

The customer magazine of DEUTZ AG

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Dear readers,



The European parliament adopted the next stage of exhaust-gas legislation for mobile work machines on 5 July 2016. The EU Stage V will enter into force in 2019 and contains, in particular, more stringent statutory thresholds regarding the particulate emissions. From page 6 onwards you can find out what we are doing to make this transition as simple as possible for our customers. During our successful trade fair year 2016, „stage V ready“ was also the main area of focus. After having presented our supplemented engine range for the new emission stage at Bauma in Munich in March, our new TCD 9.0 engine was recently the centre of attention at Bauma Shanghai (page 13). The four-cylinder-diesel engine, with nine litres cylinder capacity, marks the start of a new engine generation that we are planning within the framework of a cooperation with the Liebherr corporate group. By means of this plan, we can expand our product portfolio in the upper output range from 200 to 700 kW and, on top, we shall receive the exclusive rights for the TCD 9.0 production in China. This is a nice project, which confirms the many years of successful cooperation with Liebherr (page 12). As a general principle, the customers and their requirements are at the centre of focus with all our endeavours. Why talking to our customers can never be substituted by anything else, is explained by Georg Diderich, Senior Vice President Sales & Service EMEA on page 10.

We have made good headway as regards our location optimisation. After a construction time of less than one year, the relocation of the crank- and camshaft production from Cologne-Deutz to the new shaft centre in Cologne-Porz could already start in April of this year. You can find out how this large-scale project could be

executed so quickly in the report on page 14. We are also very proud of the high quality standard of our education because, also in 2016, DEUTZ was once again distinguished for its outstanding performance in the field of vocational training. Therefore, it comes as no surprise that the instructors and apprentices also require the appropriate premises. In the course of our location optimisation, the training areas were also relocated to Porz in summer. What the new vocational centre looks like can be seen on page 16. Service also plays an important role for us. In the current issue, we present you our Xchange area, which offers a comprehensive portfolio of exchange components, covering everything from a compressor to a complete engine and, in so doing, guaranteeing the same quality as the DEUTZ original parts (page 18).

Dear readers, I will retire on 31 December 2016, and the position of Chairman of the Executive Board will be handed over to Dr Frank Hiller. I would like to make use of this opportunity to thank you for your good cooperation in my time as the Chief Executive Officer. I am convinced that DEUTZ is well prepared for what may come and will also play a leading role in future with the development of more environmentally-friendly and more efficient propulsion technology worldwide.

In my personal capacity and on behalf of my management colleagues, I would like to wish you a Merry Christmas and a Happy New Year.

Kind regards

Dr Helmut Leube

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.

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Dr Frank Hiller assumes managing directorship at DEUTZ

Generation transition at DEUTZ AG: With effect from 1 January 2017, Dr Frank Hiller (50) became a member of the management board of DEUTZ AG, in the position of Chief Executive Officer. This was decided by the supervisory board of DEUTZ AG in its meeting of 22 September 2016. With this, Dr Frank Hiller succeeded the existing chairman of the board, Dr Helmut Leube (63), who will be retiring on 31 December 2016. Dr Leube guided DEUTZ AG safely through the financial crisis, rejuvenated the complete product line and aligned the company structures to ensure a sustainable future. „We thank Dr Leube for his very successful work and wish him all the best for his future,“ says Hans-Georg Härter, chairman of the DEUTZ AG supervisory board.

Dr Frank Hiller spent his entire working life in the industry. He was a member of the management board at MAN Truck & Bus AG (since 2009) and at Leoni AG (since 2014). „With the change in the chairmanship of the board at DEUTZ AG, we are delighted to have acquired a personality with extensive industrial experience as regards technological and market aspects,“ says Hans-Georg Härter.

„Vom Rhein an die Spree“ – The DEUTZ Choir on an anniversary tour



The DEUTZ Choir was also under way as a musical ambassador of DEUTZ AG and the City of Cologne in 2016. In the Kaiser-Wilhelm Memorial Church in Berlin, the DEUTZ Choir, together with prominent soloists and the renowned symphony orchestra, arranged a fund-raising concert under the motto of „Vom Rhein an die Spree – ein musikalischer Brückenschlag“ (From the Rhine to the river Spree – Musical Bridge Building) under the direction of Heinz-Walter Florin on 29 September 2016. Works by Mozart and Schubert, Verdi, Fauré and Bach were performed. On 1 October 2016, the choir could co-develop the musical accompaniment of a festive service in Hedwigs cathedral. An additional highlight of the trip was a meeting of the choir, among others with the member of the Bundestag, Wolfgang Bosbach, and other Cologne members of the Bundestag in the German Bundestag.

