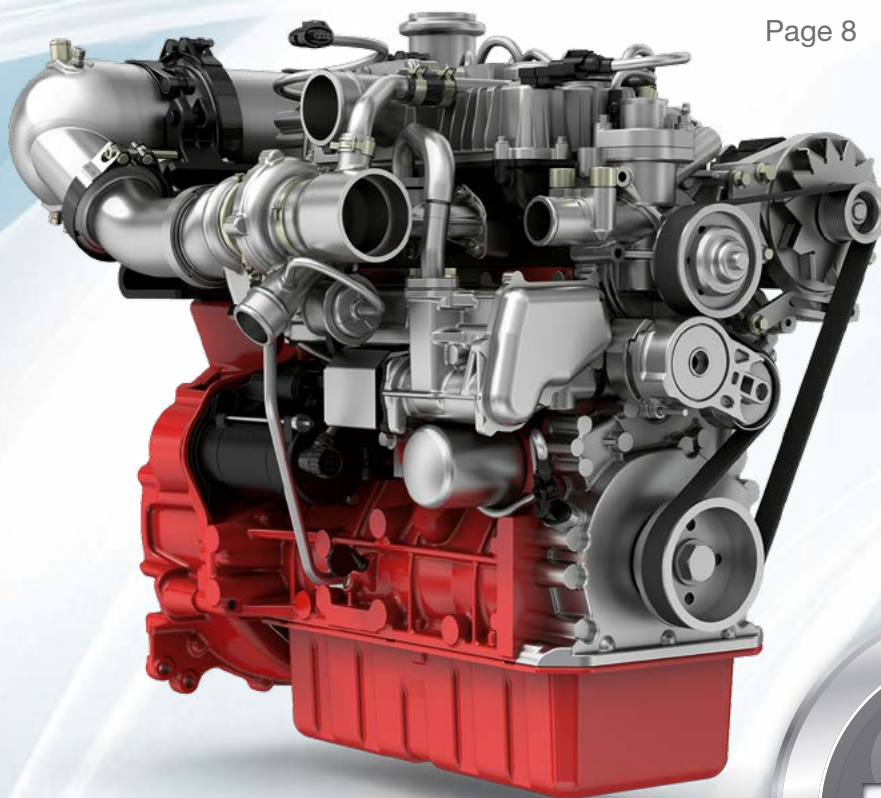


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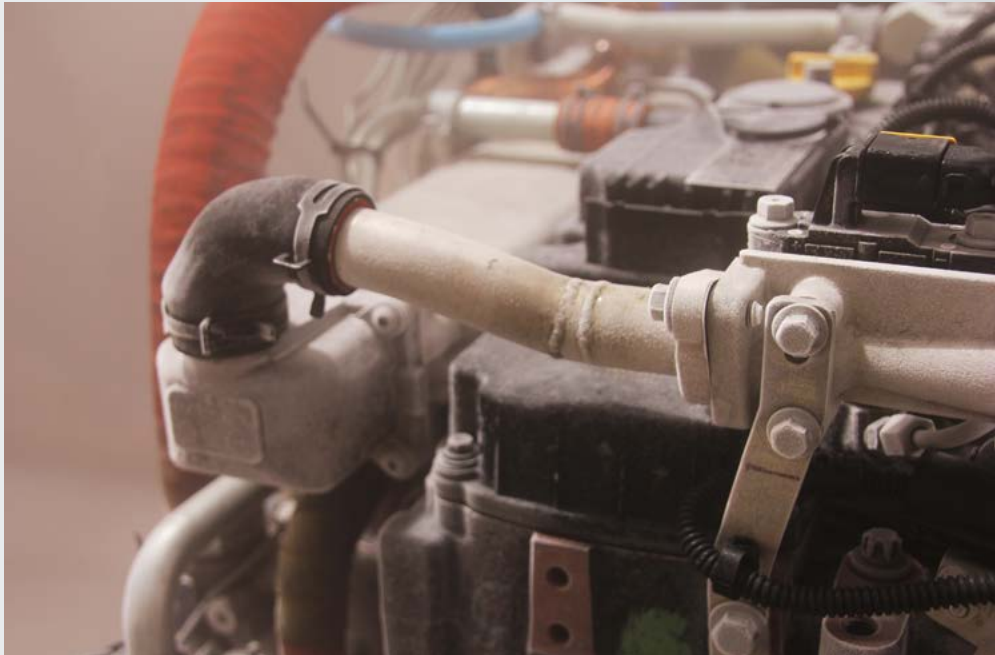
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**Dear readers,**

Laying the foundation for a construction project is always a special event. In our case, with the laying of the new DEUTZ shaft centre foundation a few weeks ago, we have taken an important step toward the future. The workplaces of a total of 140 employees will be relocated from Deutz to Porz in the coming year and with the production surface of about 13,500 square metres, Cologne will become the integrated location for high-volume series (p.5).

However, since, for us, a business relationship does not end with the sale of an engine, we have bundled a number of service offers under the “Engine Plus” programme, which has the purpose of supporting our customers in the best possible manner, both prior to as well as after the purchase of their engines. From individual application engineering right up to the retrofitting of useful additional components, our customers receive a versatile service offer that allows them to get the maximum benefit from their engine. (p.8).

The application field for our engines is also highly versatile. Be it at dizzying heights in the remotest mountainous regions of Peru, deep underground in the mining sector, in tropical temperatures or the freezing cold – you can always rely on DEUTZ engines. In this issue, among others, you can discover how a DEUTZ 2.9 litre engine offers a high-performance propulsion in a compact tracked paver that is used for road construction (p.16) and how our engines in the high-performance snow blowers ensure safe passage for the planes through the mountains of white snowy splendour (p.12).

Best regards,

Dr Helmut Leube

Dr Margarete Haase

Michael Wellenzohn



To ensure that our engines also reliably perform as they should, they are prepared for this very purpose in our cold chamber (p.22). That a DEUTZ engine can do more than one sees at first glance, is not least thanks to its digital heart. Because, where sophisticated mechanics regulated the fuel injection and combustion process in the past, this is achieved by electronic control units today, with the help of highly complex algorithms. This increases performance and efficiency, reduces exhaust gas emissions and simplifies the vehicle service. We tell you how digital our engines actually are on p.20.

Note: Gender differentiation has not been applied in this document for reasons of improved legibility. The relevant terms apply for both genders in the sense of equal treatment.





## Girls visiting DEUTZ

What was standing in front of the DEUTZ Technikum on 23 April 2015 could almost be described as futuristic: an impressively two-storey truck with a retractable balcony and equipped with state-of-the-art technology on a surface of about 100 square metres. This conspicuous vehicle is one of ten M+E InfoTrucks that the employers' association of the M+E industry deploy throughout Germany within the context of their career information campaign. For the first time ever, on the occasion of „Girls' Day“, this truck was now presented in Cologne. The female pupils who decided to spend „Girls' Day“ at DEUTZ AG were thus the first to take the multimedia applications and demonstrative experimental stations of the InfoTruck into operation, where they could get to know technical relationships at M+E-typical workstations for themselves in a hands-on manner. Yet there was still much more to come: following a personal welcome of the girls by the DEUTZ board member Dr Margarete Haase, the pupils could experience the history of the engine construction live in the DEUTZ Technikum and, thanks to the presentation held by female DEUTZ apprentices, they found out something about DEUTZ AG itself and what the technical vocational training looks like for girls at an engine maker.

## With DEUTZ through the Night of Technology

The 12th of June saw the fifth Night of Technology in Cologne. 56 participants from the industry, the German medium-sized companies, research, handcraft and teaching once again offered a direct insight into their operating procedures. In the spotlight: Technology and the people behind it. Amazement, participation and experiencing things first hand were once again on the agenda and the success concept of the event idea which was born in 2009 and developed by the local Cologne associations of the VDI (German Association of Engineers) and VDE (Association for Electrical and Electronics Engineers).

DEUTZ was also there once again and, from 18:00 to 22:00, opened its gates for engineering enthusiasts. The visitors could view the Technikum engine museum and the assembly hall at the location in Cologne Porz within the context of a guided tour. Among others, the original models of the DEUTZ company founder, N. A. Otto, are exhibited in the Technikum, on a surface of 600 square metres. Attracting a particularly great amount of attention were the two original gas-operated engines from 1867 and 1876, which are still fully functional. At the visitor gallery of the production area, the guests could subsequently compare these impressions with the current-day diesel engine state-of-the-art technology in the different assembly steps of engine production – from the delivery of the materials, right up to the collection of the completed engine.



