Welcome to this edition of MAHLE Aftermarket news –
keeping you connected to everything going on at MAHLE
Aftermarket, and how it pertains to you – our customer.
Evolution is at the heart of every growing industry, and
ours is indeed growing with the shift from the Automotive
Aftermarket Industry Association (AAIA) to the Auto Care
Association. Our company continues to evolve as well, with
the addition of thermostats to the product offering, and the
expansion into the tool and equipment market showcased
through the new MAHLE Service Solutions division.

We are committed to the evolution of parts, tools,
equipment, and business practices to best fit your needs.
To stay true to this promise, we are consistently reviewing
and updating so that the aftermarket continues to be known
for cutting edge products and technology. In this edition,
you will learn about the new heavy duty catalog with a
refreshed layout and extensive product offering. Insight is
also provided into how the aftermarket is making strides
in protecting the environment through smart parts, and
advanced technology in filters and turbochargers. Look
inside to see how we are becoming a better partner for you.
Whether the need is for an engine system, a liquid management system, or an air management system; the one constant among all of them is that every new car manufacturer relies on MAHLE expertise to deliver ... And that is exactly what we deliver to the Auto Care Industry.

As what was formerly the AAIA evolves into the next chapter of its life, I reflect on the evolution of what was MAHLE Clevite Inc., to what is now MAHLE Aftermarket Inc. Seven years ago MAHLE purchased the engine parts operations of Dana Corporation. In one significant transaction, MAHLE announced that it was determined to be a long term player in the North American independent aftermarket; taking its business from approximately $16 million in 2006 to nearly $170 million today.

Today, MAHLE Aftermarket Inc. represents so much more than simply internal engine parts. We have evolved into an industry leading supplier of a broad array of under hood components, and the tools and equipment that support the vehicle repair industry. Engine bearings, gaskets, pistons, and piston rings for light vehicle, heavy duty, and performance applications may be where MAHLE originally achieved notoriety; but now that portfolio encompasses everything from turbochargers, filters, and thermal management components, to products for the tool and equipment industry.

The same principles that helped MAHLE gain prominence in the engine parts arena, are leading the way to that same prominence in other areas of the Auto Care Industry. Bringing the OE spirit for pioneering new technology, perfecting more traditional ideas, and insuring that our customers have the best options in under hood components to support their customers.

Sincerely,

Jon Douglas

April 24, 2014 may not be significant to most people, but to those who live, work, and believe in the independent aftermarket – this is the day that the largest trade association supporting our business transitioned from the Automotive Aftermarket Industry Association (AAIA) to the Auto Care Association (no abbreviation). With a slogan of, “Independence drives us”, this conversion was debated by many of the brightest minds in the industry for over a year.

As a Tier I automotive supplier with expected sales of over $13 billion in 2014, the “Independence drives us” motto proved particularly interesting. MAHLE has always been a company that has embraced our original equipment connection; it is the very backbone of the philosophy we bring to the Independent aftermarket.

Quality, technology, and innovation are at the core of every product in the MAHLE Aftermarket offering. In fact, we prefer to think of our group as not just a “parts manufacturer”, but a provider of full system solutions that are borne of the finest and most advanced OE vehicle design teams across the globe.
This February, MAHLE Aftermarket Inc. added a new division, MAHLE Service Solutions, which specializes in the tool and equipment product offering. Included in the new MAHLE Service Solutions division are the ArcticPRO®, FluidPRO® and NitroPRO® brands currently sold under MAHLE RTI, which was purchased on January 1, 2013. These brands will not be affected by the name change, which will fully turnover to MAHLE Service Solutions at AAPEX 2014. Growth in products and new markets is already underway for MAHLE Service Solutions under the direction of General Manager for MAHLE Service Solutions in North America, Max Dull.

MAHLE AFTERMARKET CORE BRANDS STAY THE SAME
MAHLE Aftermarket Inc., formerly MAHLE Clevite Inc., made the shift over to their new name on January 1, 2014. Speculation on if the brands were changing along with the name has been a hot topic since, but the answer is simple – No. The name change signifies the expansion of the MAHLE Aftermarket product offering from just engine parts into a variety of traditional retail parts including filters, thermostats, and workshop equipment. This growth does not mean the Clevite brand, synonymous with engine parts, is any less strong or going away. The staple brands of MAHLE Original, Clevite, Victor Reinz, and Behr will continue to stand for quality, service, and value in the North American Aftermarket.