Even more DEUTZ Engine Plus

The already varied product range and DEUTZ Engine Plus service programme is being expanded to include additional attractive offers: By the end of the year, a new cooling agent warm-up can be ordered for the TCD 4.1/6.1 and 7.8 (emission level Tier 4 final) engines. What is more, there will be a flexible Plug&Play SCR Tank in 3 different sizes (20-, 32- as well as 50-litre) for these engine series. For the TD 2.9 and TCD 3.6 engines, the new DEUTZ Cooling Pack (as a loose member parcel) and DEUTZ Power Pack (as a loose member parcel and already assembled) will be introduced by the end of 2016. At the beginning of 2017, a new colour display will round off the comprehensive DEUTZ Engine Plus offer.

More details regarding the entire offer can be found soon at www.deutz.com or at your DEUTZ service partners.



Start for 27 new apprentices at DEUTZ

On 1 September, 20 young men started their vocational training at DEUTZ AG in Cologne. At this event, the career starters of DEUTZ were welcomed by the member of the management board, Michael Wellenzohn in the Technikum. „With the start of your education, a new stage of life starts for you today. A sound vocational training forms the basis for your future career. Thus I am very happy that you have decided to complete your technical vocational training at DEUTZ AG,“ says Michael Wellenzohn, Chief Officer of Sales/Service and Market-

ing. At DEUTZ, the vocational training period traditionally starts with the introduction days, which are organised by the apprentices in the second year of apprenticeship. Here, the apprentices of the higher years of apprenticeship report on their experience and provide the career starters with many valuable tips about their employer. Since this year, the vocational training is carried out in the new vocational training centre in Cologne-Porz for the first time. The instructors and apprentices moved into these modern premises prior to the start of the

new vocational training year. „Our new vocational training centre offers ideal prerequisites to retain our high standard of vocational training also in the future. Thus it is also an important investment in the future of young people,“ says Frank Opitz, head of the vocational training centre in Cologne. Seven young people also started their training at the DEUTZ sites in Ulm and Herschbach. The plant in Ulm will train four industrial mechanics and one industrial clerk, and the Herschbach site has two new cutting machine operator apprentices.

DEUTZ distinguished by THW as an honorary office-friendly employer



F.l.t.r.: Markus Adams (DEUTZ AG, test centre), Martin Strecker (Head of Human Resources, DEUTZ AG), Dr Hans-Ingo Schliwienski (THW state representative North Rhine-Westphalia), Thomas Endres (DEUTZ AG, repair) and Tatjana Regh (THW agency Cologne) at the distinction in the Mont-Cenis Academy in Herne.

On 25 October, within the framework of a ceremonial act at the Mont-Cenis Academy in Herne, the Agency for Technical Relief (THW) distinguished DEUTZ AG as an employer that is supportive of employees holding a voluntary office. All in all, twelve companies, which cover the full gamut of small companies right up to an international stock company, were honoured. „Volunteer work is essential for our society,“ explains the THW state representative for North Rhine-Westphalia, Dr Hans-Ingo Schliwienski. „As one of the operational organisations that is supported by volunteers, THW is dependent on the employer's understanding. THW's work would not be possible without this support.“ DEUTZ releases employees from work for missions and training courses within the context of their honorary office at THW. As such, it supports the human population protection system that is based mainly on volunteer work. Martin Strecker, Head of Human Resources at DEUTZ AG, as well as the DEUTZ employees and voluntary THW members Markus Adams (test centre) and Thomas Endres (repair), accepted the price in Herne on behalf of all other volunteers.

DEUTZ now at Instagram

DEUTZ has expanded its social media activities to include the Instagram photo service. Instagram is a free online service for sharing photos and videos.

