Melett newsletter issue six

QUALITY REPLACEMENT TURBOCHARGER PARTS

NOW OPEN

Melett North America Sales and Distribution Centre

We are delighted to announce that our first 'Melett owned' subsidiary, Melett North America Inc. is now fully operational and open for business.

The new centre includes sales, warehouse and distribution facilities to serve the US and Canadian markets. The centre is also an ideal shipping point for our customers in Mexico or South America, if shipping from the US is preferred.

Ian Warhurst, Kenny Taylor, Lacy Harden, Donnie Beaty and James Stones

As the American market is becoming stronger, we recognised the potential of having a base within the US

Following the successful launch at the ADS Florida show in August, the opening of the new centre follows Melett's move to larger premises in the UK last year and more recently the opening of Melett's Engineering office in China, earlier this year.

The new North American facility is managed by Kenny Taylor, formerly with Cummins Turbo Technologies. Kenny is already very well known in the industry after working with Cummins/Holset for the past 10 years. As General Manager, Kenny was responsible for the sales and distribution of turbos and parts to the entire Holset dealer network in the US and Canada.

"As the American market is becoming stronger, we recognised the potential of having a base within the US," says Ian Warhurst, Managing Director and Owner of Melett Ltd in the UK. "The opening of Melett North America Inc. is a very positive step for us, as it reflects a significant expansion of our business and gives us a better understanding of the American market allowing us to develop more suitable parts and serve our US customers better".

Contact details for the new facility are:

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HOT TOPIC Overspeeding

The long-term future for turbochargers

Website search function in detail

We take a look at industry news

Our in-house engineering team

Melett - Helping the Reconditioning Industry to keep Reconditioning

THIS ISSUES HOT TOPIC

Common turbo failure modes create much discussion between our customers and technical department. To assist our customers in identifying the various failures in warranty situations and how to prevent failures occurring, we have created a series of help topics.

In this issue our focus is on OVERSPEEDING

Overspeeding is a term used when a turbo is operating well above its normal operating limits.

So, what causes overspeeding?

- Engine modifications including 'chipping' or 'over-fuelling'
- Inconsistent flow of air into the turbo - this can be caused by a tear in the air hose or it becoming completely detached, or by restrictions in the air intake filter or pipe work
- The wastegate or VNT mechanism has been set incorrectly
- Worn injectors
- Installing an incorrect turbo
- Loss of signal to the SREA (Simple Rotary Electronic Actuator) for the wastegate or VNT control

Visual effects of overspeeding?

- The 'orange peel' effect
- Inducer blade damage can be a consequence of housing rub
- Staining due to oxidation
- Partial loss of blades
- Burst wheel

The 'orange peel' effect explained:

'Orange peel' effect on the back face of the compressor wheel is created by expansion and contraction. When the compressor wheel overspeeds it grows in size. This expansion causes cracks between the grain boundaries of the material, in mild cases this returns back to its original state (like elastic) but in most cases these cracks begin to grow and eventually part of the hub can break away.

Quite often overspeeding is overlooked as a cause of the turbo failure. This is because symptoms of other failures can occur as a result of this overspeeding. Material transfer and discolouration of parts may indicate a lack of lubrication. Scoring to parts could indicate oil contamination, however the particles that have caused the scoring could have broken away from the bearings as a result of the overspeeding and imbalance caused by this. This imbalance can also cause compressor rub and turbine wheel rub in the housings, which in turn can lead to the shaft snapping and loss to part of the inducer.

All in all overspeeding causes a lot of damage and is often the primary failure mode! Recognising these features when diagnosing a warranty return can save time and money.

For further information on this or other topics, please contact Melett Technical Support. *technical@melett.com*

The 'orange peel' effect on compressor wheels

Compressor wheel rub

Complete component failure

FUEL POWERED FUTURE

We had many interesting conversations with customers at the Automechanika Show in Frankfurt – many customers were asking our opinion on the long term future of turbochargers. To help with our long term strategy, Melett believes it is important for the aftermarket to maintain awareness of the future global direction of engine technology and more importantly – the future of turbocharged vehicles.

