PLASTIC DESIGN INTERNATIONAL INC

PLASTIC DESIGN INFORMER

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Informal Informer

by Donna DelGreggo

Hello Everyone,

You can tell that it's spring in Connecticut! First it's chilly and raining, then it's warm and sunny and then it's sunny… but cold!

We attribute the saying 'If you don't like the weather in New England… wait a few minutes' to Mark Twain. But what he actually said was slightly more eloquent, as you can see by these excerpts from a speech given at the New England Society's 71st Annual Dinner, New York City, December 22, 1876:

"… In the spring I have counted one hundred and thirty-six different kinds of weather inside of four-and-twenty hours…

The people of New England are by nature patient and forbearing, but there are some things which they will not stand. Every year they kill a lot of poets for writing about 'Beautiful Spring'. These are generally casual visitors, who bring their notions of spring from somewhere else, and cannot, of course, know how the natives feel about spring…

Yes, one of the brightest gems in the New England weather is the dazzling uncertainty of it. There is only one thing certain about it: you are certain that there is going to be plenty of it… a perfect grand review; but you never can tell which end of the procession is going to move first."

Personally, I think Mr. Twain was absolutely right… and I don't think I would trade spring in New England for any other weather in the world except, of course, for autumn in New England!

I hope you all enjoy this edition of the newsletter. Take care!

Donna

PDI Happenings

Waterlines 101: The basics

By Jake Tuczapski, PDI's Process Engineer

It isn't rocket science to understand that a mold is really a heat exchanger. The heat you put into the plastic to melt it must be removed enough not to shrink or warp a part. Most people put in 7/16-inch-diameter waterlines. Why? Two rules of thumb:

- The drill size for a 1/4-inch pipe tap is 7/16 inch, which allows you to put in the quick disconnect nipple without having to re-drill the hole in order to tap the threads.
- Waterlines control heat within three diameters of themselves. The 7/16-inch size is a happy medium between many small lines and the fact that larger lines don't particularly increase the heat exchange benefit. With a minimum of 1.5 gal/min through this circuit we will get turbulent flow… the optimum cooling situation.

Yet, simply having the right diameter waterline is only one of the three elements of good cooling. Assume you have a thin tube-shaped part, about 3 inches long. One end has an ID of 1/4 inch and the lower end is about 3/4 inch in diameter. A good tool designer, moldmaker, or molder would immediately say these cores should probably be made of P-20 or beryllium copper. (While on its face many people would reject beryllium copper because of its insufficient hardness, recent developments have allowed this metal to be almost as hard as P-20.)

Cooling the Core

With the core cut to configuration, we now need to cool it (our second element). Conventional cooling choices are either a baffle or a bubbler. Here is where most people tend to fall into a trap. If the water is directed up the tube with the bubbler or on one side with a baffle we still have to maintain the cooling characteristics with turbulent flow. We must be sure our bubbler or baffle is not so constrained that the entire system is strangled and turbulent flow stops.

The next concern with this insert is proximity. If we can't get the water close enough to the heat, it won't make any difference if it's turbulent or not. This is especially a problem with thin protruding cores. If you can't get the waterline near the source of heat, bring the heat to the waterline. This is done with the use of gas pins – hollow pins that contain a low-boiling liquid (sometimes Freon). One tip of the pin is heated, and it immediately transmits the heat to the other end of the pin, which should be located in the middle of the waterline.

Managing Heat

Two other important factors are where to put waterlines, and how to hook them up. Nearly everyone cools the cores and cavities, but the most common mistake is not getting sufficient cooling to the runners, sucker pins, stripper plates, and (most importantly) the sprue… whether it is a hot runner or conventional design. Anywhere there is heat it should be managed. If you have a stripper plate on the ejector side with sucker pins holding the runner and it is not cooled, it's just a matter of time before:

#1 – it heats up and starts galling the pins because of thermal expansion, or
#2 – the sucker pins are so hot and the plate is so warm that the runner will not stick to the sucker pins and will come off the plate like a wet noodle.

Continued …

Parmesan Spinach Cakes

4 servings, 2 spinach cakes each

12 ounces fresh spinach
½ cup part-skim ricotta cheese or low-fat cottage cheese
½ cup finely shredded Parmesan cheese, plus more for garnish
2 large eggs, beaten
1 clove garlic, minced
¼ teaspoon salt
¼ teaspoon freshly ground black pepper
1/8 teaspoon freshly ground nutmeg

Preheat oven to 400°F. Pulse spinach in a food processor until finely chopped. Transfer to a medium bowl. Add ricotta (or cottage cheese), Parmesan, eggs, garlic, salt, pepper and nutmeg; stir to combine. Coat 8 cups of a muffin pan with cooking spray. Divide the spinach mixture among the 8 cups (they will be very full). Bake the spinach cakes until set, about 20 minutes. Let stand in the pan for 5 minutes. Loosen the edges with a knife and turn out onto a clean cutting board or large plate. Serve warm, sprinkled with more Parmesan, if desired.

Per serving: 141 calories; 8 g fat (4 g sat, 3 g mono); 123 mg cholesterol; 6 g carbohydrates; 13 g protein; 2 g fiber; 456 mg sodium; 560 mg potassium.

"The best jobs program in the world is demand, and demand is coming back," - Billionaire Warren Buffet, in a CNBC interview May 3, 2010, on the health of the economy (following the annual shareholder meeting of Berkshire Hathaway).

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Internal looping should be serial. The water circuit should be able to enter the mold and find its way out again without splitting into separate paths. When water circuits are split internally in the mold, turbulent flow can be measured on the in and out, but how do you know this is what's happening in the mold? Water will always take the path of least resistance. Therefore, if there is a parallel circuit but one leg is constricted and the other isn't, the water will have a tendency not to flow into the restricted portion.

Parallel circuits, which are a form of an internal manifold, should be avoided at all costs. The machine manifolds work because they are usually fed by 2-inch or larger lines. So long as the plant water can maintain the pressure, the parallel machine manifold will deliver pressure to each line equally. Bringing a waterline to the mold and then making a small manifold or splitter to allow that one line to be split into multiple lines will only work if the pressure and flow out of your mini-manifold is equal to the pressure of the line in.

While this is possible, it is also difficult. If you must have a manifold on the mold, put it on externally with large pipes as the inlet, and split it into smaller lines to the mold so that the circuits can be balanced before the handles of the valves are taken off and welded into place.

Waterlines and water circulation in a mold are easy. However, simple oversights like the ones mentioned here can turn the best mold into a loser.

Out & About

Visit our booth at the Atlantic Design & Manufacturing Show, Tuesday, June 8th – Thursday, June 10th at the Jacob K. Javits Convention Center, New York, NY – Booth 150

PDI ANNIVERSARIES

May
Darek – Engineering Team Member, CT **– 4 years**
Lee – Engineering Team Member, CT **– 2 years**

June
Joanne – Business Unit Member, CT – **12 years**
Kathi – Planner/Scheduler **– 28 years**

July
Khalid – Business Unit Leader, CT **– 9 years**
Maria – Business Unit Member, CT **– 12 years**
Suzette – Director of Engineering **– 5 years**

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PDI's Quality Policy

To be a Leading Supplier of Custom Injection Molded Products by providing On Time Deliveries and Competitive Global Pricing through Continual Improvement and Manufacturing Innovations.

Exceeding Our Customers' Expectations … Everytime