An app for Android, iOS and Windows 10 Mobile is available for this. Instagram is the most popular image service worldwide. According to the latest statistics from 2016, more than 40,000 photos and videos are uploaded every minute. This means about 60 million contributions every day. Among others, DEUTZ uses this platform to make current engine photos and videos accessible for customers and interested users. As such, DEUTZ is now represented at four social media channels:

www.facebook.com/DEUTZofficial
www.linkedin.com/company/DEUTZofficial
www.youtube.com/user/DEUTZdigital
www.instagram.com/deutzofficial

The European parliament adopted the next stage of exhaust-gas legislation for mobile work machines on 5 July 2016. The EU Stage V will enter into force in 2019 and contains, in particular, more stringent statutory thresholds regarding particulate emissions. With its wide range of "Stage V ready" engines, DEUTZ is ready to make the transition as simple as possible for its customers.

Safely into Stage **V** with DEUTZ

Over the past decades combustion engines have been optimised first and foremost as regards their performance, weight, size and efficiency. In the recent past, another characteristic that the engine developers have had to take into account with numerous developments has been added – exhaust emissions. The successes are impressive. Since the introduction of the statutory EU Stage I regulation in 1999, nitrous oxide and particle emissions have been reduced by more than 95 per cent. DEUTZ engines with diesel particulate filter (DPF) even reduce the particulate emissions by more than 99 per cent, which improves the air quality, in particular in the inner cities. By comparison: the exhaust gas of a DEUTZ engine with diesel particulate filter contains less particulate mass than the ambient air in numerous metropolises worldwide. With clean technology, the environmental burden is thus significantly reduced. However, the industry and politics will also be responsible for limiting the emissions even further in future. ▶

STAGE
ready **V**



DEUTZ engines already comply with the EU Stage V regulations today. At the start in 2019, the product portfolio will – among others – be supplemented further by the new TCD 5.0 (centre).



As regards the construction size and execution, DEUTZ „Stage V ready“ engines remain almost identical so that no costly changes to the customer device will be necessary with the emission stage transition.

▶ With the coming EU Stage V, the particle mass limit is reduced once again, from currently 25 to 15mg/kWh and, in addition to this, a particle number limit of $1 \times 10^{12}/\text{kWh}$ will be introduced. The use of a diesel particulate filter (DPF) is indispensable to comply with the number threshold. What is more, depending on the engine, additional systems such as a diesel oxidation catalyst (DOC) or selective catalytic reduction (SCR) are deployed. On the one hand, these highly-developed systems must be as compact as possible and, on the other, must be individually adjusted to the customer device. DEUTZ masters both of these perfectly. As such, with the Stage V transition, it supports its customers in the best possible way.

Identical construction sizes save costs and effort

If the construction sizes of the engine systems were to grow, the customer would have additional effort and costs with the integration in his application. Here, already at the beginning of 2015, DEUTZ could promise that the current diesel engine pallet ranging from TCD 2.9 to 16.0 remains almost identical as regards the construction sizes and execution. Thus, with

the emission stage transition, no costly changes will be required with the customer device. In addition to this, DEUTZ will offer a so-called smart EAT system (EAT = Exhaust aftertreatment). This solution for exhaust gas treatment consists of a so-called Single Unit, in which the DOC, DPF and SCR (incl. dosing unit) can all be accommodated. By means of this, the entire technology for exhaust gas treatment has been integrated extremely compactly in just one part.

Thus the client gains additional installation space in his device. However, should this be required, the SCR system and DOC/DPF unit can also be installed separated as a so-called Flexible Unit, if the available space can be utilised better in this manner. Thereby, the system follows the modular logic of the tried-and-tested DVERT construction kit (DEUTZ Variable Emission-Reduction-Technology) which, depending on the application, always provides the best individual solution.

Apart from the compact construction sizes, however, it is especially the management of the complete system, consisting of the engine and exhaust gas treatment that is of central importance so as to allow stable operation in the customer device. DEUTZ

▶ **“Engines with DPF already satisfy the threshold values of Stage V today, which is why DEUTZ offers them on the market with its well-known „Stage V ready“ seal.”**

also faced this challenge early on already and, as regards the deployment of the necessary DPFs for Stage V, has already gained extensive experience today. Here,

the current Stage IV TCD engines between four and eight litres of cubic capacity have a DPF as a standard feature – the compact TCD 2.9 and 3.6 are optionally available with DPF.

Many years of experience: DEUTZ and the diesel particulate filter

“Engines with DPF already satisfy the threshold values of Stage V today, which is why DEUTZ offers them on the market with its well-known ‘Stage V ready’ seal.” The thus resulting serial experience is now benefiting DEUTZ customers, since the reliable operation of a DPF within the entire system

requires well-founded integration expertise and understanding for the respective application. Depending on the device in which the engine is installed, there are completely varying load profiles.

