

# HeatWorks

HeatWorks 12 | October 2014 | [www.ceramicx.com](http://www.ceramicx.com)

## APPLICATIONS ENGINEERING

NEW ARTICLE SERIES

*IR Heat Solutions  
for all sectors*

THIS ISSUE -

### AUTOMOTIVE MANUFACTURING

## TRAINING

Benefit from Infrared  
Heating Knowledge

## SUCCESS IN CHINA

*Chinaplas 2014  
Report*

## Why?

Why Infrared Heating  
and Why Now?

## RESEARCH REFLECTIONS AND REFLECTORS

*Notes from C<sup>2</sup>I<sup>2</sup>*



Prague | Athlone | Waterford  
SPE

A GROWING FORCE  
CERAMICX UK

Working with  
NIPA

It gives me great pleasure to introduce this our twelfth edition of HeatWorks magazine.

In some ways this is an issue of firsts: the first article from our friend and associate in control technology Andreas Farrenkopf at Hetronek; the first article from Richard Martin of Green Energy on the consumer benefits of IR Heating; also our first report on the work of Gerry McNally of the Northern Ireland Polymers Association. A first also in relation to the opening of our first UK office in Cambridge.

I hope that you enjoy the clustering of pages about the UK market in this issue. HeatWorks magazine intends to feature much more similar material. Ceramicx believes that the revival of the UK manufacturing economy will continue – and strongly. Indeed we hope that future issues of HeatWorks will feature significant numbers of our IR case study work in the UK market.

Please don't hesitate to get in touch with us if you have an IR heat work story that you would like to tell. We would be more than happy to help give it circulation and publicity.

Many thanks again



Frank Wilson  
Managing Director Ceramicx Ltd.

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## HeatWorks

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# Ceramicx reaps success in China

HeatWorks magazine here features Frank Wilson's report on Ceramicx in China and the company's participation in Chinaplas 2014; an annual exhibition that is challenging for the top spot on the international plastics exhibition circuit

I am pleased to report that Ceramicx enjoyed an extremely successful showing at Chinaplas 2014, Shanghai at the end of April 2014. All thanks and credit due to our agent and distributors Xu Shan and GSAE.

It would be futile to try to describe the unique buzz of this particular plastics exhibition, and I have seen many such shows throughout the world.

The Chinaplas show is now in a strong position. Unlike its global competitors - who can only renew their brand every three years - there is more than enough action in Chinaplas to sustain a successful commercial performance each and every year and with a choice of two locations. Next year the show reverts back to the south of the country.

You may have also noticed that, three years ahead of schedule, China has now overtaken the USA as the leading trading nation in the world. This is a significant milestone that is taken extremely seriously within China itself

**It would be futile to try to describe the unique buzz of this particular plastics exhibition, ....**

(and no doubt in certain corners of the White House, Washington). Attendance at any manufacturing exhibition in that country gives you a direct experience of why this is so.

Ceramicx is now reaping the value of having conducted detailed and intensive market and manufacturing in the months leading up to the Chinaplas show. In this context the old marketing adage rings true: "Make what you can sell - don't try and sell what you're able to make."

Thanks to the hard work, customer-service and customer research of our Chinese partners and distributors we are now researching and manufacturing a bespoke range of quality IR heating products that have been made

specifically for the demanding Far Eastern market. I am very glad that we are doing so: Chinaplas 2014 proved that demand for our new Chinese products is heavy, and already we are seeing further customer requests for further innovations and product modifications.

Another common sense saying applies in relation to the Chinese market - "90% of success involves showing up." Our USA associates, Weco International, call it 'feet on the street'.

Put simply, the Ceramicx Managing Director showed up in person at Chinaplas 2014, something for which there can be no substitute. The consequences for having done so will stand us in extremely good stead over the coming 12 months and the important feedback and discussions could have been achieved no other way.

Ceramicx also produced a special edition of HeatWorks magazine just for Chinaplas 2014. It was published in Mandarin Chinese and we made sure to feature many of the best technical articles from HeatWorks past issues as well as all Ceramicx news from the present



The Ceramicx stand attracted a good deal of attention



HeatWorks was published in Mandarin for Chinaplas



Ceramicx stand at Chinaplas 2014 as part of the BPF ( British Plastics Federation ) Pavilion

time. This new publication special is now doing great business in China and also does Ceramicx and IR heating technology great service in this biggest of manufacturing market places.

I'll say it again: although volume is still the main feature of the Chinese manufacturing marketplace, China has its eyes on other prizes. China, for example, is determined to make 'Made In China' the ultimate benchmark of manufacturing quality in the world. This aim may seem remote in view of much recent talk of re-shoring; quality issues and distance from European markets. It is also widely reported that the Chinese minimum wage is set to rise some 100% in the next five years as the global manufacturing playing field levels up. Despite all these factors my view is that Chinese manufacturing will continue to advance. Those of us with long enough memories will clearly remember how the 'Made in Japan' badge very soon became a mark of quality rather than its opposite. Change will happen. Of that there is no doubt.

All of these developments happen through people. And, as said, our growth in China is greatly aided by the excellent performance of our agent Xu Shan and our distributor, Guangzhou Salaimi Automation Equipment Co. Ltd. (GSAE). The latter was established in 2011 and represents Ceramicx for product sale and service works in China, including Taiwan, Hongkong and Macao.

## The QSPT principles: Q-Quality, S-Service, P-Price, T-Time, and based on integrity, excellence, service and surpassing.

Under the leadership of Mr Peter Li, GSAE is extremely focused on introducing the advanced IR technology to the marketplace and enhancing the IR technical application level in China.

GSAE's management works with a matrix entitled the QSPT principles: Q-quality, S-Service, P-price, T-time, and based

on "integrity, excellence, service and surpassing customer expectations ". The company is extremely customer focused with no technical or application difficulty too great or small to solve.

As befits the size of the marketplace GSAE has the following sales distribution in the region: Guangzhou Mr. Li; Beijing Mr. Xu; Shanghai Mr. Qiu; Qingdao; Mr. Huang; Shantou Mr. Lin; Taiwan Mr. Su

Chinaplas 2014 is the second time for Ceramicx in Shanghai and our stall was most definitely stacked out with an increased abundance of product and production option, including the Hetronik production control system.

Ceramicx had the opportunity this time around to show some important new approaches to platen and oven building; ringing changes in aluminium and steel building and deploying Hetronik process control system to give exact precision in temperature and control of IR heat radiation. Such options give more efficient IR absorption to the target material, lower the process energy consuming, enhance production speed and prolong the service time of heaters.

All of this development work directly helps our GSAE engineers in the field; to give customers more and more bespoke advice the best IR heat solutions; including issues of elements and control method according to various heating materials or heating targets. The breadth of our range - short-wave, middle-wave, long-wave and Hetronik control systems - gives our Far Eastern customer the most efficient

heat service and resolve the heat difficulties in application. The Chinese plastics and rubber sector has played a dynamic role in taking the country to the top spot in world manufacturing, importing some 5 billion dollars worth of production machinery in 2013 alone. However, China is also keeping step

广州萨莱米自动化设备有限公司目前在中国地区拥有以下区域销售机构:



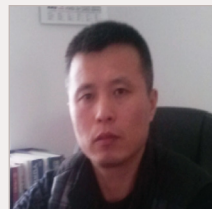
广州 李先生  
Mr Peter Li  
Guangzhou.



北京 徐先生  
Mr. Xu Shan  
Beijing



上海 邱先生  
Mr. Qui  
Shanghai



青岛 黄先生  
Mr. Huang  
Qingdao



汕头 林先生  
Mr. Lin  
Shantuo



台湾 苏先生  
Mr. Su  
Tiwán



Ceramicx video Chinaplas 2014

joined to the global economy in their need for energy saving, higher automatic in material feeding, cutting, collection, regrinding and recycling. This of itself requires a commitment to quality and to low energy methods such as IR heating know how and hardware.

And the Chinese plastic machine industry is most definitely putting its mind to the tasks of energy-saving and emission reduction; not least since this is also of strategic and competitive importance. Ceramicx IR heating know how is able to play a massive role here with many future opportunities lining up and at speed.

The Asian and Far Eastern populations and home markets are well suited to further fuelling these developments. With greater urbanization and with the rapid development of big cities throughout Asian, there will be sustained and clear demands on the supporting infrastructures.

Against this background, Ceramicx will be on hand to provide IR heating solutions for front-line industries such as industrial cable industry, automotive sectors, advanced packaging industry, composite material thermoforming; plastics processing industries and electronic industry.

Xu Shan and GSAE will be by our side; supporting Ceramicx, and suggesting new product applications and helping building the professional engineering delivery team in order to provide Chinese customers with the best infrared emitters and also technology service.

The variety of China's market place and the fresh approach taken by many Chinaplas visitors reminded and encouraged me again of the great scope for IR heating products. As we sat down to review enquiries on the final day of the exhibition we were able to itemize the wide fields of use for Ceramicx Infrared heating elements - long-wave, middle-wave and short-wave products. The list includes: thermoforming machines, BOF film production, composite material heating (pre-heating),

with the world's need for energy efficient and clean methods of production – to make a difference and a profit not simply through low technology and cheap labour.

For example the most basic kinds of thermoforming production - high in energy consumption and low in automation - are now distinctly on the wane in China. Chinese companies are indeed



A selection of photographs - Chinaplas 2014

ceramicx 北京 Beijing  
 ceramicx 青岛 Qingdao  
 ceramicx 上海 Shanghai  
 ceramicx 汕头 Shantou  
 ceramicx 中国 China  
 ceramicx 台湾 Taiwan

23 - 26 APRIL 2014  
**Chinaplas**  
 国际橡塑展  
 2,900 EXHIBITORS  
 130,370 VISITORS.  
 220,000m<sup>2</sup>

surface heat treatments, glass screen print heating, ITO glass vacuum coating heating, rubber vulcanization, industrial PU belt heating, automotive interior product thermoforming, cloth drying, paint curing, organic coating heating, leather-wear heating, plastic welding, electronic industry, printing drying and curing, space heating, food temperature preservation, sauna and others.

In addition to the development work and the opportunity perhaps Ceramicx also has the rub of the green in relation to the Far Eastern markets this year. This after all is the Chinese Year of the Horse – traditionally very auspicious for Ireland. In the Chinese system the horse is extremely useful and it supports human life in a myriad of ways. IR heat technology is the same. Our mission at Ceramicx is simply to help bring that IR heating benefit to bear for customers – in China and throughout the world. ■



# Ceramicx UK Ltd - a growing force

HeatWorks magazine reports on the launch of Ceramicx UK Ltd and the opening of the company's first office in Cambridge.

It was an excellent start to the year for the fostering of Anglo Irish relations generally. Few in the UK and in Ireland could have failed to notice the convivial celebrations around the first state visit of an Irish president to the UK. The event was remarkable in many ways; in terms of the pageantry and also for the future social and economic implications.

It therefore was as good a time as any for Ceramicx to formally launch the opening of its first UK office: The location is the historic and learned town of Cambridge; near to the company's Cambridge University associates in the Institute for Manufacturing, also closely located to Ceramicx's East Anglian commercial and industrial partners, Green Energy.

**It was an excellent start to the year for the fostering of Anglo Irish relations**

The UK business climate - especially in relation to its continuing nurture of SME manufacturers - has become very favourable. For example, it is not for nothing that the UK currently has the highest projected forward growth from any European country and has also been successful in 're-shoring' much of its manufacturing work from around the world; from India and from the Far East. This activity could not and would not have happened without plenty of willing and successful UK SME manufacturers ready to take on quality manufacturing work. In short, Ceramicx feels right at home in this environment.

The Ceramicx view is that, for manufacturing at least, the UK Government has played out a good hand: The establishment of the Catapult manufacturing centres of excellence, for example, has given a clear signal of skilled support and intervention in key areas.

Ceramicx is now involved with the Bristol-based Composites catapult venture, based at the National Centre for Composites and intends to explore further UK catapult technologies based upon our IR heating competences.

Over the past four years Ceramicx has also steadily built bridges with the British Plastics Federation - jointly exhibiting at Chinaplas in Shanghai this year. Growing relationships with other UK trade associations are being fostered. This partly because Ceramicx is steadily

growing its sales with important players in the UK thermoforming and plastics processing markets.

In short, Ceramicx likes what it sees over the Irish Sea.

UK operations, including the company's online shop, will now be undergoing some intensive expansion and restructuring in the coming months. Outside of Ireland the UK is the only other global market that has the advantage of the Ceramicx online shop. Purchasing components and IR heaters in this manner guarantees the UK buyer immediate shipment and leisure to purchase 24/7.

In fact for Ireland and the UK it is now cheaper to purchase lower volumes through the shop as it eliminates the administration time involved for Ceramicx.

**.....the UK currently has the highest projected forward growth from any European country**

UK users benefit by being supplied by Ceramicx in Ireland due to proximity, same time zone, an understanding of each others culture and methods of doing business. Ceramicx expects the business through the shop to constantly evolve and grow.

Ceramicx is a 98% export company based in a country that, in truth, has a slender market for the technical goods that the company manufactures and supplies. Ceramicx therefore has always sought to leverage the UK in order to help gain international competitiveness in a globalised world.



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**The general approach is evolutionary rather than revolutionary:**

The Ceramicx Cambridge office represents a first step outside the Ceramicx manufacturing plant based in Ballydehob, Ireland.

The UK is becoming an increasingly important market for Ceramicx - given the context of a company that exports 98% of products around the world. Some 12% of that turnover is now located in the UK. The clear signs are that, this percentage will continue to build and increase in the coming years.



NATIONAL COMPOSITES CENTRE  
[www.nccuk.com](http://www.nccuk.com)



BRITISH PLASTICS FEDERATION  
[www.bpf.co.uk](http://www.bpf.co.uk)

When Ceramicx was founded it looked to the Potteries industry in Stoke-on-Trent in order to source equipment, materials and machinery. The company accordingly built up many good friends in the UK since the inception of the company. The UK's long history of SME manufacturing is well established in the DNA of the nation. Generally speaking Ireland does not have that same history and cultural affect and so Ceramicx therefore has taken the opportunity to do a lot of its learning in the UK.

The trade and cultural visits in Q1 2014 reaffirmed that Ireland is a large market for the UK and that the UK is also a massive market for Ireland: This fact has long been understood by the Irish food industry and many more for a long time. Only in recent years, however, has the UK started to really refocus on its high value and high-tech manufacturing, something the country was once a world leader. Provided the innovation and the skill sets are in place Ireland can stand to assist and to benefit. The outcomes can only be good for all.