One of the on-going challenges facing the global automotive industry is the need for more effective technological solutions, which will provide lower emissions and better fuel efficiency in tomorrow's vehicles.

There is much hype surrounding electric and hybrid powertrains in the news today, however it is the internal combustion engine that is set to remain the favourite for many years to come. Research has found that one of the biggest effects of electrification has been to push engineers to develop new more creative solutions for engine technology. Thanks to technological advances such as turbocharging, improved injection systems and variable cam timing, internal combustion engines are more efficient than ever before.

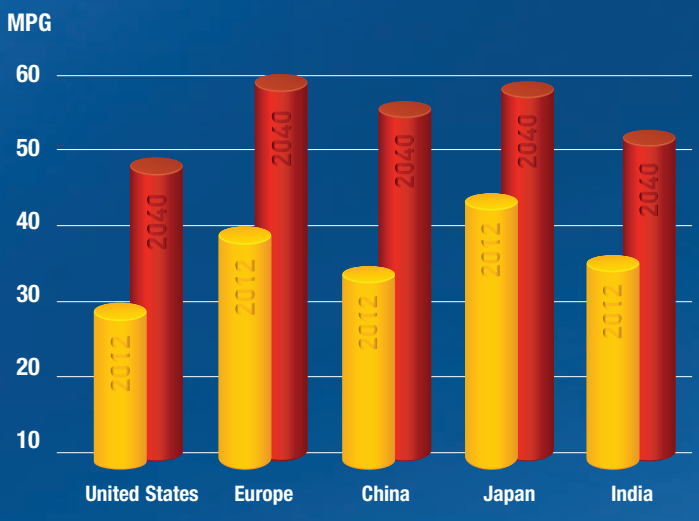
Thanks to technological advances such as turbocharging, improved injection systems and variable cam timing, internal combustion engines are more efficient than ever before.

Analysts believe around 25% of vehicles in Europe will have some form of electrification by 2020, but most of these will be hybrids with a smaller, efficient turbocharged engine. Only approximately 2% of cars sold will be fully electric vehicles. This is partly due to the high cost of the advanced batteries needed to power these vehicles and also because combustion engine technology has advanced rapidly with fuel-saving systems.

In the near future, it is the turbocharged internal combustion engine that is proving to be the quickest and most cost effective route to emission compliance and lower greenhouse gases. Industry analysts predict by 2020 as many as seven out of ten engines on new light vehicles produced globally will be turbocharged. Downsizing is the current trend resulting in up to 40% fuel savings. As a result, the turbocharged V6 is the new V8 and the in-line 4 turbo is the new V6.

Our conclusion is that with the turbo OEM's are doing such a good job in developing their own technology, it is going to be a very long time before the aftermarket needs to get worried. The future is definitely going to be turbocharged for many years to come…

Average on-road new car fuel efficiency



Source: ExxonMobil

New Melett website with improved search functionality

Following valuable customer feedback, the Melett website has undergone a design refresh including improved search functions, making it quicker and easier for our customers to find the information they are looking for. The comprehensive search facility allows customers to search in a variety of ways.

Search Function Guide:

Search by Manufacturer

Designed to help you quickly find the turbo part number when only the vehicle Make and Model is known.

Search by Turbo or Vehicle OEM Number

Designed to help you quickly find a turbo when you know the turbo or vehicle number.

Where Used and Keyword search

This comprehensive search function allows you to search the Melett database using ANY keyword e.g. Galaxy / GT1749V / OM647 or ANY component part no. to find all other turbos with the same components e.g. 1102-017-439 / 1102-015-300. Use this search to find the same component in any other turbo to make best use of your old core. NB: As per original Melett search box.

Shaft and Wheel search by dimension

This search function allows you to simply find all the Shaft & Wheels available from Melett by the Inducer diameter.

