



Spectator

the Newsletter of the Ontario Section of SPE

May 2016

Technical Presentation – Thursday, 19th May 2016

Extrusion Troubleshooting: Identifying the Impact of Processing Conditions and Machine Design on Thickness Variation

Presenters: Paul Waller and John Perdikoulis

Registration: 6:00 pm **Dinner:** 6:30 pm **Presentation:** 7:00 pm

Price: Members \$50, Guests \$60, Students \$30, GoToMeeting \$25 (Limited spaces available for GoToMeeting – first come first served basis: login details will be sent to registrant)
– Please register in advance online. Walk-ins – Add \$10

SUMMARY: This presentation will present an approach for troubleshooting extrusion problems by reviewing many of the possible contributors. While this presentation is using a blown film gauge variation example, many of the concepts presented can be applied to other areas of extrusion. The relationship between polymer properties and equipment design will be one of the main themes.

While Extrusion is fairly well established many of the pioneers and experts are reaching retirement age and opening the way for the next generation of equipment designers and operators. Unfortunately, the “industry veterans” are also taking away many years of experience which leaves the next generation to struggle with, and repeat, many of the same problems that were experienced and, somehow, solved. This presentation will provide some insight into the extrusion process and make the attendees more aware of some of the potential sources of problems including some that are not very obvious.

The presenters, John Perdikoulis and Paul Waller, have well over 50 years of combined experience in extrusion process troubleshooting.

John Perdikoulis is a Professional Engineer with over 25 years of experience in the plastics industry. He holds B.Eng. and M.Eng. Degrees from McMaster University and a Ph.D from the University of Waterloo, Canada. He is currently president of Compuplast Canada Inc., providing simulation software and services to the polymer processing industry worldwide. From 1985 to 1996, John was R&D Engineer for Brampton Engineering where he was responsible for screw and die design and helped develop the first commercially available 8 and 9 layer blown film dies in the world. In 1996 he formed Compuplast Canada Inc. as the North American office for Compuplast International (Czech Republic) which he co-founded in 1990.

Paul Waller has been involved in the plastic film manufacturing industry for over 30 years. He is the president of Plastics Touchpoint Group, and his clients have included raw material suppliers, processors, end users, educational institutions and industry associations. Mr. Waller started his career in Dow Chemical Canada’s polyethylene technical service group before moving to Esso Chemical Canada’s Vinyl division. After working with BOPP at Mobil Chemical Canada, he became Sales Manager of blown film machinery at Macro Engineering Co. Ltd. Mr. Waller subsequently joined the Canadian Plastics Institute as Seminar Manager and became Manager of Education Services when it merged with the Canadian Plastics Industry Association. Mr. Waller then joined Haremar Plastic Manufacturing Limited as Director of Technical Operations before founding the Plastics Touchpoint Group, Inc. Mr. Waller designed and delivered the classroom portion of the Blown Film Technology Course for the Canadian Plastics Training Centre in Toronto and SENAI in Brazil.

Summer is Fast Approaching

Spring is here and summer is most certainly on the way, and the SPE Ontario has two events scheduled to round out our 2015-16 year. Unfortunately we had to cancel our April student career event due to a lack of registered participants, and our Recycling Seminar as one of our major contributors had to withdraw due to scheduling conflicts. New dates for these events are being considered and will be finalised during the 2016-17 programme.

On 19th May we have a presentation by Dr. John Perdikoulis (Compuplast Canada Inc.) and Paul Waller (Plastics Touchpoint Group, Inc), which will illustrate an approach for troubleshooting extrusion problems by reviewing many of the possible contributors. While this presentation is using a blown film example, many of the concepts presented can be applied to other areas of extrusion. The relationship between polymer properties and equipment design will be one of the main themes.

Finally in June we will have our flagship event, the 50th anniversary golf tournament at Pipers Heath Golf Club. Registration details are on our webpage and please register quickly to take advantage of our early bird rate, which expires on 6th May.

Please check our SPE Ontario webpage for more details on these events.

If you have any questions about any of our events please don't hesitate to contact us for more information.

REMINDER – SPE Ontario website

In the past we have used <http://www.speontario.com> but we have transitioned to a SPE hosted webpage on the

main SPE website as it is more efficient to maintain, as well as having greater mobile functionality, and can be accessed by other interested divisions and sections much more easily. The new address will be <http://www.4spe.org/Communities/sectiondetail.aspx?ItemNumber=5378>. This can be found by going to the SPE main website, then clicking on 'Communities', then 'Sections', then finally 'Ontario'.