HEAVY DUTY CATALOGS
The heavy duty program is shifting gears in the right direction, and so are the new HD catalogs released this spring. The new heavy duty catalog features consolidated catalogs with new coverage in each outlining the growth in the program. Each catalog contains the extensive heavy duty coverage across multiple manufacturers including some new faces like Komatsu. The catalogs will feature heavy duty product offerings in cylinder components, bearings, gaskets, filters, turbochargers, valve train, and ancillary.
CLIMATE PROTECTION

WHAT AN ENGINE EMITS—YESTERDAY, TODAY, AND TOMORROW. AN OVERVIEW OF EXHAUST EMISSION STANDARDS, TEST METHODS, AND NEW DRIVE CONCEPTS.

It used to be simple: when a vehicle was being driven, you could hear it immediately. But times are changing—more and more vehicles now glide by almost silently. However, most of them still include a combustion engine, as a so-called range extender. What then is the trend for the drive systems of the future? And how can the combustion engine become even more efficient and environmentally friendly? To begin with, let’s have a look at the basics: What do exhaust emissions consist of? And how much is allowed?

IN THE STANDARDS: THE POLLUTANTS
Increasingly stringent climate protection requirements and rising fuel prices are the main driving forces behind the development of new technologies to reduce exhaust emissions. The general rule is: the less thirsty a vehicle is, the less exhaust gas it emits. It is much more complex, however, when considering the exhaust gas composition. Exhaust gases are a waste product that result from the internal combustion of the supplied fuel in combination with air. The pollutants contained therein can be reduced using various aftertreatment systems. Out of the exhaust gas tract come mainly carbon monoxide (CO), nitrogen oxide (NOx), hydrocarbons, N₂ (nitrogen), CO₂ (carbon dioxide), and particulate matter (PM), the maximum levels of which are laid down in the well-known European standards that also serve as a basis for calculating motor vehicle taxes in Europe.

EMISSIONS LIMIT VALUES FOR PASSENGER CARS

<table>
<thead>
<tr>
<th>Effective from</th>
<th>Gasoline</th>
<th>Diesel</th>
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<tr>
<td></td>
<td>CO</td>
<td>NOx</td>
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<tr>
<td>Euro 1</td>
<td>3.16</td>
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<td>Euro 2</td>
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<td>Euro 6</td>
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Values in g/km

The more fuel that is combusted, the more carbon dioxide (CO₂) is generated. CO₂ itself is not directly harmful to health, and is therefore not included in the emission standards—but it is considered the main cause of climate change. If global warming is to be halted, a significant reduction in CO₂ emissions is required. For this purpose, statutory limits for the transport sector were set in many countries—including the USA, China, Japan, and the EU.

EMISSIONS LIMIT VALUES FOR PASSENGER CARS

COMPARISON OF CO₂ LIMITS ON AN INTERNATIONAL BASIS

Source: German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety.

Source: ADAC e.V.
IN THE DEBATE: THE NEDC
The standardized measurement method NEDC (New European Driving Cycle) is used in Europe to determine the consumption and emissions values. The vehicle runs through precisely defined scenarios on a chassis dynamometer to simulate operation in urban and extra-urban traffic—under specified environmental conditions.

However, due to differences between the NEDC average fuel consumption and actual consumption, the test method has come under increasing criticism. Studies by independent vehicle associations questioned the legitimacy of the measured values and came to the conclusion that the methods do not meet real-life driving conditions. To ensure that the underlying test procedures accurately reflect reality, alternative test methods for determining the fuel consumption and pollutant emissions are currently being validated.

UNDER OBLIGATION: THE AUTOMOTIVE INDUSTRY
The required reductions in fuel consumption and pollutant emissions can only be achieved with a high level of investment in research and development by the automotive industry. As a long-time partner to the automobile manufacturers and a pioneer in technical innovations, MAHLE assumes its responsibility to provide appropriate solutions—and has been focusing on these issues as part of its ongoing development work for many years. With success, as the products listed below underline.

In order to tap the greatest possible savings potential, manufacturers combine the latest technologies within and outside the engine.

1. Measures within the engine
   - Optimization of the combustion chamber: using new component geometries (such as the bowl-type or omega-shaped cavities on the piston crown developed by MAHLE to optimize the fuel-air mixture)
   - Downsizing or right-sizing
   - Increasing the injection pressures
   - Intake channel control—for example, by using the MAHLE Torqueboost CamInCam® camshaft
   - Optimizing the injection parameters
   - Multi-valve technology—for example, with the latest generation of MAHLE lightweight valves
   - Boost pressure control—instead of conventional control, made possible with electronic actuators from MAHLE

In recent years, the inside of the engine experienced significant ongoing development, which is also clearly evident when considering the injection processes in gasoline engines: there has been a move away from port fuel injection towards direct injection with high injection pressures.