## Experience engine construction live at DEUTZ

Also in this year, DEUTZ AG once again participated in the special “Erlebnis Maschinenbau” (Experience Engine Construction) campaign day. On the 18th of June 2015, young adults who are interested in technology had the opportunity of gaining an on-site insight into the vocational trainings, qualifications and future chances offered in mechanical engineering at the participating companies, and also to find the suited profession for themselves.

While visiting the historical collection of engines in DEUTZ Technikum, the pupils had the opportunity to experience the history of combustion engines live and, thanks to a company presentation, could gain more knowledge on DEUTZ AG and its product range. “Actively supporting young people with their career choice is of great importance for us. Campaign days such as the “Erlebnis Maschinenbau” not only give the young adults the possibility of finding the right profession for themselves, but also allows us as a company to show how exciting a technical education can be,” says Dr Margarete Haase, member of the DEUTZ board of directors.

DEUTZ offers school-leavers a high-quality education in six different industrial-technical professions. The results of the DEUTZ exam candidates are regularly better than the IHK average. Since 2011, the IHK has honoured the high quality of the DEUTZ vocational training by repeatedly awarding it the “Die Besten” (The Best) prize. Other companies also benefit from this, as they have their complete vocational training or individual specialist courses conducted at DEUTZ.

## Interview



### A technical education offers numerous possibilities

*Ms Roos, as an employee in the system coordination of after treatment of exhaust gases turbochargers and exhaust gas recirculation, you are an example for the group of women in technical professions which, unfortunately, is still much too small. What brought you to this occupational profession?*

While I was still at school, I had a holiday job in the field of machine maintenance to finance my driver's licence. This is where my interest in technical professions was kindled and for this reason, following my high school graduation, I started a vocational training as an industrial mechanic and subsequently went on to study at a university.

*Technical professions are still considered a male domain. Do you notice this in your daily work?*

Of course, time and again, there are “critical” colleagues and, especially during my apprenticeship, I had the impression that I had to prove myself more often than my male colleagues. Also during my studies, I attracted attention among my male fellow students, yet at DEUTZ I have only gained positive experiences.

*How would you convince young women to decide to pursue a technical career?*

I find that a technical vocational training opens up a great variety of stimulating career opportunities. Unfortunately, despite numerous campaigns, such as Girls' Day, it is still only a small share of women who decide to embark on this path. Possibly, this is also due to the fact that the competence of women is frequently questioned when it comes to technical professions and, because of this, one needs to have a healthy portion of self-confidence. However, companies must also become more attractive for women, especially with regard to the work-life balance – in a working environment that is often dominated by men, this issue is frequently not addressed.

## DEUTZ lays the foundation for the future



On 6 July 2015 and in the presence of the employees of the early shift of the shaft production, the members of the DEUTZ executive board, Dr Helmut Leube, Dr Margarete Haase and Michael Wellenzohn, as well as the head mayor of the City of Cologne, Jürgen Roters, and the Cologne Commissioner for Economic Development, Ute Berg, lay the traditional foundation stone for the new DEUTZ shaft centre. Werner Scherer, chairman of the general works council of DEUTZ AG, as well as Sefa Cagan, member of the DEUTZ works council, also symbolically laid the first stone for the new building in Ottostraße in Porz.

In his welcome speech, DEUTZ CEO, Dr Helmut Leube, underlined the significance of the DEUTZ shaft centre. “With the decision to build the new shaft centre, we are investing in our future, since, by means of this, we continue to secure our innovative ability and competitive edge. With our shaft centre, Cologne-Porz becomes an integrated location for high-volume series,” the CEO emphasises. Cologne's head mayor, Jürgen Roters, also praised the large-scale project. “This is a good day for DEUTZ AG, but also for the city of Cologne and the Porz region,” Roters said. “We are and remain an industrial location that continues to develop when it comes to innovations,” the head mayor stated.

As is the tradition when laying the foundation stone, a time capsule was also embedded in the foundation stone wall for the DEUTZ shaft centre. The contains: the most recent issue of a Cologne daily newspaper, an issue of the DEUTZ employee magazine, an aerial photograph of the current plant in Cologne-Deutz, a piece of the original roof tile from the current shaft production building, two miniature customer devices, a miniature model of the Cologne cathedral and an engine model of a 2.9 agri engine.

The total costs for the construction project amount to 26 million euros. About 15 million euros are needed for the building, inclusive of state-of-the-art power engineering, and about eleven million is invested in the procurement of new machinery and installation equipment. The workplaces of a total of 140 employees will be relocated from Deutz to Porz in the coming year. In addition to this, step-by-step, about 130 machines and installations will be relocated, to Porz. The building, with a total surface of 13,500 square metres will then be located in direct proximity to all DEUTZ technical crews and, thanks to the shorter routes to the assembly areas, will ensure substantial logistic benefits.





Intermat 2015:

# Stage free for Stage V

Intermat is one the largest trade fairs for the construction industry worldwide. Every three years manufacturers and suppliers present their latest developments in Paris. This year, DEUTZ used the exhibition to launch its „Stage V ready“ campaign.

Construction vehicles with man-high tyres, house-high street-pavers and excavator arms that reach high up to the ceiling of the trade fair walls – there definitely are a lot of impressive devices on show at Intermat. In comparison, the high-performance construction machine engines appear really small. Small, or to be more precise, compact, because this is how the equipment manufacturers would like to have their engines; and this is exactly how DEUTZ also delivers them.

To draw attention to oneself as a supplier within the context of the trade fair hustle and bustle, the companies always have to come up with something special. At this year's Intermat in April and already from a purely optical consideration, DEUTZ decided to introduce clear accents, with an entirely new trade fair booth design. Instead of an open surface, modern semicircular design elements guide the visitors through the DEUTZ engine pallet in a targeted manner. All five TCD engines, ranging from 2.9 to 7.8 litres of cubic capacity, were exhibited. What is more, the so-called Service-Display presented all services that are available with regard to the topic of engines – from the engineering service and right up to the original DEUTZ spare parts supply. The lounge area in the background as well as a meeting room in the interior area of the trade fair booth offered the DEUTZ team the opportunity for conducting numerous talks with the customers and experts from across the globe.

As this is already the tenth edition, DEUTZ placed its thematic focus on its highly-developed exhaust aftertreatment technology. This plays a central role, especially within Europe, since it is here that the most stringent emission guidelines worldwide, presently the EU Stage IV, currently apply. Based on the suggestion of the EU Commission regarding the next EU Stage V, which is anticipated as of 2019, DEUTZ engines with diesel particulate filters in the area of 2.9 to 7.8 litres of cubic capacity already satisfy the targeted threshold values today. This confirmation provides the equipment manufacturers with a great degree of planning security regarding the DEUTZ engines. For this reason, under the slogan of „Stage V ready“, DEUTZ has developed a corresponding marketing cam-

paign, which it first presented to its customers on the occasion of Intermat 2015. The essence is the statement that all demonstrated engines can also be used as Stage V engines after 2019, without this requiring any technical amendments. Thus, no cost-intensive changes need to be carried out on the customers' equipment. A special „Stage V ready“ seal on the engines clearly transports this information.

The trade fair appearance at Intermat 2015 was jointly implemented by DEUTZ FRANCE SAS and DEUTZ AG. Andreas Reiter, Directeur Général of the French DEUTZ subsidiary, reflects on the trade fair in an interview.



Thanks to the semicircular design elements, the new trade fair booth layout guides the visitors through the range of DEUTZ engines in a targeted manner.

## In dialogue

### Interview with Andreas Reiter, Directeur Général, DEUTZ FRANCE SAS



**myDEUTZ:** Intermat is the largest trade fair for mobile working machines in France and, also internationally, it is one of the most important fairs in the branch. For which markets is it of particular reference, and what does this mean for DEUTZ FRANCE?

**Andreas Reiter:** Intermat is a construction machine trade fair with an international flair. All important manufacturers of earth-moving machines, cranes and elevators, drilling instruments, transportation vehicles, etc. are present. New technologies and equipment are on display, as well as components and materials that are of significance. In this regard, the manufacturers not only focus on the French market, but also on the export markets worldwide. For DEUTZ FRANCE, as the „host“, and within the context of the global DEUTZ trade fair appearance at Intermat, it is of considerable importance to present future engine technologies to our customers. What is more, the presence

offers us the chance of conducting talks with all customers, condensed within one week. The DEUTZ booth, which once again was outstanding, offered an excellent communication platform to do so.

**myDEUTZ:** As a special highlight, DEUTZ first presented its „Stage V ready“ campaign in Paris. How was this topic received by the visitors?