IR heat training and webinars will play a vital part in that regard and [www.ceramicxinfraedtraining.com](http://www.ceramicxinfraedtraining.com) will be the primary vehicle. The site has just opened to take subscriptions and is free to Ceramicx customers (see pages 8 and 9 for details).

In seeking to establish a UK presence Ceramicx has to date had very good initial contacts with the UK Trade and Investment and the UK's Department for Business, Innovation and Skills. Ceramicx has also reopened links with Barclays bank, with new accounts established.

Educational work on matters of Infrared (IR) heating is also well underway with our UK distributor partners Green Energy. These efforts are targeted on the sizeable UK HVAC, Architectural and Building Services sector. The potential for IR heating and installations in these areas has hardly yet been tapped and Ceramicx intends to be in the vanguard of that movement working hand in hand with our partners Green Energy. In summary, the Ceramicx-UK business future looks extremely bright; both for continuing industrial growth and for real advancement of IR heating in the HVAC and building industries. HeatWorks magazine expects to regularly report from this interface for some time to come. ■

# World Class Business

The smartest, most creative technology company in the world can achieve very little if the right business processes are not deployed in its service.

In this our 2nd article on Cambridge University's Institute for Manufacturing (IfM) HeatWorks magazine takes a closer look at how the IfM is working with Ceramicx in order to define and refine the latter's strategy, modus operandi and objectives.

'A couple of years ago,' recalls founder Frank Wilson, 'Ceramicx succeeded in attaining a World Class ranking for our ceramic-based products. We are accordingly ranked in the top 2% of such manufacturers worldwide. However, we do not believe that this alone means the world is automatically beating a path to our door. On the contrary we decided to work with Cambridge University's IfM in order to properly leverage our position and to ensure that our world class technology is supported by world class business tools and planning.'

The IfM accordingly conducted a series of four workshops with Ceramicx; external analysis; internal analysis; strategic choices and action planning. These workshops covered the following elements respectively

**Workshop 1;** stakeholder wants and needs; product market group; opportunities and threats; possible strategic directions.

**Workshop 2;** functional analysis; capabilities and competences; core competencies; potential basis for competition.

**Workshop 3;** option development; preferred strategic directions; option evaluation; implications for action planning.

**Workshop 4;** objectives and actions; key performance indicators; timing and resources; roles and responsibilities.



Dr Derek Ford, Cambridge University's Institute for Manufacturing

The workshops are structured this way in order to help companies analyse the environment in which they operate; examine their capabilities; and then develop a clear strategy and the action plan to get them there. Ceramicx director C ath al Wilson notes that 'the workshop process is an intense one but rewarding. Ceramicx is now some four months into implementation – and it is fair to say that the foundations laid are solid. Nothing has been left out. Processes of selectivity have nurtured and strengthened the company.'

The IfM-led workshops were partly used in order to drill down into the Ceramicx technical portfolio and to also make an exhaustive listing of the company's core competences. Ceramicx was thereby enabled to identify a total of 44 projects for future work, graded for short, medium and long term action. Three of these are now near completion.

The business of identifying core competences is key to a solid platform and crucial for planning the future. The IfM uses two kinds of competence in this work. The first, called generic competence, describes the 'essential functional activities which should



UNIVERSITY OF  
CAMBRIDGE

IfM

be performed competently and consistently. Significant under-performance of a generic competence is liable to detract from competitiveness.'

A 'core competence' is a different matter and is described as a 'distinguishing combination of capabilities that confer a distinctiveness which is highly or uniquely valued by customers. Core competences are central to the success of the business and should be protected and sustained in order to maximise the benefit provided by the competitive advantage they deliver.' Ceramicx made a complete list of all competences and then did further mapping and planning work around the group of highest scoring core competences.



Ceramicx production manager Patrick Wilson and Dr. Derek Ford construct a flow process chart for Ceramicx.

A three legged matrix was then used to further map out the strengths of the Ceramicx business under the heading of 'operating disciplines'. The three legs are titled Product Leadership/Innovation; Service and Efficiency.

Product Leadership includes qualities of 'inventiveness; development skills and understanding of customer needs. Taken together these combine to continually excite the market with new products.'

Efficiency is all about 'an obsession with cost and productivity. This focus helps deliver the cheapest, most reliable and most convenient products and services.

Service is defined as being about 'close relationships with chosen customers. This helps enable the delivery of superior tailored solutions which provide unmatched service.'

Ceramicx did further work on these and many other tools and topic headings in order to arrive at the finished operational plan for 2014. This will be rolled out this year with a number of further planned sessions with the IfM.

The new Ceramicx UK office is but a stone's throw from the IfM HQ in Cambridge thus enabling close contact for the foreseeable future.

Within the UK the IfM has a limited number of free consultancy packages for those SME manufacturers located near Cambridge in East Anglia and the East Midlands and also offers competitive rates to SME businesses elsewhere in the UK and abroad. Apply direct to the IfM for further details. ■

*Ceramicx would like to take this opportunity to wish Derek the very best in his retirement. We look forward to him dropping by to visit us while on holiday in Ireland.*

# Why IR heating? and why now?

Sometimes you just need to take a step back to look at the economic and environmental fundamentals.

As Ceramicx gets ever closer to the important UK market we asked Richard Martin of our associates there, Suffolk based Green Energy (eu) to talk about the path-finding approach...

“Warmer - for longer at less cost”

With these words, we could almost close this article right here. Job done. Think of the boxes you can tick and insert "Infrared Heating" as the solution:

- The only low-cost heat solution for "Off-gas" areas of the country;
  - The only low-cost heat alternative for high-rise buildings (can't install gas beyond the second floor);
  - The only heating solution that you can run 100% from even modest alternative energy installations like domestic solar – therefore truly a "100% carbon-free", attractive investment;
  - Considerable advantages for the health of old buildings when compared with central heating;
  - Considerable advantages for the health of people, when compared with central heating (dry, affordable 24 x 7 warmth V's. Humid & expensive hot-and-cold cycles!);
  - Low installation cost (avoiding fuel and "wet" pipes for new installations and the considerable retrofit expenses implied by new gas boilers for existing installations);
  - Low – or "no" - maintenance cost.
- This list goes on!

## How does it work?

The key scientific reasons underlying all the above can be summarised as the advantages of "Radiant Heat" over "Convection Heating" on the one hand, and the magic of "Low Watt Density" in heater construction on the other.

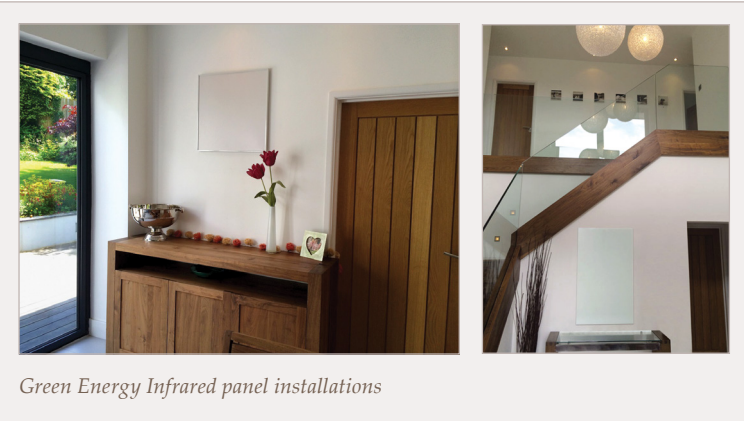




**What's so special about radiant heat?**

We have forgotten, in our last 60 years of cheap fossil fuels, that radiant heat is more effective than convection heat: converting almost totally as a species to convection-based Central Heating systems because they were cheap to run; but not because they were in any way effective.

Much like getting a fly-wheel up to speed and then only adding occasional "top-up" energy, radiant heat systems warm up a building and the objects within it, which then start radiating back with only occasional top-up.



*Green Energy Infrared panel installations*

This means a focus on warming up appropriate surface areas instead of volumes of air (as in central heating). It also implies a lower energy requirement from the start. Furthermore, situations such as the occasional open door, window or draught are restored as an aspect of normal living, and not the hermetically sealed pre-requisites of a system that is only able to heat the air!

And with a radiating environment and decent air circulation: well, damp, fungus, bacteria, all those companions of central heating – literally – fly out the window. Your building – and you – benefit.

**What's "Low watt density"?**

If Radiant heat is so great, why did we switch away? Until the last 50 years, mankind was always heated by radiant sources: the sun; fires; Roman hypocaust; wood-burning stoves; Coal and electric bar fires. But these sources became either hard to come-by; polluting or expensive. From the 1960's onwards, gas and oil, became cheap, clean sources of fuel, but they implied a totally different (convective) form of heat.

In the last decade, technology to produce cheap radiant heat from electricity, in parallel with the scarcity, increasing unacceptability of gas and oil as pollutants, and their consequent increasing expense have combined to produce viable "Low watt density" heating panels that really are cheaper to run than oil, gas or traditional electric heaters.

IR panels have a thinly stretched, coiled wire packed densely over the entire surface of the heater, offering the opportunity to input a much lower power, to heat the wire only enough to raise the panel surface temperature to 100°C (a very low temperature in electrical resistance

terms). However a panel of 1m<sup>2</sup> surface area outputting 100°C is a very effective heater! Add-in the efficiencies of radiant heat over convection heat and - you can see how this really works.

**But what are the challenges to mass adoption?**

Everyone we talk to agrees this is a "no brainer". However, our challenges in getting this technology to a wider audience are not theological, but pragmatic.

- 1) *Whether in Commerce, public sector or domestic markets, we are working against 50 years of investment into fossil-powered technologies. So however compelling the case to change may be, all that weight of existing commitment and capital represents a considerable "mountain of inertia" to overcome.*
- 2) *The second factor is education. Not only have we forgotten the advantages of Radiant Heat over the last 50 years – an educative challenge in itself – but if you expose any new capacity in any market today people jump rapidly on the bandwagon to try to fill it up – whether or not they truly understand the technology they're dealing with.*
- 3) *Modern myths. The infrared market has been subject to its own share of myth and over-hyped messages, ranging from over-exaggeration of health benefits by the sauna industry, to blanket energy-savings statements that lack credibility. This is a shame, because the measured, fact-based, "no frills" message in both health and energy savings is so compelling that – properly stated – it makes the over-sold message completely unnecessary. This is why we feel education, provision of an online knowledge-centre and insisting on installers becoming accredited to be so important.*

**Turn the page** to find out how you and your company can benefit from provision of new training in IR heating – offered by Ceramicx and Green Energy in the industrial and commercial sectors respectively.

**Ceramicx builds exclusive Herschel Comfort heater range for UK markets**

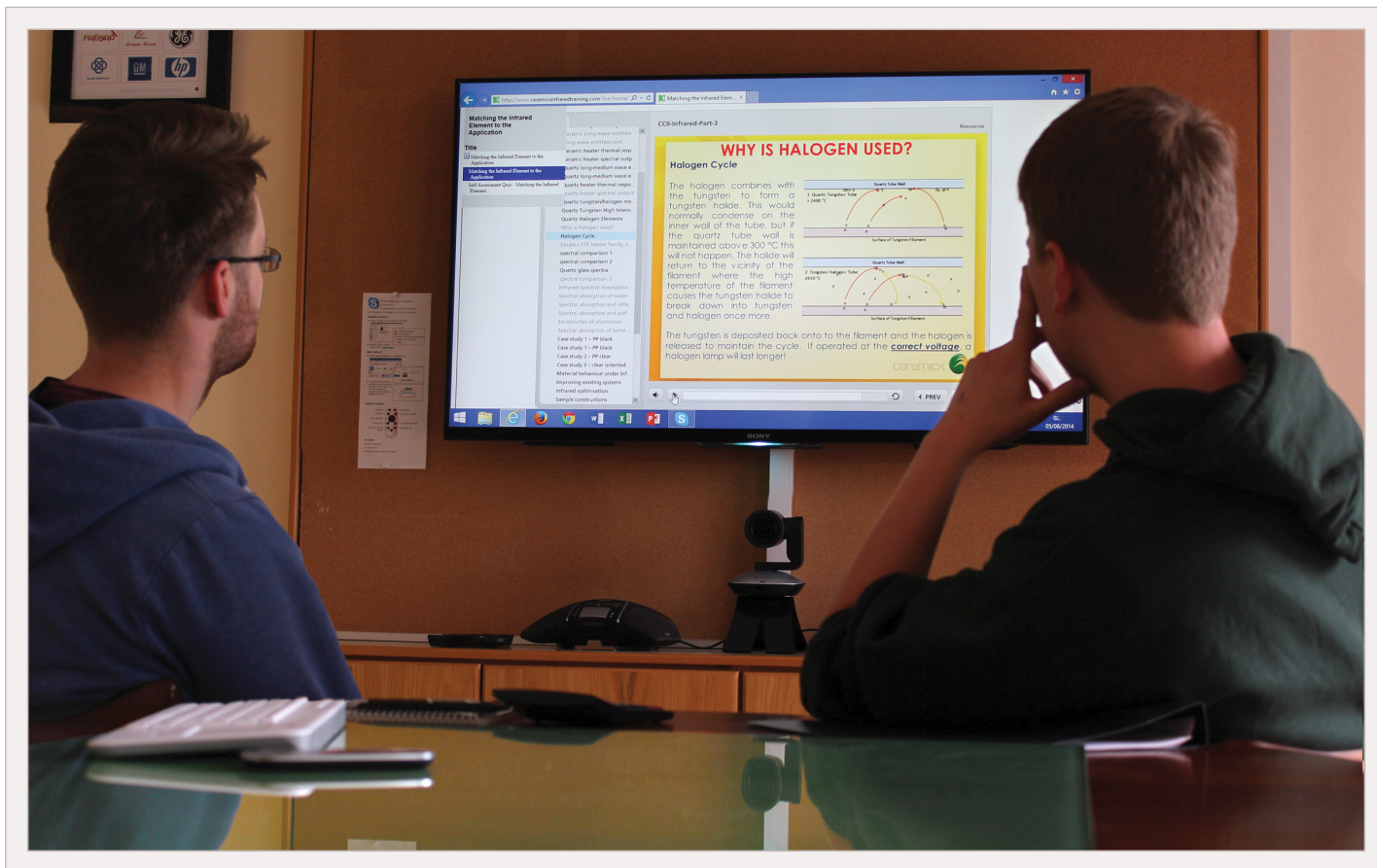


*Some Ceramicx built units and a recent installation by Green Energy of commercial parasols heated by infrared.*



# Get the IR heat training!

Dr Gerard McGranaghan of Ceramicx outlines the launch of the Ceramicx Infrared Training Centre, explaining why Ceramicx and UK partner Green Energy now provides IR heat know how at all levels.



