Temperature profiles at different area-related energy densities.

Both the uniformity of the curves as well as the constant distances between the curves are remarkable. The rise in temperature at 15 J/mm² is around 60 K (T_{max} = 150°C). For every increase in energy density of 2.5 J/mm², the exceed-temperature rises by 8 K. The assumption, that the relation between the energy density in the heating period and the maximum surface temperature is linear, can be confirmed when the temperature is analyzed at different time steps during heating depending on the energy density, as shown in **Figure 5**.

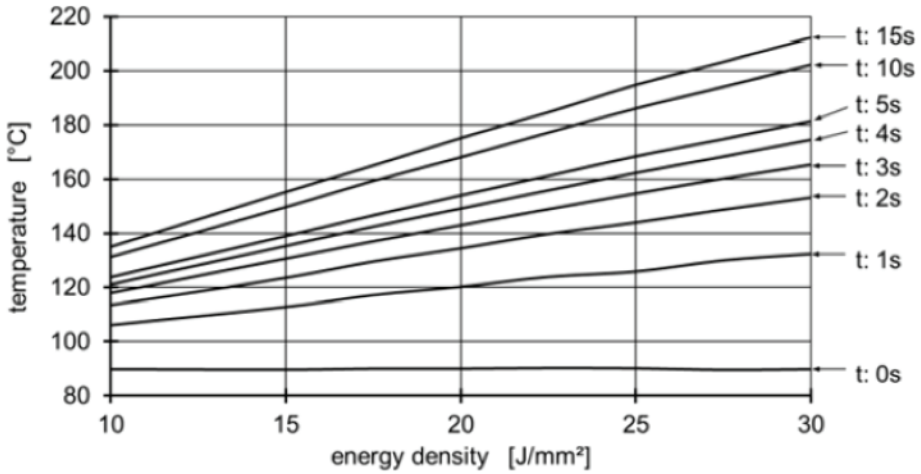


Figure 5. Surface temperature at different time steps during heat-up depending on the energy density.

The temperature measurements presented so far were taken at a position 0.5 mm below the surface, which is assumed to closely represent the real surface temperature. In order to gain information about the temperature distribution inside the mold, a further experiment was performed to analyze the temperature in different distances from the surface. For this purpose, a circular geometry was heated for 10 seconds with a laser power of 2000 W. The measured temperatures of the five thermocouples are shown in **Figure 6**.

IMD Best Paper Continued

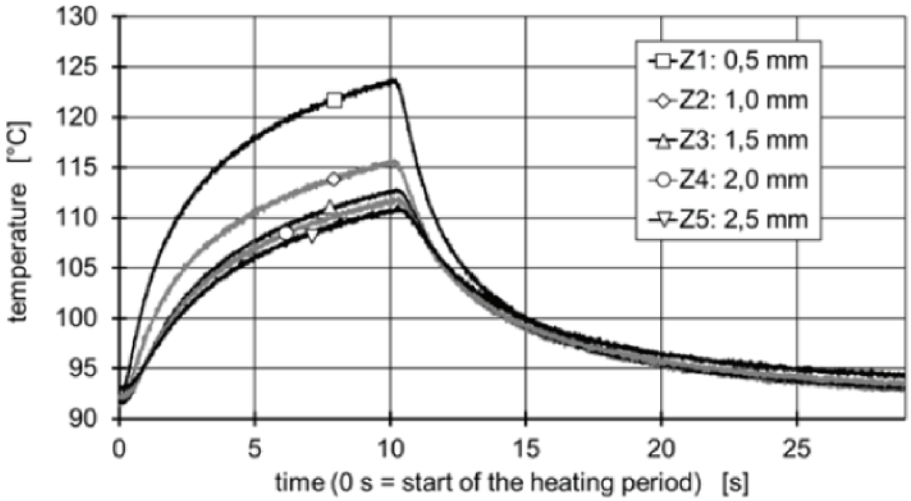


Figure 6.
Temperature profiles in five different distances to the cavity surface.

It is obvious, that all curves have the same characteristic shape showing a large gradient at the beginning which is constantly flattening and an instantaneous drop in temperature after the laser is shut off (t = 10 s). As expected, with increasing distance to the surface a lower temperature is measured. Furthermore, the largest gradient in temperature at the beginning can be observed at the surface. It can be remarked, that about 60% of the final exceed-temperature are achieved within the first two seconds of the heating period. With longer heating time, a large amount of the absorbed energy is conducted away and is not used for a temperature rise at the surface. For this reason, shorter heating times with larger energy density are favorable.

For a production of plastics parts with reproducible part properties, identical thermal conditions in every cycle are required. For this purpose, a fully automatic injection molding process with external laser based mold heating was evaluated. In this case, the deviation in cavity temperature at the beginning of the injection phase was analyzed. For the experiment, a polycarbonate (PC) type Makrolon LED 2445, Bayer MaterialScience AG, Leverkusen/Germany, was used. The basic mold temperature was set to 90°C. The aim of the dynamic heating process was to achieve a cavity temperature before the injection of 160°C, which exceeds the glass transition temperature of the polymer. A mold temperature above this threshold was shown to have several positive effects on the part quality with respect to future possible applications. The recorded cavity temperature course is shown in **Figure 7**.