**Andreas Reiter:** The consistent „Stage V ready“ product presentation at our trade fair booth showed our customers that DEUTZ already has a clear concept today, which it will launch on the market at the required time. The „Stage V ready“ message has reached all customers as a trend-setting future alignment. The consistently positive feedback, both during and after the DEUTZ press conference, also confirmed this. With „Stage V ready“ we can give our customers planning security, in that they can mount our engines in the Stage V without this requiring any new developments regarding the equipment or adjustments to our engines.

**myDEUTZ:** Apart from this, which additional trends were focussed on at Intermat 2015?

**Andreas Reiter:** As in numerous industrial areas, the construction machinery industry is also demonstrating an increasing interest in alternative energies. Thus, among others, we noticed an increase in the number of enquiries regarding gas engines. Equally, time and again, the question regarding the topic of hybrid solutions comes up. Here, the overall subject matter is targeted at increasing the economic efficiency while operating the equipment. The consumption reduction of fuel is of particular importance.

**myDEUTZ:** With which offers could DEUTZ succeed at convincing its customers?

**Andreas Reiter:** Without a doubt, with the already mentioned „Stage V ready“. Equally, the DEUTZ hybrid activities. In this regard work is being done in concrete projects, and prototypes are already being tested at a number of different equipment manu-

### About our partner in conversation:

Andreas Reiter has been the managing director of the DEUTZ subsidiary DEUTZ FRANCE SAS since January 2015. He was already employed in this position from 2004 to 2012. In addition to this, with his organisation in Paris and the BCA (representative office) in Algiers, he is responsible for the important DEUTZ market in Algeria. Apart from this, there is MAGIDEUTZ, which is located in Casablanca/Morocco, a subsidiary of DEUTZ FRANCE, and where Andreas Reiter is appointed as president. As regards the service side of things, DEUTZ FRANCE is responsible for the French-speaking areas of Africa and, in the near future, Luxembourg. Andreas Reiter commenced his vocational training at DEUTZ in 1981 as an industrial management assistant and, following a course of studies in foreign trade, he held various positions for DEUTZ in Cologne, in London (DEUTZ UK) and Paris (DEUTZ FRANCE).

facturers. We were also able to provide an important message toward the OEMs with regard to the issue of „Downsizing“. With our TCD 2.9 and 3.6 model series, we provided a significant contribution with regard to the reduction of the equipment costs.

**myDEUTZ:** When compared with other trade fairs in this branch, what is special about Intermat in Paris?

**Andreas Reiter:** Of course Intermat cannot be compared with Bauma in Munich and, especially as regards its size, it cannot compete. However, due to its political and economic proximity to North Africa and other African countries, Intermat in France does have a certain locational advantage for these export regions. A considerable number of operators and decision-makers from a great variety of different functional areas in Africa always visit the trade fair in Paris.



DEUTZ presented its „Stage V ready“ campaign to the general public for the first time at Intermat 2015.





## ► DEUTZ Engine Plus:

# The for the Customers

**The DEUTZ business is not only limited to selling engines. With the „Engine Plus“ programme, DEUTZ has bundled a series of service offers that provide the customers with the best possible support, both prior to the purchase of an engine as well as thereafter. From individual application engineering right up to the retrofitting of useful additional components, our customers thus get the maximum benefit from their product.**

For DEUTZ, a successful business relationship requires mutual respect and an understanding of individual requirements, plus the ability to find solutions in a fast, competent and non-bureaucratic manner – in each and every stage of the co-operation. So as to satisfy this aspiration in a holistic

manner, DEUTZ offers a total of five different service fields within the context of the “Engine Plus” programme, which meet the individual requirements of the customers. The first component is the original DEUTZ “Engine Accessories”. These consist of a broad range of components that have been aligned to the DEUTZ engines, ranging from electronic ventilation control to a hydraulic start-stop function, right up to complete power packs. What is more, a large number of retrofitting kits are available for the retrofitting in the field.

As the second component, DEUTZ provides support in the form of customer-specific engineering support and application services, so as to implement optimum system integration of the hardware components and software functions required for the relevant machine. DEUTZ offers individual solution approaches with these “Engineering Services”, for optimum usage of the installation space and reduced installation costs. This is also complemented by the DEUTZ Testing Support. As the producer of complex die-

sel engines, DEUTZ has in-depth expertise and state-of-the-art testing and measuring equipment for engines and components. As an equipment manufacturer or development service provider, customers can now receive access to these resources such as, among others, functionality and endurance tests, a cold chamber or a mobile emission measurement, in accordance with the EU and EPA evaluation.

With the DEUTZ “Professional Tools”, users will find high-grade hand tools in industrial quality that represent the ideal equipment for every workshop, thanks to their resilience, durability and safety.

As the name suggests, the “Extended Parts Coverage (EPC)” extends the component protection for the heart of the customer machine. Thereby, a warranty extension of up to 5 years for DEUTZ engines is possible. The EPC programmes are offered for almost all application segments and take into account run times of up to 9,500 hours of operation. This provides numerous advan-

## In dialogue

### Dr Markus Müller, Head of System Integration, DEUTZ AG.

**myDEUTZ:** *Modern diesel engines are becoming increasingly more complex. As a result, is the need for development services on the part of the customers also increasing?*

**Dr Markus Müller:** To a significant extent, the engine development of the past years was characterised by the requirements stipulated by the exhaust gas legislation. As a matter of fact, the complexity has increased enormously with the launch of the exhaust gas treatment for EU Stage IIIB and/or US Tier 4 interim in 2011. This is also mirrored in the integration of the entire system in the huge variety of different applications, and results in great challenges for both our customers as well as DEUTZ. Simultaneously, however, this is an opportunity for us to distinguish ourselves on the market with first-class service. Since, the better the integration and alignment of the whole system of engine and machine, the greater the reliability, service life and overall performance of the customer machine. Because of this, the need for service performances has definitely increased.

**myDEUTZ:** *The “Engineering Services” and/or system integration field is a particularly individual service. In this regard, which benefits does DEUTZ offer its customers?*

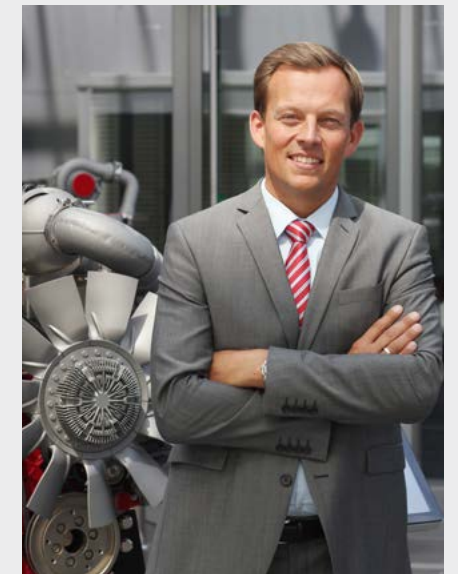
**Dr Markus Müller:** The system integration is closely interlocked with marketing and sales. Already in the planning phase of a new device, we offer the possibility of optimally aligning the engine and the exhaust gas treatment system to the different requirements and mission profile. Here we make use of our modular “Technology Construction Kit” DVERT®, so as to be in a position to offer a cost-efficient solution. In this regard, we pursue a holistic approach and support our customers with technical project management and system design – thus referring to the exhaust gas treatment, customer package and NVH (Noise, Vibration, Harshness) – right up to the segment-specific application engineering and the field trial. Thanks to this, the customer

receives a “turn-key” solution and, as such, has the possibility of reducing internal development capacities. What is more, the customer benefits from the DEUTZ expertise, which continues to grow in diverse applications, and the tailor-made components that optimally satisfy the requirements as regards reliability and functionality.

**myDEUTZ:** *Which components and/or development services can this be, quite concretely?*

**Dr Markus Müller:** On the one hand, this can refer to standard components, such as a device specific SCR tank or also modern technologies, such as a hydraulic start-stop system. The latter is becoming increasingly more important, especially in the current working environment, where operating costs are an important cornerstone. Here DEUTZ offers a number of different start-stop solutions – from the simple possibility to stop an engine in certain operating conditions, right up to hydraulic start-stop solution with an optimised engine and increased starting cycles. Due to the targeted reduction of idling phases, fuel can be saved and this is also better for the environment. In addition, with regard to the EU Stage V and thus associated use of a diesel particulate filter, this results in a high machine availability for light load applications, because less soot enters the DPF.

Another example of our “Engineering Services” is the so-called best efficiency point alignment of the engine control device with the machine control. It is the key for optimal performance, dynamics and fuel consumption. However, for smooth operations with the device, the hydraulics and engine must exhibit a very good dynamic performance. So as to secure the volume flow of the hydraulics and sufficient torque reserve for load variations, a rotational speed is set that is beyond that of the maximal performance. To improve the efficiency, a so-called down-speeding is performed, where the



engine is always operated at the lowest possible engine speed and yet, despite this, the needs of a dynamic load response of the hydraulic system are satisfied.