Compressor Wheel search by dimension

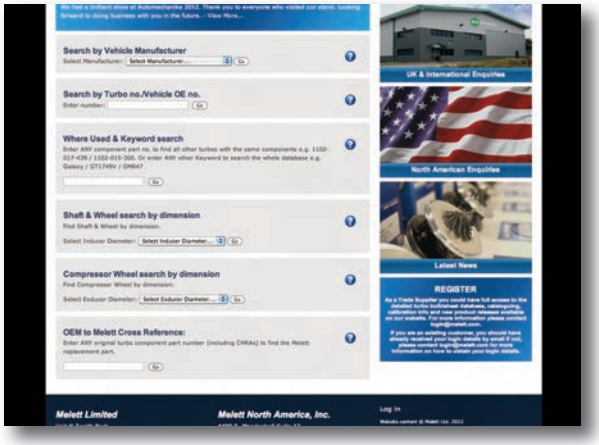
This search function allows you to find all the Compressor Wheels available from Melett by the Exducer diameter.

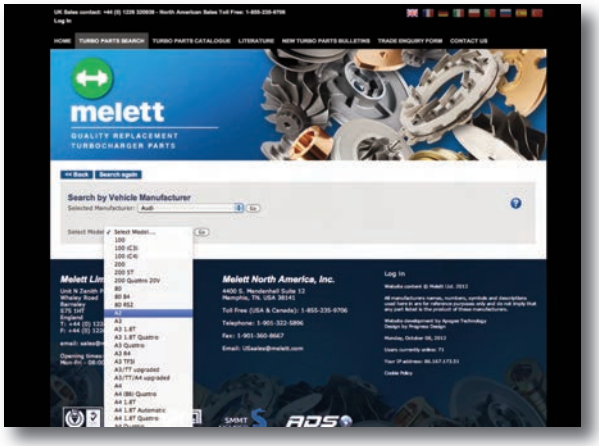
OEM to Melett Cross Reference

The cross reference search function is specifically used to find the equivalent Melett part number against the original turbo component number.

For detailed instructions on the purpose of each search function please refer to the help button.

As part of our continuous effort to meet our customers' requirements, the Melett website will continue to develop making it more informative for customers. We are always delighted to hear your suggestions or any feedback on any changes we make.

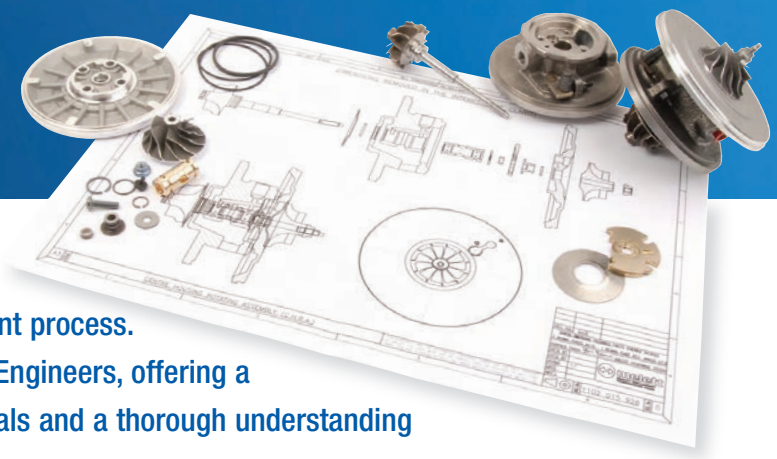




As a Trade Supplier you could have full access to the detailed turbo buildsheet database, cataloguing, calibration info and new product releases available on our website. For more information please contact login@melett.com.

If you are an existing customer, you should have already received your login details by email if not, please contact ***login@melett.com*** for more information on how to obtain your login details.

The Melett engineering team



A key focus of our in-house Engineering department over the past year has been to speed up the development process. The expanding team now consists of five highly skilled Engineers, offering a wealth of experience and knowledge in different materials and a thorough understanding of our products and how they are used in the marketplace.

In the spotlight: Mark Tindall, Engineering Manager

Mark has over 30 years' engineering experience including tier 1 automotive experience and 25 years design experience. Mark started his career as an apprentice and trained in mechanical engineering before joining Melett over eight years ago. He is currently Melett's longest serving employee and speaks fluent turbo!