**Infrared Technology is often treated with an air of mystery, and perhaps a large amount of this is down to the fact it is not visible.**

However, when we get down to it, people are much more familiar with infrared energy than they may at first think! Take the sun for instance, or a common toaster. In fact a better understanding of Infrared, is not beyond the reach of anyone involved in the infrared arena. And...its precisely this reason that we should not neglect to improve our understanding! A better understanding of infrared is essential for any professional working in the infrared arena!! All disciplines-sales, installation, or design can benefit from an enhancement of IR

heating knowledge. At Ceramicx we have accordingly designed courses to put you and your companies infrared knowledge on a sound footing; from the very basics to theoretical aspects, to practical industrial situations, with a few tips and tricks along the way.

**All disciplines - sales, installation or design can benefit from IR heating knowledge.**

The aims of the new course are to convey out the basics of Infrared from an Industry perspective. The course is set out in four modules, and can be taken online, or as a taught classroom course.

#### The modules are

1. Fundamentals of Heat transfer and Infrared
2. Infrared Energy in Process Heat
3. Matching the Infrared Element to the Application
4. Control of Infrared

Each module is expected to take around 60-90 minutes, and each course also finishes with a short online test where the results will be emailed to the student. The student may re-take the test a number of times.

### 1 Fundamentals of Heat transfer and Infrared

The first module covers the basics of infrared from a theoretical and practical standpoint. This is combined with a refresher on heat transfer meaning all students should then be on an even footing for the subsequent modules.

### 2 Infrared Energy in Process Heat

The second module builds on the industrial aspect with an introduction to some of the key processes that utilise infrared heating methods as well as introducing some more theoretical aspects applicable to IR. Conventional processes such as thermoforming are highlighted, and some novel and less well known methods are described so as to familiarise the student with the breadth of applications suitable for Infrared.

### 3 Matching the Infrared Element to the Application

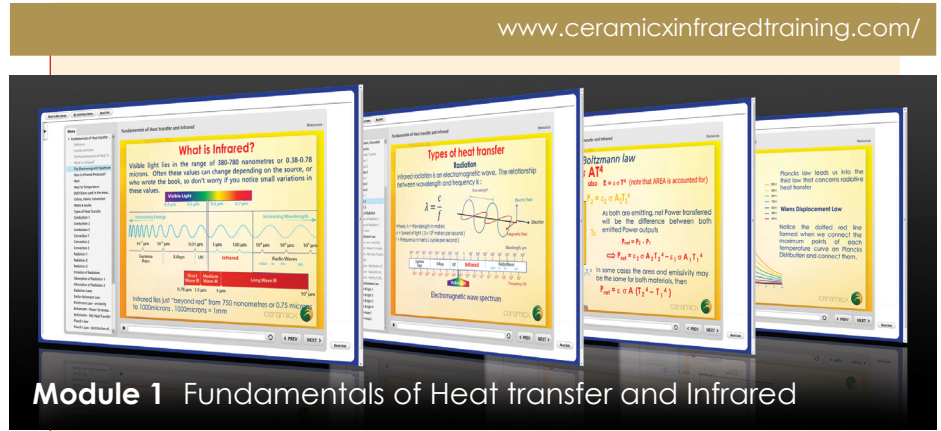
The third module then deals with matching the element to the application, a pre-requisite for the successful outcome of any infrared installation. This module aims to tie the knowledge of IR seen in module 1 with knowledge of the process in module 2. Absorption characteristics of common materials are introduced and some practical examples and tips are also given.

### 4 Control of Infrared

The final module is on the control of Infrared and includes temperature sensors and basic concepts of control systems. The thermocouple is introduced and advantages and disadvantages discussed. Alternative sensors are also covered as are non-contact thermal sensors. Finally, an introduction to control systems is given with a basic guide to switching, control, PID and guidelines on construction of larger systems.

Although taking the course will not guarantee to make one an expert in IR, nonetheless Ceramicx hope that the user will now be sufficiently knowledgeable about IR so as to have confidence in dealing with colleagues, customers and clients, and that this will benefit all in the business of Infrared.

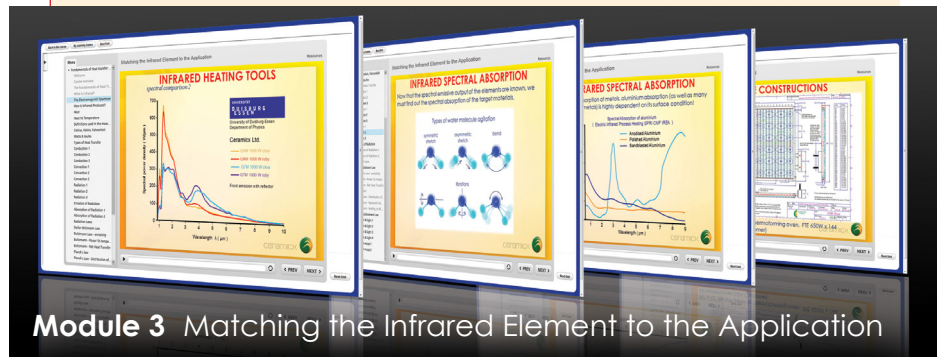
On Successful completion of each module, the student will be sent a certificate of competence from Ceramicx.



Module 1 Fundamentals of Heat transfer and Infrared



Module 2 Infrared Energy in Process Heat



Module 3 Matching the Infrared Element to the Application



Module 4 Control of Infrared

The course is now available online Free to Ceramicx customers and distributors (subject to approval) at <http://www.ceramicx.com/applications-training/> or alternatively contact us for further details.

Subscription is currently £150 per module and exam (i.e., £150 each for part 1, Part 2 etc.) or £42 monthly recurring for all modules (£500 annually, minimum subscription 12 months). Further modules will be added on an ongoing basis.

If you'd like Ceramicx to provide classroom training, this can be arranged either at Ceramicx in scenic West Cork, or in a location of your choice ( cost available on application ).

# Working with NIPA

None impressed Ceramicx more at the SPE All Ireland than the recent work of the Northern Ireland Polymer Association (NIPA) as communicated by Gerry McNally.

**Dr Cáthál Wilson reports on the dynamic changes that NIPA members are bringing to the world of polymers; in Ireland and globally.**



Dr. Cáthál Wilson

**The business climate in Ireland is currently enhanced by a window of opportunity for technology transfer and for trade through all parts of the island**



Gerry McNally, Director of Research Innovation and Competence, Northern Ireland Polymers Association

Gerry McNally and I met at both the Athlone and Waterford legs of the SPE All Ireland summit meeting and found a great deal of common ground in many ways, not least in relation to plastics technology and issues of heat work.

Gerry was appointed Director of Research Innovation and Competence of the Northern Ireland Polymers Association in Oct 2012, following a successful career at Queens University since 1990.

During his academic career he held several positions in Queens including, Co-founder and Director Polymer Processing Research Centre from 2003, Co-founder and Research Group leader, Medical Polymers Research Institute from 2004-2009.

He was President and co-founder, American Society of Plastics Engineers, European Medical Polymers Division from 2007-2010 and was thus ideally placed to play a central part in the SPE All Ireland meetings in early March 2014.

During his career at Queens, Gerry was involved in over fifty applied research grants in the field of polymers, valued at over £15M. In July 2012 Gerry was awarded the prestigious American Society of Plastics Engineers Educator of the Year - the first European Academic to be awarded the prize since 1976.

Subsequent to the SPE All Ireland meeting Ceramicx and Gerry have now met several times; losing no time in putting a shared agenda to good use, and for the wider benefit of NIPA members.

The business climate in Ireland is currently enhanced by a window of opportunity for technology transfer and for trade through all parts of the island; sometimes assisted, through Inter Trade and EU schemes; sometimes purely for the sake of the opportunity.

In that sense my first Belfast visit with NIPA was purely practical; helping create a road map of the scope of these opportunities

Needless to say it was a pleasure to share our company's know-how; specifically our expertise in Infrared heating for industry - about our energy-saving systems design and build - ovens; platens; control systems could increase precision in moulding while also increasing bottom-line profit. There was much of our recent expertise to impart in the area of high volume and fast recycling thermoforming operations; the bigger the scale the bigger the savings.

It was also a clear eye-opener to see at first hand what, in many ways, is the nearest to a model trade association for plastics worldwide.

NIPA has clearly been remoulded and revitalized over the past two years. The organisation's offices are located at the Innovation Centre at the Northern Ireland Science Park in Belfast. By any standard the organisation is in great health; going from strength to strength, something not unassociated with Gerry joining the body two years ago. What works for NIPA will work for Northern Ireland since NIPA's growing membership employs one in ten of Northern Ireland's manufacturing workforce..

Gerry made the point in his SPE conference presentations that when it comes to plastics, matters of reputation and image are extremely important. NIPA found that a certain amount of re-branding and repositioning (changing 'plastics' for 'polymers' for example in the NIPA name) was recently needed in order to boost profile - and membership.

The new 'make over' has worked extremely well: NIPA is now well



on the way to including 75% of all Northern Irish plastics companies in its membership. This is actually a staggering achievement when compared to the ratios of most other plastics-based trade associations.

Inclusiveness is important too and has played a part: One of the ground-breaking features of NIPA today is the way in which plastics composites are increasingly becoming a part of its membership. I personally have never understood why the reinforced plastics sector has remained apart from the bulk of other plastics processing industries. It seems to Ceramicx that NIPA is leading the way here - to have all polymer-based industries speaking with one voice.

SPE All Ireland heard that numbers of NIPA joiners are on the increase and that many parts of the plastics processing scenario are buoyant and healthy thanks in no small part to the efforts and investment of the leading names such as Armstrong Medical, Brett Martin, Denman, Denroy, Greiner Packaging and many others.

Localism is supremely important - as it should be, NIPA has identified several key challenges here and has recognised the need to work as a consortium in order to address these and to rally the sector in a market led approach to innovation, energy, transport logistics, education and training.

NIPA Members also have a keen external and export market focus and view these markets as their main opportunities for growth. One in three of the NIPA Members individually exports to over 30 countries and one in eight have received the Queens Award for Enterprise in recognition for these efforts.

The main manufacturing areas covered by the membership include extruding (pipes/tubes, sheet & film), injection moulding, composite technologies, thermoforming, blow moulding, stretch blow moulding, and rotational moulding.

The membership is made up of manufacturers, research and development / advisory & support services / higher education, and the wider supply chain. The NIPA Board is

drawn from and annually elected by the local manufacturing members.

NIPA facilitates inter-company networking and Working Groups in Composites, Energy, Manufacturing Processing and Material Innovations.

NIPA has also established links into Cogent and Semta (the Sector Skills Councils), as well as the British Plastics Federation (BPF) and other agencies; to help promote, manage and support the delivery of the industry strategy and plans.

Ceramicx undertook our second visit in early May of this year. This further cemented the NIPA relationship and, via a series of company visits in Northern Ireland, allowed us to talk turkey and get down to business with a number of leading manufacturers.

More detailed issues of Infrared energy and IR heat work, naturally, were the focus of our 2nd trip itinerary. The common denominators most often are reduction of energy and of cycle time in order to decrease costs and to improve profitability.

Ceramicx is now well on the way to reciprocating the same hospitality and trading with Gerry and NIPA member companies. Our factory based training in West Cork in Infrared Heat know-how is already underway for a number of Northern Irish business. The resulting closer business relationships can only bring good to all.

The next issue of HeatWorks magazine will report in more detail on both our own and NIPA's work into energy saving matters. ■



Northern Ireland  
Polymers Association

*The Northern Ireland Polymers Association (NIPA) promotes and supports a network that encourages the innovation, training, sustainable development and profitable growth of the plastics industry in Northern Ireland.*

# POWERING PLASTICS TECHNOLOGY IN IRELAND

HeatWorks magazine reports from the inaugural



Society of Plastics Engineers (SPE) All Ireland conference, held in

Athlone on March 4 and Waterford on March 6, 2014.

**The conference days were hosted by the Society of Plastics Engineers European Medical Polymers Division, Enterprise Ireland, Irish Development Authority and Engineers Ireland.**

More than 400 political leaders, state agencies, business people and industry experts were in attendance; including Bob Carmichael, former VP of Boston Scientific and Johnson & Johnson (Corp), Dr. Tom Kelly of Enterprise Ireland, Dr. Finbar Dolan, Technical Director of Lake Region Medical and also Ceramicx-own Dr. Gerard McGranaghan and Dr. Cáthál Wilson.

The first day of the Irish SPE event included the opening of the Applied Polymer Technology (APT) Gateway in Athlone; a national technology centre focused on all aspects of polymer research funded by Enterprise Ireland in Athlone Institute of Technology (AIT). The new centre already has a huge remit from Medical Device, Composites, Moulding, Pharmaceutical and Technology companies in Ireland including Medtronic, Boston Scientific, Teleflex, Cappella Medical and Novate Medical.

The Athlone area has a relatively young, well educated workforce and there is emerging evidence of potential cluster development in polymer intensive industries such as: medical devices, automotive, pharma, composites and recycling. These factors have resulted in companies such as Abbott, Baxter,





The Q and A Panel at Waterford Institute of Technology

Boston Scientific and Covidien locating multiple plants in this area. Over the past twenty years, AIT has grown the polymer research area into an interdisciplinary hub, interfacing with the plastics industry across multiple platforms on thousands of projects.

In recent years, AIT has invested heavily in the infrastructure of the research facilities with the completion of a HEA co-funded €2 million purpose built Research Hub in 2010, while the only facility in Ireland equipped for pilot and large scale polymer processing is housed in the new €36 million Engineering and Informatics Building and in a dedicated APT polymer processing facility.

The Athlone March 4 programme speakers were joined after lunch by Sean Sherlock TD, Minister of State for Research and Innovation who journeyed from his Cork constituency to address the gathering, commend the initiative and to present some awards to those involved in the work around the Athlone Institute. Included in the honours here were Athlone Extrusions founder and owner Jimmy McGee for his tireless work in the area and around the Athlone Institute. Also Paul Blackie from the Athlone institute staff.