**myDEUTZ:** *Which importance will the field of “Engineering Services” have for DEUTZ in future?*

**Dr Markus Müller:** First and foremost of course, DEUTZ is an engine manufacturer. One of our key USPs on the market is the systems that have been customised to suit our customers’ needs. With us as a partner, especially manufacturers of smaller and medium-sized machines can comfortably integrate engines with the latest emission stages in their machines and, what is more, they receive an aligned overall system with regard to performance and efficiency. However, also larger customers are increasingly integrating us in interface functions within their own development division so as to be in a position to fall back on our experience and support. For this reason we are expanding our value chain in a targeted manner, taking the load off our partners’ shoulders with complex challenges and, in so doing, generating valuable benefits for the customers. “Engineering Services” reinforces our central aim of linking customised solutions and a maximum of customer proximity and is therefore of very great importance.

tages, such as the 100 per cent absorption of spare parts and wage costs in the event of a warranty claim. Alternatively, end customers with low equipment use time can purchase the EPC-Light version, with reduced maximally permitted operating hours, yet with the same warranty period.

The fifth component, the “Engine Plus” programme contains the DEUTZ “Service for 3rd party engines”. The reconditioning of engines and components represents a cost-efficient and resource-saving alter-

native to a new acquisition. DEUTZ offers its customers more than 60 years of experience in the reconditioning of technical components – regardless of the brands and manufacturers. DEUTZ overhauls components for compact, mid-sized and large engines of renowned manufacturers in a continual process, from the individual item, right up to serial production. All sequences and processes are quality tested and certified in accordance with DIN ISO 9001 / EN ISO 14001. Should this be desired, the contract manufacturing of the recondition-

ed and quality-controlled parts ensues just-in-time.

With Engine Plus DEUTZ therefore offers a real “Plus” as regards everything concerning the engine. In so doing, the customers benefit from the many years of DEUTZ experience, which becomes important in particular with the system integration within the context of the “Engineering Services”. In this regard, please also read our interview with Dr Markus Müller, Head of System Integration at DEUTZ AG.



## „Sales is also about communication“



Since 1 January 2015, Georg Diderich has been Head of Sales and Service EMEA (Europe, Middle East and Africa).

**myDEUTZ:** Mr Diderich, you were a man of communication for many years, among others also as press spokesman of the company. What appealed to you so much that you decided to change to a significantly more operative activity such as sales?

**Georg Diderich:** Sales is also about communication: Communication with the customers, the most important stakeholder of every company. Insofar my experience in corporate communication also pays off in my new activity. However, in the past 24 years I was predominantly travelling in operative functions: in service sales, in marketing, in the sales support, back then referred to as the so-called "Support House" and as the responsible person for the "Product Line A", the engines with a cylinder capacity up to 4 litres. Seen from such an angle, the past 5 years as the head of corporate management were merely an "excursion" into strategy work – but a very important one, which allowed me to round off my experience in different corporate divisions. Now I am looking forward to actively contributing in the implementation of the growth strategy, which we jointly developed in the course of the past years.

**myDEUTZ:** Which experience gained in the field of communication do you bring to sales?

**Georg Diderich:** Good communication is not a one-way street: Listening is just as important as speaking, if not even more so. If we want to be successful when compared with our competitors, we have to listen to our customers, take note of their demands and wishes and take these seriously, and then we have to convert these into the right products and service offers. In my new function, I am the mouthpiece of the customer within the company – but also the mouthpiece of the company at the customers.

**myDEUTZ:** You are responsible for the regions of Europe, the Middle East and Africa. Which challenges do DEUTZ encounter in these markets? What are the special requirements of the customers there?

**Georg Diderich:** The "EMEA" sales region comprises 126 different countries with numerous different languages and cultures, varying industrial development as well as varying legal framework conditions and national currencies. There are regions that have a strong population of machine manufacturers and a strong export orientation, and there are regions in which we virtually only do service business. Our products, services and network structures are just as varying as the markets and their respective demands: Our offer ranges from the emission level 0 right up to level IV, from our legendary air-cooled engines up to the liquid-cooled high-performance engines; Power Packs, Xchange engines and the original spare parts; highly-qualified repair services as well as trainings and schooling measures. We operate this via own subsidiaries and service-centres, independent national agencies, dealers and service workshops, Joint-venture companies and licensees. However, one aspect remains the same with all customers: The desire to cooperate with a reliable partner who is able to react to the different requirements rapidly and flexibly.

**myDEUTZ:** The first 100 days in the new position are over – which experience can you share with us after this period?

**Georg Diderich:** From a strategic and technical vantage point, we are ideally positioned: Our "Road Map" points us in the right way toward profitable growth and with a large number of newly acquired customers, we can already see first successes. Our engine programme is ready for the next

emission level V, which is to be launched in Europe in 2019. In addition to this, key product developments which are aimed at additional optimisation and extension of our engine programme have been launched: In the coming years, we will expand our product portfolio with smaller engines and gas versions and develop new engines in the cylinder capacity range of larger than 4 litres. However, we must become even better: We must become faster and more flexible, we must continue to improve our delivery performance and our quality to retain our customers in a highly cyclical, volatile and fiercely competitive market and seize every opportunity. For this reason we must rework our internal processes, design them in a more efficient manner and act in concert across the different departments – not least because the satisfaction and motivation of our employees also increases and, when the entire company is committed to our growth strategy and supports it, this helps us outside on the market. We must expand our technical competence in sales to better elucidate the increasingly more complex products and our USPs. In addition to this, we must further expand and qualify

► **"We have to listen to our customers, take note of their demands and wishes."**

our sales and service network to secure comprehensive support for our customers and use the internet to a greater extent, so as to develop new distribution channels in the service area. Not least, we must further increase the planning and forecast quality in sales – by means of this we help the production areas improve their performance.

**myDEUTZ:** Which goals do you personally wish to achieve with the assumption of your new function?

**Georg Diderich:** In my new function I would like to further expand our sales and service activities so as to implement our growth strategy, the development of which I, together with others, have worked on intensively in the course of the past years. In this regard, my many years of experience in the different corporate divisions as well as my extensive internal and external network will certainly be very useful.

## State-of-the-art technologies for diverse cultural requirements



Interview with Bob Mann, CEO of DEUTZ Corporation in the US

**myDEUTZ:** Mr Mann, after having worked for DEUTZ Corporation in the U.S. for 16 years, over the past six years, you have been engaged as Senior Vice President of Sales Service & Marketing at DEUTZ AG in Cologne. Last year, you decided to return to the U.S. and to assume the post of CEO at DEUTZ Corporation. Which impressions and experiences are you taking with you from your tenure at the head office in Cologne?

**Bob Mann:** The thing that has left the greatest impression on me during my time in Cologne is the tremendous depth of knowledge and expertise that is held by the men and women that make up the team in Cologne. While we are one of the smaller companies in our peer group, to quote a boxing expression "we punch way above our weight". The only way we can do this is with an incredible team. I must also say a large "thank you" to the team in Cologne for not only helping me during my time at headquarters, but also for accepting me into their workplace. The greatest experience was to work with a very varied customer group. Some of these customers demand extremely complex technical solutions, while others ask quite simple solutions, but with highly complex cultural demands. I was also lucky to work in Cologne during the time that the new 2.9 and 3.6 were launched. These two products

have been very well accepted by the international markets and prove that we, as a company, can develop world class engines and compete against the very best.

**myDEUTZ:** The DEUTZ subsidiary DEUTZ Corporation in Atlanta is the core subsidiary for the region spanning North, Central and Latin America. Which are the challenges posed by these regions with which DEUTZ products have to contend?

**Bob Mann:** In the Americas Region we also have very varied markets. North America is high regulated from an exhaust emission perspective but is a completely open market from a tariff point of view. This means both domestically produced engines and imported products can compete. The barrier to enter this market is one of development spending. That is, without the latest technology it is very difficult to gain market share. The major South American markets, Brazil and Argentina are completely opposite. They have extremely

high tariffs to enter but a low technology demand. This combination protects the local manufacturers,

► **"As in many markets around the world, in the Americas DEUTZ products are synonymous with reliability, durability an innovative solutions."**

and makes importation almost impossible. While we enjoy a good market share with engines below 4 litres in displacement we have difficulty in selling the larger engines. Most of our competitors are local producers and are either vertically integrated engine and machinery manufacturers or driven by the scale of the North American on-highway market. In both cases this gives a cost and service base that is extremely difficult to compete against. Because of the geographic size of our market, we have to work hard to maintain a service network that can offer our customers the speed and quality of service they demand. This is currently our greatest challenge.