Now, when you try to connect to <http://www.speontario.com/> it should transfer you to the new site where you will find the SPE Ontario information page. This will have our events listed and a PayPal link for quick and easy payments. We apologize for any inconvenience caused during this transition, and urge you to save the new SPE Ontario website in your bookmarks.

If you do have any issues as we move to the SPE hosted webpage please contact me, Bruce Howie at bhowie@dominioncolour.com.

Bruce Howie, SPE President

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We are pleased to announce a new partnership with **Excellence in Manufacturing Consortium (EMC)** and its **Canadian Manufacturing Network** to provide resources to local manufacturers and the benefits of real time access to regional Labour Market Intelligence!

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SPECTACLE

The Bottom Line Of Energy Efficiency

Processors are starting to notice that \$1 of energy cost savings can be equivalent to \$20 in new sales

By Jon Evans

The one benefit of the plastics processing sector being a major user of energy—responsible for 4% of global energy consumption, according to some estimates—is that there's a lot of scope for reducing its energy use. That, at least, is what the European Commission and the U.S. government think; both of them have introduced initiatives aimed at greatly reducing energy consumption by the plastics sector.

In the USA, the Department of Energy (DOE) has launched the Better Buildings, Better Plants program, which will help manufacturing companies adopt measures intended to enhance their energy efficiency by 25% over a period of ten years. These measures will include developing energy management plans and tracking and reporting energy data annually to the DOE. This program is designed for any manufacturing company, but plastics processors are a definite target, and companies such as Amcor have already become involved.

The European Commission initiative is designed to help meet its target of reducing energy consumption across the EU by 20% by 2020, compared to current projections. As such, in 2011 the European Plastics Converters Association (EPCA), an umbrella group comprising the plastics industry associations for eight countries, including Germany, France, and the UK, established a voluntary agreement on energy efficiency.

Under this agreement, EPCA members pledged to work towards reducing their energy consumption by 20%, compared to their 2007 usage, by 2020. To do this, each national association began by submitting a long-term plan to the EPCA detailing how they will implement the voluntary agreement. They then began monitoring the progress of their own members and reporting back to the EPCA annually.

Prioritization

So it's a shame that despite these initiatives, and the fact that energy prices remain high even with falling oil prices, energy efficiency is still not a major priority

for many plastics processors. "They've become accustomed to high energy prices," says Robin Kent, managing director of Tangram Technology, a British energy management consultancy for the plastics industry. "They're still concerned about energy efficiency, but [some] of the heat has gone out of it."

One of the main reasons for this, according to Kent, is that plastics processors simply have so many other things to think about. "People are just overwhelmed with numbers of things to do, and there are competing pressures on their time," he suggests.

This is unfortunate, because there's a great deal of scope for processors to reduce their energy consumption, thereby reducing their costs – through simple, straight-forward measures that require little or no financial outlay. Examples of these simple measures and their effects on energy use are detailed in a guide titled *Energy Management in Plastics Processing*, which was written by Kent and published by the British Plastics Federation (www.bpf.co.uk) in 2011.

This guide details the benefits of installing variable speed drives (VSDs) on motors, which are the largest single user of energy in most plastics-processing operations. Simply slowing a motor down by 20% with a VSD can reduce energy use by 50%. Compressed air is also a major expense, especially for blow molding operations, accounting for around 10% of energy use – as is cooling water, which can account for 10-15% of energy use.

For compressed air, the most effective way to reduce energy use is to find and fix any leaks, which on an average site can cause the loss of 20-40% of the generated compressed air. In addition, cold air should preferentially be fed to the compressor, as cold air is already denser than warm air.

Where possible, cooling water should be cooled by simply exposing it to cold external conditions, ideally utilizing dedicated cooling towers, rather than by using

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refrigeration systems. Chilled water pipes should also obviously be insulated to prevent the water warming up.

A Data-Driven Approach

Ensuring that even these simple measures are undertaken effectively, however, requires collecting data on energy use, both before and after instigating the measures. Beforehand, this data is required to determine how and where energy is currently used by the plastics processing plant, in order to identify which measures will be most effective. “The whole process of energy efficiency should be data-driven, and you should go for where the big hits are, and that depends on your process and your factory,” says Kent.