Jon Ratzlaff, current SPE President, flew in from Oklahoma City, USA, to take part in the conference and to urge the plastics sector in Ireland to look beyond its boundaries and to embrace an outgoing and expansive role; exporting its successes globally; making partnerships and creating innovation.

The SPE is a professional global network of over 30,000 members and Ratzlaff said that 'this All-Ireland effort has the potential to open-up new opportunities and markets for Irish SMEs by partnering with global leaders, through networking with industry experts and using their guidance, leverage and advice.'

The second day of the SPE conference saw the launch of Ireland's first Super Critical Fluid assisted polymer processing facility located in Waterford Institute of Technology (WIT) and funded through Science Foundation Ireland. This facility will be a key driver for developing sustainable research partnerships and providing technical assistance to a large range of companies in the South East of Ireland, through the National Applied Technology Polymer Gateway Centre,



such as ClearStream Technologies (CR Bard), FastForm Research, Bausch & Lomb, Eirgen Pharma, Nypro, Genzyme, Allsop Europe and Teva Pharmaceuticals.

The Advanced Polymer Processing Centre at Waterford Institute of Technology boasts state of the art equipment to work with industry and to develop competencies in high-end value polymer engineering, supporting existing industries such as Bausch & Lomb and Nypro as well as high potential start-ups in the region.

Dr C ath al Wilson and Dr Gerard McGranaghan of Ceramicx gave a full overview of the work of the company on this second day of the conference. Both Ceramicx men outlined the typical technical and commercial issues involved in Infrared radiation work, gave a variety of case study work and presented a number of general issues involved in the heat work of plastics in industry.

The overriding focus of the two days was geared towards SMEs, both in the regional areas of the South East and in the Borders Midlands West regions of Ireland. Part of the conference highlighted the fact that a number of supports, assistances and networks are there for companies who are attempting to get into higher value technologies.

The events succeeded in attracting engineering and science professionals from the Medical Device, Pharmaceutical, Green Technology, Composites and Plastics Processing sectors. ■



Jon Ratzlaff, SPE President flew in from Oklahoma City, USA, to take part in the conference



Dr. Gerard McGranaghan and Dr. C ath al Wilson of Ceramicx gave a full overview of the work of the company

# SPE Thermoformers look lively!



Ken Braney

**Ceramicx and our US distributor Weco International have long been strong supporters of the Society of Plastics Engineers (SPE) organization.** It was therefore our great pleasure to ask Ken Braney, past SPE President, to cover the 9<sup>th</sup> SPE European Thermoforming Conference, Prague, Czech Republic, April 3<sup>rd</sup>-4<sup>th</sup>.

This conference is presented by the European Thermoforming Division of SPE. The last conference in 2012 was held in Venice Italy and this year it is in Central Europe in Prague Czech Republic.

Delegates came from countries in Europe, North America, India, The Middle and the Far East. Thermoformers, material suppliers, end users as well as machine builders were able to listen to a variety of speakers during the two-day event.

The theme of the conference was 'Forming a Sustainable Future'.

The first speaker was Christian Majgaard, former global manager at Lego Denmark. He spoke about the 'quest for growth' and the interpretation of the reality of business development. There were problems associated with 'buzz' words, concepts etc., that always sounded good on paper but were not always feasible in achieving the growth necessary for companies in today's fast moving world.

## **Innovate constantly**

He was followed by Roger Kipp, who was the 2010 Thermoformer of the Year in North America. Roger spoke about 'Starting our innovation engine'. The talk highlighted areas that we often take for granted when going forward in business. How many times is it thought that if it has worked for a period of time it will therefore continue in exactly the same way. The only route forward as far as Roger Kipp was concerned is that you have to revisit all aspects of your company on a regular basis - otherwise you will slip behind in the business world. Presentations then became more technically detailed in relationship to subjects such as 'latest developments in micro-thermoforming technology',

'Improvements in Heavy Gauge thermoforming simulation by use of 3D digital image correlation', 'Thermoforming software simulation software T-SIM' and finally 'The latest developments in extrusion and thermoforming of liquid crystalline polymers (LCP)'.

In another section of the building there was a display of parts made by thermoforming that showed the wide range of products that are made through thermoforming. Parts in Acrylic, HDPE, ABS with PMMA Surface were some of the highlighted products exhibited. There were a number of mouldings that stood out as very technical and perfectly finished: One was a special light, used in operating theatres, and therefore designed to transmit light in a perfect way as well as being completely sealed, since the highest level of hygiene are demanded for these environments.

## **Thermoforming by design**

The two other items, one was a rear of a car where the lights and all items in the rear of the vehicle were put into this thermoformed part and that last was a ticket machine shell that was made from acrylic. These machines are used at airports etc. for people to check into their flight collect their tickets and even converse with a person if they are having difficulties with actions. The shell is shaped to accommodate a



keyboard, all electronic parts to make the unit function. All products were classified as outstanding examples of the thermoforming technology. Two of these parts were subsequently being shipped to Las Vegas directly after the show in order to be included in a worldwide competition at ANTEC 2014 in May. Parts from all sectors of the plastics industry will be submitted (injection mouldings, blow mouldings, rotary moulding, thermoforming parts etc.), and the winners will be selected at the ANTEC Conference.

The second day of the conference began with a presentation on 3D printing and was presented by David Bue Pedersen Ph.D. who is a researcher at Denmark's Technical University.

David not only presented the concept and videos explaining the basis of the 3D printer he also showed examples of products made by this method.

There were a number of other interesting presentations. One highlight came from the Turkish plastic packaging industry, explaining the growth and potential in Turkey for thermoforming. Another came from the Case New Holland Company, illustrating the use of thermoformed parts in the company's various vehicles and inviting the audience to investigate the opportunities for other areas of their machinery that could use thermoformed parts

The conference was brought to a close by Marek Nikiforov, Chair of the SPE European Thermoforming Board and it was obvious that this 9<sup>th</sup> Conference not only upheld the standards from the past but surpassed them on giving all delegates an understanding of today's and tomorrow's trends and technologies.

*Ken Braney is a past president of the Society of Plastics Engineers (SPE) 2010-11 and was the first non North American to hold that office. He is currently UK based and is Managing Director of the Plastics Machinery Group International Ltd. [www.plasticsmg.com](http://www.plasticsmg.com)*

# Research, reflections and reflectors.....

Dr Gerard McGranaghan, Operations Manager at the new Ceramicx C<sup>2</sup>I<sup>2</sup> Centre checks in with some new notes from the C<sup>2</sup>I<sup>2</sup> which has been busy in a number of roles



## Herschel Update,

The Herschel's main business to date has been the detailed technical characterisation of the Ceramicx range of products. However we have also had time to try out some interesting heat flux profiling on arrays and reflectors. This research is still very much ongoing but I can present a few interim findings and thoughts here!

## Elements in an Array

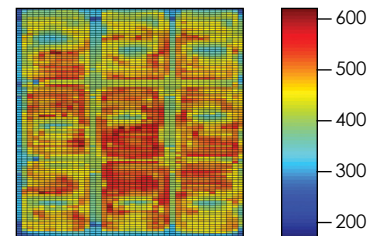
On a 3 x 3 array of QFE elements, we found that the heat flux profile was largely hemispherical in profile. This was on a flat array without a surrounding reflector at the sides shown in figure 1(a). The heat flux at 100mm can be seen in image 1 (b) below. When a 20mm deep reflector was added

around the perimeter of the array, the amount of infrared radiation scatter immediately decreased. This can be seen in image 2(b) below. Notice that the peak heat flux at the centre of the array also increased as a result of adding the small reflector at the sides.

Finally, we added a reflector of 50mm depth all around the perimeter (see image 3(a)). This had the effect of further confining and reducing the spread of infrared radiation outside the array. Peak heat flux also increased up to 1.21 W/cm<sup>2</sup> at the centre of the array.

Next we investigated the effect a redundant element within an array (say a failed element) had on the heat flux profile. We found changes not only in the magnitude of the heat

flux levels, but also as expected, in the final outline of the heat flux profiles. The resulting heat flux maps tended to approximate to the form of the heated elements, not surprisingly! These two images show the heat flux profile when a corner element and the centre element is powered off.



Temperature ( °C )scans from our non-contact IR thermocouple without reflector. All elements on.

Figure 1a



No Reflector

Figure 2a



Reflector 20mm deep

Figure 3a



Reflector 50mm deep

1	2	3
4	5	6
7	8	9

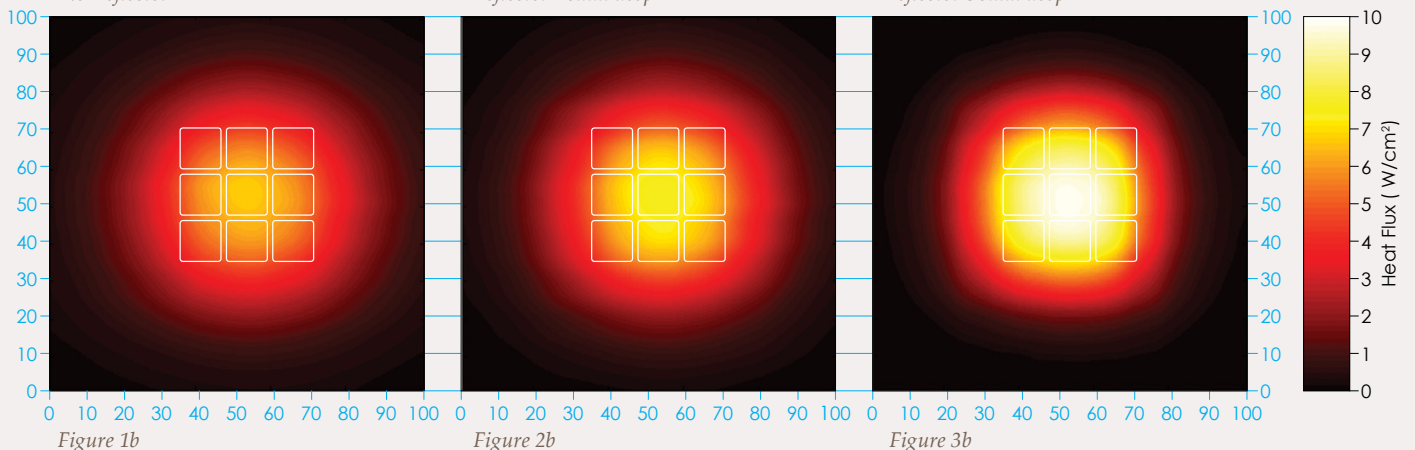
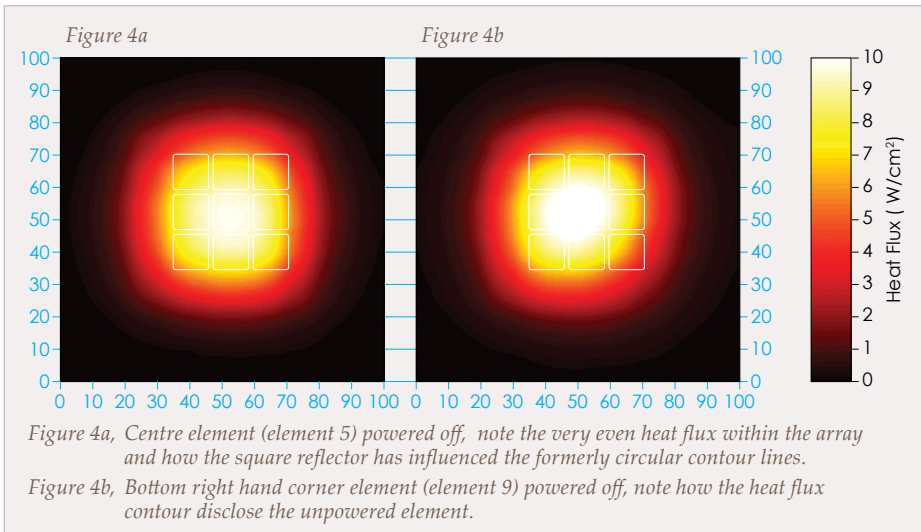


Figure 1b

Figure 2b

Figure 3b





### Stainless Steel or Aluminium?

The Herschel has also been used to characterise quartz element bodies. These are available in aluminised or stainless steel options. It is long known that stainless steel can discolour with temperature as oxide colours form on its surface. In order therefore to fully assess the effect of this change in surface conditions on the stainless steel quartz cassette the C<sup>2</sup>I<sup>2</sup> Centre carried out a series of tests using the Herschel.

As a starting point, 800W quartz elements were selected. We quickly found that even a new clean stainless steel body began to discolour very rapidly once powered up. There was also little difference in performance between clean or discoloured elements as both returned 53% of the input energy at 100mm. In addition we noticed that the aluminised steel bodies performed slightly better; reflecting a higher proportion of the infrared energy to the front of the cassette from between 54.3% to 54.7% at 100mm for the three elements tested.

However, when the reflector was removed from behind the quartz cassette and the elements were re-tested, some interesting differences were then found: The stainless steel body showed a drop in performance from 53% to around 50%, a drop of 3%. This performance could largely be due to increased radiative emission from the rear of the now discoloured stainless steel cassette. Conversely, the figures for the aluminised steel elements remained at over 54%, despite the lack of a reflector.

Therefore where conditions suit, and all things being equal, an aluminium cassette body will perform slightly better than a stainless steel cassette body.

However, it must be borne in mind that all of these tests were performed with 800W elements. Lower wattage stainless steel elements may not experience the same discolouration factors and the same decrease in emissivity. This is a fascinating area of IR heating performance, Ceramicx intends to do a lot more of it, and our Herschel instrument is key to creating accurate road maps based upon empirical data.

### Shiny side out!

Finally, we recently used the Herschel to answer a question that had long been on the mind of a few people here in Ceramicx. Aluminised steel is typically supplied from most manufacturers with one side polished, the other side unpolished.

Ceramicx has up until now manufactured its quartz cassettes with the shiny side facing out, more aesthetically pleasing all round.

However, it behoved us to ask "if the radiant performance was better, wouldn't there be a case to change and put the shiny side in?"

