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RELIATRACE IS HEATING UP THE MARKETPLACE



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**"When it comes to potential applications for heater circuits, the sky is the limit."
 Mark Ester**

CEOCFO: *Mr. Ester, what is Reliatrace?*

Mr. Ester: We are a designer and manufacturer of printed circuitry. Our history has been mainly with membrane switches and sensors. Recently we have taken on a new capability to screen print Positive Temperature Coefficient (PTC) ink, which means we can build heaters that do not require a controller or a thermostat. The temperature control is provided by the ink and the pattern of the ink deposit. We build to a targeted temperature which will not be exceeded.

By screen printing we are basically putting down a very thin coating like paint and probably not even that thick. It is conductive ink. Typically, we use silver and graphite or carbon to print a circuit. That has been our history but now that we can add the Positive Temperature Coefficient ink to that, it gives us a chance to provide a safer, lower cost alternative to copper circuit heaters, which require a temperature controller. Copper is a thicker and heavier construction and if the controller fails, the temperature can get out of hand and burn. With the Positive Temperature Coefficient ink, it cannot go above the targeted temperature because it is the ink that controls it and not an external controller like a thermostat or thermistor.

CEOCFO: *How did you develop this Double-Sided Polymer Circuitry (D/SPC®) solution? What is the history as related to Reliatrace?*

Mr. Ester: It was developed by Sheldahl Corporation, in Northfield, Minnesota. When we left the company in 1992, we had the rights and the knowledge to use it going forward. This past year we applied for a patent with the combination of our double-sided approach with Positive

Temperature Coefficient ink, and that became the patented capability that we have.

CEOCFO: *Why was this the right time?*

Mr. Ester: From the time we were introduced to PTC ink, it took us about two years to learn how best to use it. The other part of that was when the Positive Temperature Coefficient ink was available, there was still some development work that had to be done. Today we have come a long way, but we have much more work to do. We are working very closely with a manufacturer of the PTC ink. They are learning from us and we are learning from them the best way to use this ink and the capabilities that it has. This research has led us to develop our own commercial product, which we are selling direct to consumer. It is a bread dough-rising device. We call it Raisenne (www.raisenne.com), and it allows us to put the temperature at the perfect level for any kind of yeast dough rising. It provides the perfect rising temperature and raises dough in less time.

CEOCFO: *You are very creative at Reliatrace!*

Mr. Ester: We strive to be – everyday.

CEOCFO: *Have people been looking for a better way as far as the heating or is it more they will be excited to know it exists?*

Mr. Ester: I think it is the excitement to know it exists. It provides the perfect environment for raising dough, takes all the guesswork out of it. We have had tremendous response on the Raisenne product, and we are looking forward to bringing more products like that to the marketplace. We have had people request different applications and we are addressing those as we can, so it is something that we are just beginning to understand. The market acceptance has been excellent.

CEOCFO: *Does your company's history and commitment to quality help with potential customers; in retention of current customers?*

Mr. Ester: That is why we have been able to maintain our customer base, we have done a very good job of supplying quality products for our entire existence. For many years I have asked our customers why we haven't heard anything from them. They tell us they don't have any quality issues, so no need to call. We do expect that if they have a defect that they would let us know so that we can see what caused it and improve the product if necessary. Typically, it is a workmanship issue and not a design or technology issue.

CEOCFO: *Where would the self-regulating devices be most applicable and what might be a place that one might not normally think of in this area?*

Mr. Ester: We also have B2B clientele with the heater circuits and they include things like melting ice on glass, such as for automotive glass. We did a prototype for a locomotive head lamp which was freezing-up because they changed to LED lights which do not cast-off heat, so we provided a way to keep the headlamp free of frost and ice so that they could use the LED lights.