A battenfeld-cincinnati pipe-extrusion line. The company reportedly has developed more efficient single- and twin-screw extruders that are able to melt various materials at lower temperatures than previously possible (photo courtesy of the company).

Afterwards, the data is required to determine the effectiveness of those measures, which can help to make the whole energy-saving process self-sustaining. “It’s about being able to go to the decision makers and say, ‘Here’s the data [from when] I changed this motor ... and I saved this much money,’” explains Kent. “It’s about using the data to justify current and future purchases.”

Fortunately, obtaining this data is much easier than it used to be. “When we first started trying to wire up factories to understand where we were using energy, we were wiring them up with hard-wire cables, and the whole process was quite difficult to manage,” recalls Kent. “Now we’ve gone from wired networks with poor data handling to wireless networks with great data handling. Instead of trying to look at a machine and download the information, now we can do it all on-screen.”

Cutting Energy in Thermoforming

In addition, many of the latest processing machines come with sensors already built in. Thermoforming is the most energy-intensive of all plastics processing technologies, utilizing 6 kWh of electricity for every kilogram of production, whereas injection molding utilizes just 3 kWh/kg. This high energy usage is due to the large-scale heating required to soften the extruded plastic sheet prior to it being overlaid on a mold, and then the cooling required afterwards.

So to try to manage this energy use as efficiently as possible, the latest thermoforming systems from the Swiss company WM Thermoforming Machines utilize a range of sensors, including temperature, pressure, and water-flow sensors. In addition, these systems, which combine extrusion and thermoforming machines, offer several other ways to reduce energy use. They use highly-efficient, water-cooled AC motors to operate the extruders, and apply cooling more efficiently using a spiral cooling circuit.

This reflects the fact that newer processing machines tend to be much more energy efficient than older varieties. According to Kent, modern plastics processing machinery uses between 20% and 50% less energy than it did ten years ago.

This trend shows no sign of slowing, as new, more advanced sensors generate ever more detailed information about plastics processing. Ceramicx, an Ireland-based developer of heating technologies, has recently developed an analytical instrument to map the heat flux produced by infra-red heating systems during thermoforming. Developed in conjunction with researchers at Trinity College Dublin and known as the Herschel, the instrument combines a radiant heat flux sensor with a six-axis robot. This means the sensor can be positioned anywhere over the heating assemblies, allowing it to build up a detailed map of the heat flux.

According to Ceramicx, this map can be used by developers of thermoforming machines to ensure their heating assemblies work as effectively and efficiently as possible. But because Herschel can determine the effect of heat radiation on all kinds of plastic sheets, it can also be employed by thermoforming companies to ensure they are applying the optimum distribution of heat for each different

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Sidel's Matrix™ blower eHR system uses electrical heating rather than traditional hot oil in bottle blow molding, creating an energy savings of up to 45% (photo courtesy of Sidel).

kind of plastic. In this way, they can keep their heating, and thus energy use, to a minimum.

Savings in Other Processes

General technological advances, combined with additional information on plastics processing operations provided by sensors, means that developers of other processing machines have found a variety of ways to make their machines more energy efficient.

General technological advances, combined with additional information on plastics processing operations provided by sensors, means that developers of other processing machines have found a variety of ways to make their machines more energy efficient.

For example, German company battenfeld-cincinnati has developed more efficient single- and twin-screw extruders that are able to melt different plastic materials at lower temperatures than previously possible. The company claims that its 75-mm, high-speed single-screw extruders use 25% less energy than conventional extruders of comparable size.

Similarly, the French company Sidel reportedly has achieved substantial energy savings in its new blow molding machines by heating the mold using electrical heat resistance rather than hot oil. According to the company, this offers energy savings of 45% compared to its older blow molding machines. Furthermore, a novel air recovery technology in the machines can reduce consumption of compressed air by up to 45%.

When One Dollar Equals Twenty

So there seems to be no end to the ways in which plastics processors can reduce their energy consumption, from making simple, inexpensive changes to their working practices, to investing in new machinery. And the associated cost savings could prove especially beneficial for processors, many of whom operate on a profit margin of just 5%.