A number of exhaustive tests were therefore carried out by the Herschel. We found, simply, that there is no measurable difference in performance between shiny side in or shiny side out on the samples we tested. It ultimately boils down to aesthetics. Ceramicx will therefore continue to keep the "shiny side out" for the foreseeable future. ■

## Get the Centre Know-how

[www.ceramicx.com/ir-heat-experiments/](http://www.ceramicx.com/ir-heat-experiments/)

The C<sup>2</sup>I<sup>2</sup> has now created a 'white papers' section on the Ceramicx website where results of tests carried out on the Herschel testing machine are published.

As time goes on, this service will expand into a comprehensive resource to answer many everyday questions faced by industrial infrared practitioners. Currently, for example, we have published a comprehensive report that characterises the heat flux output of the Ceramicx element range. This will help our customers in the selection of element types and wattages. The full colour 3D graphs will also allow customers to accurately visualise and predict the strengths of the heat flux field from each heater, something that before required many years of experience and intuition.

In addition, these separate 3D graphs are also available for viewing and download on the component products section of our website. The 3D graphs show the exact extent of the heat flux radiated by the heater in the vertical and horizontal directions, as well as quantifying the decrease in heat flux with distance.

Finally, corresponding data, such as the maximum heat flux at a distance of 100mm is now also published in the Technical Information section of the Ceramicx product range so as to further assist our customers.

Although not every element has yet been tested customers are welcome to mail Ceramicx or myself directly with any questions.

I have no qualms in reiterating a basic point – that in many cases manufacturers often leave considerations of heat work until the tail end of the project design. Our C<sup>2</sup>I<sup>2</sup> centre is in business to help design heat processes from the outset and to pre-empt difficulties further down the line.

If your company is currently engaged in such work and your thinking could do with a second opinion or with some technical resources and instruments please don't hesitate to get in touch with us. ■

Introducing the

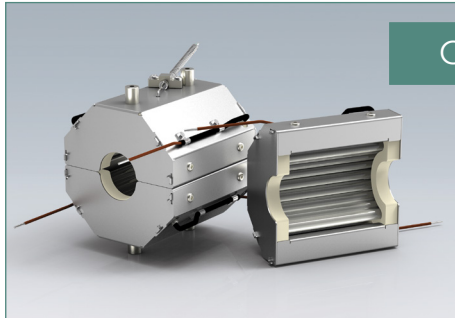
# CQHE family

Curved Quartz Half Element

The CQHE range of curved quartz heaters have been specifically designed for non-contact heating of round or cylindrically shaped objects with outside diameters of up to 25mm.

The heater construction comprises a series of translucent quartz tubes housed inside a stainless steel outer casing with steatite end plates. Each heater contains 2 stand-offs for mounting, dim Ø10 x 12mm with M4 internal thread. An FeCrAl resistance coil inside the quartz tubes provides the heat source with peak emissions in the medium to long wavelength range. Heaters achieve full operating temperature in ~5-6 minutes.

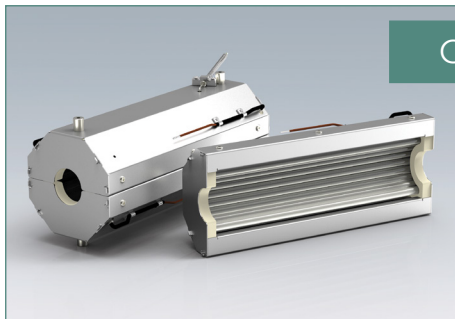
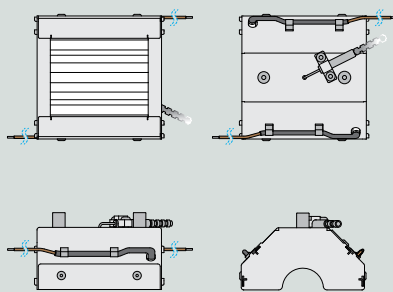
All models are fitted with an internal type K thermocouple for temperature feedback to an appropriate controller/monitor. Standard lead length for power leads is 300mm and 200mm for the thermocouple lead.



Dimensions : ( inc stand off's )  
100 X 100 X 62mm

CQHE100

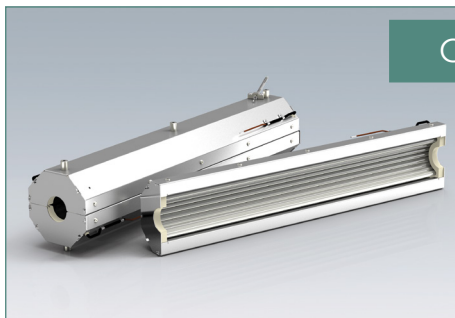
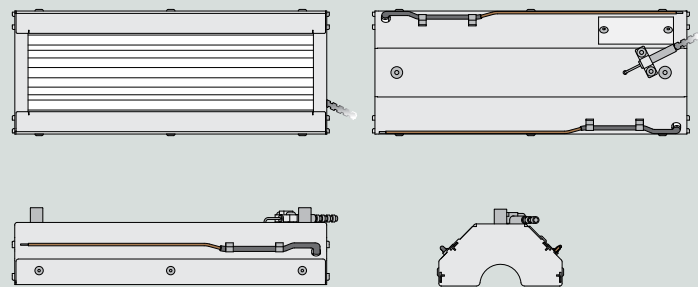
Wattage: max 250W



Dimensions : ( inc stand off's )  
250 X 100 X 62mm

CQHE 250

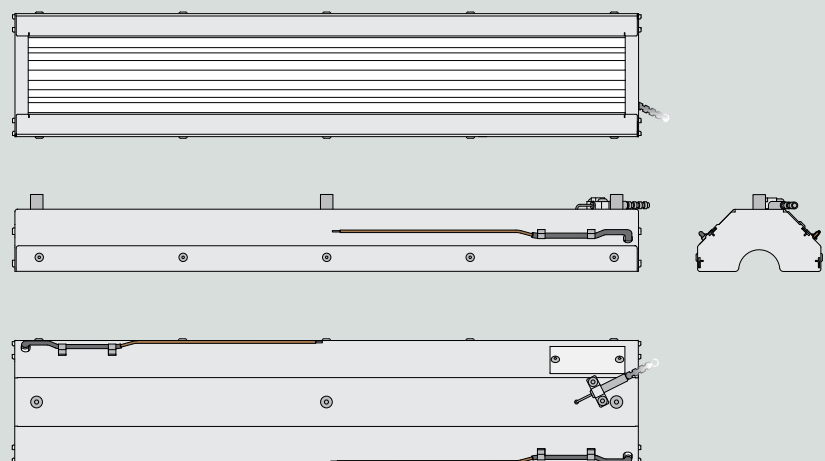
Wattage: max 625W



Dimensions : ( inc stand off's )  
500 X 100 X 62mm

CQHE 500

Wattage: max 1,250W



# Electronic Heat Control - The Guide

HeatWorks magazine has great pleasure in launching a series of articles from our partner HETRONIK

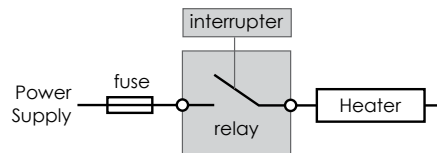
The theme of these pieces will be heater control and our guide in these matters will be Andreas Farrenkopf.

Andreas works as the sales and support manager of HETRONIK - known initially as MULTIBA – and has been a friend and associate of Ceramicx since the year 2000 when both he and Frank Wilson spoke at an "SPE - thermoforming division" conference.

We are delighted to publish him and HETRONIK in HeatWorks beginning with this introduction and overview of the topic.

### IR heater control basics – beginnings

When there was no electronics available, heaters was controlled with mechanical relays.

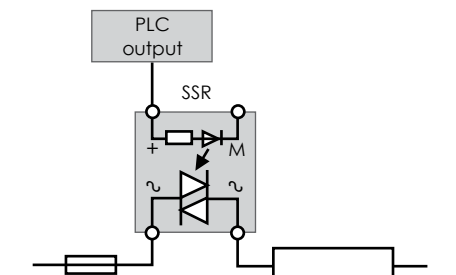


To regulate the heat output of heaters the relay contact was engaged (ON some seconds / OFF some seconds / ON some seconds / ...) with mechanical interrupters.

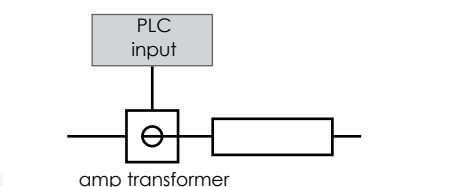
More ON then OFF time typically resulted in more heat.

With semi conductors becoming more generally available, contactors in industrial applications tended to become replaced with electronic power switches known as SSRs (solid state relays)

SSRs are controlled typically with ON/OFF/ON signals from a PLC (process logic controller).

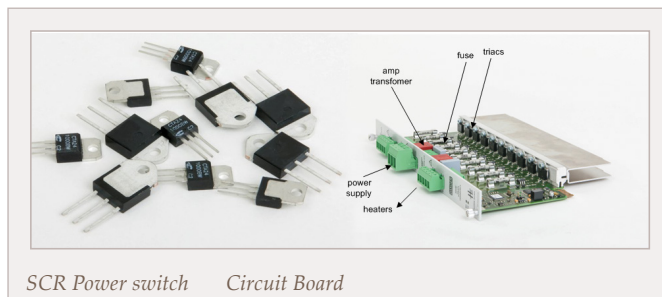


If a failure of a heater, cable, fuse or SSR is to be detected, the amp must be measured and compared in the PLC with the expected amp.



And if dozens to many hundred heaters or groups of heaters need to be controlled then things become even more complex. The wiring of PLC outputs with SSRs, SSRs with fuses and heaters as well as amp transformers with PLC inputs – all of this become quite labour/time/money intensive and also needs considerable space in electric cabinets. An example here shows only 56 SSRs:

The early 1980s saw microprocessors becoming cheaper and more powerful. The first "multi channel heater controller systems" were then designed and applied.



SCR Power switch Circuit Board

The main component of such systems are circuit boards. Their primary function is to hold

- Triacs ( electronic power switches like SSRs )
- Fuses
- Devices to detect broken fuses, heaters, cables and defective triacs.

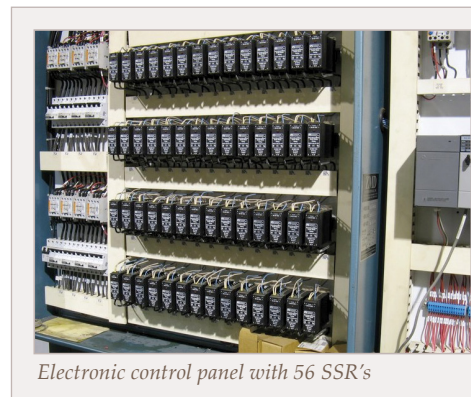
Among the first such designs - if not "the first" system world wide ever - was a three (3) channel card named PDTA3. This was designed in 1981/82 by the PLC manufacturer SCHLEICHER ELECTRONIC in Munich/Germany. The inventor of this system was my current partner in HETRONIK today, Chris Haug.

Some thirty years on, and thousands of hours in R&D later, this system design has gained success in many tens of thousands of machines in operation world wide. The common denominator and common bond is the need to control heaters or group of heaters individually in order to profile the heat.

Applications include plastics thermoforming, laminating, IR welding, paint drying, composite curing and many other industries.



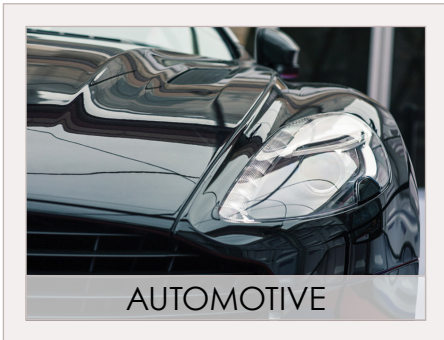
SSR - Solid state relays



Electronic control panel with 56 SSR's

For all further details of heat control and electronic control systems contact Ceramicx for further details. ■

# IR heat solutions that work for all sectors



In this new article series within HeatWorks magazine we take an in-depth look at the contribution of Ceramicx IR heat engineering to an increasing variety of industries;

The process sectors including pharmaceuticals, food and drink; oil and gas; packaging, construction; general industrial; white goods and consumer goods; all of these manufacturers have benefited from the scientific application of IR heat in their production processes.

The series begins with the contribution of Ceramicx IR process heat solutions for the automotive industry. But first, a little more background and context.....



It is no accident that Ceramicx's longstanding expertise in IR heat technology for thermoformers has led to such a variety of applications engineering for other sectors. Ceramicx exports 98% of its output from Ireland. The company is a veteran of four K shows, three Chinaplas exhibitions and three NPE showings and therefore has the benefit of working throughout the world, gaining exposure to many industries and many clients on the heat forming of plastics.

Ceramicx also manufactures all the IR heat components it uses, and does so to world-class standards. It is the only global manufacturer to do so across the three main IR heat categories; short, medium and long wave.

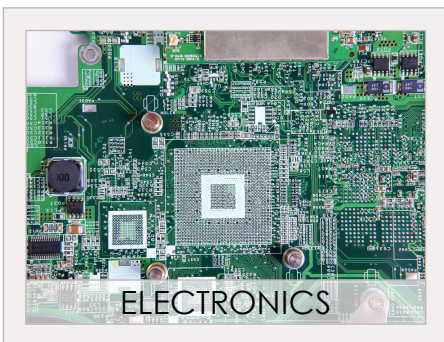
Another factor in the spread of Ceramicx applications engineering is the ubiquity of the polymer-based spectrum in all kinds of manufacturing; from glues and adhesives to polymer coatings to rubbers to resins for composite lay up. Ceramicx general expertise in the IR heating and curing of plastics therefore provides the company with access to a number of marketplaces that are beyond traditional plastics processing.

Ceramicx also designs ovens and platens, both for thermoforming machinery producers and also thermoformers worldwide. Most every job is client bespoke therefore Ceramicx needs to provide fail safe

know-how on how the IR energy and process will enhance the client's manufacturing practice. A fifteen year track record in applications engineering brings its own reward in terms of penetration of various industrial sectors.