When it comes to potential applications for heater circuits, the sky is the limit. We have seen multiple opportunities to replace copper heater

circuits, where you have seat heaters, and heaters that help with medical diagnosis. One of the first ones we talked about was a pet heater so they would have a warm bed in an outdoor environment. Anything that must be heated, can be heated with Positive Temperature Coefficient ink and it will not exceed the target temperature.

I am a motorcyclist, and I was always hoping we could develop a motorcycle jacket with a PTC heater, because right now they have copper wires that run through and if you turn it to high you can burn yourself. The PTC technology will allow you to have more broader coverage and not just down the line of the wire. This would give you greater comfort because it would not have hot spots and heat more evenly the entire surface area of your body under the jacket.

CEO CFO: *With so much opportunity, how do you decide where to focus your efforts in reaching out and new product development?*

Mr. Ester: Before we came up with the bread dough-rising idea, we had a team at Reliatrace that would brainstorm for what we could do with PTC ink heaters. One of the parameters I required was something that we could do the entire product internally, so for the bread dough-riser it is just a circuit we print with Pressure Sensitive Adhesive laminated on both sides and connected to a cable. This is all done in-house.

If we were going to provide a seat heater, we would have to work with somebody to provide a seat and then put a heater in that. I wanted to be sure we could do everything and not be dependent on a supplier in bringing PTC heaters to market.

CEO CFO: *What has been the effect of COVID on Reliatrace?*

Mr. Ester: We have seen good news and bad news with that. Before we had the PTC ink, we were a major manufacturer to medical instrumentation companies. About 75% of our business had been to medical companies and one of them was a major ventilator manufacturer. They had our plant going full capacity building ventilator switches for about eight or nine months in 2020.

The other effect it has had on the negative side is we have had a very difficult time with the virus itself because it has increased our cost to keep our employees safe from infection. We have been fortunate that our employees have been diligent in following our protocol for socially distancing, wearing masks and keeping their hands and work areas clean.

CEO CFO: *What are your plans for the next six to twelve months for the company?*

Mr. Ester: The plan is to grow the PTC ink business as big and fast as we can. There is a lot less labor that goes into building a heater circuit vs. a membrane switch, so that is one way we can be more efficient.

CEO CFO: *Did you need to retool machinery or get new machinery?*

Mr. Ester: No, it is all done with what we have.

CEO CFO: *What surprised you when you finally had the end product in hand, when you finally had the patent?*

Mr. Ester: There was an initial celebration, but more of a satisfaction that we finally had gotten to a place we wanted to be. It was certainly rewarding to see the rapid acceptance of the products in the marketplace. If there is a surprise it is how quickly we have been able to find ancillary products to go along with the original bread dough-rising device.

CEO CFO: *What is your geographic range, and do you see it changing?*

Mr. Ester: We are mainly a North American supplier, we send some things to Mexico, but not to Canada. The Raisenne itself is sold through major kitchen item distributors, which have picked this up and are going to give us exposure to Canada, Mexico and a greater part of the world. We just added a large distributor in April so we do not know yet what kind of demand we are going to see. They have already increased their demand from their initial order, so we are very hopeful that we will see a more global exposure and find out how far we can expand Raisenne sales.

CEO CFO: *With so many new ideas and companies to look at why should Reliatrace stand out?*

Mr. Ester: We do have the patented technology, combining double-sided printing with the PTC inks. One of the advantages that gives us is we can have even distribution of heat on the heating surface, and you do not have to interrupt that heat pattern by printing busbars on the top side right along next to PTC inks. It gives us a more even heat distribution and allows us to go into smaller spaces providing heat with the proven reliability of our printing process. It is very important that we bring the tail traces out from the heater circuit on the backside of the film, so that when you bend that tail down to a controller below, the printed traces are in compression, rather than expansion. If you print everything on the topside and you bend the tail traces down to a printed circuit board, it is going to stretch those inks making it easier to create opens due to cracks or bends. We have a definite advantage with our approach, and we feel that with the patent we are gaining a lot more attention for that capability.