"We understand every component that makes up a CHRA and understand the common failures associated with such parts", says Mark. "As new turbos are identified for development, the team take several original samples and thoroughly analyse their dimensions, surface finishes, tolerances and materials to gain a deep understanding of the whole assembly. There is also consideration taken of any known failure modes and of any recent improvements to similar parts. Where possible, the latest part design technology, material or manufacturing improvements are then used to improve the original component.

We understand every component that makes up a CHRA and understand the common failures associated with such parts

Mark continues, "All Melett products are engineered using the strictest quality control processes. The team incorporates 3D measurement capabilities, down to a repeatable accuracy of 2 microns, along with traditional engineering measurement equipment and state of the art 3D modelling software to create the engineering drawings for manufacture. We also invest heavily in our own tooling, including all moulds, ramping and punching tooling. Customers can be assured Melett products are designed, developed and manufactured to the highest quality standards".

You can now submit development requests from the turbo build sheets on the Melett website.

John Simpson, Raymond Fisher, Mark Tindall, Garry Platten and Danny Jenkinson

New Melett Hybrid Shaft and Wheel

As part of our commitment to continuous improvement we have now developed a new hybrid shaft and wheel for the 753420-* turbocharger.

Whilst we appreciate most failures on this turbocharger are secondary to engine issues, we still strive to make the turbo more robust by incorporating improvements to strengthen the parts.

As part of our latest improvement we have designed a new full back hybrid shaft and wheel (1102-015-442) to strengthen the turbine wheel and reduce the risk of fatigue on the inducer diameter.

During the design and development of the 1102-015-442 shaft and wheel Melett carried out various tests including on vehicle and Dyno testing to verify the design and ensure like for like performance against the original design. This shaft and wheel is now used in all our 1102-015-928 core assemblies, with many customers reporting improved results.

Melett Technical Support. ***technical@melett.com***

1102-015-439	1102-015-441	1102-015-442
As original shaft and wheel used in 753420-* turbo. Direct replacement 6.5mm journal bearing diameter and slender shaft.	Improved replacement with 7.88mm journal bearing diameter and straight shaft. Previously used in 1102-015-928 core assemblies.	Further improved design of shaft and wheel, 7.88mm journal bearing diameter, straight shaft and full back wheel.

BV39 Superback Compressor Wheel / CHRA Upgrade

With the launch of the new superback compressor wheel, part number 1303-039-405, which replaces the older design flatback compressor wheel 1303-039-400 fitted to KP39-0011/22 turbos, we are pleased to announce that all new CHRA production for this application will now contain the improved superback compressor wheel giving your customers an upgraded repair. To differentiate between the two CHRA builds, the superback version will be part number 1303-039-908. When stocks run out of the 1303-039-901, this part number will be made obsolete and replaced by the 1303-039-908.

Please note: that Melett compressor wheels for all KP/BV applications contain reduced bore interference allowing easier assembly and also reducing pre-stress on the bore which is a potential cause of wheel failure in the field.

Industry Articles

To help our customers keep in touch with current discussions in the turbo aftermarket and the future direction of the OEM's, we have added an 'Industry Articles' section to the website.

On-going trends: Smaller engines, lower emissions

New Audi 1.8 TFSI to replace previous generation 2 litre engine...

In addition to many other new features, the monoscroll turbo features electric wastegate actuation for quicker response and better gas sealing. Active control means that it can be opened at part-load, reducing backpressure and catalyst light-off time… The cast turbine wheel is now Inconel rather than MAR steel, and the compressor wheel is milled from solid. To read the full article, check out: **New Audi 1.8 TFSI** on our website.

[Source: Automotive Engineering, April 2012].

BMW Triple-Turbo Diesel

When two turbos were no longer enough, BMW applied three. The outcome – a 2,993cc straight-six diesel with three turbochargers supplying 4bar of boost. The engine generates 740Nm from 2,000rpm, revs to 5,400rpm and, in the M550d, emits only 165g/km of carbon dioxide. The system comprises two small variable geometry (VGT) turbos and a large fixed geometry turbo. To read the full article, check out: **BMW Triple-Turbo Diesel** on our website.