In a tractor, for instance, there are high full-load periods, which are not critical for the DPF use, because the exhaust gas temperature is high enough to continually allow the regeneration of the filter. In contrast, the load profile of a forklift is much more demanding. This is often only operated with low rotational speed at shorter intervals or with high engine-idle periods, which is why - in most cases - the exhaust gas temperature is too low to be able to burn the soot particles collected in the DPF.

To solve this problem, an intelligent “heat management” is required. For this reason, DEUTZ developed a so-called „heat mode” for the targeted increase of the exhaust gas temperature, which guarantees safe machine operation. The foundation for this is provided by the many years of experience DEUTZ has gained with the development, integration and serial operation of DPF systems. The highly complex model on which this is based was programmed at DEUTZ

in the own in-house software development and, as such, the internal added value and expertise was expanded in a targeted manner. Equally, the calibration of the heat mode originates from the DEUTZ development department, which was elaborated in numerous projects with a great variety of different customers and load profiles. At the same time, the database collected in the process is incorporated into future projects. As a result, DEUTZ has a strong USP on the market.

The EAT laboratory

At the beginning of July 2016, and so as to expand the understanding of the system even further, DEUTZ commissioned a new EAT laboratory in the development plant at Cologne-Porz. Its purpose: in-depth analysis of the performance of the exhaust after-treatment system.

There, samples from the catalysts and filters are tested in a so-called model gas test bench. An artificial exhaust gas is created in this test bench and passed through the sample at temperatures ranging between 150 and 700 degrees Celsius. The exhaust gas is mixed from a variety of different gases, ranging from nitrogen to carbon dioxide. By means of this, almost every exhaust gas can be produced and evaluated in a standardised manner. Following the flow-through of the sample, the composition of the exhaust gas that has been changed by the catalyst is analysed. The test results then show how effectively the test piece is working. The tests simulate real engine use and are run fully automated for up to 14 hours. Like-new and synthetic (under laboratory conditions) samples are tested, or those that are aged in engine operation. For synthetic ageing, the EAT laboratory has a so-called hydrothermal ageing furnace.

The insights gained in this manner can be used in a variety of ways. On the one hand, the components’ durability can be verified. On the other hand, DEUTZ acquires additional knowledge about how the systems will behave under real conditions. The data acquired in this manner can then be incorporated in the EAT software models in the long run.

As already described, DEUTZ regulates the exhaust gas temperature via the software models but also the urea-dosage in the SCR system of its engines. The required values can change with increasing components



With the model gas test bench in the in-house EAT laboratory, DEUTZ is establishing an in-depth understanding in the field of exhaust gas treatment.

age and are taken into account with the programming and data input of the software. This is done to guarantee the optimal emission values via the engine’s entire operational lifetime. This becomes even more important, especially as part of the EU Stage V, because an in-service monitoring will then be introduced for the first time. This means that the engine manufacturer is obliged to document the exhaust values in real field operation and disclose these. With the help of the EAT laboratory, this question can already answered in the development stage.

Fit for Stage V

DEUTZ has the know-how and the matching products to embark on this path of Stage V together with its customers. Apart from the



already available „Stage V ready“ engines, DEUTZ will also introduce additional engines on the market as of 2019. These include a particularly compact three cylinder TCD 2.2, two gas engines (G 2.2 and G 2.9) and the powerful four cylinder TCD 5.0. In addition to this, together with the Liebherr Group, DEUTZ is planning a cooperation, within the framework of which a TCD 9.0 four cylinder and additional six cylinder engines will extend the Stage V DEUTZ offer. The engines are to be produced by Liebherr and distributed under the DEUTZ brand. By means of this, the customers are provided with a broadened product portfolio that can serve almost every application individually.



“Talking with customers is irreplaceable”

Georg Diderich, Senior Vice President Sales & Service EMEA (Europe, Middle East & Africa), in an interview with DEUTZ World about emission level V, which will apply as of 2019, and why listening to the customers is so important.

DEUTZWorld: Mr Diderich, in November you had been working at DEUTZ AG for about two years in the position as Senior Vice President Sales & Service Europe, Middle East and Africa. What is your interim conclusion for this time?