2. Measures outside the engine (exhaust gas aftertreatment systems):
   - Oxidation, NOx storage, and SCR catalytic converters
   - External low-pressure and high-pressure exhaust gas recirculation
   - Particulate filter
   - Compounds (combination of catalytic converters)
   - Catalytic burner
   - Systematic integration of intelligent shut-off systems

LOOKING AHEAD: NEW DRIVE SYSTEMS
Electric is not necessarily the same as electric: the majority of currently available passenger cars on the market with electric motors are hybrid vehicles—they are equipped to generate propulsion with at least two energy converters and two in-vehicle energy storage systems according to the UN definition. In most cases, the energy is usually stored by means of an accumulator battery, fuel/gas tank, or kinetic energy storage. Frequently used energy converters are electric, gasoline, and diesel engines.

More and more manufacturers are offering vehicles that don’t have a mechanical link between the engine and the drive wheels: the propulsion is generated by electric motors that are powered by accumulators. In order to handle longer distances, an additional combustion engine is installed, which recharges the batteries if their energy supply runs out. A concept that has also been implemented by MAHLE for validation in the Audi A1. On one hand, a high savings potential arises from the low combustion chamber volume of the engine used (downsizing). On the other hand, it is possible to achieve optimum energy efficiency from the supplied fuel because the engine is only switched on for the purpose of recharging and/or boosting and is thus only operated in its most effective areas; independent of the position of the accelerator pedal or the speed traveled.

There is still no consensus among experts as to which new concept or exhaust gas aftertreatment system will ultimately dominate the market. It is quite certain, nevertheless, that combustion engines will not be entirely abandoned in the near future. No matter how the automobile will change in the future: MAHLE will make a contribution with its innovative solutions. Either through new technologies in engine and filter technology—or in thermal management, whose innovation potential can now be more effectively exploited due to the co-operation between MAHLE and Behr.
“Winning this race is the greatest feeling that you can have in this sport, aside from getting the Sprint Cup Championship trophy,” said Earnhardt. “I didn’t know if I’d ever get another chance to have that feeling again.”
ON A DAY (AND NIGHT) WHEN HIS NO. 88 CHEVROLET SS WAS THE CLASS OF THE FIELD, DALE EARNHARDT JR. BROKE THE DAYTONA 500 Jinx That Cursed Since He Last Won in 2004, Earning His First NASCAR Sprint Cup Victory Since 2012 – A 55 RACE WINLESS DROUGHT – EARNHARDT LED A RACE-HIGH 54 LAPS TO CROSS THE FINISH LINE AHEAD OF SECOND-PLACE DENNY HAMLIN.

The victory was especially satisfying since he finished in the runner-up position three of the past four years at this season opener for the NASCAR Sprint Cup Series.

The race ended under caution at 11:18 PM because of a rain delay of more than 6 hours. That, plus several lengthy cautions to clean up the debris from multicar incidents, contributed to the race ending 11 hours after it began—the longest race in NASCAR history.

This was Earnhardt’s second win at the Great American Race; his first in a decade. It also marked the eighth time that Hendrick Motorsports won this coveted trophy, including last year.

Earnhardt’s Chevrolet didn’t miss a beat, thanks in large measure to the skills of the team in the Hendrick Motorsports Engine Shop, under the leadership of Jeff Andrews. Inside the motor that carried Earnhardt to victory were MAHLE Original® piston rings and Clevite® engine bearings. Every Hendrick Motorsports engine comes equipped with MAHLE Original piston rings, as are the engines of some of the other teams. However, every team in NASCAR Sprint Cup competition relies on Clevite engine bearings.

As the laps ticked down to the finish, it wasn’t a sure bet that Earnhardt would win. In the final 60 laps there were four multicar accidents, each involving at least six cars. This caused plenty of anxious moments for everyone, but especially Earnhardt’s Hendrick Motorsports teammate, Jeff Gordon.

“I don’t know what happened,” said Gordon. “The sun went down, the rain went away, the track dried and everyone switched their brains to ‘this is a 10-lap shootout.’ It was unbelievable; I’ve never seen the Daytona 500 like that.”

As the track was cleared for the final dash to the finish, Earnhardt had to fend off a challenge on the final restart by Team Penske driver Brad Keselowski, who ended the race in third place. Gordon, a three-time Daytona 500 winner, helped his Hendrick teammate with a draft to protect the lead, allowing Earnhardt to cross the finish line in first place.

The win assures Earnhardt of a spot in the season ending Sprint Cup Chase for the Championship. Under NASCAR’s new rules, any feature-race winner qualifies for the season-ending, ten-race playoff, which will feature elimination rounds culminating in a winner-take-all finale among four drivers.

