

## There's no end to compliance!!!

To enable Heat Treatments to supply a first class service to our customers', we must first ensure that we act in accordance with our own rules and the regulations.

So far this year we've had a full calendar in terms of Quality Assurance having had a number compliance audits of one sort or another.

- We were visited by an Airworthiness Inspector from the Civil Aviation Authority in March for our annual on-site assessment. We're happy to report that we passed with flying colours and that the quality assessment score given to us by the CAA has been steadily improving.
- In early June we had another annual audit and this time it was the Machine Shop's turn. It was a two-day re-certification audit to re-new our ISO 9001 certification. Again very few problems were uncovered.

- In mid August an American auditor will be paying us a visit from Lockheed Martin, to assess our heat treatment processes. This is an audit that is done every three years and during the interim we supply heat-treated sample specimens to Lockheed for their review and approval.

Although these main compliance audits are undertaken each year, it is by no means the only auditing and compliance activity that takes place. There are supply assessment visits, supplier questionnaires, internal auditing and the calibration of measuring equipment and furnaces.

So although compliance can be a bit of a dirty word – it's just part of the normal processes that we work through at Heat Treatments.

## The low down on drawings and specifications

In an ideal world a part requiring machining will arrive in the machine shop accompanied by detailed specifications and / or drawings. But guess what – we don't live in an ideal world. At Heat Treatments we work in a 'jobbing' environment where volumes and time do not always allow for detailed drawings to be created. Hence there is a need to find some kind of middle ground where we are given enough information to ensure we can achieve the finished result ensuring the part is 'fit for purpose'.

In most cases, work we receive is accompanied by some form of drawing. Problems arise when we receive poorly done drawings, faxed photocopies (which have become blurred and / or faint) and what we call 'cigarette box' sketches. Difficulties are also encountered when we receive samples, failed parts or rough mock-ups that aren't accompanied by any drawings or back-up information.

The drawing provided doesn't have to be an elaborate 3D CAD production. If the part required is a simple item, a clear, well dimensioned hand-drawn sketch is sufficient as long as it conveys all the functional requirements of the part.

Drawings should include information on the tolerances required. If this detail is not provided we are forced to adopt standard tolerancing / finish combinations which may not be sufficient to make the part 'fit for purpose'.

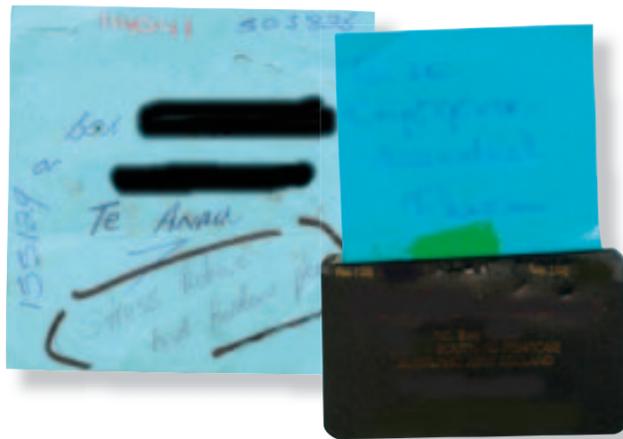
Looking at the opposite end of the spectrum, there are also times when drawings are received that have tolerances putting it in the over-engineered category, which results in needless costs.

In the majority of situations we are aware of how the part is going to be used and will modify the level of tolerance / finish accordingly. However, as we are an ISO registered machine shop

we are still required to get a concession from the customer in order to release a part that does not comply with the original specifications.

Getting the pricing right is also hard if the information provided is not adequate. All too often we are asked to quote on the basis of non-machining drawings (e.g. foundry casting, general assembly or drawings required by the toolmaker who is making the part). Giving an accurate cost based on these is difficult and can lead to over pricing.

The bottom line is that the more detail we have the better able we are to provide you with a finished product that meets your needs and which is priced appropriately.



Some examples of orders and drawings received with work from customers.



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# Celsius

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## Keep Moving

Do we invest or do we sit tight and wait for inclement times to pass? It's a question many within the engineering and manufacturing industry are currently asking themselves ... yet again.

It's not surprising given the talk of a cooling economy, free trade agreements making life uncomfortable if not downright impossible and things like escalating energy costs and unwieldy compliance regimes all contributing to the rising cost of production.

This all makes for an increasing level of unease and uncertainty – and to cap it all off there's the upcoming general election where MP's will offer up their souls for a slice of the action.

But before we get too overwhelmed by doom and gloom, don't forget this is nothing new. Many of us have faced this situation before and know that often the answer is to keep 'moving', making the most of any opportunities that do present themselves and adapting the business model accordingly. In fact, enduring companies have basically learnt to play with the cards they're dealt.

At Heat Treatments our plan is to continue doing just that – keep moving. We've made significant investment in our business over the past two years and we'll be making the most of every opportunity we're given to continue to provide reliable and up to date services for our customers – whatever the economic climate throws at us.

With this in mind we bring you the 7th issue of Celsius in which we profile PT Ltd – a company with 'exacting' standards, we give you the low down on machine shop drawings and specifications and the Lab Team outline tips on making the most of the Nitriding process.

As always we invite your feedback so that we can continue to improve Celsius, and hope that you enjoy reading this latest issue.

Fergus Thomson  
General Manager



## PT Ltd

In this issue of Celsius we spoke with Keith Flexton, NZ sales manager for PT Ltd, a privately owned New Zealand company working in the area of electronic force and load measurement equipment.

### Tell us about PT Ltd, it's products and markets ...

Most of what we use on a daily basis has been measured at some point in its lifecycle. In fact every day we come into contact with measuring devices - from the small scales at the local supermarket right up to the heavy road vehicle weigh bridges you see on the side of the road. At the heart of all this weighing equipment resides one or more load cells.