**myDEUTZ:** What do you consider to be the strengths of DEUTZ engines in terms of regional requirements?

**Bob Mann:** As in many markets around the world, in the Americas DEUTZ products are synonymous with reliability, durability an innovative solutions. This reputation has been earned from tough applications, such as underground mining machinery, operating in some of the hottest, coldest and highest ambient conditions. We also led the market with our innovative exhaust after treatment technology on the 2.9 and 3.6. This enabled us to offer trouble free solutions to the major US fleet customers, who in turn demanded our products from OEMs.

**myDEUTZ:** In Europe, the new stage V emission legislation is expected as of January 2019. What is your assessment of the development of emission legislation in the U.S. in the future? In which direction is this likely to develop?

**Bob Mann:** I believe that the US will also adopt a Tier V emission stage. It is important to have harmonization in international emission legislation not only to provide environmental protection but also to allow manufacturers to produce one design of machine for the major markets. Another consideration is that if the EPA does not adopt a Tier V there is a real possibility that California will do so alone. This would add an additional layer of complexity to an already complex issue.

**myDEUTZ:** Which are the opportunities that the American market offers for DEUTZ?

**Bob Mann:** I believe our next opportunities lie in the local production of below 4 litre engines, according to the DEUTZ strategy of

globalisation. This will allow us to serve our customers in a more efficient way and ultimately at a lower cost to DEUTZ. We are also beginning to operate our own service dealerships. This is an exciting project, giving us the chance to solve some problems in our market while at the same time expanding our margins.

**myDEUTZ:** In what way do American and German customers differ?

**Bob Mann:** This is actually a very interesting and complex question. DEUTZ is a household name in the German speaking markets, so our acceptance in that customer base is far reaching. Although we have been in the US for some 60 years we are still not widely known as an engine manufacturer but as a tractor company, from the DEUTZ Fahr days. Similarly in Argentina the name DEUTZ is extremely well known in the agricultural markets and the farmers view our brand with extremely high quality German engineering. Speaking specifically about German and US OEM customers. German customers are very direct; they usually know what they want and press hard to achieve their goals, generally speaking a deal struck is a deal that is kept. US customers are much less direct and they will try to keep all deals as flexible as possible and sometimes getting a firm commitment is very difficult. As in all markets the correct cultural approach and awareness is vital when dealing with these two customer groups.



# Because Every Second Counts

The Schmidt snow blower Supra 4002 and Supra 5002 are two superlative power packs. Plenty of snow and large surfaces - ideal conditions for the high-performance machines! Thereby, in principle, it plays no role what the condition of the white splendour is. Be it wet, powdery, hard or frozen snow: The snow blowers work through the masses of snow in a targeted and reliable manner, with a particularly high-performance, rotating snow clearing technology.

The high-performance snow-clearing machines Supra 4002 and Supra 5002 were developed especially for the removal of large amounts of snowfall. For airports, Supra 5002, with a clearing capacity of up to 5000 t/h, is recommendable. A casting distance of up to 40 metres is no problem in this regard. As is the case with the 4002 series, (clearing capacity 3500 t/h), the machine can take along fuel for at least eight hours of work - absolutely indispensable, when every second counts.

What is more, both devices are impressive when it comes to their innovative articulated steering, which always provides the machine with a consistently strong forward feed and guarantees an exact track following of the vehicle within the clearing track of the clearing head. Especially for deployment at airports, the Supra can be equipped with additional movable hydraulic front valves. Thus the clearance width is expanded and can be adjusted flexibly to the respective snow pile width. This guarantees a particularly clean removal of snow.

Regardless, most importantly, a powerful snow blower requires one thing: a powerful

propulsion. Both the DEUTZ engines of the TCD 12.0 V6 variety in the Supra 4002 as well as the engines in the TCD 16.0 V8 variety, in the heart of the Supra 5002, are not only compact and high-performance power packs, but also low-emission and environmentally friendly. With a performance of 240 to 520 kW at 1800 to 2100 R/min<sup>-1</sup> respectively, the V-engines impress with best cold starting abilities, also under extreme conditions. So as to guarantee the unrestricted capacity of its engines, also with ice-cold temperatures, DEUTZ subjects the engines to special tests in its in-house cold chamber (also see the report on page 22). Thus, machine operators can rely on their DEUTZ, also under the most challenging climatic conditions. Equipped for the exhaust emission EU Tier 4, it goes without saying that they satisfy the latest exhaust emission level standards. The high-performance Common Rail Injection System and the electronic engine control (EMR 4) with intelligent connection to the drive management system ensure optimal engine performance combined with low fuel consumption. What is more, the Supra has an Eco mode, which allows an additional fuel-saving of approx. 20%, both in clearing and in driving mode.

Apart from the low noise level in the driver cab of merely 75 dB(A), the Supra 5002 also convinces with the ergonomic layout of all control elements. The clearing head is operated with a joystick that has a simple key function and additional comfort elements ensure maximal occupational safety and performance - also applicable here: Efficiency and safety are inextricable linked to one another.

The **ASH Group** is the leading system provider of innovative technical products for the cleaning and clearance of traffic areas as well as the mowing of green spaces in particularly challenging terrains. The comprehensive offer comprises a number of vehicles as well as innovative accessory and mounted devices for the individual vehicle equipping. Aebi Schmidt consists of two product divisions, each of which produces high-quality agriculture or municipal and special appliances, in addition to having a central distribution and sales division. Highly versatile and decade-long experience makes Aebi Schmidt an equally reliable and competent partner for customers from across the globe. A service and performance programme that is perfectly aligned to the different customer needs offers the matching solution for virtually every challenge.

With its location in Burgdorf in Switzerland, **Aebi** is one of the worldwide leading manufacturers of vehicles by means of which safe mechanical working and upkeep of extreme sloped terrains, as well as particularly discerning terrain is made possible.

**Schmidt** has production locations in Germany, Holland and Poland. In numerous divisions, the company offers some of the world's most comprehensive product programmes. The complex portfolio consists of a variety of versatile solutions for the areas of winter service, summer service, airport, vehicle and railway engineering.

Right in the middle of summer nobody likes to think of winter, but one thing is certain: It will come. While it is, in particular, a hot summer that lets the fans of winter sports hope they can experience a winter wonderland at the end of the year, this would, first and foremost, pose a great challenge to airports. So as to secure passenger operation, also in the event of larger amounts of snow, the airport operators plan ahead in a timely manner, and today already invest in high-performance snow-clearing machines. Among these are the two rotary snow ploughs Schmidt Supra 4002 and Supra 5002, which have a DEUTZ as their hearts, so as to provide the right propulsion.



On 20 April, the General Secretary of the Socialist Labour Party of Spain (PSOE), Pedro Sánchez, visited the DEUTZ SPAIN plant together with his party colleagues from Extremadura at a national and local level, Guillermo Fernández Vara, and José Carlos Contreras.

During the tour of the different corporate areas in Zafra, the General Secretary and his entourage were accompanied by numerous members of the works council, as

employees on a daily basis so as to guarantee products with high quality requirements for increasingly more discerning markets.

In a very cordial atmosphere, Pedro Sánchez thanked the employees for their elucidations and here directly addressed some of the most senior employees in the cylinder-head installation, whom he thanked for their great commitment in adapting to the new technologies. In his opinion, they are a “good example for the future generations.”

Following this, the technical director, Fernando Angulo, thanked Pedro Sánchez for the visit and his interest in visiting the DEUTZ plant, despite his busy agenda. Fernando Angulo made use of the opportunity to invite Messrs Fernández Vara and Contreras to visit the company once again to discuss in more detail those topics that refer to the future of the company and its employees.

## Pedro Sánchez visiting DEUTZ SPAIN

representatives of both trade union sections. Pedro Sánchez seized the opportunity for a short conversation with them about the current work situation of the company and the most important future challenges for the employees.

During his visit, he appeared greatly interested in trying to understand the different manufacturing processes in detail and was very surprised about the high degree of technology deployed in the DEUTZ SPAIN plant.

He also made use of the opportunity to talk with a number of employees directly at their workstations about the general aspects of their production activity, to gain a first-hand impression of the challenges faced by the

During the brief meeting with the Management Board of DEUTZ SPAIN, the General Secretary appeared interested in the “Dual Vocational Training” system that had been introduced into the company as well as the implementation of the “Industry 4.0” project, whereat his great degree of expertise was impressive.

