



# Celsius

ISSUE 1

APRIL 2004



Heat Treatments Limited  
Quarterly Newsletter  
Autumn Issue

## Welcome

Welcome to the first issue of Celsius, Heat Treatments quarterly customer newsletter.

Our goal in bringing you this publication is to raise your awareness of the products and services that we can offer and to endeavour to demystify some aspects of the heat treatment process.

Why? Originally founded as W.D. McGregor Limited in 1946, we have a long established history of servicing New Zealand's engineering and manufacturing industries. Ours is a complex industry and it is our belief that by expanding your understanding of what we do and how we do it, we will enable you to identify new ways in which we can be of service.

Celsius will cover all manner of things including the 'lighter side' of Heat Treatment's business – it won't be just vacuum hardening and gas carburising and the like! We also want to give you the 'human' side of Heat Treatments as we believe it's our people that make us truly successful and it's their knowledge, experience and expertise that enable us to give you consistently high quality products and services.

We'd also like to encourage you to get involved, so let us know what you would like to read about in future issues and don't forget to take part in our reader's competition.

Fergus Thomson  
General Manager

### This Issue...

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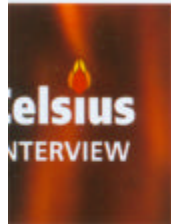
Moving with the Times



# Reinvestment and an Eye for the Future



Keith McGregor  
Owner



## An Interview with owner - Keith McGregor

Ask Keith McGregor what he thinks is the key to running a successful family owned business and he'll say reinvestment and an eye for the future. What he perhaps fails to mention, but which is rapidly obvious, is also the passion for innovation, determination and genuine desire to do a good job and give good service.

Celsius talked recently with Keith about his involvement in the business, what he believes are the key drivers behind its success and his view of the future.

### How did you get involved in the business?

Having got some solid mechanical work experience under my belt I decided to take up my father's offer of a job within the family owned heat-treating business. My brother John was already working there as a fitter and turner and the mechanical experience I had gained meant it was a good option for both the Company and me.

### What have been the key drivers in the development of the business over the years?

Heat Treatments has a history of both responding to customer demand and to leading the market in terms of innovation. My father started out building pottery kilns and when he saw a gap in the market for heat-treating of steel he began to build furnaces to meet this demand. He was so successful that he soon gave up making pottery kilns and concentrated solely on heat-treating.

This tradition of always looking to the future and ensuring we respond and adapt to meet the needs of the market has meant we've been able to grow and develop the business to what it is today.

We believe wholeheartedly in a continual programme of reinvestment. It's only by looking for ways of improving your existing plant or by building and installing new equipment that you can offer customers a wider and more complete range of services.

We get a lot of inspiration from trips overseas to various heat-treating conferences. Making contacts with people who are in the same business means we can learn from their mistakes and benefit from their successes.

Although our market is small, New Zealand requires a diverse range of heat treatment processes. As a result we've avoided specialising in any one area and pride ourselves on being able to offer the largest range of services available.

The bottom line is that we enjoy what we do, we value the skills, knowledge and expertise of the people who work as part of the Heat Treatments team, and we are always

trying to stay one step ahead of market demand.

### What have been some of the challenges along the way?

Second-guessing where the markets' going is not an exact science and there have been times when we've installed plant that was in a sense 'ahead of its time' in New Zealand. This can place you on a very steep learning curve.

And like most businesses we've had to cope with rising costs (i.e. labour / power etc) and at the same time face customers' demands for lower prices. In this situation the only thing you can do is get truly innovative. It's about finding new methods or techniques that will give you the same quality job but at a lower price per unit.

### Where is the business at today?

Heat Treatments has never been a business that stands still for long and we're firm believers that change can open the door to new opportunities. For example when my brother, John, decided to retire recently we made the move to bring in Fergus as General Manager, responsible for the day-to-day running of the business. Through his eyes we've gained a whole new perspective on where our business is at and where we need to take it.

Although our core business is and will always be heat-treating we've made the move to upgrade our machine shop. With many external machine shops as valued customers our goal is not to set ourselves up in direct competition but to be able to offer a more complete service to those clients whose products require machining and who don't have access to an in-house facility.

And as always we have a number of projects underway aimed at improving or expanding the services we offer. For example we're currently negotiating with an American company to purchase the plans for a new carburising furnace. We've identified an opportunity within the heavy industry sector for the processing of larger, heavier components. This furnace is highly automated, is able to load and unload itself and will be the only one of its kind in New Zealand. We believe it will be in 'hot' demand when it comes on line.