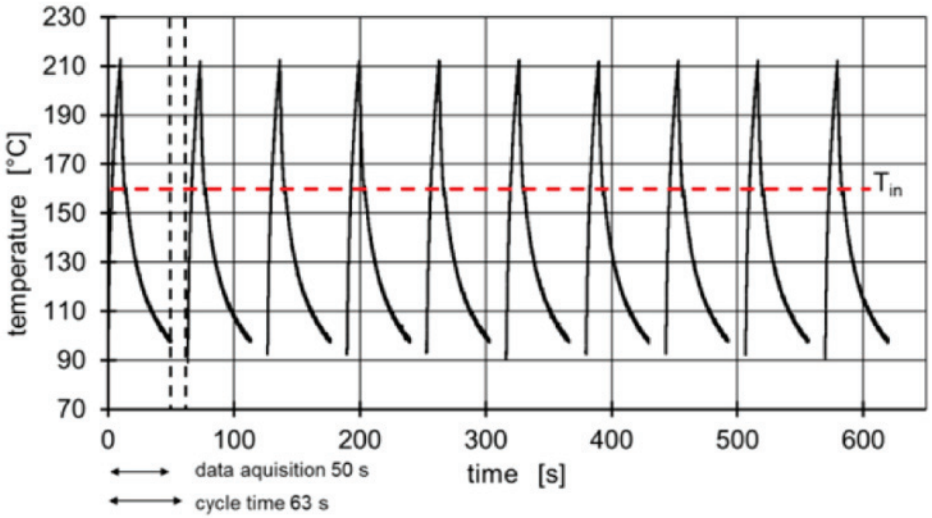


Figure 7.
Cavity temperature in fully automatic cycle mode with dynamic mold heating.

It can be seen, that the desired temperature at the beginning of the injection (T_{in}) can be achieved precisely in every cycle. The maximum deviation is less than 1%, so a reproducible molding process can be assumed.

Conclusions and perspectives

Dynamic mold heating can be used to combine high temperatures during injection and low temperatures for a safe demolding in short cycle times. As an innovative process technique, a system featuring an external robotguided laser scanner was developed and set into operation for the first time. This system allows the flexible and mold independent dynamic heating of the cavity surface.

In the scope of the thermal analysis is was shown, that the laser parameters heating time, area-related energy density as well as the spot diameter influence the temperature profile during the heating period. To reduce the amount of heat that is lost by conduction, short heating times with large energy densities should be chosen. More than half of the total exceed temperature is achieved within in the first two seconds of the heating period. The relation between the energy absorbed at the surface is linear; the base temperature of the mold has no influence and only determines the overall temperature level.

In future investigations, the temperature profile at thesurface will be analyzed more in detail. An important issue in this context is not only the maximum temperature that can be generated, but also the homogeneity of the temperature field. For this reason, the radiation geometry has to be investigated and further optimized.

Once the process technique is understood in detail, further injection molding experiments will be performed to investigate the effect of the increased mold temperature. For this purpose, application relevant demonstrator parts will be designed and analyzed. Examples are parts with a functional micro structure or potential weld lines at the surface.

Acknowledgments

The research project 17090 N of the Forschungsvereinigung Kunststoffverarbeitung has been sponsored as part of the "industrielle Gemeinschaftsforschung und -entwicklung (IGF)" by the German Bundesministerium für Wirtschaft und Technologie (BMWi) due to an enactment of the German Bundestag through the AiF.

References

1.Osswald, T.A.; Turng, L.S.; Gramman, P.: Injection Molding Handbook. München, Wien: Carl Hanser Verlag, 2002

2. Pötsch, G.; Michaeli, W.: Injection moulding. An Introduction. München, Wien: Carl Hanser Verlag, 2007

3. Chen, S.C.; Jong, W.R.; Chang, Y.P.: Variable Mold Temperature on the Part Qualities of Injection Moldes Parts. Proceedings of the 63rd Anual Technical Conference (ANTEC) of the Society of Plastics Engineers (SPE). Boston, USA, 2005

4.Michaeli, W.; Gärtner, R.: Injection moulding of micro-structured surface. Proceedings of the 62nd Anual Technical Conference (ANTEC) of the Society of Plastics Engineers (SPE). Chicago, USA, 2004

5. Michaeli, W.; Klaiber, F.; Scholz, S.: Investigations in Variothermal Injection Moulding of Microstructures and Microstructured Surfaces. Proceedings of the 5th Conference on Multi-Material Micro Manufacture (4M). Cardiff, Wales, 2008

6.Lin, H.-Y.; Chang, C.-H.; Young, W.-B.: Experimental Study on the Filling of Nano Structures with Infrared Mold Surface Heating. International Polymer Processing 26 (2011) 1, p. 73-81

7. Gießauf, J.; Pillwein, G.; Steinbichler, G.: Die variotherme Temperierung wird produktionstauglich. Kunststoffe 98 (2008) 8, S. 87-92

Feature: Warpage

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Warpage

Warpage is a problem that occurs to some plastic products experience after the molding process. Dimensional distortion or twisting, also know as potato-chipping, appear on the part after it has been ejected from the mold at the end of the injection molding process. Under load, a molded part will disfigure, dependent on its geometry and modulus of the material. Warpage is a result of the same phenomena except the load is internal and results from molded in residual stresses. If stresses are high enough, the part will disfigure and will continue to do so with time at the same stress. Continued distortion under constant stress is referred to as creep. Strained molecules will also experience stress relaxation.

Warpage can be controlled by proper material selection; part design and process parameters. We will look at all three processes in detail to help reduce warpage and possibly eliminate an amount of warpage. All process described below are when dealing with plastic material.

Material Selection

There are many questions we must ask ourselves about the proper material selection. What is the application? What is the part's function and how must it perform our in the field! What are the elements of the environment or industry that the part will see?

These of course are the standard and basic questions related to starting any new job or application. When defining the part's function, we must make sure that the right material is selected to help with reducing warpage. Since warpage and shrinkage are closely related, we will use the following analogy.

Crystalline polymers shrink more than amorphous. Crystalline plastics shrink anisotropically and amorphous plastics shrink isotropically. If the material is naturally somewhat flexible, such as PE, warpage is more likely to occur than for an inflexible material like PS. Filled and reinforced polymers are less likely to warp because of their greater modulus. Warpage occurs as a means of releasing internal stress in the part. If that cannot occur because of part design or material, then the internal stress from uneven shrinkage will be stored and may lead to failure by stress-cracking or environmental stress-cracking.

Part Design

Designing a part with minimum warpage is not unlike any general part design. The same basic rules apply.

- Design part with uniform wall thickness
- If part has variable wall thickness, gate from thick to thin
- Use ribs and gussets appropriately
- Balance runner systems
- Size gates to avoid premature freeze-off
- Allow for uniform heat dissipation
- Vent tool properly to help relieve molded stress

Feature: Warpage

Relieving molded in stress is probably the most important ingredient when thinking about tool design. Not only will proper gate and vent sizes and locations help, they can also help with the orientation of the polymer of fibers within the polymer.