In a brief summary, the Management Board explained the most important aspects of the new “crankcase” project, that is currently being commissioned in the plant. Pedro Sánchez congratulated DEUTZ SPAIN on the outstanding perspectives which are opening up for the company thanks to this project, and he wished all involved parties continued success for the future.



At its annual Distributer Meeting DEUTZ Corporation announced the recipients of its 2014 Distributor Awards.

## DEUTZ Corporation Announces 2014 Distributor Award Recipients

DEUTZ Corporation is pleased to announce the recipients of its 2014 Distributor Awards. Each award was presented last week, at DEUTZ Corporation's annual Distributor Meeting. The meeting was held this year in Montego Bay, Jamaica. Dave Combs, Vice President of Distribution noted, “It was appropriate for us to present the awards at this particular Distributor Meeting, since the theme was “Powered by Partnerships” and each recipient serves as an outstanding example of a strong partner.”

### The DEUTZ Distributor Award recipients for 2014 are as follows:

#### DEUTZ Distributor of the Year: Diesel Industrial de Chihuahua

With multiple locations across Mexico, Diesel Industrial de Chihuahua provides sales and service of DEUTZ engines all across Mexico. <http://deutzmx.com/>

#### DEUTZ Outstanding Service Award: Stauffer Diesel

Customers across a vast majority of Pennsylvania remain confident that their DEUTZ service needs will be met, since Stauffer Diesel is on the job! In fact, Stauffer Diesel has been on the job for more than fifty years! <http://www.staufferdiesel.com/>

#### DEUTZ Outstanding Sales Award: Interstate Power

Customers in Minnesota, and the Dakotas rely on Interstate Power, due to their knowledgeable staff, and parts on the shelf to meet their DEUTZ engine needs. <http://www.istate.com/>

#### Most Improved DEUTZ Distributor Award: Marindustriel

Located in Montreal, Quebec, Marindustriel has a solid reputation for providing customers with DEUTZ engines, parts and service, all across the province. <http://www.marind.ca/>

Steve Corley, Chief Sales Officer for DEUTZ Corporation noted, “We were very pleased to recognize these four outstanding distributor partners during our Distributor Meeting.”

### Special recognition for DEUTZ Corporation

DEUTZ Corporation itself also received special recognition at its annual Distributor Meeting. The international trade association Associated Equipment Distributors (AED) awarded the DEUTZ Corporation for being a member of the organization for the past fifty years. Associated Equipment Distributors (AED) is an international trade association representing companies involved in the distribution, rental and support of equipment used in construction, mining, forestry, power generation, agriculture and industrial applications.



► “AED is a great organization, and we are pleased to be involved”

President & CEO of DEUTZ Corporation

to be involved. We've made so many good friends through AED over the years, and have spent time during many annual meetings catching up with them. We're proud to be a part of AED, and to accept this recognition.”

Bob Henderson also presented to DEUTZ distributors during the second day of the annual meeting, in a General Session segment entitled, “Distribution: Today's Challenges”.

Dave Combs, Vice President of Distribution for DEUTZ Corporation remarked, “It was really great to have Bob Henderson present during our Distributor Meeting. Bob always has plenty of insight to share regarding legislative issues, as well as distributor best practices.” Combs added, “It was especially timely for Bob to present in our General Session, since the theme of our meeting this year was, “Powered by Partnerships”.

Headquartered in Norcross Georgia, a suburb of Atlanta, the organization employs over 175 people. In addition, DEUTZ Corporation operates a remanufacturing production facility (Xchange program), in Pendergrass, Georgia.

More information about DEUTZ Corporation may be found by visiting [www.deutzamericas.com](http://www.deutzamericas.com)



The new and exceptionally compact Vögele "Mini Class" road paver 800-3i makes road surfaces from 0.50 to 3.20 metres.



# Compact Partnership

At the international Intermat construction fair 2015 in April, Vögele presented its new, particularly compact SUPER 800-3i road paver to the public. With a width dimension of only 1.40 metres, a highly compact and high-performance engine is also required – the DEUTZ TCD 2.9.

Most of the time, when thinking of road pavers, one thinks of over-dimensionally large devices that apply metre-wide asphalt layers to the motorways. Most of the time, however, they are not suitable for the construction of small paths, streets and places. Compact and agile pavers are required for this. With the SUPER 800-3i, the Vögele producer – a global market leader for road pavers – has launched a particularly compact model on the market.

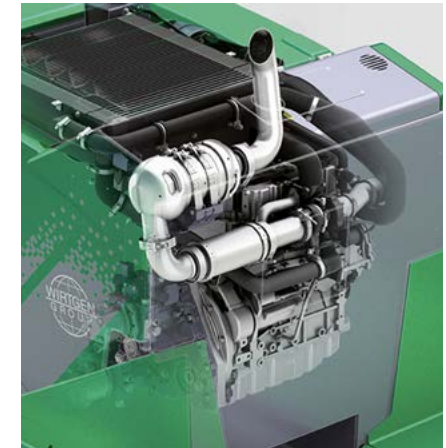
Its concept allows a broad range of possible applications on a great variety of different construction sites, such as the filling of cable trenches or the manufacturing of foot and bicycle paths. Equally, it can also be deployed in gardening and landscaping or for the mechanised installation of coverings in halls or underground car parks. These place highest demands on the agility and compactness of the machine. In a word: The SUPER 800-3i can always demonstrate its strength when the construction site is particularly restricted, narrow or low. With an outside track gauge of only 1.14 metres, the track paver is even suitable for the paving between rail tracks. The so-called range of paving applications – thus referring to the width of the paved layer – ranges from 0.50 to 3.20 metres. Due to the small clearance width of 1.40 metres and the total height of under 2.00 metres, it can also fit through narrow entrances or gateways without any problems. Thus, even the paving of traffic surfaces in buildings is not a problem. The well-wrought machine design allows the manual paving even up to 5 centimetres to side limitations, such as kerbs or walls. With its large floor mount, the long crawler chassis provides optimal traction. Therefore, constant propulsion is also guaranteed in difficult terrains.

## Small Engine, Great Performance

It goes without saying that a machine which is so compact, must also satisfy the greatest demands regarding the construction size. The SUPER 800-3i has a modern and high-performance DEUTZ TCD 2.9., with a length of only 648 mm, a width of 560 mm and a height of 685 mm.

Frank Niclaus, District Head of Engine Sales Germany at DEUTZ, explains: "The exceptionally compact construction form of the paver and the thus resultant possible applications are truly remarkable. Here our engine and the machine form a perfect team." The TCD 2.9, together with the TCD 3.6, were redeveloped from scratch and launched on the market in 2010. Here, right from the outset, the focus of the development was on the construction size. With the compact engines TCD 2.9 and 3.6 DEUTZ is a market leader and enables deployment in extremely small construction spaces. Apart from its efficient construction design, the engine also sets standards with regard to performance.

The water-cooled 4-series cylinder diesel engine is equipped with a cooled external exhaust gas recirculation, turbocharging as well as charge air cooling, which enables great performance and, simultaneously, low fuel consumption. With its 2.9 litres of cubic capacity, it has a performance of 55.4 kW at 2,200 R/min or 54 kW at 1,800 R/min in the so-called ECO stage of the Vögele paver. By means of this, the efficiency is once again increased, which makes the machine particularly interesting for smaller companies or municipal companies. In comparison to its predecessor, the paver now has more than 20 per cent more power. What is more, with the deployment of a SUPER 800-3i, a demand-controlled cooling ensures that the fuel consumption and the noise emissions are reduced.



Apart from the SUPER 800-3i, the sister model, SUPER 700-3i, which belongs to the so-called "Mini Class" of Vögele, also relies on the DEUTZ TCD 2.9. Essentially, the 700-3i offers the same product properties, with the exception of a slightly smaller lay-down rate of maximally 250 t/h, in comparison to 300 t/h with the 800-3i.

## State-of-the-art Engine Technology

Also with the exhaust emissions, the DEUTZ TCD 2.9 complies with the highest guideline standards for mobile construction machines currently applicable – which is the Stage IV in Europe or the equivalent of the US EPA TIER 4, applicable in North America. The engine attains this with the sole usage of an oxidation catalytic converter (DOC). It is also optionally available with a closed particulate filter (DPF), which allows deployment on the Swiss market and for specially regulated communal applications. Even more stringent emission guidelines apply there, which call for a DPF. By the way, the addition of the "i" of the SUPER 800-3i stands for "intelligent emission control" and describes all machines of the WIRTGEN GROUP, which are equipped with state-of-the-art engine technology. JOSEPH VÖGELE AG belongs to the Wirtgen Group – an internationally active group of companies active in the construction machinery industry. Five renowned brands belong to this group, i.e. Wirtgen, Vögele, Hamm, Kleemann and Benninghoven, which have their parent plants in Germany, as well as local production sites in Brazil, China and India.