### In conclusion – what do you think makes Heat Treatments successful?

Put simply – our people, our equipment and our desire to do a good job and give exceptional service.



## Heat Treatments

QUALITY • SERVICE • EXPERTISE

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### The Heat Treatments Service Team:

Heat Treatments:	Len Allen Murray McLeod	Customer Service Production & Quotations
Technical / Metallurgical:	Adam Walmsley & Ivan Mitchell	
Machine Shop:	Dennis Scotting Brian Thompson John Baird	Estimates & Quotations Production Operations
General:	Steve Askew Kathy Williams Elaine Folau	Quality Co-ordinator Receptionist Accounts Receivable



## Checks and Balances – The Role of the Metallurgy Lab

Success for Heat Treatments means consistently delivering a quality product that does the job it was designed to do. Ensuring this happens on a continual basis is the ultimate responsibility of the Metallurgy Laboratory team – but who are they and what do they do?

Most heat treatment facilities operate some sort of 'lab' to test the quality of products produced. However what sets Heat Treatments lab apart from its competitors is the depth of experience, knowledge and expertise inherent in the team.

As trained metallurgists, with over 45 years combined experience in the trade, Adam Walmsley, Ivan Mitchell and Gopal Reddy are able to deliver clients a number of services and benefits.

Tasked primarily with providing metallurgy quality assurance of Heat Treatment's processes, and services, the team also provide crucial advice and support during the specification phase of a products life cycle.

"Most clients are very clear on what their product should look like and how it needs to work, however many are unaware of what they need to consider in terms of it's metallurgy make-up. That's where we can add real value. If a client gets us involved at the concept stage we can offer advice on the type of metal used and the hardening process that will deliver the best results. This can save a client a significant amount of time and money, especially when it's a large or complex job," comments Adam Walmsley.

"Using our team to write specifications and procedures for use in the heat treatment process a client can be assured of an optimal result not only on the first batch but on subsequent batches. And once a relationship is established an on-going dialogue with a client provides feedback which we can use to improve on the initial specification."

### Getting to grips with the 'guts' of a product – Testing

The Metallurgy Lab spends a considerable amount of time testing products using a variety of different procedures. These tests are part of the company's on-going quality assurance programme but are also carried out at the request of clients who require written verification of the process and its results as applied to their product.

Tests look at a range of things including:

**Microscopic structure** – This is where the visual features of a metal are examined under a microscope to ensure they meet specification and to determine whether or not there are any detrimental features.

**Micro Hardness** – Completed under a microscope this special type of hardness test

measures changes in hardness over the cross section of a component and can also hardness test specific features or areas.

**Case Depth** – As some products only need to be hardened on the surface leaving the core soft, there is a requirement to test the depth of hardness or 'case depth'. Two methods can be used including visual (micro-structure - as above) or hardness traverse (micro hardness - as above).

**Hardness** – The most common type of hardness test is called the Rockwell Test and it involves using a set force to press a cone shaped diamond into the surface of the part being tested. The depth that the diamond 'sinks' into the part indicates its hardness i.e. the further it goes the softer the metal.

### The name of the game - Consistency

Producing a product that meets set quality criteria and which is consistent across batch loads is not an easy task. Although everyone takes their share of responsibility in maintaining quality, the 'buck' stops primarily with the Metallurgy Lab as they have the capacity to test the huge number of process variables, equipment, personnel and techniques used during the heat treatment process.

Process variables include such things as temperature, gas flows, atmospheres, pressure, heating / cooling rates and quench speeds to mention just a few. These must be controlled within set tolerances in order to achieve the optimum properties desired, and if they aren't surface finish, colour, distortion or mechanical properties of the product can be negatively influenced.

The team continually monitor equipment for maintenance issues and to ensure accurate calibration. In addition they review the techniques used in the heat treatment process of a product to determine whether or not heavy versus light loads or even the load orientation have affected the final outcome.

If you have any questions or would like to contact one of the Metallurgy Lab's team members contact 09 621 0020, follow the prompts and press 2 for 'Heat Treatment Services' and then 4 for 'Technical enquiries'.



The Laboratory Team  
Gopal Reddy, Ivan Mitchell  
and Adam Walmsley



Gopal Reddy  
Instron Hardness Tester



Gopal Reddy  
Micro Hardness Tester

## Celebrating our Greatest Asset – Our People

Heat Treatments wouldn't be where it is today without the knowledge, expertise and experience of our people. In each issue of Celsius we'd like to profile a member of staff and get their perspective on life at Heat Treatments.