Orientation affects shrinkage and has the potential to cause warpage. Differential orientation causes shrinkage, which may vary along and across the flow direction, creating a tendency for the part warp. When dealing with variable wall sections, make sure to think in gradual transitions. Eliminate all sharp corners and if you can core out a thick section, this will help with approximate uniform wall thickness.

Process

More often than not, molders have to contend with warpage after the material is chosen and the tool is built. This means that molders, will have to try and process the warpage out of the part. After all, you have heard that processing is a "black art". Therefore, molders must be magicians.

There are some basic rules that will apply when trying to process out warpage. One of the most common misconceptions is processing with a cold mold to help reduce the warpage within the part. This could not be farther from the truth. What happens in the hot material hits the cold mold surface, which in turn creates molded in residual stresses. Residual stress is the most common cause for what? Warpage. This is where we started from in the beginning of this tech brief.

The most useful process parameters to aid in reducing warpage are:

- Lower melt temperature
- Increase and maintain uniform hold pressure
- Increase cure time
- Alter mold temperatures, (but not to the degree of molded in residual stresses)

Conclusion

There are many other factors and cures that can contribute to a parts warpage. Material selection, part design and process are the three ingredients that will determine the result of how a part will function in its environment. The key to freedom from warpage is the initial design of the part. If this is not done properly, it is almost impossible to make corrections through changes in molding conditions. While warping resulting from mold design or molding conditions can sometimes be corrected by annealing or fixturing, redesign of the part design difficult to repair.

am a highly trained plastics engineer with over 20 years of sales support experience. This includes technical service, application development and market engineering. I now have my own plastics consulting business (DDC Consulting) and help plastic manufacturing companies. This includes troubleshooting plastic problems and helping with new plastic applications. I help with injection molding, design, tooling, material suggestions and problem solving. I have a true passion for plastics and love to travel.

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Injection Molding Division - Engineer of the Year Award

2015 Injection Molding Division's "Engineer of the year award" shall be presented during 2015 ANTEC to Mr. Erik Foltz, who was named the award recipient after the awards committee met in January 2015.

Purpose:

To recognize outstanding contributions made and meritorious services performed for the Injection Molding Division.

ScopeC:

The award shall be presented to a member of the Division in recognition of his or her services for the Division. The award is not intended to honor the contributions made to the Injection Molding Technology.

- The award shall be presented at the Division's annual business meeting generally held in conjunction with the ANTEC.
- It will not be necessary to present an award every year.
- The award shall be limited to only one per year and shall not be given to the same individual twice.

Selection Committee:

The selection for the award shall be the responsibility of a committee, appointed by the board, consisting only of the past award recipients. The committee shall consist of at least three such members and shall be chaired by one of the members designated by the board.

Selection Criteria:

Selection of an individual shall be based upon one's contributions to the Division. Length of service, committee-work and holding an office in the Division are some of the valid criteria for selection along with the quality of service to the Division. However, being a past chairman of the Division is not an automatic qualifier for the award. Current chairman of the Division shall be ineligible for the award during his administration.

History:

Award was established 1981-82 during the chairmanship of Nick Rosato. The following table lists the award recipients to date.

IMD Engineer of the Year Award Continued

List of Recipients:

Recipient	Year	Recipient	Year
J. Theodore Engelhard	1982	John P. Beaumont	2001
Dominick V. Rosato	1983	Joseph Duska	2002
William C. Filbert	1985	Lawrence Cosma	2003
Kishor S. Mehta	1986	Suzy Witzler	2004
James J. Wenskus	1987	Jack Dispenza	2005
Donald V. Rosato	1988	Larry Schmidt	2006
Robert E. Nunn	1989	Don Allen	2007
Fredrick J. Buja	1990	Jim Peret	2008
Wolfgang Meyer	1992	Hoa Pham	2009
Jonathan M. Newcome	1993	Brad Johnson	2010
Philip Hubbauer	1994	Tom Turng	2011
Raymond J. Veno	1995	Jose Timmerman	2013
Nick Fountas	1996	Susan Montgomery	2014
T. Henry Forsyth	1997	Erik Foltz	2015
Eliot M. Grossman	1998		
Paul N. Colby	1999		
Peter F. Grelle	2000		

IMD Board of Directors Meeting

January 16, 2015

Orlando, FL

Submitted by Hoa Pham (for Srikanth Pilla)

Welcome

Chair Adam Kramschuster called the meeting to order at 9:00 AM ET. He welcomed all attendees to the meeting, and thanked Tupperware for hosting the reception and the Board meeting. He also welcomed Vikram Bhargava as guest to the meeting. Adam asked Hoa Pham to record the minutes for Secretary Srikanth Pilla who was not able to attend the meeting.

Roll Call

Present were:

- In person: Adam Kramschuster (Chair); David Okonski; Peter Grelle; Tom Turng; David Kusuma; Raymond McKee; Kishor Mehta; Jim Wenskus; Hoa Pham.
- Via Teleconference: Susan Montgomery; Lee Filbert; Erik Foltz; Nick Fountas; Jack Dispenza, Rick Puglielli; Larry Schmidt (Emeritus)

Guest was: Vikram Bhargava (via teleconference)

Absent were: Srikanth Pilla, Brad Johnson, Mal Murthy (Emeritus)
This constituted quorum.

During roll call, Michael Uhrain announced his resignation from the Board. He thanked the Board for supporting him during his overseas assignment and offered to assist in projects when needed.

Opening Remarks

Mr. Jose Timmerman, Executive Vice President of Tupperware Supply Chain and Operations Worlwide, welcomed the Board. He emphasized the need for companies to invest in research and development, which drives the ability to maintain a pipeline of quality and differentiated products to fuel business growth. He urged the IMD Board to continue and strengthen its efforts in helping the industry develop engineering talent.