A recent review session at Ceramicx, for example, reminded the company of its IR heat work for clients in the following areas:

- **Automotive** - polymer/glass/metal bonding | advanced adhesive processing | thermoformed component production | polymer/wire heat shrinking (harness) production.
- **Construction** - lighting manufacture | polymer/concrete coating and protection | signage production | pipe and utilities product.
- **Electronics** - solder reflow | PCB design and heatwork.
- **Food** - food warming and cooking processes (with IR heat)
- **Glass** - polymer/glass bonding | glass bending – Toughened glass furnace build
- **Medical** - IR heat for surgical theatres | blood platelet separation | blood bag production
- **Industrial** - variety of paint, print and polymer coating and drying, laminating solutions



- **Oil, Gas and Mining** - plastics to metal bonding | pipe coiling | materials separation
- **Packaging** - high speed thermoforming solutions | ISBN blow moulding | pallet design and manufacture | assisted printing

And increasingly Ceramicx is adding to its know-how of the core thermoplastics processing space. A visit to the Advanced Engineering show NEC Birmingham in November 2013, for example, highlighted many opportunities in IR heat-based ovens for plastics composite production. A number of conversations have now led to new business in this area and have also meant growing relationships for Ceramicx with the National Composites Centre (NCC) in Bristol, with the Northern Ireland Polymers Association (NIPA) with the Institute for Manufacturing at Cambridge University and in the devising of IR heat training for industrialists.

Ceramicx is also aligning itself to the undoubted future growth in IR heat technology itself. The food industry, for example, is currently just scratching the surface in terms of what IR heat can do. Healthcare applications; chemical and process plant work; curing and bonding of materials; opportunities for IR heat in the built environment – all of these provides markets for Ceramicx applications engineers.

'To measure is to manage' and Ceramicx has also become increasingly involved in machine specification and in various aspect of process control – for IR heat in thermoforming and for all kinds of applications engineering.

US and UK based customers have become increasingly important to Ceramicx in this regard; using a combination of IR sources and process control to decrease their energy usage scrap and downtime and increase production. For thermoformers, for example, Ceramicx engineers have succeeded in streamlining a process whereby the design and installation of new IR heating systems typically requires but 3-4 days onsite for integration, including a 24 hour runoff. And turnaround times can be achieved in less than six weeks for a complete oven control system.

All Ceramicx clients are encouraged to measure their process – in terms of cost; energy consumption and energy per part. The company works as hard

on its systems of thermocouples and energy measurement devices for clients as it does on the production and delivery of IR heaters and heating systems. In this regard Ceramicx IR applications engineering is closely associated with saving energy and with lowering carbon footprint.

IR heat can also save other problems in industry: For many manufacturers non-IR heating legacy issues in process manufacturing can include burn outs, electrical faults and with problems with older style and non-directional heating. Tubular and magnesium filled heating solutions; black rod heating and other kinds of non-infrared sources can all make a contribution to inexact systems and amount to a waste of energy and electricity cost.

'In a completely enclosed system or oven, this kind of non-IR based heating becomes uncontrollable. Operators are being continually forced to ramp up the power and the electricity input in order to try and maintain an even temperature.

According to Ceramicx, IR heat sources come with a number of inbuilt benefits for all kinds of manufacturing:

- Major reduction in capital equipment wear and tear
- Elimination of 'hot box' tubular problems
- Changes in control or instrumentation not strictly necessary
- Poor performing infrared to be replaced with superior platens
- Savings in directional heat
- Better resultant product quality
- More complex parts possible
- Cooling requirements also reduced
- Improved environment for operators
- Reduced material wastage and scrap

These advantages apply all across the board in industry. The Ceramicx belief is that sooner or later IR heat sources will come to take the major part of heat work for all non-contact process industries worldwide.

This new HeatWork part series will explore the application of IR heat across a number of sectors, beginning (over the page) with the automotive sector.



GLASS



INDUSTRIAL



MEDICAL



OIL, GAS, AND MINING



PACKAGING



# Fast forward for IR heat solutions in automotive

The automotive manufacturing sector is one of the most innovative and competitive worldwide.

In the past ten years the Ceramicx automotive order book and track record includes working directly with OEMs and also with Tier 1, 2 and 3 suppliers in the UK, USA, Germany, Italy and other country markets with automotive manufacturing capabilities.

The competitiveness of the automotive sector means that IR heating solutions certainly have to add technical value and forward thinking. They also have to contribute to the 'cost down' reviews that are a continuing feature of this industry. IR heating energy efficiency, energy saving and precision control are therefore a big part of the offering brought to the automotive party.

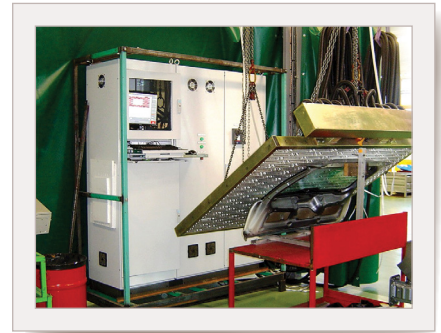
And since Ceramicx know-how is not tied to any one manufacturing process - such as thermoforming or injection moulding - the company can explore heat work solutions in a free ranging and creative style.

Recent Ceramicx work in the composites area, for example, has led the company to explore the possibilities for body panel work being produced at mass volume in GRP or Carbon fibre materials. The processing parameters for such large parts are not simple but they are feasible - with the help of the new IR measurement systems developed by Ceramicx, such as the Herschel test instrument (see page 14)

Elsewhere, Ceramicx IR heating know-how has been deployed in the automotive sector in areas of painting;

drying and curing; adhesive and glue annealing and drying; thermoforming of interiors linings and parts; plastics/rubber bonding and strengthening; plastics/metal bonding and strengthening; polymer/glass bonding and adhesion (windscreens); instrumentation manufacture and other components.

Put simply, the metals-substitution movement continues to make inroads into the automotive and transport markets. Polymer-based and carbon fibre manufacturing solutions are increasingly taking up the challenge, fulfilling demand and filling production gaps. IR heat work is helping these trends towards automotive lightweighting, cost reduction and aesthetics. Herewith some examples from recent Ceramicx work.



## Solutions that stick

When it comes to top-end pedigree some of the most demanding and upmarket automotive marques are still lovingly crafted in England.

For over three years now one of these leading OEM British manufacturers has been successfully working with Ceramicx in its automotive panel construction work.

Put simply, the client had an issue with component-to-component adhesion. The workable area in manufacture was also recessed and provided a difficult space to work within.

The client adhesive materials were also of an extremely high specification; offering the equivalent strength of steel when set while offering equivalent lightweighting of some 80%.

Ceramicx engineers worked with the OEM client to design the right form of IR heating that would dry and anneal two components together in the optimum time. Success in this key manufacturing process has led to further work in other areas for the same client.

Ceramicx IR heating know-how was invaluable for the client in a pre-emptive strike against possible production bottlenecks; reducing the cycle time for this process and ensuring that the gluing station would not hold up the line and would not hinder output and productivity.

The process involves an 8mm bead of adhesive being applied to a component then positioned and squeezed down to a 25mm wide strip on a 2nd component. Surrounding areas also needed heat work whereby a 75mm strip was heated around every panel on the car. Flexibility was key and the heat needed to be adjustable within very tight tolerances.

Initial heating work involved an experimental period with tungsten based IR heaters. These were then changed over to a specially designed array of Ceramicx hollow ceramic elements (FFE4 400W or HFE4 200W). The Ceramicx system was used to heat a carbon fibre component from the outside of the join order to achieve a curing temperature of ~50°C on the inside of the join - at the same time not exceeding a temperature of 80°C on the outside.

The Infrared (IR) heaters for the system are controlled by a Jumo controller with temperature feedback from a Micro Epsilon pyrometer that measures the temperature on the outside of the panels. Dwell times were typically 15-25 with a median value of 17 minutes with 60-80°C setpoints.



**Counting off the kilometres** Odometering - the measurement of distance travelled - has been with us since Ancient Rome. Issues of aesthetics and performance mean an incessant turnover of ideas and solutions for automotive application.

Ceramicx recently collaborated with its German distributor, Friedr Freek and a leading German 1st tier supplier in order to service the innovation needs of a German OEM automotive company.

The 1st tier supplier serves a multitude of automotive customers. Its principal technologies include vacuum forming and high pressure forming of film on components. Ceramicx engineers were involved in fine tuning aspects of the thermoforming production.

Key production issues in the production of the odometer included the accuracy of part forming; the integrity of seal and the aesthetics of the product. The current trend for 3D dashboard instrumentation also places high demands on the accuracy in high pressure forming technology with printing positioning needing to be highly accurate and with exact temperature control in the process.

**Automotive technology in harness** Horse power has never been so well trained as in the work done by Ceramicx for leading auto-supplier Mecalbi and its range of automotive industry products.

Harness wirings for the automotive industries comprise a good deal of the value-added content for any given car.

Ceramicx IR heat technology and hardware now helps provide Mecalbi with the accuracy and reliability needed in order to perfectly execute its Shrinking Tube Control Systems (STCS) for the supply of automotive wire harness production.

Bearing in mind the high production rates of the harness industry the Portuguese based company needed Ceramicx to design and supply an oven solution with a very high degree of robustness and reliability and accuracy. A bespoke solution was required.

The Irish/Portuguese partnership involved the development of 2 new solutions: quartz resistors for Mecalbi's STCS-CS 19 and STCS-RT machines, with the objective of providing a failsafe solution since the traditional and previous arrangement was easily damaged by the cable's terminals. The second project involved building a small infrared oven for the STCS-IR500 and STCS-RCM machines, with the objective of providing high stability and energy efficiency.

Both solutions required strict specifications in terms of power, temperature, dimensions, stability and reliability. After fulfilling client expectations Mecalbi used its new infrared oven in its STCS-RCM machine for the validation of the machine in one of its major customers. The new technology was received very enthusiastically, passing all the validation tests with flying colours.



**Opening the door** A good deal of automotive manufacture lends itself to the business of deploying large thermoformed plastics panels, especially in the area of reinforced door linings.

Ceramicx USA distributor Weco and a leading 1st tier supplier all worked together on a project together for a leading US automotive marque. The Weco customers is the only auto supply company that is vertically integrated from fiber to fabric to finished part. Every product that the company makes is custom-designed for its intended use.

Ceramicx and Weco both got into the mix in order to help optimise the thermoforming performance and ensure that the door-liner moulding was fit for purpose and exceeded client expectations.

**Joining together and pulling apart** Ceramicx played a leading role in this EU-led project for easy dismantling of bonded parts at the end of a vehicle's life.

A leading Italian OEM marque was the client and a network of some five suppliers collaborated in an EU led and funded solution for windscreen joining and disassembly technology.

Ceramicx IR heating know-how was indispensable in working out drying and curing systems for the rubber to metal and glass bonding needs and – as importantly – for the dismantling of the vehicle at the end of its life.

The work was part of the ILIPT and Ecodism projects and was titled 'smart bonding process for mounting and dismantling car glazings' and the task was to set up an intelligent and reversible bonding system.

The project succeeded in, Forming a clear primer system for the windscreen edge surround. Applying the new system with special adhesives in the same way as during normal production. The adhesives then cure more rapidly and also stays dormant during the life of the vehicle.

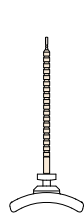
Ceramicx was involved in developing IR heaters to ensure that at the end of its life the whole assembly system would debond within two minutes, owing to the application of IR heat in the range of 140-160°C. This work greatly improved upon the time taken for previous disassembly processes by a factor of some 500%.

The project was scoped and delivered to an industrial scale. In addition and thanks to the targeted application of IR heating, the project succeeded in preventing end-of-life windscreens from being broken up for scrap and classed as shredder residue.

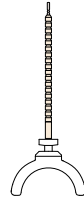




## CERAMIC ELEMENTS



Trough



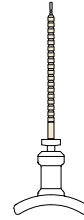
Curved



Hollow



Flat



Pillared Trough

### CERAMIC TROUGH ELEMENTS

[www.ceramicx.com/trough-elements/](http://www.ceramicx.com/trough-elements/)



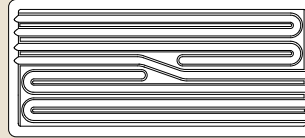
FTE / FTE-LN



HTE



QTE / QCE



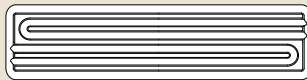
LFTE

FTEL - LN

<b>FTE</b> Full Trough Element	245 x 60 mm	150W 250W 300W 400W 500W 650W 750W 800W 1000W
<b>HTE</b> Half Trough Element	122 x 60 mm	125W 150W 200W 250W 325W 400W 500W
<b>QTE</b> Quarter Trough Element	60 x 60 mm	125W 250W
<b>QCE</b> Quarter Curved Element	60 x 55 mm	150W 250W
<b>LFTE</b> Large Full Trough Element	245 x 110 mm	1000W 1500W
<b>FTE-LN</b> Full Trough Element -Long Neck	245 x 60 mm	250W 400W 500W 650W
<b>FTEL-LN</b> Full Trough Element Long - Long Neck	285 x 60 mm	1000W

### CERAMIC HOLLOW ELEMENTS

[www.ceramicx.com/hollow-elements/](http://www.ceramicx.com/hollow-elements/)



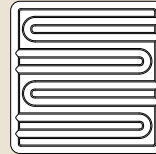
FFEH



HFEH



QFEH



SFEH

<b>FFEH</b> Full Flat Element Hollow	245 x 60 mm	250W 400W 500W 600W 800W
<b>HFEH</b> Half Flat Element Hollow	122 x 60 mm	125W 200W 250W 300W 400W
<b>QFEH</b> Quarter Flat Element Hollow	60 x 60 mm	125W 200W
<b>SFEH</b> Square Flat Element Hollow	122 x 122 mm	250W 400W 500W 600W 800W

### CERAMIC FLAT ELEMENTS

[www.ceramicx.com/flat-elements/](http://www.ceramicx.com/flat-elements/)



FFE



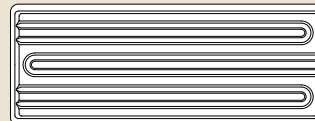
HFE



QFE



SFSE

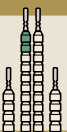


LFFE

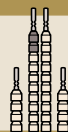
<b>FFE</b> Full Flat Element	245 x 60 mm	150W 250W 300W 400W 500W 650W 750W 1000W
<b>HFE</b> Half Flat Element	122 x 60 mm	125W 150W 200W 250W 325W 500W
<b>QFE</b> Quarter Flat Element	60 x 60 mm	125W 250W
<b>SFSE</b> Square Flat Solid Element	122 x 122 mm	150W 250W 300W 400W 500W 650W 750W
<b>LFFE</b> Large Full Flat Element	245 x 95 mm	150W 350W 750W 1400W