Trevor Edmondson

### Trevor Edmondson Welder

Responsible for: Large variety of welding, sheet metal work, light engineering

Length of service: 38 years

### How have things changed during your time with Heat Treatments?

The move from furnace and oven manufacture to what is now its core business - heat treatments - was significant in my early years as I was employed as a welder, along with eight others, to build furnaces. Mr. McGregor senior had real foresight and saw how this aspect of the business had the greatest potential. Then when Keith and John McGregor took over from their father, they streamlined the company and continued the tradition of reinvestment, and again used technology and innovative equipment to leverage growth.

### What makes Heat Treatments a good place to work?

I've always enjoyed the variety of work available. Although my core skill is welding I've had to turn my hand to sheet metal work, turning, insulation and other light engineering work. I've been involved in both designing and fabricating of furnaces and have had the opportunity to work offsite at places like Air New Zealand and Comalco.

I've been talking about retiring for about six years but then each time I get close to going through with it some interesting work comes up and I don't want to miss out!





## Getting to Grips with Terminology

Every business has its own jargon and heat-treating is no different from any other. It's usually not a problem until you discover that everyone isn't 'singing from the same song sheet' and that one person's understanding of a term is totally different from another's. And that's when mistakes can happen!

One such example in our business is the term Case Hardening. Broadly speaking Case Hardening is used to describe a number of surface engineering techniques including; carburising, nitriding, and induction hardening. However in New Zealand it is generally accepted that Case Hardening refers to the carburising process only. If, as a customer, you aren't

aware of this you risk ordering what is in effect an inappropriate process which could lead to less than beneficial results.

Similarly, situations can also arise if there is a lack of awareness of the impact of different Case Hardening processes. For example when pre-hardened high tensile materials such as 4140, 4340 or P20 are Case Hardened using the carburising process, there is a tendency to 'through' harden areas, especially thin sections, leaving a component that has very limited ductility. Carburising is carried out at about 900°C, which can result in distortion and the possibility of cracking if the component has a complex shape or sharp corners. The bottom line is Case Hardening these types

of steels is best done by Nitriding, or if geometry permits, Induction Hardening. With these processes the risks of distortion, cracking or loss of core strength are much lower.

So how can mistakes like this be avoided? It's important to be specific about the type of Case Hardening you require and noting this on all order forms. If you are unsure as to which process is the most appropriate, make a call to the Metallurgy Lab Team and get some advice.

And finally - don't forget... just because we're all singing - doesn't mean we're singing from the same song sheet!



Carburising Furnace being loaded

## Moving with the Times

One aspect of Heat Treatments' business that hasn't changed over the years has been our commitment to offering a 'total' service. That's why we've always maintained a small machine shop for those customers who don't have an in-house facility or who would like us to complete the job following the heat treatment process.

And like the rest of our business, this area has grown enormously as customers reap the rewards of the machine shop's knowledge, expertise and skills. For many years the machine shop existed out the back of the heat-treating plant, but with

ever increasing volumes of work the decision was finally made to bring the facility 'in from the cold' so to speak.

According to John Baird, Operations Manager of the Machine Shop, moving next to the heat treating plant has given the team a 40% increase in space, reducing congestion, increasing productivity and enabling them to install several pieces of new equipment.

"One of the primary benefits of the shift for our customers has been our ability to increase both capacity and productivity.

We've been able to install an additional Machining Centre which has already enabled us to reduce lead times and overall costs," says John.

"We have also just installed a **Co-ordinate Measuring Machine** which will improve our ability to measure accurately and work as a quality 'precision' Machine Shop."



Terry Sassman Co-ordinate Measuring Machine

## Stoke the Coals of your Mental Furnace

Correctly answer the following questions and go in the draw to win a case of Adam's choice selection of 'Quench Media' (wine).

What year did W.D. McGregor set up shop?

What types of metals are often more appropriate for nitriding than carburising?

How much more space has the machine shop got since it moved to its new location?

What three different processes can Case Hardening be referring to?

If you are not the person to whom Celsius was sent, do you wish to receive Celsius on a regular basis?

Yes / No

Name:

Company:

Postal/Physical Address:

Phone:

Email:

Please fax back to 09 621 0019 to go into the draw on 30 April 2004.