Approval of September 19, 2014 Meeting Minutes

Motion: David Okonski moved that the September 19, 2014 meeting minutes be approved, as written and distributed. Jim seconded and the motion carried.

IMD Board of Directors Meeting Continued

Financial Report – Jim Wenskus, Treasurer

Jim presented the financials from July 1 to December 31, 2014. The quarterly rebate from SPE was on track and bills were paid. Newsletter sponsorships have been good.The incoming sponsorships covered the expense of publication.

The Board discussed the proposed budget for 2015 – 2016. In this discussion, the scholarship funding was brought up to consider either paying the remaining amount in full or increase the annual payment to reduce the time to pay off.

Motion: Raymond moved that the Board approves paying off the remaining amount in two years, with an equal pay-out each year, starting in 2015. Kishor seconded and the motion carried.

Action Item: Jim to send in and record the payments for the IMD Scholarship.

Adam presented the request from Russell Broome, the SPE Managing Director, for the IMD to sponsor the cost of developing and manufacturing the mascot for The Chain, which is the new SPE social media platform. This mascot, called Linky, would be distributed at ANTEC 2015. The Board was not clear on several aspects of this project, such as mold making and timing to meet ANTEC/NPE 2015 in March. Adam would obtain clarification from Russell. To facilitate decision making in a timely fashion, the Board voted on a guide for Adam to take action as necessary.

Motion: David Okonski moved that the Board gives Adam the authority to approve up to $2000 to sponsor Linky, and the Board reserves the option to increase this amount through a vote from the Board, depending on additional information. Pete seconded and the motion carried.

Action Item: Adam to obtain clarification on Linky project from Russell and inform the Board.

Since the communication to new members have been done electronically, the Board agreed to delete line item #19, titled New Member Letter, from the Expenses section of the budget.

ANTEC Technical Program Committee Report – Raymond McKee, Chair

ANTEC Technical Sessions (Raymond): The ANTEC Conference will be held in Orlando, March 23 – March 26, 2015. Early registration ends on January 31, 2015.

Raymond reported that the paper review was conducted on October 29, 2014 in Menomonie, WI. The review panel included Ray, Pete, Adam and Jeremy. More than 60 papers were reviewed, and two best papers were identified.

Raymond also presented the session matrix for the IMD technical program. He called on the Board to assist with moderating, and the Directors responded accordingly. There would be a joint session with the Mold Making Division on Tuesday morning. The joint session with FAPSIG on Tuesday afternoon needed a co-moderator. Vikram offered to reach out to Kulkarni and let Raymond know within a week.

IMD Board of Directors Meeting Continued

Action Item: Vikram to let Raymond know if Kulkarni accepts to co-moderate the joint session with FAPSIG.

Tutorials (Jeremy): Seven speakers were scheduled for the tutorial presentations.

ANTEC 2015 Reception (Jeremy): The sponsor line up was excellent, with 10 confirmed sponsors. David Kusuma offered Tupperware sponsorship. David Okonski appreciated Tupperware's offer and recommended that Tupperware display a table at the reception. David Kusuma was also amenable to provide Tupperware items for door prizes.

Adam suggested to have an agenda for the reception to facilitate an orderly flow of events at the reception. This agenda would be provided to the reception attendees.

Action Item 1: Adam and Jeremy to develop the agenda and distribute at the reception.

The Board discussed ways to recognize sponsors, as given in the action items below.

Action Item 2: Jeremy to arrange for a banner printed with sponsor logos for the reception hall.

Action Item 3: Jeremy to work with Heidi to get space in the newsletter to thank the sponsors.

Action Item 4: Jeremy to reach out to SPI to get a badge scanner to capture information of attendees at the reception and provide this list to each sponsor.

Jeremy and David Okonski suggested that the Board recognize two recipients of the SPE Plastics Hall of Fame Award at the IMD Reception, namely John Beaumont and Maureen Steinwall.

Motion: Jeremy moved that the Board honor John Beaumont and Maureen Steinwall at the ANTEC 2015 Reception with plaques being presented to both, and an additional one-year SPE membership to Steinwall. David Okonski seconded and the motion carried.

Action Item 5: Tom to include two additional plaques to his awards preparation.

ANTEC 2015 Board Meeting (David Okonski): The Board discussed either to have the Board meeting on Monday as was done in 2014, or to return to the original schedule on Sunday.

Motion: David Okonski moved that the IMD Board meeting be moved back to the Sunday schedule. Peter seconded and the motion carried.

With the passing of this motion, the IMD Board will meet on March 22, 2015, at the Residence Inn by Marriott Orlando at Seaworld.

Technical Director Report – Peter Grelle, Chair

ANTEC Technical Papers

Peter presented the trends of IMD papers with regards to paper sources, paper types, geography and the APQ index. This trend data showed that the total number of papers decreased since 2005 but seemed to level off.

TOPCON Update

No TOPCON is scheduled for 2015. The next Penn State Erie conference will be in 2016.

IMD Board of Directors Meeting Continued

Injection Molding Webinar

Pete reported that the first set of 3 webinars was a success. The webinars were:

- Injection molding Part Design Basics
- Gate Runner Design
- Mold Flow Simulation – What Information Do You Get?

The plan was to offer the same webinar topics in Fall 2015. In addition, another survey would be needed to determine if the areas of interest had changed since the last survey done in March 2013.

Councilor Report – Susan Montgomery, Councilor

The next Council meeting will be at ANTEC 2015 in March.

IMD Membership Committee – Nick Fountas, Chair

Nick reported that the IMD membership started to grow slightly. The demographics leaned towards members with mature careers. Nick reviewed the trend for Division/SIG choices made by incoming members.

Pinnacle Award – David Okonski, Chair

David reported that the IMD earned the 2015 Pinnacle Gold Award, which would be presented at the ANTEC Leadership Luncheon on March 22. He also shared some lessons learned from the process. Managing the Pinnacle Award was a good exercise for the incoming Chair because it helped in understanding the success metrics and in identifying the strengths and challenges of the Division.