Georg Diderich: In this highly heterogeneous region, the past two years were characterised by a predominantly weak market environment. There were many different reasons for this, for instance the low oil and gas prices that have been causing financial difficulties in many Middle Eastern

countries and in North Africa but also in Eastern Europe. Low producer prices in agriculture, as well as decreasing government spending are leading to a weak investment propensity in numerous sectors, especially in Western Europe. Apart from the suffering of those people who have to persevere there and that of millions of refugees, the geopolitical hot spots in the Middle East also have an economic dimension.

However, despite this, the companies in our industry, the manufacturers of „non-

road mobile machinery“ and their suppliers, which include us, must continue to invest further in product development. This is necessary so as to be prepared for the next exhaust gas emission stage 5 that will become obligatory in the European Union as of January 2019. In this regard, the legislative process required relatively much time. Meanwhile, though, it is clear which objectives the manufacturers must satisfy. And here, particular responsibility rests on the shoulders of engine manufacturers.

DEUTZWorld: In your area of work, where did you start with the further strengthening of sales activities and the securing long-term customer relationships?

Georg Diderich: I see sales as an interface between the customers and the company. With this image, it becomes apparent how important the communication with our customers is for our success. Even if it is true that electronic data exchange dominates daily business with numerous customers – the conversation with customers is absolutely irreplaceable. Our customers do not only want to know what we are doing; they also want to know why we are doing it. They do not only want to know our product strategy but also be able to influence it, and they want to be informed regarding changes in a timely manner. Of equal importance is that our customers inform us in a timely manner regarding their strategic direction. This is the only way to ensure that

customer relationships are developed and retained in the long run.

This is where I started. Apart from the usual internal measures that are targeted at more efficient positioning and focussing on the organisational structure, it is particularly those measures that target increased communication and transparency that count: Regular management meetings with the largest customers, technology talks that also include our developers, as well as business reviews with the sales organisation are examples in case. And here the most important policy is that of being approachable for our customers, listening carefully to what they have to say and involving the largest possible number of specialist departments at DEUTZ.

DEUTZWorld: Since 1999, increased stringency regarding the exhaust gas norms for mobile work machines, especially in the USA and Europe, have contributed to reducing the emission of particles and nitrogen oxides by more than 95 per cent. The next step is stage V in 2019. Which threshold values will stage V prescribe?

Georg Diderich: With the introduction of stage V, the emission values will drop significantly once again. The EU Stage V stipulates a reduction of the current 25 mg/kWh particle mass limit to 15mg/kWh and, for the first time, it also stipulates introducing a particle concentration limit of 1x10¹²/kWh. With the tightening of the emission legislation, the emission values of the engines are thus optimised step by step. Thereby, a standard that still appeared unimaginable years ago could meanwhile be attained. In actual fact, the exhaust gas of a current DEUTZ engine with diesel particulate filter contains, for instance, fewer particulates than the ambient air in numerous metropolises worldwide.

DEUTZWorld: As an engine manufacturer, how did DEUTZ prepare itself for stage V?

Georg Diderich: The engine manufacturers can achieve the more stringent values by means of targeted optimisation and the introduction of new technologies. Here, attention can be focussed on both the internal engine measures such as an improved fuel injection, as well as the after-treatment of exhaust gases. However, especially due to increasingly more complex systems, the latter can increase the size of engine systems, exacerbating the integration into existing customer equipment under certain circumstances. It is here where we at DEUTZ started supporting our customers in the best possible manner with product planning and the necessary transition of their products to stage V. It was our objective to present solutions for stage V already at the earliest possible time. Simultaneously, we also want to give our customers plan-

► “Our customers do not only want to know what we are doing, they also want to know why we are doing it.”

ning security. In the spring of 2015, for the first time, we were able to present these engines with the „Stage V ready“ seal to our customers at Intermat in Paris. Here we took the conscious decision for a diesel particulate filter and SCR systems early on, and as a result, we had already gained experience and expertise with stage IV engines. Especially the diesel particulate filter (DPF) requires in-depth understanding regarding the interaction with the customer's machine or the load range in which the engine is deployed. Our current product range from TCD 2.9 to 7.8 is already available as a standard series with DPF. As such, hardly any adjustments are required on the part of the customer.

Our large TCD 12.0 and 16.0 engines will also be available with DPF for stage V. In so doing, we ensure that our customers will not have to provide additional installation space for the after-treatment of exhaust gases. What is more, we are also constantly expanding our product range with additional stage V engines, such as the TCD 5.0, presented at Bauma in Munich in 2016 and the TCD 9.0, which has just been presented at Bauma Shanghai.