### THERMOCOUPLES

[www.ceramicx.com/thermocouples/](http://www.ceramicx.com/thermocouples/)



**Thermocouple Type K**  
+ Nickel Chromium  
- Nickel Aluminium



**Thermocouple Type J**  
+ Iron  
- Copper Nickel



## EDISON SCREW ELEMENTS

[www.ceramicx.com/ceramic-bulbs/](http://www.ceramicx.com/ceramic-bulbs/)



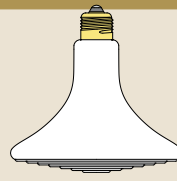
ESEB



ESES



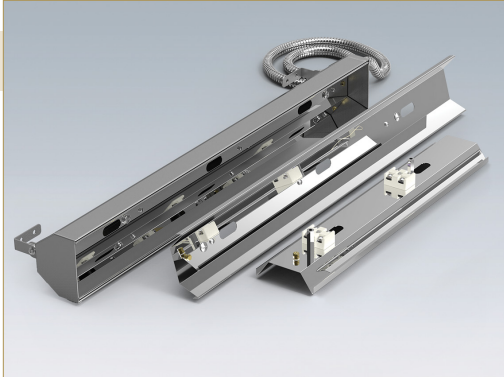
ESER



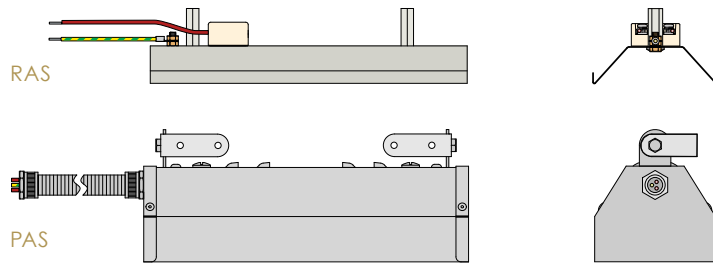
ESEXL

- ESEB** Edison Screw Element Ball
- ESES** Edison Screw Element Small
- ESER** Edison Screw Element Regular
- ESEXL** Edison Screw Element Extra Large

Ø65 x 140 mm	60W 100W
Ø80 x 110 mm	100W
Ø95 x 140 mm	150W 250W
Ø140 x 137 mm	400W



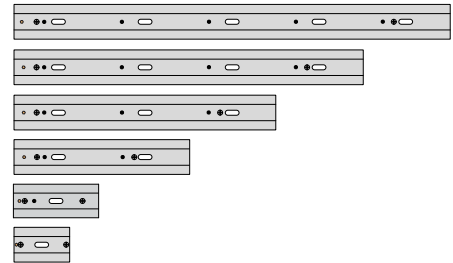
## REFLECTORS / PROJECTORS



## REFLECTORS

[www.ceramicx.com/reflectors/](http://www.ceramicx.com/reflectors/)

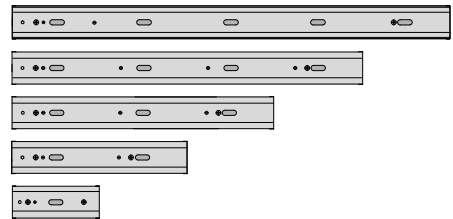
- RAS 5** Reflector Aluminised Steel 5 1,254 x 100 mm
- RAS 4** Reflector Aluminised Steel 4 1,004 x 100 mm
- RAS 3** Reflector Aluminised Steel 3 754 x 100 mm
- RAS 2** Reflector Aluminised Steel 2 505 x 100 mm
- RAS 1** Reflector Aluminised Steel 1 254 x 100 mm
- RAS 0.5** Reflector Aluminised Steel 0.5 160 x 100 mm



## PROJECTORS

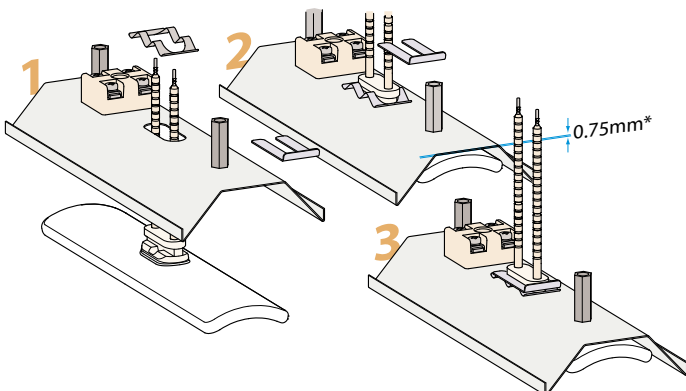
[www.ceramicx.com/projectors/](http://www.ceramicx.com/projectors/)

- PAS 5** Projector Aluminised Steel 5 1,258 x 94 mm
- PAS 4** Projector Aluminised Steel 4 1,008 x 94 mm
- PAS 3** Projector Aluminised Steel 3 758 x 94 mm
- PAS 2** Projector Aluminised Steel 2 508 x 94 mm
- PAS 1** Projector Aluminised Steel 1 258 x 94 mm

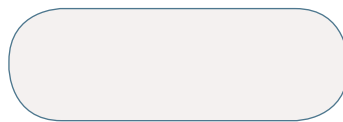


## INSTALLATION OF PILLARED ELEMENTS

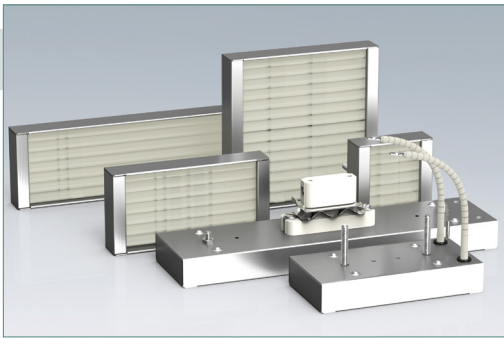
[www.ceramicx.com/ceramic-bulbs/](http://www.ceramicx.com/ceramic-bulbs/)



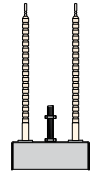
Recommended reflector thickness 0.75 - 0.9mm  
( minimum/maximum thickness 0.5 - 1.5 mm)



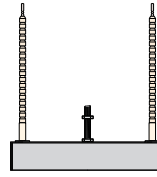
Slot hole size 42 x 15 mm



## QUARTZ ELEMENTS



Standard



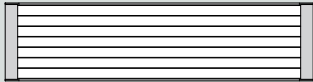
Square



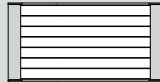
Pillar

### STANDARD QUARTZ ELEMENTS

[www.ceramicx.com/standard-quartz-element/](http://www.ceramicx.com/standard-quartz-element/)



FQE



HQE



QQE

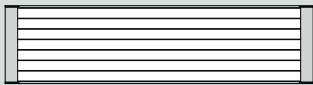


SQE

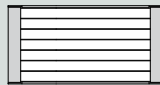
<b>FQE</b> Full Quartz Elements	247 x 62.5 mm	150W 250W 400W 500W 650W 750W 1,000W
<b>HQE</b> Half Quartz Element	124 x 62.5 mm	150W 250W 400W 500W
<b>QQE</b> Quarter Quartz Elements	62.5 x 62.5 mm	150W 250W
<b>SQE</b> Square Quartz Element	124 x 124 mm	150W 650W 1,000W

### PILLARED QUARTZ ELEMENTS

[www.ceramicx.com/pillared-quartz-elements/](http://www.ceramicx.com/pillared-quartz-elements/)



PFQE

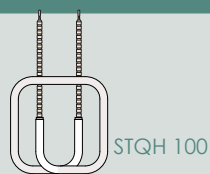


PHQE

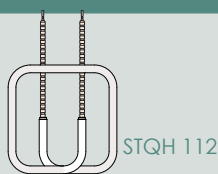
<b>PFQE</b> Pillared Full Quartz Elements	247 x 62.5 mm	150W 250W 400W 500W 650W 750W 1,000W
<b>PHQE</b> Pillared Half Quartz Element	124 x 62.5 mm	150W 250W 400W 500W

### SQUARE QUARTZ TUBE ELEMENTS

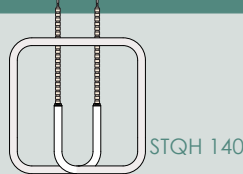
[www.ceramicx.com/quartz-square-tube-elements/](http://www.ceramicx.com/quartz-square-tube-elements/)



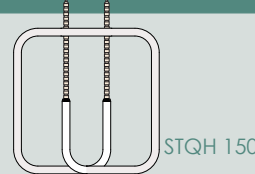
STQH 100



STQH 112

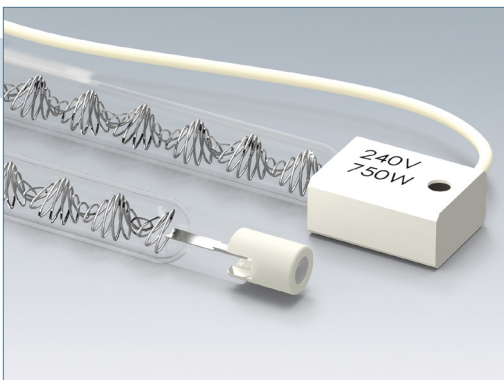


STQH 140

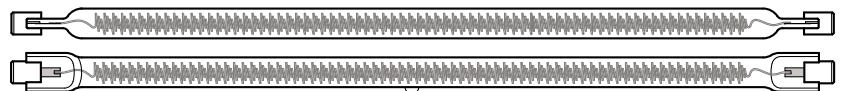


STQH 150

<b>STQH100</b> Square Tube Quartz Heater	100 x 100 mm	150W - 400W
<b>STQH112</b> Square Tube Quartz Heater	112 x 112 mm	150W - 400W
<b>STQH140</b> Square Tube Quartz Heater	140 x 140 mm	150W - 650W
<b>STQH150</b> Square Tube Quartz Heater	150 x 150 mm	150W - 650W



## QUARTZ TUNGSTEN / HALOGEN



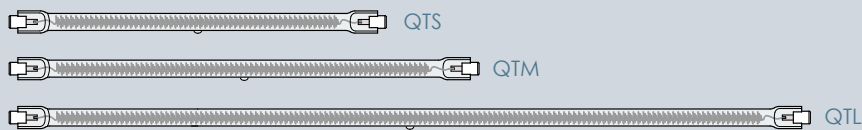
Quartz Tungsten



Quartz Halogen

## QUARTZ TUNGSTEN TUBES

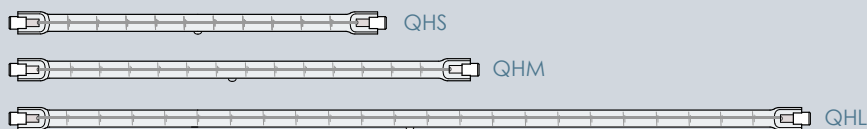
[www.ceramicx.com/fast-medium-wave-emitters/](http://www.ceramicx.com/fast-medium-wave-emitters/)



<b>QTS</b> Quartz Tungsten Short	Ø10 x 244 mm	750W
<b>QTM</b> Quartz Tungsten Medium	Ø10 x 277 mm	1000W
<b>QTL</b> Quartz Tungsten Long	Ø10 x 473 mm	1500W 1750W 2000W

## QUARTZ HALOGEN TUBES

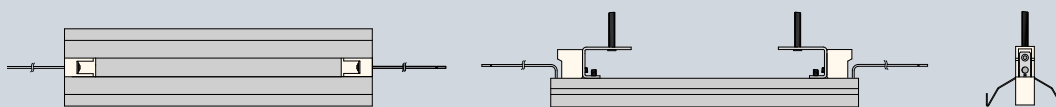
[www.ceramicx.com/short-wave-emitters/](http://www.ceramicx.com/short-wave-emitters/)



<b>QHS</b> Quartz Halogen Short	Ø10 x 244 mm	750W
<b>QHM</b> Quartz Halogen Medium	Ø10 x 277 mm	1000W
<b>QHL</b> Quartz Halogen Long	Ø10 x 473 mm	1500W 1750W 2000W

## QUARTZ TUNGSTEN/HALOGEN REFLECTORS

[www.ceramicx.com/reflectors/](http://www.ceramicx.com/reflectors/)

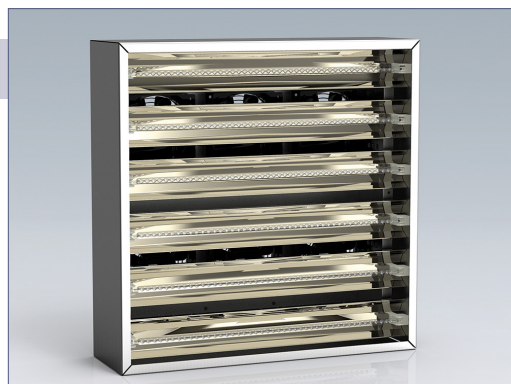


<b>QTSR</b> Quartz Tungsten/Halogen Short Reflector	250 x 62 mm	( Suitable for QTS/QHS, Tubes supplied separately )
<b>QTMR</b> Quartz Tungsten/Halogen Medium Reflector	300 x 62 mm	( Suitable for QTM/QHM, Tubes supplied separately )
<b>QTLR</b> Quartz Tungsten/Halogen Long Reflector	497 x 62 mm	( Suitable for QTL/QHL, Tubes supplied separately )

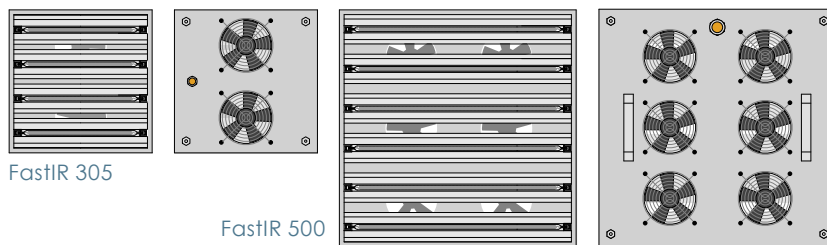
## SPECIAL TUBE ORDERS

[www.ceramicx.com/special-tube-orders/](http://www.ceramicx.com/special-tube-orders/)

Ceramicx can supply other types of Halogen/ Tungsten elements, of varying design, dimensions, length, coatings, terminations and electrical rating.