Nominations Committee – Hoa Pham, Chair

David Okonski is the incoming Chair, and Susan continues her term as Councilor. Hoa presented the nominees for Board officer roles:

- Chair-Elect: Raymond McKee
- Treasurer: Jim Wenskus
- Technical Director: Pete Grelle
- Secretary: Srikanth Pilla

Motion: Hoa moved that the Board approve the nominees for Board officers as presented. Kishor seconded and the motion carried.

Hoa presented the candidates for Board Directors:

- Lee Filbert
- Erik Foltz
- Jeremy Dworshak

Motion: Hoa moved that the Board approve the nominated candidates for posting on the general ballot to be elected to the Board, as presented. David O'konski seconded and the motion carried.

Action Item: Lee, Erik and Jeremy to provide a short bio to Hoa for the general ballot.

IMD Board of Directors Meeting Continued

Engineer-Of-The-Year Award Committee – Kishor Mehta, Chair

Kishor reported that the Committee had elected Erik Foltz as the recipient of this award. The Board congratulated Erik, and he thanked the Board.

HSM & Fellows and Awards – Tom Turng, Chair

HSM & Fellows: Tom reported that Jose' Timmerman was the nominee for Fellows, and Jack Dispenza nominee for HSM. Tom also asked the Board to suggest nominees for next year. Pete and Adam suggested some candidates, and offered to make the initial contact.

Action Item: Pete and Adam to contact their proposed candidates and update Tom and the Board.

Awards: Tom will prepare the standard four plaques for the IMD, and the two additional plaques for the recipients of the Plastics Hall of Fame Award.

Education Committee – Jeremy Dworshak, Chair

No update

Communications Committee – Rick Puglielli, Chair

Adam reported that Rick had been assisting with the newsletter. With the Board's agreement meeting, Adam formally appointed Rick as Communications Committee Chair.

Newsletter – Rick Puglielli
Rick reported that The IMD Newsletter earned the SPE 2015 Communications Excellence Award, which would be presented at ANTEC 2015. Contacts made on the Injection Molding Division LinkedIn group and other groups have helped in obtaining articles. Rick proposed to conduct cross-marketing with other SPE newsletters, shows and websites to increase interest.

The schedule to send in content for the upcoming newsletter is given below. Adam reiterated the need to get content to Heidi by the deadline so that the review process could take place in time for the targeted publication date.

- Spring (March 2015) – February 20
- Summer (July 2015) – June 10
- Fall (November 2015) – October 10

Sponsorships have been encouraging, with a variety of offerings and packages for the sponsors. The Board reviewed the list of sponsors and renewals.

Pete suggested that the Board consider offering the Chair complimentary sponsorship announcements published in the newsletter. The Board discussed the merits and details.

Motion: Kishor moved that the Chair gets a complimentary quarter page sponsorship announcement in the IMD newsletter for one year. Pete seconded and the motion carried.

IMD Board of Directors Meeting Continued

Motion: Kishor moved that the Board offer Adam, the outgoing Chair, one complimentary quarter page sponsorship announcement in the IMD newsletter. Pete seconded and the motion carried.

IMD Website – Adam Kramschsuter
The website at http://www.injectionmolding.org was launched in Spring 2014. In a previous meeting, Wilhelm DeVos, SPE CEO, recommended that the IMD used SPE to setup the IMD website at the cost of $5000. As a follow-up, Adam, Rick and Jeremy met with SPE HQ to discuss this idea. After reviewing the IMD website, the SPE staff recommended to continue using the existing website.

David Okonski asked if we could have a private section on the IMD website for just the Board. The Board also wanted to add a capability for administrators to add comments. Adam agreed to follow-up on these inquiries. Nick mentioned that the website has capability to set up e-mail addresses as well.

Action Item: Adam to follow-up on the capability of the IMD website to setup a section just for the Board and to add capability for administrator comments.

Social Media
The IMD's Facebook and LinkedIn group have been active, and the Board was encouraged to add content to these sites.

Board Member Progression – Erik Foltz

Inspired by the TPC progression process, Erik proposed to have a more defined growth path for new and current Board members to continue serving the Division and SPE, and to better accommodate Board turnover. The Board discussed how new Directors have been introduced to the Board and the Board's expectation of their active participation. After discussions, it was apparent that at times new members were not aware of all the committees and their work. As such, the Board agreed to add a tab to the Board meeting agenda file, where a listing of active committees (Chair, Co-Chair) would be recorded.

Action Item: David Okonski to add the listing of Committees to the agenda file.
David Okonski proposed to separate the sponsorship role from the reception role that is currently under the 'next-year' TPC. The sponsorship committee is responsible for generating income for the Division to fund activities such as reception, newsletters, scholarships, etc. This topic will be further discussed at the next meeting.

Action Item: David Okonski to add new committee topic to the next meeting agenda.

New Business – All

Recognition of Tupperware: Pete noted that Tupperware has continuously supported the Board for 24 years, and 2016 would mark 25 years. Pete suggested and the Board agreed to recognize Tupperware for this unwavering support.

Action Item: Tom to prepare an award for this recognition.

IMD Board of Directors Meeting Continued

ANTEC 2015 Registration for Sponsors: Dave Okonski asked to clarify if sponsors would be offered complimentary registration at ANTEC and the number of passes.

Action Item: Adam to check with SPE and update Dave and the Board.

Old Business – All

None

Next Meeting

The next Board meeting will be on March 22, 2015 at the Residence Inn by Marriott Orlando at SeaWorld, 11000 Westwood Blvd, Orlando, Florida 32821.

Adjournment

Motion: Pete moved that the meeting be adjourned. David Okonski seconded and the motion carried. The meeting adjourned at 3:45 PM ET.