The race also marked the return of the iconic No. 3 car, made famous by Earnhardt’s father, which had not raced in the NASCAR Sprint Cup Series since he was killed in a tragic, last-lap accident at this race in 2001. The win gave Earnhardt Jr. his 2nd Daytona 500 victory; one more than his father achieved.

“Junior’s victory is big for a lot of reasons,” said Denny Hamlin, who finished 2nd in the 500. “It’s obviously very significant when any Earnhardt wins at Daytona.”

JOHN FORCE perseverance

Even the most casual fan of drag racing knows the name John Force. With 16 world championships and a record 28 seasons finishing in the top ten, his record is unparalleled in professional sports! It wasn’t always that way. Growing up poor, the youngest of 5 kids, things were so tough one Christmas that the other four kids gave up their gift from mom and dad so young John could have the toy truck he wanted so badly.

It didn’t get much better when he started racing back in 1974. It was considered amazing if his car finished the race under power, more often than not, it was on fire by the finish line. He raced 9 seasons before getting a win. Many a lesser man would have given up, but not John Force! Actually, the opportunity to give up was presented again in a terrible crash in 2007. Six hours of reconstructive surgery and months of rehab left him hobbling around on crutches with many betting he would retire. John’s won two more championships since that accident and shows no sign of slowing down after winning #16 in November 2013. We’re pretty sure “giving up” is not in the John Force vocabulary!

John Force has been a MAHLE Aftermarket customer throughout his entire career. Clevite engine bearings are used in all the John Force Racing cars and looking over John’s extensive collection of funny cars from earlier seasons is a lesson in the evolution of the Clevite logo. The engine bearings John uses are specially designed for the 10,000 horsepower, nitromethane powered engines used in top fuel and funny car drag racing. We’re proud to have also been therewith bearings as daughters Ashley, Courtney and Brittany all learned to drive the A Fuel Dragster as their driving careers began.

As you can see in the photo, our long association with John Force Racing allows some special privileges like a winner’s circle visit with our customers from Hanson Distributing or a guided tour in the Force command center.
## Featured Aftermarket Products

### Pistons

**For passenger cars:**
- **Chevrolet/GM 6.6L Duramax, 2006-2010 Express/Savana 2500, 3500, 4500; 2006-2010 Silverado/Sierra 2500, 3500**
  - Part no(s.): 224-3708; 224-3709

### Thromostats

**For passenger trucks:**
  - Part no(s.): TM 12 105

### Piston Rings

**For passenger trucks:**
- **Ford Powerstroke 6.7L Diesel, 2010 and newer**
  - Standard 0.20/0.40 bores
  - Part no(s.): 42183; 542183

### Engine Bearings

**For passenger trucks:**
- **Chrysler 6.7L and 8.4L HEMI with VVT, 2005 and newer**
  - SH-2191S; SH-1990S for non-VVT applications

### Turbochargers

**For passenger cars:**
  - Part no(s.): 02D TC 16116 000

### Pistons

**For engine:**
- **Caterpillar 3114, 3116 Aluminum Piston**
  - Swirl top design for improved efficiency. Used in 3114 engines with serial number prefixes 2FG, 372 and 3116 engine with serial prefixes 4TF, 6RR, 98Z
  - Part no(s.): 224-3749X; OE piston number 7E3428
You can find detailed information about new products in the Online Catalog at www.mahle-aftermarket.com with real-time updates.

**Turbochargers**

For passenger cars:
- Caterpillar C15 model GTA4294BS turbocharger
- High pressure turbo for high exhaust manifold location. Found in serial number prefixes BXS, KRA, MXS, NXS, TRB, RKS.
- Part no(s): [OS32426](#)

**Cabin Air Filters**

For passenger cars:
- 2014 Mercedes-Benz CLA250
- Part no(s): [LAK 879](#)

**Oil Pan Gasket (With Windage Tray)**

For passenger cars:
- Part no(s): [OS32426](#)

**Pistons**

For engines:
- Caterpillar C16 forged steel MONOTHERM® piston 18.0:1 compression ratio
- Found in engines with serial number prefixes BXS, KRA, MXS, NXS, TRB, RKS. Later bushingless design and can be used to replace early pistons with bushed pin bores.
- Part no(s): [234-58411D; OE piston numbers 3445514, 2545858, 2529567, 3037460, 5994767, 3136534](#)

**Shop Equipment**

For shops:
- ArcticPRO® R410A Series Refrigerant Handling System
- Compatible with R1234yf refrigerant; Meets SAE and VDA standards
- Part no(s): [460-80872-00](#)

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SMALL DIFFERENCE, HUGE IMPACT: THE PATENTED OIL FILTER PIN.