And that's where PT Ltd, or Precision Transducers as it was originally called, comes in. Established in 1979, the company manufactures load cells and weighing accessories for the New Zealand and export market.

Based out of a manufacturing facility in Auckland we employ around 60 people and on average produce around 200,000+ 'units' per year. Despite over 75% of our products being sold off-shore we maintain a focus on our home market and where possible endeavour to support local suppliers, like Heat Treatments.



Our load cells are used by companies for all sorts of applications including trade certified apparatus and material testing. Therefore it is vital that the PT load cell can be relied upon to deliver results which are accurate and repeatable. To achieve this the cell must be produced to exacting standards and that means using only the best materials, processes and methods of manufacture. For example we use specialised imported steel because the quality of the product is directly related to the quality of the steel used. The result is a high quality device that works exactly the way it's been designed to.

Our product range includes Shear Beams, S-Types, Bending Beams, Compression (Canisters and Pancake) and specialist weighbridge load cells.

A key differentiator is our ability to produce one-off, highly specialised weighing devices known as load pins.

Our capacity to accommodate specialised requirements and our commitment to precision is, we believe, a key factor in our on-going success.

### What are the key challenges facing PT Ltd ....

Due to the limitations of the New Zealand market there is the need to focus on driving exports and competing on the world market brings its own challenges. The strong kiwi dollar, free trade agreements and having to compete against countries like China where labour, utility and other costs are so much cheaper, can make life tough. But we make sure that we win the race when it comes to quality, reliability, precision and customer service!



### Explain the role Heat Treatments plays in your business ...

Heat Treatments has been working with PT Ltd since its inception. With over 80% of our products being made from various types of steel the majority of what we produce goes through Heat Treatments at some point in the manufacturing process.

Heat Treatments understands that the treatment process must be exactly right for the load cell to perform correctly. In fact our engineering department will often discuss special jobs with the Heat Treatment team in order to confirm what process is required in order to yield the best results.



The bottom line is precision - that's what we offer our clients and that's what we need from Heat Treatments.

## Did you know:

In one year :-

- 107 different calibration checks are carried-out on our furnaces, ovens and associated equipment
- 160 pieces of measuring equipment are calibrated, inspected and passed as being okay to ensure our customers' work is correct.

## The in's and out's of Nitriding

The Lab Team have put together the following tips on Nitriding and what you need to consider in order to get the best results:-

### Residual Stresses:

Nitriding is performed at temperatures that will relieve any residual stresses in the material and may result in distortion. This effect can be reduced to a minimum or even eliminated by incorporating a stress relieving operation during manufacture. As a general rule, the part should be rough machined, leaving 0.2mm - 0.5mm on dimensionally critical areas, stress relieved, finish machined, then finally nitrided. Automotive Crankshafts; Used cranks with unknown histories should also be stress relieved.

Correct procedure is as follows:

- Stress relieve (note we stress relieve cranks in a nitrogen atmosphere to prevent scale)
- Grind to finished size
- Nitride
- Polish Journals

### Material Condition:

Steels to be nitrided should preferably be in a hardened and tempered condition prior to nitriding. High tensile steels such as 4140/4340/P20 are supplied by the steel company already in the hardened and tempered condition. However, many tool steels are supplied annealed. Grades such as H13, D2, A2, and O1 will respond much better if hardened and tempered first.

### Surface Finish:

It is not recommended to nitride mirror polished components. The polishing can make the surface slightly passive and cause variable/patchy surface hardness when nitrided. We recommend a minimum surface roughness of 0.05µmRa and leave the final polish until after nitriding.

### Threads:

Nitriding increases 'notch sensitivity', which means notched components can become brittle. This is especially relevant to high strength fine threads. If you have any highly stressed threads please make us aware of them so they can be masked.

### Growth:

A small amount of growth occurs on all surfaces during nitriding. Dimensionally critical parts should have an allowance for growth. Generally with our process, depending on the depth of nitriding we expect 2 - 10µm of growth on all surfaces.

### Cleanliness:

Cleanliness is very important with nitriding, as any contamination can affect the atmosphere control and may result in discolouration and/or reduced properties of the nitrided layer. Not only is your job effected, but everyone else' work in the load may suffer. Used plastic moulds in particular must be thoroughly cleaned, as dirty water jackets and plastic left in sprue areas can be a real issue.

## The man behind the voice



Dennis Scotting could be called the 'voice' of the Machine Shop. Ably assisted by John Hoogveld, Dennis is the person you call when you want to find out what's happening with your job, what it will cost and when it will be ready. With a life time of work in the engineering industry and having spent the last 17 years in the Heat Treatments Machine Shop, he's the ideal man for the job.

Asked what he sees as his biggest challenge his response is 'lack of detail'.

"Just knowing what the part is going to be used for can make a huge difference. For example when grinding large pins for quarry and road working machines, we know we can allow a large tolerance (1/2 mm in some cases) as a large amount of mud and dirt gets into these machines causing all sorts of grief. On the other hand, we have customers who require close tolerances of less than .01mm and a finish to cater for more exacting conditions.

When asked what advice he would give to customers looking to utilise the services of the machine shop Dennis gives the following advice:-

- Ensure that the type of metal, heat treatment process and machining specifications are appropriate in terms of how the part is going to be used.
- Provide drawings with size specifications. Sending in a worn part, without supplying original size details means we are left guessing as to the tolerances required. This can easily result in 'over-engineering' of a product and that in turn means a higher product cost.
- If at all possible take a long term view as to the quantity you require. The initial set-up cost can be minimised by spreading it across larger quantities.