Submitted by Hoa Pham (for Srikanth Pilla) February 1, 2015

IMD Leadership

DIVISION OFFICERS

IMD Chair
Adam Kramschuster
University of Wisconsin-Stout
kramschustera@uwstout.edu

Chair-Elect
TPC ANTEC 2020
David Okonski
General Motors R&D Center
david.a.okonski@gm.com

Treasurer
Jim Wenskus
wenskus1@frontier.com

Secretary
TPC ANTEC 2018
Srikanth Pilla
Clemson University
spilla@clemson.com

Technical Director
Peter Grelle
Plastics Fundamentals Group, LLC
pfgrp@aol.com

Past Chair
Erik Foltz
The Madison Group
erik@madisongroup.com

Councilor, 2014 - 2017
Susan E. Montgomery
Lubrizol Advanced Materials
susan.montgomery@lubrizol.com

BOARD OF DIRECTORS

TPC ANTEC 2015
Raymond McKee
Sonoco
Raymond.Mckee@sonoco.com

TPC ANTEC 2016
Education Committee Chair
Jeremy Dworshak
Steinwall Inc.
jdworshak@steinwall.com

TPC ANTEC 2017
Communications Committee Chair
Rick Puglielli
Promold Plastics
rickp@promoldplastics.com

TPC ANTEC 2019
David Kusuma
Tupperware
davidkusuma@tupperware.com

Membership Chair
Nick Fountas
JLI-Boston
fountas@jli-boston.com

Engineer-Of-The-Year Award
Kishor Mehta
Plascon Associates, Inc
ksmehta100@gmail.com

Awards Chair
HSM & Fellows
Lih-Sheng (Tom) Turng
Univ. of Wisconsin — Madison
turng@engr.wisc.edu

Assistant Treasurer
Nominations Committee
Chair Historian
Hoa Pham
Freudenberg Performance Materials
hp0802@live.com

Jack Dispenza
jackdispenza@gmail.com

Lee Filbert
IQMS
lfilbert@iqms.com

Brad Johnson
Penn State Erie
bgj1@psu.edu

Michael C. Uhrain IV
Sumitomo
michael.uhrain@dpg.com

EMERITUS

Mal Murthy
Doss Plastics
Dosscor@gmail.com

Larry Schmidt
LR Schmidt Associates
schmidtlra@aol.com

IMD New Members

The Injection Molding Division welcomes 286 new members…

Ken Adams
Artemis Ailianou
Josh Alamo
Joshua Allor
Mohamed Alsoofi
Bruce Anderson
Ivan Aragon Cruz
Rhea Arcilla
Tom Baines
Paul Baird
Praveen Kumar Balasubramani
Nakia Barclift
Jane Barefield
Stephen Bassler
Erin Beaver
Ryan Beck
Jake Behrens
Corie Benton
Andy Beyerl
Alex Bialler
Craig Birrittella
Michael Blake
Jeffrey Bobkoski
Miles Bojanic
Timothy Bolt
Jason Bonanno
Gavin Borchardt
Connor Bourque
Dominique Brelanci
Deanna Brewer
Isai Briones
Joshua Brown
Joseph Bruining
Terrika Bumpass
Chris Butryn
Silvestre Cano
Will Carpenter
Mike Chapman
Edward Chappel
Jeffrey Chattaway
Feiwu Chen
Ching-Chang Chien
Tyrah Chisholm
Sean Chronis
Jim Clinton
Michelle Cloutier
Gregory Cole
Adam Colton
Abdul Coulibaly
Phillip Cox
Jaquante Crocker
Sean Cuevas
Roy Cunningham-Oller
Jarrett Dawkins
Paul Dean
Angela DeAngelo
Brandon DePass
Aram Der Hagopian
Jesse Derouin
Jeffrey Dininger Sr.
Joseph Dolin
Joe Donofrio
Rodney Douthat
Robert Eden
Kristen Eisiminger
Daniel Elder
Dave Ellison
Geoffrey Estabrooks
Robert Felster
Adam Fermanich
Shane Fischer
Jeffery Fitch
Brandon Frederick
Philip Gabor
Juan Gallardo
Mauro Gariboldi
Thomas Garner
Jonathan Garrett
Rick Geddes
Jonathan George
James Gibb
Richard Giltz
Stefano Giordano
Christopher Gladman
James Goldthorp
Ed Gomez
Rickardo Grant
Robert Green
Christopher Gucik
Harshini Gullapalli
Rajesh Gundimeda
Rajesh Guntupalli
Matt Haggard
Christian Hampel
Rayman Hannish
Kevin Hardy
Joaquin Harris
Ronnie Hartzell
John Hastings
Xiang He
Alan Hickok
Eva Hnatkova
Joseph Hoffer
Benjamin Hoffmann
Alexander Hogan
Christopher Holloman II
Christian Holz
Jun Hyung Hong
Chris Horner
Kimberly Huang
Wenzhi Huang
Robert Hudecek
Michael Hughes
Garrett Humphrey
Hidetsugu Iwasaki
Trevor Jack
Desmond Jackson
David Jacob
Ian James
Ehsan Jazaeri
Nicholas Jennings
Brettain Johnson
Cameron Johnson
NIcholas Johnson
Matthew Jones
Maurice Jones