Time and again, repair shops and motorists are confronted with serious engine damage. The cause of many of these cases: the installation of an oil filter that barely functions—because it lacks an important detail.

“I don’t understand. I always adhered exactly to the inspection intervals and used the same engine oil as specified by the engine manufacturer. And now... the engine has had it!” The owner of the vehicle is shocked. But there is no doubt about the diagnosis made by the MAHLE engine expert on hand in the repair shop that day: bearing damage to the turbocharger—due to wear caused by contamination. Removing the oil sump reveals an alarming sight: heavy deposits of soot and abrasion throughout the entire engine, and the connecting rods and main bearings show excessive wear. Or, as the MAHLE engineer states: “This looks like the engine has been driven without an oil filter.”
WHAT HAPPENED?
The expert opens the oil filter housing, pulls out the filter element—and immediately sees two things: the installed filter does not meet the specifications of the vehicle manufacturer. And the filter element has obviously not fulfilled its intended function. But why? To understand this, you need to know how the MAHLE oil filter module functions and what distinguishes it from other systems.

THE PIN: MORE THAN A SEALING ELEMENT
A black plastic mandrel is mounted at the end plate of the filter element—known as the pin, which is equipped with an O-ring gasket. After assembly, the pin fits precisely into the bore in the filter housing and seals it off.

A CLEAN SOLUTION
When rotated during a filter change, the pin clears the bore in the filter housing, so that any residual oil in the housing can drain into the oil sump. This complete draining procedure is vital—for two reasons: the remaining oil would squirt out of the housing when installing the new filter. Secondly, the intent and purpose of the oil change is to completely replace the used oil with new oil. Since the new MAHLE Original filter is also equipped with a pin including gasket, the return bore is completely closed again during assembly. This ensures that when in use, all of the engine oil is pumped through the filter paper and therefore purified.

THE GOAL IS “X-RAY VISION”
Replacing the filter module is generally a particular challenge for the repair shop. This is because the filter housing often sits deep in the engine bay—and the service professional can only guess where the bore is exactly, and how he must turn the filter for the pin to meet the bore. The MAHLE engineers addressed this while developing the pin—and found a solution that allows the MAHLE filter to be fitted in the housing in any position so that it always snaps into place and locks. A sophisticated design that is so clever that the service professional immediately sees two things: the installed filter does not meet the specifications of the vehicle manufacturer. And the filter element has obviously not fulfilled its intended function. But why? To understand this, you need to know how the MAHLE oil filter module functions and what distinguishes it from other systems.

AND HOW DOES THE PIN FIGURE OUT THE CORRECT ROTATION?
At the bottom of the housing there is a helical guide, similar to a marble run. By tightening the cover, the pin slides through this guide to the bore, where it snaps into place and locks. A sophisticated design that is so clever that the service professional immediately sees two things: the installed filter does not meet the specifications of the vehicle manufacturer. And the filter element has obviously not fulfilled its intended function. But why? To understand this, you need to know how the MAHLE oil filter module functions and what distinguishes it from other systems.

CAUTION! RISK OF INJURY!
In order not to violate existing MAHLE patents, competitors have tried attaching a large plastic blade next to the pin in an effort to copy our filter insert. This blade can end plate turn into a destructive weapon and get caught when screwing the cover into the housing. When this happens, the filter insert can no longer rotate. The fatal consequences: the pin can no longer slide along the helix, and the service professional does not have a guide anymore to line up the pin exactly with the bore—making this an extremely difficult task.

Another problem: the sharp plastic blade can come dangerously close to the by-pass valve on the bottom of the housing, damage it, and put it out of commission. This means: the by-pass valve, which should only be opened for short periods in certain situations, is now permanently open.

Background information: role and function of the by-pass valve
The by-pass valve guarantees the oil supply to the engine at low outside temperatures and with cold, still viscous engine oil by first feeding the untreated oil into the oil circuit, thus ensuring lubrication. As soon as the engine oil is warm and its viscosity is reduced, the by-pass valve must close reliably so that all of the engine oil is fed through the filter paper.

THE SECRET DANGER—AND THE FATAL CONSEQUENCES
The danger for the mechanic: a by-pass valve that has been damaged in such a way that it shows no symptoms at first. Even when the valve is permanently open, the engine runs properly to begin with; the indicator light goes out and thus fails to warn the motorist. Consequently, it goes unnoticed that the engine oil is circulating through the open by-pass valve in the engine circuit and the oil filter is completely disabled. This means: all pollutants that would otherwise be retained—soot, dirt, and metal abrasion—circulate untreated through the oil circuit. These abrasive and corrosive foreign substances in the oil then lead to engine damage caused by excessive wear.