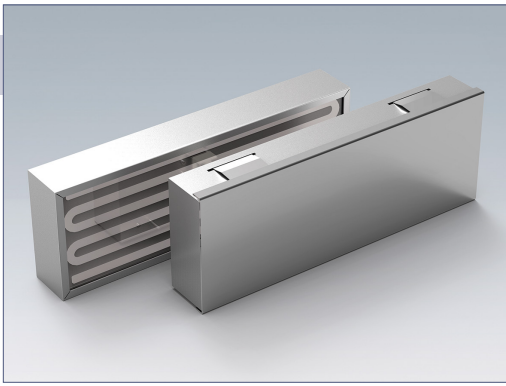
## FAST IR



## FAST IR

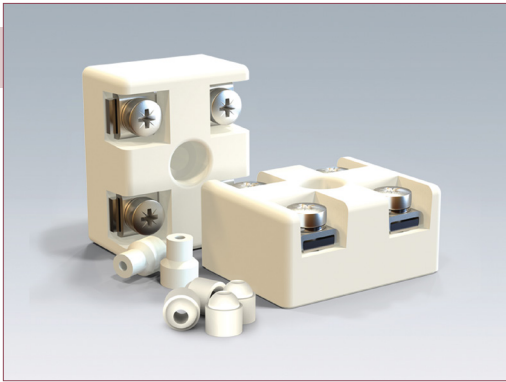
[www.ceramicx.com/fastir-systems/](http://www.ceramicx.com/fastir-systems/)

<b>FastIR 305</b> Suitable for 1000W Quartz Tungsten/Halogen Heaters QTM/QTH ( tubes sold separately )	305 x 305 x 150 mm	<b>4 Tube</b> 4kW	<b>5 Tube</b> 5kW
<b>FastIR 500</b> Suitable for 2000W Quartz Tungsten/Halogen Heaters QTL/QTH ( tubes sold separately )	500 x 500 x 150 mm	<b>6 Tube</b> 12kW	<b>7 Tube</b> 14kW



## CUSTOM PANEL HEATERS

Custom Panel Heaters.  
Available with anodised aluminium or ceramic glass face.  
Range of Wattages and Voltages.  
Multi-zone options with removable miniature thermocouple plug.



## STEATITE

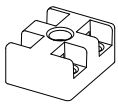
Steatite ceramic dust has proven itself to be the material-of-choice for the manufacture of electrical insulators. It has good mechanical strength with good dielectric properties and a high temperature resistivity of up to 1000°C.

Steatite is most commonly used in applications where a high temperature electrical insulator is required. It operates very well in cold switching applications and is also an excellent high voltage insulator.

### STANDARD STEATITE COMPONENTS

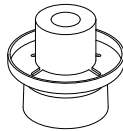
[www.ceramicx.com/steatite-press-components/](http://www.ceramicx.com/steatite-press-components/)

#### 2P Ceramic Terminal Block



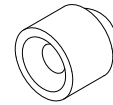
10 Pack  
no Fittings  
40 x 32 x 20 mm

#### Ceramic Grommet and Starlock



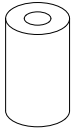
**Fastener Set** 100 sets  
per pack - used as an  
Insulator in sheet metal  
with 6mm hole  
21 x 18 x 15 mm

#### Ceramic Beads



per kg  
Loose or Strung  
Ø5 x 6 mm  
4.5 mm to shoulder

#### Ceramic Tubes



Ø5 x 11 mm

### SPECIALISED STEATITE COMPONENTS

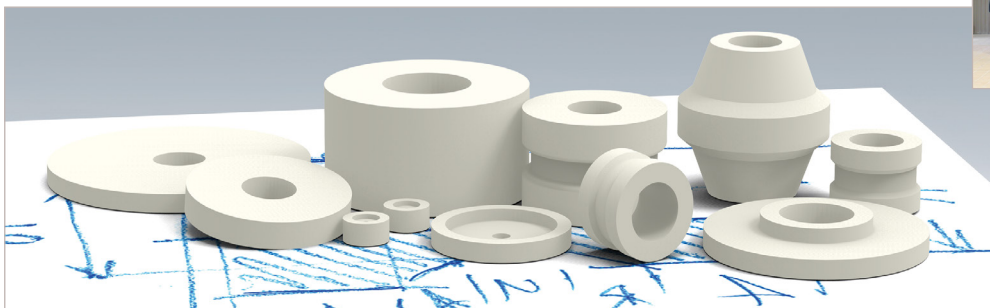
[www.ceramicx.com/specialised-dust-press-components/](http://www.ceramicx.com/specialised-dust-press-components/)

Ceramicx now offers the manufacture of specialist Steatite ceramic dust press components to companies that need quality insulators as part of their product manufacturing. For over twenty years Ceramicx has been shipping components and products to manufacturers in over 65 countries worldwide. Service, confidentiality and world class quality is offered, together with a unique know-how in developing and designing product solutions in Steatite Ceramic where needed.



Ceramicx manufactures dust press components on Dorst 20 and 15 tonne presses ( shown above ) and a Dorst 6 tonne press

A selection of parts that can be purchased

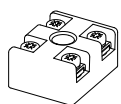


## ACCESSORIES

### HIGH TEMPERATURE CONNECTORS

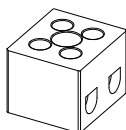
[www.ceramicx.com/high-temperature-connectors/](http://www.ceramicx.com/high-temperature-connectors/)

#### 2P Ceramic Terminal Block



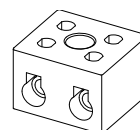
10 Pack  
Stainless Steel  
Fittings  
40 x 32 x 20 mm

#### 2P Mini Ceramic Terminal Block



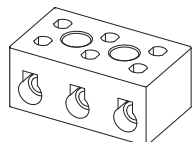
10 Pack  
Nickel Galvanised Brass  
Inserts, Zinc-plated Steel  
Screws  
21 x 18 x 15 mm

#### TB2 Ceramic Terminal Block



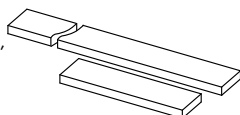
(closed) 10 Pack  
Plated Brass Inserts,  
Nickel Galvanised  
Screws  
34 x 30 x 22 mm

#### TB3 Ceramic Terminal Block



(closed) 10 Pack  
Plated Brass Inserts,  
Nickel Galvanised  
Screws  
51 x 30 x 22mm.

#### Stainless Steel Buzz Bar

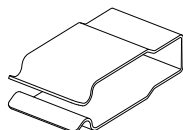


used with the ceramic  
terminal block to  
produce a flexible power  
distribution system  
8 x 2 x 1000 mm

### MOUNTING COMPONENTS

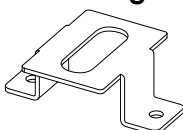
[www.ceramicx.com/mounting-components/](http://www.ceramicx.com/mounting-components/)

#### Flat Ceramic Base Holder



For Halogen/Tungsten  
heaters fitted with flat  
ceramic base

#### Mounting Bracket



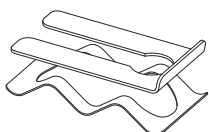
For ceramic elements  
72 x 57 x 28 mm.  
slot 42 x 15 mm

#### R7s Ceramic Holder



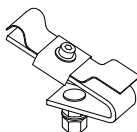
For Standard Quartz  
Tungsten/Halogen Tubes

#### Steel Wave and Spring set



Used in the mounting  
and installation of all  
Ceramic elements  
and the Pillared  
Quartz elements

#### STQH Holder

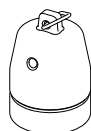


For all types of square  
tube Quartz Heaters  
(STQH)

### E27 ACCESSORIES

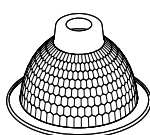
[www.ceramicx.com/bulb-reflector-and-e27-holder/](http://www.ceramicx.com/bulb-reflector-and-e27-holder/)

#### E27 Edison Bulb Holder



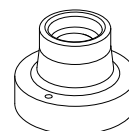
High temperature  
porcelain holder used  
with ceramic IR bulbs  
Ø53 x 74 mm

#### Ceramic Bulb Reflector



Highly polished  
reflector for use  
with ceramic IR bulbs  
Ø220 x 110 mm

#### E27 Bulb Holder with Base



High temperature  
porcelain holder used  
with ceramic IR bulbs  
Ø78 x 60 mm

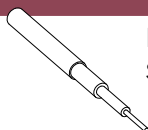
#### Glass Infrared Bulb



225W  
Ruby Double  
mirror  
123 x 170 mm

### HIGH TEMPERATURE NPC CABLE

[www.ceramicx.com/high-temperature-npc-cable/](http://www.ceramicx.com/high-temperature-npc-cable/)



#### High Temperature NPC Cable

Single Conductor Cable, Flexible Nickel Plated Copper Core, Glass Fibre Insulation, Silicone Coated Fibreglass Braid  
0.75 mm, 1.5mm, 2.5mm, 4.0mm



Ceramicx recently introduced two new pieces of equipment to its engineering department a specialist metal parts washer and a vibro de-burring mill to ensure that all metal components and parts meet the highest possible standards of finish.



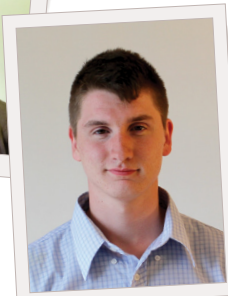
Ceramicx was recently featured in a film commissioned by Enterprise Ireland and shot by Glass Eye Productions. Ceramicx was used as a demonstrator of the effectiveness of the Innovation Partnership programme at a conference in Turkey where the Ceramicx has generated good business in recent years with its partner company Ser Rezistans A.S. Take a couple of minutes to enjoy the video here <http://youtu.be/CZZzV55ltk>



Ceramicx are happy to announce that after an 18 month process An Bord Pleanála has dismissed the appeal against the granted planning permission. This has created a pathway for growth for Ceramicx in the coming years. The permission effectively allows for a doubling of the size of the plant with a significant new engineering hall, a new production hall, new offices and a research lab and centre.



Before ▲  
After ►



Ceramicx would like to congratulate Mr. Shane O'Donovan an employee in Ceramicx. Shane recently completed his machinist training in the FAS centre CIT in Cork. This training involved Shane undertaking a 42 week course. Ceramicx helped support Shane in this undertaking and are proud to have him re-joining the team here and look forward to the new level of contribution that he will bring to bear in the months and years ahead.

## Exhibitions



■ **Interplas 2014** UK's leading plastics industry event. NEC, Birmingham, UK. 30 Sept - 2 Oct 2014

■ **Composites Europe** 9th European Trade Fair & Forum for Composites, Technology and Applications. Messe, Düsseldorf, Germany. 7 - 9 Oct 2014

■ **Fakuma** 23rd International trade fair for plastics processing. Messe Friedrichshafen, Friedrichshafen, Germany. 14 - 18 Oct 2014

■ **IPF** 8th International Plastics fair, Japan. Makuhari Messe, Chiba City, Tokyo, Japan. 28 Oct - 01 Nov 2014

■ **Advanced Engineering UK** Multiple inter related high value engineering. NEC, Birmingham, UK. 11 - 12 Nov 2014.

■ **EuroMold** World fair for Moldmaking and tooling, design and application development. Messelgände, Frankfurt, Germany. 25 - 28 Nov 2014

■ **PastIndia 2015** 9th International plastic exhibition and conference. Pragati, Maidan, New Delhi, India. 5 - 10 Feb 2015

■ **NPE 2015** The International Plastics Showcase. Orlando, Florida, USA. 23 - 27 March 2015



- Exhibiting
- Distributor exhibiting
- Visiting



Talk to us today about your infrared heating needs.



**ceramicx**  
INFRARED FOR INDUSTRY



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 Email: info@elmec.in



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 Fax: +27 21 552 7304



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 ■ Marc Johnson *Operations Manager*



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 Fax: +55-11-4646-1083  
 Email: andre.santos@smsresistencias.com.br



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[www.ceramicx.com](http://www.ceramicx.com) | [www.ceramicx.co.uk](http://www.ceramicx.co.uk)

# CHECKOUT

# ceramicx onlineshop

Infrared heating elements direct from the manufacturer

## Ceramic Elements

Trough elements

Hollow Elements

Flat Elements

Ceramic Bulbs

Thermocouples

## Quartz Elements

Quartz Heaters

Single Tube Quartz Heaters

Pillared Quartz Heaters

## Quartz Tungsten / Halogen Elements

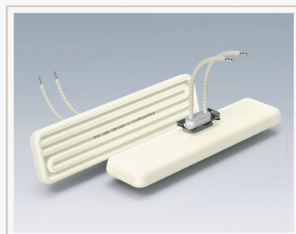
Quartz Tungsten Tubes

Quartz Halogen Tubes

Special Tube Orders

## Steatite Press Components

UK IRL  
high temperature  
connectors  
Manufacture C



### FULL FLAT ELEMENT HOL...

Available from 250 to 800 Watts  
Dimensions: 245 x 60 ...

VIEW PRODUCT



FULL  
Avr



# shoponline



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IRL [www.ceramicx.com](http://www.ceramicx.com)

For all non standard items contact [sales@ceramicx.com](mailto:sales@ceramicx.com)



## ONLINE INFRARED TRAINING COURSE

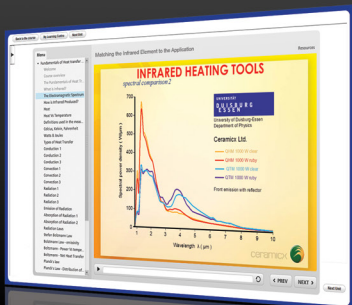
The course is divided into four modules that set out the basics of Infrared from an Industry perspective.

Each module will take 60-90 minutes to complete and finishes with a short online test. The modules can be taken online, or taught as part of a classroom course.

Further information can be found inside on pages 8 and 9.

The course is now available online at

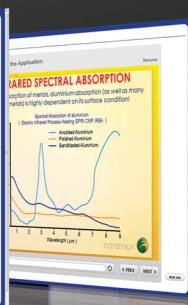
[www.ceramicx.com/applications-training/](http://www.ceramicx.com/applications-training/)



**Module 1**  
Fundamentals of Heat Transfer and Infrared



**Module 2**  
Infrared Energy in Process Heat



**Module 3**  
Matching the Infrared Element to the Application



**Module 4**  
Control of Infrared