IMD New Members Continued

Scooter Jones
Alvaro Juarez
Arnold Kagle
Demetrius Kelly
Royston Kent
Alexandria Kesek
Travis Kiel
Deborah Kirgis
David Knickelbine
Harol Koalaglu
Harry Koshulsky
Matthew Kula
Arun Kumar
Arthur Kupracz
Akshat Ladha
Kamal Ladha
Sean Leonard
Sam Lepley
Santineshia Lester
Changjin Li
Dongpo Lin
Dongsheng Liu
Zhixue Liu
Eric Long
Puneet Madan
Greg Madru
Ajay Mallelil
Tim Malloch
Robert Mann
Cameron Manuel
Nolan Markham
Korrey Marsh
James Matyniak
Chris Max
Jeremy Maxey-Vesperman
Matthew McDaniel
Caroline McDougald
Chris McGrady
Christopher McKinnon
Allan McLean
Christopher McLeod
Donovan McNatt
Christopher McNeil
Daniel Meldrum
Ian Menego
Jose Eduardo Mercado
Kelsey Metzler
Rigel Millan
Joseph Miller
Douglas Miner
Michael Morassi
Kenneth Morris
Audrey Moseley-Gholl
Michael Mutsakis
Satoshi Nagata
Jaime Navarrete-Damian
Unmesh Nayak
David Nelson
Jason Newman
Santiago Ocampo
Sanjay Odak
Swee Kien Ong
Sindhiya Paliniswamy
John Papadopulos
Alex Parelius
Dominique Parrish
Jequalyn Parrish
Jarvis Patrick
Jonathan Patz
Daniel Peretz
Carle Philippe
Douglas Pickett
Andrew Pierce
Kenneth Polizzi
John Poppe
Duane Potter
Patrick Quiggin
Bill Ratzlaff
Maron Raymon
Chad Rhen
Charles Richter
Michael Roberson
Ramon Rodriguez-Leon
Clark Roper
Alberto Rossetto
Felix Rozuk
Hussein Salim
Amir Samad
Daniel Sander
Denys Sanftleben
Eben Sarver
Christian Schafer
Ryan Schenck
Robert Schiavone
Ralph Schultz
Devone Scott
Kaan Serpersu
Amish Shah
Kevin Shamberger
James Shortt
Idrissa Shwadogo
John Sloss
Calvin Smith
Holly Smith
Jarred Smith
Julius Smith
William Smith
Joshua Snyder
Sejad Spahic
Jacob Stoffel
Kai Stuebiger
John Surprenant
Tim Sutter
Eric Swensied
Jonathan Tamil
Tiffany Tang
Daniel Taylor
Jordan Taylor
Antonio Teng
Matthew Theriault
Jamie Thomson
Kraipop Thongsak
Jie En Tit
James Toon
Jasheka Torrence
Melanie Tucker
Ned Uzelac
Christina Vander Mause
Zach VanHuis
Sin Vila
Laurence Ville
Chen Wang

IMD New Members Continued

Guodong Wang
Jiangqing Wang
Ruizhen Wang
Shigao Wang
Wei Wang
Julian Ware
Douglas Warnock
Austin Watkins
Jonathan Wesley
Brad White
Christopher White
Glenn Whitecotton
Bradley Whitney
Marcellous Williams
Zac Williams
Brian Wood
Mariah Woody
Michael Wright
Kangsheng Wu
Zhenghai Wu
Sihai Xie
Hua Yan
Terence Yan
Joshua Yeoman
Lei Yuan
Yugang Zhang
Yunhe Zheng
Michelle Zwick

...from 16 countries:

Australia
Canada
China
Czech Republic
France
Germany
India
Italy
Mexico
Singapore
South Korea
Taiwan
Thailand
Turkey
United Arab Emirates
U.S.A.

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Advanced Plastiform Inc.
Advanced Composites
AerosUSA Inc.
Ajou U.
Aladdin Temp-Rite
Alco Plastics
Alliance Rubber Co.
Allied Oil & Tire Co.
Ambrit Engineering Corp.
Amco Polymers
Ames Companies
Americhem
Amsted Rail
Anant Extrusions Ltd.
Arkidelo Pty Ltd
Automation Plastics
AST Technology UK Ltd.
Autodesk
B&C Plastics
Barr Inc.
Basell Australia
B. Braun Medical Inc.
Badger Meter
Bayer MaterialScience
Becton Dickinson
Beijing U. of Chemical Technology
Bemis Manufacturing Co.
Berry Plastics
Bipore Medical Devices, Inc
Borouge Australia
Branson
Braskem America
BUCT
California State U. - Chico
Callaway Golf
CalsonicKansei N.A.
CamelBak Products LLC
Carlson Tool & Manufacturing
Catco
CE Engineering
Celanese
Central Carolina Community College

IMD New Members Continued

CESAT - UPAEP
CE-Technologies LLC
Chase Plastics Services Inc.
China Synthetic Resin Association
Clariant
Command Chemical Corp.
Comtec IPE
Consolidated MetCo
Corma Inc.
CoreTech System (Moldex3D) Co. Ltd.
Cultec Inc.
Custom Service Plastics
Davis Applied Technology College
Delphi Automotive Systems
Diversified Engineering & Plastics Inc.
DME Co.
Dolphin Products
Donnelly Custom Manufacturing Co.
DSM Engineering Plastics Inc.
Eastman Chemical
EG Industries
Elring Klinger
Elgin Molded
EMS-Chemie
EMS-Grivory
Engel Global
Engel Machinery
Epson Portland Inc.
ETS Evco Plastics
Executool Precision Tooling
ExxonMobil Chemical Co.
Eve Hook Fall Protection
Evenflo Co. Inc.
Ferris State U.
Generation Four LLC
General Motors
Georgia-Pacific LLC
Gilbert Tweed
Global Precision Industries Inc.
GM Nameplate.com
Harbor Plastics
Hennepin Technical College
Hochschule Darmstadt
Icon Plastics Pty. Ltd.
iD Additives, Inc.
Innovative Design
International Contract Molding
InterPRO
Instituteof Plastics Processing (IKV-Aachen)
Instituto Tecnologico de Celaya
Iowa State U. - ABE Dept.
ISPA
ITW
Jiangsu Golden Material Tech Co. Ltd.
Kao USA
Kas Engineering Inc. - Oxnard Div.
Kettering U.
Kellen
King Mongkut's Institute of Tech. Ladkrabang
Kongju National U.
KOSTAL Kontakt Systeme, Inc.
Kraft Foods Group
Kraft Foods Group
Kraiburg TPE Corp.
Kuraray America, Inc.
Lacks Trim Systems
Linear Mold & Engineering
LORD Corporation
MacDermid Autotype
Mallelil Polymers Pvt. Ltd.
Marplex Australia Pty. Ltd.
Matrix Composites & Engineering
McCord Executive Search
Medical Device Consumables
Medway Plastics
Mega Brands
MGS Manufacturing Group
Milacron Plastics Machinery LLC
Milliken Chemical
Milwaukee Tool
MiniFAB
Ministry of Environmental Protection of China