CAUTION! REAR COVER MISSING!
Engine damage is also known to occur even when the pin of the replacement filter gets caught and breaks off during assembly in the housing. The fatal consequences: a return bore that is permanently open. As a result, most of the engine oil from the oil filter housing is fed directly back into the oil sump, instead of lubricating parts of the engine.

HOW TO RECOGNIZE THE DANGERS
Basically, the risk for the service professional is particularly high:
- if it is generally possible to make a mistake during installation
- if the mistake is impossible or difficult to notice
- if it has fatal consequences for the engine

CHEAP FILTERS CAN BECOME VERY EXPENSIVE
In the case outlined here, the service professional did not notice that he had damaged the by-pass valve in the oil filter housing when fitting the replacement filter and had thus disabled its function. When he discovered the mistake, it was already too late. A complete overhaul of the engine was now due—and that only because on one occasion he resorted to a supposedly cheaper replica filter.

The dispute concerning who bears the costs of the repair often ends in court. Appraisers must then attempt to clarify who is responsible for the improper filter change that first destroyed the by-pass valve and then the entire engine.

In order for repair shops to avoid significant risks such as these, MAHLE specialists educate customers with technical information, advise against lower quality replacement filters, and recommend the exclusive use of MAHLE Original filters that have been designed and patented specifically for such installations—for maximum repair security.
THE CONCEPT OF TURBOCHARGING ALWAYS OFFERS ROOM FOR HEATED DISCUSSIONS. AFTER SUCCESSFULLY MINIMIZING AND EVEN TOTALLY ELIMINATING TURBO LAG, THE LIFE EXPECTANCY OF TURBOCHARGERS IS CURRENTLY BEING DEBATED IN MANY PLACES— AND STATEMENTS ARE CIRCULATING, SUCH AS: “1.4 L SWEEP VOLUME AND 170 HP, THAT’S ASKING FOR TROUBLE”, OR “IT’S NO WONDER THAT WITH SUCH HIGH POWER DENSITY THE TURBOCHARGER ALSO NEEDS TO BE REPLACED AT EVERY SECOND SERVICE INTERVAL”. IS THIS RIGHT? A SUMMATION—AND SOME IMPORTANT DATA, FACTS, AND BACKGROUND INFORMATION YOU SHOULD KNOW ABOUT.

WHY TURBOS ARE BECOMING EVER SMALLER
In the course of downsizing the motor, the size and mass of the turbocharger is also decreasing. This minimization is not due to economic reasons in order to save material, but serves to reduce the driven, oscillating masses. Ultimately, the rule is: the smaller the mass, the better the responsiveness of the turbocharger, and the more efficiently the engine can operate.

WHAT A TURBOCHARGER MUST WITHSTAND TODAY
The more compact and more efficient the turbocharger, the higher the loads each individual component has to withstand. A glance at the data sheets for the latest turbochargers clarifies: rotational speeds of up to 330,000 rpm are prevalent (equal to engine speeds of 5,500 revolutions per second), and circumferential speeds of around over 1,700 feet per second (which still amounts to about 1,200 miles per hour). The statement that loads are increasing definitely cannot be refuted. It is therefore good to know: turbochargers have been, and continue to be designed for the service life of a vehicle (e.g. truck turbochargers are given a service life of up to one million miles). Such highly resilient—and yet fuel-saving—units are made possible using the latest materials and technologies.

THE DRIVER AS THE CAUSE OF FAILURE?
A common cause for the premature failure of turbochargers lies in how turbocharged vehicles are operated. Many vehicle owners are unaware that the engine in their vehicle is turbocharged, or they don’t know anything about the specifics and recommendations that need to be observed. Hence, here are some useful tips on how your customers can reduce the risk of their vehicle experiencing premature turbocharger failure—with your help.
THE SEVEN COMMANDMENTS for a long turbo life

COLD START: TAKE THINGS SLOWLY
The turbo is faster than the oil: modern turbochargers can reach their maximum speed within about three seconds. With the majority of turbochargers, the rotating assembly is hydrodynamically mounted and therefore relies on a perfect oil supply. However, when cold-starting the engine, the oil is highly viscous and thus still viscid, which leads to the risk of inadequate lubrication. It is therefore recommended to start driving the vehicle under a low to medium load until it is warmed up. Letting the engine warm up by idling, however, should definitely be avoided—because the resulting lower oil pressure as a function of the lower engine speeds combined with the still viscous oil places great stress on the bearings.