"That means if they save a dollar in energy, that's equivalent to putting \$20 on the sales line," says Kent. "People get excited by new sales, of putting \$200,000 on the sales line, but they don't get excited about taking \$10,000 off the cost line, although it has the same effect on profits."

As an added bonus, by reducing their costs in this way, plastics processors would also be helping their governments meet their energy-saving targets.

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19th May 2016

'EXTRUSION TROUBLESHOOTING'

Presentation by
Dr. John Perdikoulis
(Compuplast Canada Inc.) and
Paul Waller
(Plastics Touchpoint Group, Inc)

Toronto Airport West Hotel
5444 Dixie Road, Mississauga

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Dinner: 6:30 pm

Presentation: 7:00 pm

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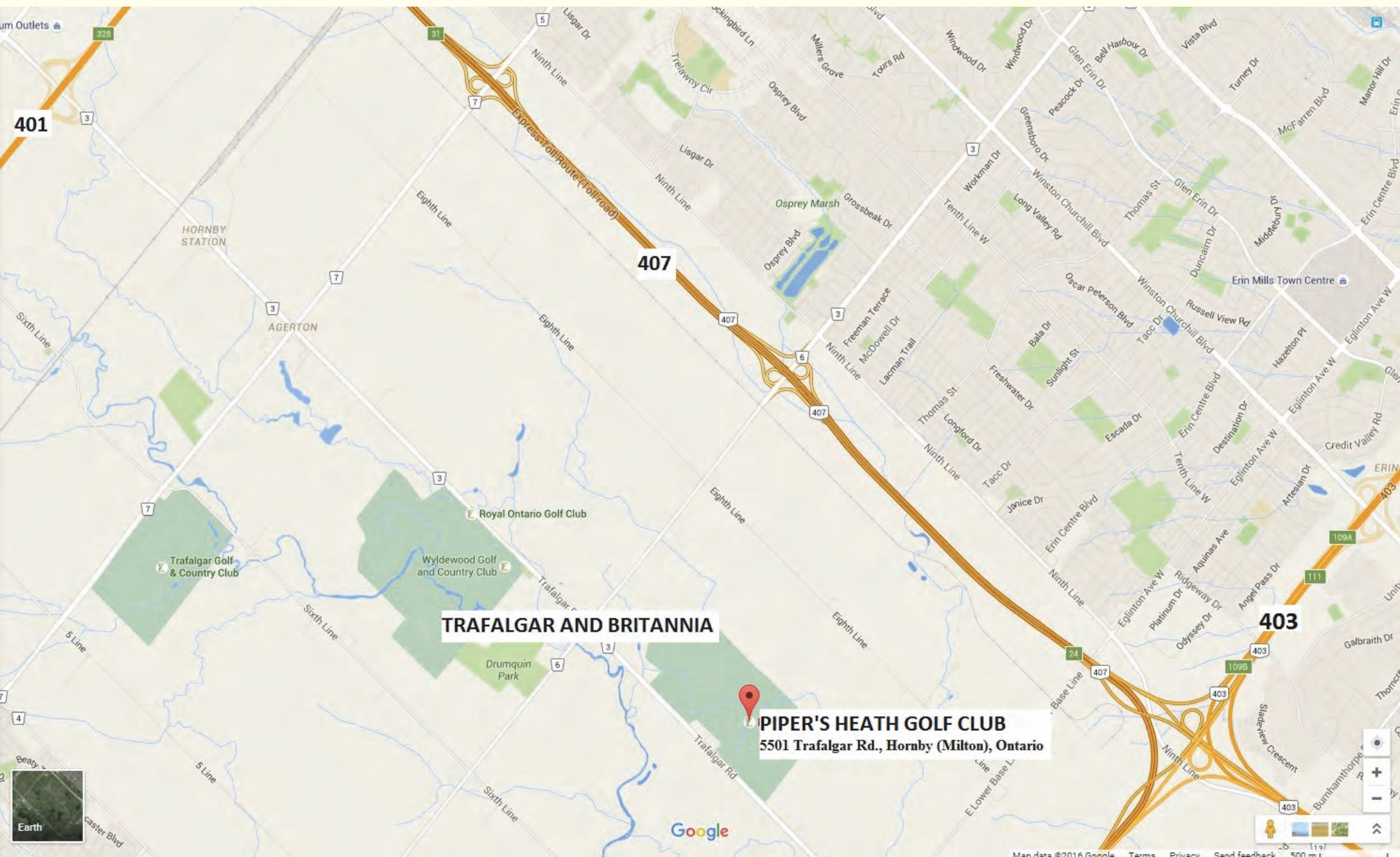
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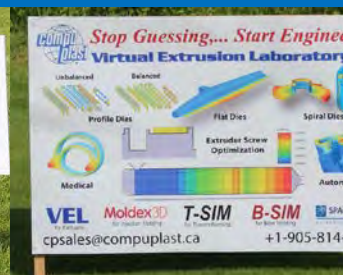
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- Your company's brochure will be placed on each chair.
- Your corporate logo will be displayed on 2 holes.
- 1 pop-up banner with your corporate logo and marketing images will be placed on one side of the projector screen, during the dinner presentation.
- Our President will thank your company at the start and end of the dinner presentation.
- You may provide all the golfers and diners with up to TWO items with your corporate logo on them.
- You will receive ONE Foursome pass and FOUR dinner tickets (\$800 value).