The TEAM cooperative project is dedicated to the development of technologies for energy-saving drive systems of mobile work machines. This is a promising field of research, because analyses have shown that with new technologies, an energy- and pollutant-saving potential of more than 20 per cent can be anticipated. In „Green Wheel Loader“ – a partial project of TEAM – a DEUTZ TCD 7.8 will bring the developers a little bit closer in attaining this objective.

*The „Green Wheel Loader“ – a partial project of TEAM – based on a serial vehicle by the manufacturer Liebherr. For the motorisation, an optimised DEUTZ TCD 7.8 was deployed in conjunction with a hybrid system.*

# Efficient TEAM-Work

The development of efficient drive systems requires an integrated look at machines. Here, the interdependencies among the individual propulsions and the processing-relevant loads have to be taken into account. Quite often, this is difficult to realise in practice, because the expertise is typically distributed between manufacturers and suppliers. As a general principle, the sub-systems such as propulsion, diesel engine, working hydraulics or tools are purchased externally.

For a comprehensive consideration, the modern simulation tools provide a good foundation. And to go on step further, the cooperative project TEAM (Development of technologies for energy-saving drive systems of mobile work machines) was started in February 2012. In this regard, with the purpose of bundling their competences, a total of 18 OEMs and supplier companies, 5 university institutes and one association have joined forces. This project had a dura-

tion of 3 years and, with the official closing ceremony at the Technical University of Dresden, ended in April 2015.

## Perceptible and Measurable

The objective of the collaborative project was the perceptible improvement of the efficiency of all propulsion components and the machine application, a significant fuel saving in comparison to the current standard machines as well as the corresponding evidence for this that was to be provided under real conditions. For the latter, a dem-

onstrator was assembled especially for this very purpose – the “Green Wheel Loader” technology carrier. The project budget had a total value of approx. 8.5 million euros, of which approx. 4.3 million euros was provided by the Federal Ministry of Education and

Research as well as by the project sponsor Karlsruhe (PTKA).

Apart from a number of different other key topics, the “Green Wheel Loader” partial project appeared to offer a particularly large efficiency potential. Simultaneously, it had the purpose of enabling the test under real conditions. The project was initiated by the VDMA (German Engineering Association). As partners, the Institute for Fluid Technology of the TU Dresden, the Institute for Machine Elements and Machine Design of RWTH Aachen as well as the industry companies Liebherr, Hydac Fluidtechnik, Bosch Rexroth, Danfoss Power Solutions, Hydrive Engineering and DEUTZ were involved.

## The Ideal Operating Point

DEUTZ contributes its expertise in the field of efficient diesel engines, gained in the course of many years. The DEUTZ engine provides the propulsion for the demonstration wheel loader of the Liebherr manufacturer, as well as its working hydraulics. The wheel loader is an experimental unit, whose drive train, when compared to that of serial machines, has been virtually completely removed and replaced by innovative components provided by the project partners. The TCD 7.8 deployed by DEUTZ was optimised first and fore-

most with the purpose of obtaining the ideal operating point and integrated into an intelligent hybrid system. Here, the fundamental conceptual idea is to leave the dynamics to the hybrid system to the greatest possible extent and to operate the combustion engine in a restricted, consumption-optimal map range.

The industry diesel engine, with 7.8 litres of cylinder capacity has a top performance of 250 KW at 2,200 revolutions per minute. Its maximal torque is at 1,400 newton metres at 1,450 revolutions per minute. The engine complies with the current exhaust emission level EU Tier IV and, thanks to a diesel particle filter (DPF) already satisfied the EU Tier V, which is anticipated for 2019, today. Thus, innately, it is among the lowest-emission diesel engines on the market and as such provides the ideal foundation for additional optimisations.

## More Efficiency thanks to Hybridisation

Today already, thanks to the highly-developed exhaust gas treatment, modern DEUTZ diesel engines generate hardly any emissions. Here, for instance, with a DPF more than 99 per cent of the soot particles are held back. Additional saving potentials are to be attained by means of a lower fuel consumption, yet here, too, the engines have already attained a very high stage of development. Additional consumption im-

provement to the engine are virtually exclusively attained by reducing the operating speeds (so-called down speeding). Therefore hybridisation – the combination of a combustion engines and an alternative propulsion – is an option.

Wolfgang Beberdick, Head of Pre-Development at DEUTZ, explains: “The challenge is found in selecting the operating points of the engines so as to ensure that the efficiency factor is as high as possible. This can be attained by avoiding small loads and high revolutions. Simultaneously, a hydraulic or electric alternative drive, in interdependency with a transfer gearbox and corresponding energy storage must ensure dynamic and reliable output.” Thus, if the machine operator literally steps on the gas, the required additional performance is initially provided by the alternative propulsion forms – the combustion machine thereby remains in its ideal operating range and in so doing saves fuel. “Thereby, depending on the respective application case, savings potentials of up

to 15 per cent can be realised,” Beberdick continues. With this project, the alternative propulsion form is a so-called hydrostatic hybrid module, thus a hydraulic engine, which draws its energy from a pressure accumulator.

In the course of the project and the discussion with the other research partners, it was concluded that a single operation point would not be sufficient. Hence, together with the chair for combustion engines in Aachen, the engine was optimised to allow for a restricted operating range. By means of this, a significantly lower nominal torque was defined. In this configuration, the engine has a performance of maximally 205 KW at now only 1,600 revolutions per minute; the maximum torque value is now at 1,500 newton metres, at 1,200 revolutions per minute. In so doing, the critical engine operating points (with a high rotation speed and low load) are avoided. What is more, additional optimised components, such as modified common-rail injectors and a new exhaust gas turbo-charger have been deployed.

10 per cent reduction in Fuel Consumption  
At the end of the project, the test of the wheel loader under real conditions followed. For this, a defined working cycle was run on the premises of the Dresden gravel plant, and the fuel consumption was compared to that of a reference engine. The result: Thanks to the optimised engine and in interaction with the hybridised drive train, the “Green Wheel Loader” attained savings of 10 per cent. Ac-



cording to Wolfgang Beberdick, the optimal level of fuel consumption can even turn out to be significantly higher: “Needless to say, DEUTZ, being an engine producer, can only realise this in very close cooperation with its customers, the machine producers. The configuration of the entire system and its integration into the machine are decisive with regard to how energy efficient a mobile work machine will be.”



Federal Ministry  
of Education  
and Research

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**PTKA**  
Project Management Agency Karlsruhe  
Karlsruhe Institute of Technology

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Modern control units enable increasingly detailed monitoring and controlling of both engine and machine.

For quite some time already, the digital revolution has been a reality when it comes to the combustion engine. Where sophisticated mechanics regulated the fuel injection and combustion process in the past, this is achieved by electronic control units today, with the help of highly complex algorithms. This increases performance and efficiency, reduces exhaust gas emissions and simplifies the vehicle service.

## DEUTZ Tier 4 Control

Already since the 1990s, DEUTZ has been equipping its engines with electronic control units, also referred to as ECU or EMR (electronic engine control). Such a unit consists of high-performance hardware with a micro-controller and software that has been aligned specifically to the type of engine and target application. This processes a myriad of sensor data, ranging from the rotational speed to the exhaust gas temperature, right up to the charge air pressure, and controls the engine via the corresponding actuators on the basis of an optimised control strategy.

The drivers behind this development are, first and foremost, the constantly increasing emission requirements that are to be satisfied. Simultaneously, the performance and efficiency and/or fuel consumption

of the engines are significantly improved. The electro-mechanically regulated fuel injection prepared the way for a fully electronically-controlled engine. On the basis of common rail technology, the potential was subsequently further exploited and all injection times, quantities and pressures were steered in their entirety by the ECU. In the next step, the exhaust gas treatment such as, for instance, the regulation of the DPF and SCR systems, was integrated.

All DEUTZ engines of the current exhaust gas emission stage US EPA Tier 4f / EU Tier IV have a completely electronic engine control. Due to the continuous expansion of functions, there has been an extreme increase of the complexity of the control unit software. While the scope of a Tier 3 engine control unit consisted of about 10,000 parameters, in Tier 4f this has increased to about 40,000.

Taghi Akbarian, Head of Electronics at DEUTZ AG, explains: "The requirements to be fulfilled by the software features will increase in future. The steering and regulation of additional components and functions of the engines and machines will be added. In addition to this, thanks to a system-spanning and application-specific control strategy, the software offers the possibility of aligning the steering and regulation of an engine and drive train in such a manner that the best possible overall benefits are attained for our customers with regard to fuel consumption, performance and efficiency."