TURNING OFF THE ENGINE: PATIENCE, PLEASE!
Immediately turning off the engine after driving under high load should be avoided, if at all possible. Even though some manufacturers have now begun to keep the lubrication and cooling going electronically for some time after the engine has been turned off, most of the current models are reliant on direct support to discharge the prevailing high temperatures after full-load trips. Therefore, the turbo driver should allow the engine to “wind down” and run it cold at a leisurely pace—also by idling if not otherwise possible (but making sure the surface underneath is firm and non-combustible).

If the turbocharger is not allowed to run cold, oil carbon is produced, which for one has an abrasive effect, but can also block supply and return lines—often with extensive consequential damages.

TURBO AND STOP-START? CAUTION!
To avoid the effects of turning off the engine in its hot state, the stop-start system should be disabled after full-load trips—because immediately after driving on the motorway, even a red traffic light can have costly consequences.

OIL: THE RIGHT DECISION
Modern engine oils are high-tech fluids; numerous additives optimize the properties and thus contribute to a long, low-emission engine life. However, the more complex the engine oil composition, the more serious the consequences when using inappropriate engine oil, for example:

- Premature wear
- Heavy smoke formation
- Consequential damage to exhaust gas aftertreatment systems
- Engine damage

Engines with turbochargers, in particular, should only be operated with oils that meet the specifications of the vehicle manufacturer. As only these are suited to the precise requirements and operating conditions of the engine.

OIL CHANGE: ALWAYS NICE AND CLEAN
In order for the engine oil to perform its various tasks in the engine, turbocharger, and peripherals, it needs to be in good condition. Frequent short trips, extremely high temperatures on a consistent basis, poor filtration, and negative influences from unmaintained auxiliary aggregates reduce the load-bearing capacity of the oil. A decrease in the oil quality leads to premature engine and turbocharger wear. That’s why it is important to strictly adhere to the recommended oil change intervals.

DRIVE WITH DUE CARE
Increased oil consumption or conspicuous blue smoke from the exhaust are always warning signs and require the assistance of the repair shop. The oil return line should be checked for oil coking especially if the engine was previously subjected to high operating temperatures and ran sub-optimally. In this case, it helps to replace the return line (and for preventive measures the supply line too) to eliminate the error and avoid consequential damage. Otherwise, there is a risk of damaging the turbocharger, engine, and exhaust gas aftertreatment system. Apart from that, the emission of burned oil pollutes the environment.

OBSERVE FILTER CHANGE INTERVALS
Uninvited intruders can bring about a premature end to the turbocharger. Ever increasing demands on noise and acceleration behavior, oil consumption, and emissions values leave no place for foreign particles; even a single, invasive grain of sand can cause severe turbocharger damage within a few seconds. Correspondingly, great importance is attributed to the air filter, which is also subject to exacting demands. (By comparison, a human could be supplied with breathing air for about 10 hours with the amount of air that per minute passes through an average 2.0-litre engine at full load.) Hence the urgent recommendation to stick to the specified filter change intervals and only use high-quality filters.

BEEN ABUSIVE?
The turbocharger is a highly efficient means of increasing the performance yield—due to the high demands and loads, however, also a “sensitive soul”. This means: if the above recommendations are not adhered to, failures might occur.

Turbocharger failure can be recognized by symptoms such as a drop in performance, heavy smoke from the exhaust, whistling and rattling noises, or loss of oil. In general, however, the principle applies: the turbocharger might be the cause, but does not need to be. To save the repair shops and motorists unnecessary replacements—and as a result, unnecessary costs—MAHLE Aftermarket provides an abundance of information. Many useful tips and technical information are available for download from the website www.mahle-aftermarket.com. A brochure on turbocharger damage is also available, which helps to avoid renewed damage if a failure occurs. Training in maintenance and the repair of turbocharged vehicles is additionally offered by MAHLE Aftermarket sales and trading partners.
At AAPEX 2013, MAHLE Aftermarket Inc. unveiled the new line of MAHLE Original® thermostats, expanding their traditional retail product offering. Breaking into the thermostat market provides the chance for MAHLE Aftermarket to show the craftsmanship of German engineering in an integral part of the automobile - not only for the engine, but also passengers.

Thermostats have been regulating temperatures inside the engine and vehicle for decades facilitating in minimal wear for the engine, lower emissions for the environment, and a comfortable drive for passengers. Thermostats wear many hats in the life of a vehicle, and are built to sustain any condition they are faced with – except human error.

Many human factors (as explained above) result in thermostat replacement. This is when thermal management product offerings become essential in the Aftermarket. Technicians are looking for OE standard thermostats, and customers are looking for a part that is built to last a lifetime. MAHLE Original® thermostats fit the need of both parties, so technicians know they are providing their customers with the best product in the Aftermarket.