Raffle & Prize Table Sponsor \$1200

- A large banner with your corporate logo will be displayed behind the prize table.
- Your corporate logo will be displayed on 1 hole.
- You may place a brochure stand with your company's brochures near the prize table.
- You will receive ONE Foursome pass and FOUR dinner tickets (\$800 value).

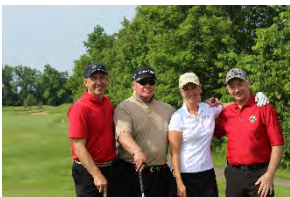
HOLE-IN-ONE Sponsor \$1600

- This is our most popular attraction. Your company's name will appear in all promotional material for the hole-in-one contest.
- Your corporate logo will be displayed on the designated "hole-in-one" hole.
- You may pitch a hospitality tent near the tee box of the "hole-in-one" hole.
- You may provide all the golfers and diners with up to TWO items with your corporate logo on them.
- You will receive ONE Foursome pass and FOUR dinner tickets (\$800 value).

Golf Cart Sponsor \$1200

- Your corporate logo will be displayed in each golf cart.
- Your company's brochure will be placed in each golf cart.
- Your corporate logo will be displayed on 2 holes.
- You may provide all the golfers and diners with golf balls and tees with your corporate logo on them.
- You will receive ONE Foursome pass and FOUR dinner tickets (\$800 value).





Half-way House Sponsor \$1500

- The \$1500 will be used to provide each golfer with one burger/sandwich/hot-dog and one non-alcoholic beverage.
- Two pop-up banners may be placed near the half-way house.
- Marketing items (pens, pads, golf balls, etc.) may be placed near the half-way house.

Longest Drive Men \$300 per hole

- Your corporate logo will be displayed on the tee block of the designated hole.
- One pop-up banner may be placed near the tee block.
- Marketing items (pens, pads, golf balls, etc.) may be placed near the tee block.
- You will receive ONE golf pass (\$150 value).

Longest Drive Women \$300 per hole

- Your corporate logo will be displayed on the tee block of the designated hole.
- One pop-up banner may be placed near the tee block.
- Marketing items (pens, pads, golf balls, etc.) may be placed near the tee block.
- You will receive ONE golf pass (\$150 value).

Closest-to-Pin Men \$300 per hole

- Your corporate logo will be displayed on the tee block of the designated hole.
- One pop-up banner may be placed near the tee block.
- Marketing items (pens, pads, golf balls, etc.) may be placed near the tee block.
- You will receive ONE golf pass (\$150 value).

Closest-to-pin Women \$300 per hole

- Your corporate logo will be displayed on the tee block of the designated hole.
- One pop-up banner may be placed near the tee block.
- Marketing items (pens, pads, golf balls, etc.) may be placed near the tee block.
- You will receive ONE golf pass (\$150 value).

Hole Sponsor \$150 per hole

- Your corporate logo will be displayed on 1 hole.
- One pop-up banner may be placed near the tee block.
- Marketing items (pens, pads, golf balls, etc.) may be placed near the tee block.

All banners, marketing items, logos, promotional material, USB memory drives, etc. must be provided by the sponsor one week prior to the event.

Contact: vijay@compuplast.com or karen.schnuelle@cgtower.com