IMD New Members Continued

Minnesota Rubber & Plastics
Mission Plastics Inc.
MMI Engineeered Solutions, Inc
Monash U.
MRIGlobalPlastics
H. Muehlstein & Co.
Nanosyntex, Inc.
Nanyang Tech
National Plastics Color
Neutrex Inc
New Berlin Plastics
Nexeo Solutions
Nextool Canada Limited
Niagara Bottling
Nifco America Corp
NIT Hamirpur
Noble Plastics Inc.
North Carolina A&T State U.
Nyloncraft Inc.
Nypla Industrial
Oldcastle
Olsen Tool & Plastics
Omya Inc.
Orel Corporation (PVT) Ltd.
Osterman & Co. Inc.
Outerspace Design
Oxylane
Parker-Hannifin
Parmalat Australia Pty. Ltd.
Penn State U. – Behrend
Penn State Erie
Pennsylvania College of Technology
Performance Feed Screw Inc.
Philips
Pikes Peak Plastics
Plastic Process Equipment Inc.
Plastikos Inc.
Poly
Polymer Resources Ltd
PolymerWarehouse LLC
PolyOne Distribution
PolyOne GLS
Polypacific Pty. Ltd.
Pontiac Coil
Power Container Corp.
Premier Plastic Resins Inc.
PrimaPlas Pty. Ltd.
Profile Injection Moulding Pty. Ltd.
PTI Inspection Systems
Reliable Caps, LLC
Reliance Industries Ltd.
Repi S.p.A.
Rexnord
Ricky Geddes LLC
RGI
Rotacaster Wheel Pty. Ltd.
RTP Co.
S&C Electric Co.
Sajar Plastics LLC
Samsung Electronics Co. Ltd.
SCG Performance Chemicals
Serigraph
Schneider Electric
Schoolcraft College
Shape Corp.
Shintech
Shure Inc.
Siemens
Skullcandy Inc.
SRGG
StaMixCo LLC
Steinwall Scientific
STIHL Inc.
Styron LLC
Sun Products Corp.
Support Plastics USA
Sustainable Manufacturing Solutions
Techmer PM
Teleflex Medical
The Marketing Store
Theranos
Toledo Molding & Die
Tomas Bata U.
Transvalor S.A.
Trek Bicycle
UMMC
U. Cincinnati
U. Mass. Lowell

IMD New Members Continued

U. Michigan
TMaG
U. Mass. - Lowell
Underground Devices
United Solar Ovonics
U. Queensland
U. Wisconsin
U. Wisconsin - Stout
U. Wisconsin - Platteville
Vibo S.p.a
Visy
Walter Pack S.L.
Washington Penn Plastic Co.
Weili Plastics Machinery (HK) Ltd.
Western Washington U.
Windsor Mold Group
Winona State U.
Xiamen U. of Technology
YESCO Electronics LLC

Society of Plastics Engineers
6 Berkshire Blvd., Suite 306
Bethel, CT 06801-1065 USA

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: ☐ Home ☐ Business Gender: ☐ Male ☐ 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*

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Signature of Cardholder: _____

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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.

USD: WELLS FARGO: 108 Federal Road, Danbury, CT 06811 USA
ACCT #2040607562129 ABA #121000248 SWIFT CODE #WFBIUS6S

EURO: HSBC Bank: 9 Penn Road, Beaconsfield, Buckinghamshire HP9 2PT UNITED KINGDOM
ACCT #70841841 IBAN #GB03MIDL40051570841841 SWIFT CODE #MIDLGB22 SORT CODE #400515

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
☐ 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
☐ Australia-New Zealand
☐ Benelux
☐ Brazil
☐ California-Golden Gate
☐ California-Southern California
☐ Caribbean
☐ Carolinas
☐ Central Europe
☐ Colorado-Rocky Mountain
☐ Connecticut
☐ Eastern New England
☐ Florida-Cental Florida
☐ Florida-South Florida
☐ France
☐ Hong Kong
☐ Illinois-Chicago
☐ India
☐ Indiana-Central Indiana
☐ Iowa
☐ Israel
☐ Italy
☐ Japan
☐ Kansas City
☐ Korea
☐ Louisiana-Gulf South Central
☐ Maryland-Baltimore-Washington
☐ Mass/New Hampshire-Pioneer Valley
☐ Mexico-Centro
☐ Michigan-Detroit
☐ Michigan-Mid Michigan
☐ Michigan-Western Michigan
☐ Middle East
☐ Mississippi
☐ Nebraska
☐ New Jersey-Palisades
☐ New York
☐ New York-Rochester
☐ 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
☐ Southeastern New England
☐ 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

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

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☐ Alloys and Blends - 010
☐ Applied Rheology - 013
☐ Bioplastics - 028
☐ Composites Europe - 026
☐ Extrusion Europe - 025
☐ Failure Analysis & Prevention - 002
☐ Joining of Plastics & Composites - 012
☐ Marketing & Management - 029
☐ Nano/Micro Molding - 023
☐ Non-Halogen Flame Retardant Tech. - 030
☐ Plastic Pipe & Fittings - 021
☐ Plastics Educators - 018
☐ Plastic in Building and Construction - 027
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INTRO-JL

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Message from the Publisher

Hello everyone!

For those of us finally digging out of winter, snow and ice, welcome back to Spring. The warm temperatures are a welcome from the cold, most places have ad to endure. And for those on the west coast, hopefully your weather has gotten milder from the warmer-than-usual temperatures this year.

Now that Spring is upon us, that means shows such as ANTEC 2015 are already gearing up for a your arrival in Orlando, Florida. All those attending this informative event should look into attending the IMD reception on Tuesday, March 24th at 5:30 in Executive I Ballroom. This reception is a great opportunity to meet other professionals and take advantage of networking!

As always a big thank you to all the article contributors and sponsor this month. Your contributions enable us to put together this newsletter for the IM members.

Our next issue is Summer and articles submissions and sponsorships are now available. Feel free to send in any papers you may have or if you are interested in sponsorships please send me an e-mail!

Thank you all, stay in touch!

Heidi Jensen PublisherIMDNewsletter@gmail.com

A big thank you to the authors and sponsors who supported this month's issue.

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