MAHLE Original® thermostats are fueled by Behr’s reputation for precision in thermal management. Behr took the traditional thermostat into the digital age by handling all temperature regulation through a computer, pioneering what is now known as the map controlled thermostat. The MAHLE Original brand now holds this same cutting-edge quality completed with the MAHLE OE seal of approval.

The MAHLE Aftermarket thermal management line will continue growing in the coming months as more bestsellers are introduced for both light vehicle, medium, and heavy duty. As Behr has built a reputation for superior thermostats, MAHLE Original will continue the legacy for providing progressive thermal management technology to the Aftermarket.

The heart of an automotive thermostat is a wax element. Careful compounding of the wax allows the thermostat to open at a predetermined temperature based upon the engine manufacturer’s design requirements. Invented in 1936, this technology has decades of use and refinement behind it. We’ve evolved from simple insert devices to thermostats with integral housings, to housings containing mixing chambers and ultimately to the current design called a map-controlled thermostat. More and more late-model vehicles use the map-controlled design and sales potential in the replacement market is growing rapidly!

To understand the map-controlled design, it helps to understand just a few basics of a cooling system. Principle one is engines run best and emissions are lowest if we keep the engine temp between 200-230° F. Principle two proves: the quicker we get to that optimum range the better for the engine and the better for the environment. Principle three is that there are certain conditions when we like the thermostat to open before the wax melts and causes it to open in the conventional manner. This is especially true as we move towards the high end of optimum operating temperature.

These special conditions mentioned above could include heavy output demand on a cold engine, certain air conditioning requirements, extended hot idling or any number of situations deemed by the automotive engine designer to require a thermostat opening sooner than the melting point of the wax in the element. In these map style thermostats, an electric resistor is inserted into the wax chamber. Electric current supplied to the resistor causes heat, melting the wax.

The term map-controlled comes from the fact that an engine control map is developed to tell the engine management system exactly what conditions demand the opening of the thermostat. We can map to throttle opening, ambient air temperature, air condition demands, etc. The options are almost infinite.

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This past February, MAHLE Aftermarket North America held their annual National Sales meeting at the Embassy Suites Hotel in Livonia, Michigan.

In order to meet the demands of the competitive Aftermarket industry, each year the sales team comes together to learn how MAHLE is being innovative through the growing product offering, quality customer service, and advanced selling tools. For 2014, training sessions were held each day on important topics to promote enthusiasm amongst the sales team and show the progressive practices going on every day in Farmington Hills. Training session topics included:

- Gasket Selling and Competitive Advantages
- New Heavy Duty Program
- Turbocharger Product Update
- Sales Force Tools
- Selling Filters & Thermostats
- Electronic Capabilities Updates

The MAHLE Aftermarket sales Team is properly equipped with all of the knowledge and tools to better serve our customers. Each day, the sales team members went through intense training. After each session, the attendees were strategically tested on what they learned – and everyone passed with flying colors. This ensures MAHLE Aftermarket customers that the sales team is the best sales group in the market.

Although training was one of the main focuses, the sales meeting was also a chance to reunite the sales team with the MAHLE Aftermarket family; after all, it is one big family. In order to be successful, everyone needs to be on the same page. Having everyone together, at one location, allowed that. Each member of this family shares the bond of being driven to success. The MAHLE Aftermarket sales team is one of the main contributing factors to the group’s success, and they look forward to serving their customers in 2014.
MAHLE Aftermarket Inc. is excited to announce the new and improved Customer Trade Area – a central repository for product information at the click of a mouse. All customers can utilize the Customer Trade area – if you are signed up with mahlecleviteorder.com, you already have access. The MAHLE Aftermarket Customer Trade Area houses electronic files on product information, pricing, policies and promotions.

As we strive for continuous improvement in communication, the new Customer Trade Area has a built in notification system with the ability for you to customize the information you want to receive by product line and type of materials. These can be changed at any time by selecting different choices in your user profile. When files have been added that meet your criteria, you will receive an email notifying you that the file is available. Simply click on the link in the email, sign in with your mahlecleviteorder.com user information, and download the document.

If you log in directly (not from a notification email) you are able to browse the documents by file type or by a listing of all documents. When you find a document of interest or benefit to you, simply click the download button or link shown by the document. Each column can be sorted by clicking on the column header. This will allow you a better look at what documents are available.

The Customer Trade Area can be accessed by a link in MAHLE Aftermarket Order or on the “Customer Login” link on the MAHLE Aftermarket website: www.mahle-aftermarket.com

Please take a moment to have a look at the Customer Trade Area, we hope it will be a beneficial tool for you in keeping up with what is new from MAHLE Aftermarket in terms of products, pricing, policies and promotions.

If you have any questions regarding the Customer Trade Area, please contact your MAHLE Aftermarket Account Manager.