So as to further optimise the software quality and the development times with the increasing complexity, DEUTZ utilises state-of-the-art methods and development tools. These consist of a professional re-

quirement management, mostly automated toolchains for software creation and testing as well as the agile development method SCRUM (a special development methodology in project management for entire software projects).

### Software as Core Competence

Thus the well-known basic components, such as the so-called 5c parts (crankshaft, cylinder block, cylinder head, camshaft, connecting rod) definitely no longer represent the only part of an engine manufacturer's competence. Equally, the electronics, inclusive of the control unit software represent a key technology, by means of which DEUTZ differentiates itself on the market. Therefore DEUTZ has built-up an own software development and, in so doing, has increased the real net output ration in this sector. It is in particular the customers who benefit from this. Apart from the steering and regulation functions, the diagnostics functionality is an essential component of the software development for the future, by means of which the statutory requirements with regard to the monitoring of all exhaust gas relevant components fitted to the engine and the exhaust gas system can be ensured. An additional benefit of the diagnostics function is the engine protection, so as to attain the maximum availability of the engine and avoid defects. "The machine operator is constantly informed regarding the condition of the engine, via the HMI interface of the engine control unit. What is more, DEUTZ offers an efficient software solution on the control unit, which allows targeted troubleshooting in interaction with the DEUTZ Serdia diagnostics tool. Here the target is to be able to quickly analyse and

remedy the fault in the field," Akbarian explains.

### The Next Generation

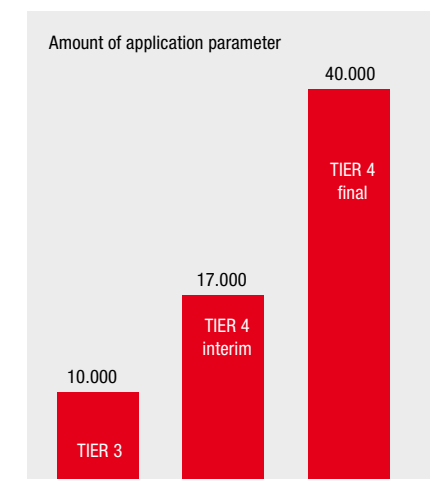
Presently, DEUTZ is working intensively on the development of the next generation of control units. The goal is to develop an ECU standard platform that is based on state-of-the-art electronic components for the coming DEUTZ engines. In this regard, the engineers fall back on larger storage resources and faster micro-controllers, so as to be in a position to depict even higher-performance control functions such as model-based regulations or diagnostic functions. Thus DEUTZ is equipped for future statutory and market requirements. Solution variants for different markets, engines and exhaust

gas emission stages are derived from this standard platform and, by means of this, a significantly more efficient development is made possible. This is essential when considering future engine generations, so as to ensure that the increasing complexity will be mastered.

Furthermore, the electronics offer the possibility of depicting an electronic or hydraulic hybridisation in appropriate applications. Within the context of a so-called GRID project (Green Industrial Diesel), DEUTZ successfully equipped a wheeled excavator with such a system in 2014. Here, the interaction and/or energy flows between the two drive systems and the electrical accumulator are steered by the specially developed electronics, to satisfy the specific requirements. With this, DEUTZ has attained a significant fuel saving of approx. 40 % and provides an outlook regarding the future system solutions.

What is more, with the new ECU generation, DEUTZ will also be able to equip its engines as a so-called "cyber-physical unit" with high-performance communication and intelligent software, so that they will be prepared for the mega-trend of "Industry 4.0". Essentially, this trend is based on the "Internet of Things". This refers to the communication of intelligent objects, which provide own status information for further processing within the network, by means of which their usability is increased.

"Ultimately, software development is an important core competence for DEUTZ. We are optimally positioned for this challenge and can also offer our customers innovative and tailor-made solutions in future," Akbarian summarises.



Due to the continuous expansion of functions, there has been an extreme increase in the complexity of the control unit software. While the scope of a Tier 3 engine control unit consisted of about 10,000 parameters, in Tier 4f, this has increased to about 40,000.



# Ice-Cold Power



The robust and resilient engines of DEUTZ AG are used in all regions of the world. Be it at dizzying heights in the remotest mountainous regions of Peru, deep underground in the mining sector, in tropical temperatures or the freezing cold – you can rely on DEUTZ engines. In this regard, the deployment in cold regions represents a particular challenge, because, also in the bone-chilling cold of the Arctic regions, it is essential to be able to rely on one's engine. In the research and development division in Cologne, DEUTZ tests how resilient its engines are when deployed under ice-cold conditions.

DEUTZ engines are used worldwide. Hereby, climatic challenges are a matter of course for both man and machine. However, not only does this refer to the sub-tropical temperatures of the southern-based regions, but also, in part, the deployment during icy conditions.

So as to be in a position to test the engines under these exceptional conditions, there is a special cold chamber in the development division of DEUTZ AG at the Cologne-Porz location. In this research and development division, in which temperatures of -40°C can be attained, tests can be performed not only with the engines, but also with complete vehicles. On a surface spanning 8 metres in length, with a width of 2.80 metres and a height of 3.50 metres, the possibility thus exists to test a tractor or a construction vehicle under ice-cold conditions.

First and foremost, the DEUTZ engineers are interested in the ignition behaviour of

the engine, because this is the critical phase for operation. For the test, the engines are frozen, which is what happens overnight in the majority of cases. The starts then ensue the following morning with the completely cold engine. Then the combustion chamber, diesel, engine oil, refrigerant and the aspirated air, quite literally, are icy. To assist an engine in attaining a clean start under these conditions, one needs a great deal of experience and engineering prowess. For this, the thermodynamics specialists elaborate the right alignment of all engine parameters. Preheating behaviour, the fuel injection quantities and times are aligned in exacting detail, and the data that has been determined is stored in the engine electronics. The alignment determined in the cold chamber is then applied to the engine under real conditions and, as such, ensures a smooth start for the user.

These procedures also place an extreme toll on the starter batteries. So that reproducible results can be delivered, the starter batteries

are charged in such a manner that they have a defined charge level. This allows reliable statements regarding whether the engine can be started under extreme conditions when the battery of the engine is not completely charged. In addition to this, DEUTZ installed a new battery simulator in the past year. In the simulator, the characteristics curves of different types of batteries are stored, so that the test bench operator, in coordination with the engineer, can simulate different battery conditions and, by means of this, can accelerate the tests.

So as to simulate a base load for the engines as well, a hydraulic load unit is also deployed. This break simulates, e.g. the load a engine would experience that is built into an excavator when the hydraulic auxiliary units generate a resistance.

The tests in the cold chamber represent a fundamental element of the development and confirms what DEUTZ promises: Reliability under all conditions.



The engines are tested for load capacity in icy conditions of up to -40 °C in the DEUTZ cold chamber.

## “DEUTZ Willi” at the North Cape

Eight weeks after its start in Lauenförde, located in Lower Saxony (Germany), the 79-year-old Winfried Langner reached the North Cape together with “Robert”, his tractor. The pensioner, who has made a name for himself as “Deutz Willi” covered a distance of about 3800 kilometres before reaching his destination, where he then could unroll the flag of his home community. Robert was his loyal companion once again, as had been the case during numerous prior long-distance trips, and proved that, even though slowly, one ultimately always reaches one's destination. The DEUTZ D15 tractor, which operates with a reliable air-cooled DEUTZ F1 L 712 engine, has a maximum speed of 18 kilometres per hour. Willi and Robert will be heading back home again with a good feeling.



## DEUTZWORLD

The new DEUTZ magazine for our customers, retailers and partners

Look forward to edition 3 | 2015!

AGRITECHNICA, the world's leading trade fair for agricultural engineering, is again being held, from 8 to 14 November 2015, in Hanover. In the next issue of DEUTZWORLD, find out why DEUTZ engines are so successful in the agricultural machinery segment.



You can find DEUTZWORLD online at [www.deutz.com](http://www.deutz.com)

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# Performed by DEUTZ

Each machine is only as good as its engine. Therefore, leading machine manufacturers have chosen the latest cutting-edge technology from DEUTZ, be it in mobile machines, agricultural equipment, ships propulsion or commercial vehicles applications.

For example this means that DEUTZ engines are installed into more than 100,000 new mobile machines worldwide per year and one out of two pieces of airport equipment are installed with DEUTZ engines and one out of three hectares of farm land in Germany is cultivated with DEUTZ powered machines.

DEUTZ is one of the world's largest independent engine producers, with an integrated power range from 25 to 520 kW. From the first installation consultancy to the life-long service support of the engine, we are completely dedicated to our customers. So that you receive products and services to your satisfaction.

**The engine company.**