[Source: Automotive Engineering, June 2012].

Fiat 500 Turbo

Fiat is adding a midlevel model, the 500 Turbo, to its U.S. lineup for 2013. The car will get a turbocharged 1.4-litre MultiAir engine rated at 135 hp and 150 lb-ft of torque. It will have larger brake rotors, sport-tuned springs and shocks and a rear spoiler, and has been developed to address consumer demand for more power and performance in the 500 line. To read the full article, check out: **Fiat 500 Turbo** on our website.

[Source: Automotive News, August 2012].

New Melett Catalogues

Due to our ever increasing range of major parts, earlier this year our new Major Parts Catalogue was launched. This will be an annual publication and has been created to give customers a thorough view of what is available from Melett per product type. The Major Parts Catalogue gives detailed dimensions in a simple table format so customers can quickly compare parts and also incorporates a detailed section for thrust bearings and heat shields, giving visual references to help customers easily identify the parts required. The in-depth repair kits section, has been designed to give customers a complete description and visual representation of the more popular kit contents.

We have also released our updated Workshop Reference Manual which now also includes basic VSR balancing specifications. The manual is designed to give our customers the full range of oversize piston rings and journal bearings available from Melett, along with the machining tolerances and basic torque settings for the bolts and shaft nuts. Please contact ***sales@melett.com*** for your free copy.

Genuine Melett Parts

It is a well-known fact that many companies make false claims that they manufacture parts for OEM's and Melett. Due to Melett's growth and the Melett brand now being recognised in the market as the trusted brand for quality replacement turbo parts and service, this is now becoming a more obvious issue for the company. In reality these false claims cannot be justified, and here's why…

The design process of any Melett part starts in the UK. Melett's dedicated team of Engineers carry out a detailed design analysis which is then sent to Melett approved manufacturers. It is important to point out that the various manufacturing processes are carried out at different manufacturers globally, and often, no one company makes a part from start to finish. Over 60% of our products are manufactured in the EU or USA by ISO/TS16949 certified companies. This automotive quality standard ensures much stricter control principles and was developed to improve stability of automotive component manufacture. Certainly in the US and Europe, only manufacturers who are actually supplying OEM's can apply to be TS16949 certified. Like the turbo OEM's, Melett also uses approved Chinese manufacturers to produce some of our parts. These parts are manufactured to Melett drawings to ensure they are dimensionally correct, castings are usually produced on Melett owned tooling and the parts are manufactured in quality workshops employing strict quality control procedures. In our experience TS16949 in China appears to be more easily available, therefore we ensure any claims by our manufacturers are followed up with a thorough on-site quality audit undertaken by our own China based Engineers, who can converse in the local dialect.

All parts are then independently inspected in China and sent back to Melett in the UK for a further final inspection to ensure material, dimensions and surface finishes are to specification. Only after this are the parts packaged in a genuine Melett box or used for CHRA production in the UK. Therefore, regardless of what you are told by other parts suppliers, if it is not in a Melett box, it is not Melett! If you are unsure about the authenticity of any Melett products you receive please contact our sales team.

To protect the Melett brand and our reputation for quality parts, we are actively pursuing companies who are passing off their own products as Melett branded products.

Melett China Engineering Office

Designed to help us improve supplier quality control the Engineering office, opened earlier this year, allows us to deal locally with any quality issues which arise and also resolve any problems quickly at source making the whole development and supply process work more efficiently. Our investment in the Chinese Office and three full time Quality Engineers signifies our commitment to speeding up the development process and gives us our own base from where Melett staff can operate.

The new office allows us:

- **To manage and coordinate the Engineering development projects with the current manufacturers acting as a local link between Melett Engineers and our approved manufacturers.**
- **To perform regular, unscheduled quality inspections at manufacturers facilities.**
- **To work with our manufacturers ensuring continuous improvement of their own processes and quality procedures.**
- **To source potential new or improved manufacturers for new products.**

melett

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