DEUTZWorld: What does stage V mean for the customers of DEUTZ but also for manufacturers of engines and devices in general?

Georg Diderich: Stage V is an enormous technical challenge. As already mentioned, apart from the actual engine, highly-developed systems for the after-treatment of exhaust gas that our customers have to integrate are necessary. However, for us as an engine manufacturer, this is also an opportunity to provide our customers the best possible support with the right solutions for them and, as a result, win market shares. I think that it is here, in particular, where DEUTZ has a key advantage in the eyes of the customers. We have busied ourselves with the required technology for stage V earlier than a large number of our competitors.

DEUTZWorld: Why should the customers' decision fall on a DEUTZ engine?

Georg Diderich: In view of the coming emission stage V, the deployment of a DEUTZ „Stage V ready“ engine gives our customers long-term planning security for their applications. Because, also after the emission level change in 2019, the engines will remain largely identical as regards their construction size and the design of all com-



ponents. As such, an expensive adjustment to the customers' machines will not be necessary. In addition to this, DEUTZ also offers so-called emission downgrade engines for use in markets that are less stringently regulated. By means of this, the use of a comprehensive engine platform that significantly reduces outlay for implementation, becomes possible.

However, to end, maybe we should listen to the customers once again: In many conversations, our customers told me that it is especially the wide range of different possible applications offered by our engines that represent a key competitive advantage. The application advantage, by means of which we have succeeded at realising countless customised propulsion solutions - getting them „under one bonnet“ in the technical sense of the word - is one of our particular strengths. And one thing that makes me particularly happy is that, more and more often, I am hearing it is an easy decision for our customers to do business with us. This is what I would like to expand in future: In an increasingly complex world, „easy to deal with“ is an important property for a company such as DEUTZ.

About our partner in conversation

At the beginning of 2015, Georg Diderich assumed responsibility for Sales and Service in the Europe, Middle East & Africa (EMEA) region. As the Senior Vice President Sales & Service EMEA, he is responsible for a region that extends from South Africa in the south right up to Siberia (Russia) in the North, from Cape Verde in the West to Pakistan in the East. EMEA comprises 126 different countries and is the largest and highest-revenue region of the DEUTZ Group. For 15 years Georg Diderich has already been volunteering his time in the Association of European Engine Manufacturers, EUROMOT, where he has been the president since 2013.



Four new engines

DEUTZ and Liebherr planning to cooperate

Within the context of a cooperation with Liebherr, DEUTZ is planning to expand its product portfolio by four new diesel engines. In so doing, in a number of different applications, DEUTZ will receive the worldwide distribution and service rights for the engines produced by Liebherr, ranging from 200 to 700 kW.

The engines are distributed under the own brand. By means of this, DEUTZ can offer its customers an even larger product range via its worldwide dealer and service network. The main target customers are manufacturers of construction machines such as excavators or wheel loaders. The engines are developed for the EU Stage V,

US Tier 4, China IV and EU Stage IIIA emission stages and are set to be available for serial delivery as of 2019.

The planned cooperation comprises engines with 9, 12 and 13.5 litres cubic capacity. What is more, an additional engine above 16 litres is to follow. This refers to a family concept, among others with a uniform customer interface and a high share of identical parts.

The engines are included in the known DEUTZ product landscape as TCD 9.0, TCD 12.0 and TCD 13.5. The TCD 9.0 four cylinder has a performance of 300 kW and a torque value of 1,700 Nm. TCD 12.0 and 13.5 refer to six cylinder engines with 400 kW and 2.500 Nm or 450 kW and 2.800 Nm.

In addition to this, DEUTZ is to be awarded the exclusive production rights for the TCD 9.0 in China. By means of this, it can serve local customers via the Chinese Joint Venture DEUTZ (Dalian) Engine Co., Ltd. (DDE). The world premier of the TCD 9.0 ensued at Bauma China in November 2016, the largest trade fair for construction machines in Asia.

DEUTZ and Liebherr have affirmed the collaborative project with a position paper and will thus be strengthening their many years of successful cooperation. This way, the deployment of DEUTZ engines in Liebherr machines up to 150 kW is also to be expanded.

The new DEUTZ TCD 9.0 is to be manufactured under licence in China.

DEUTZ presents the new TCD 9.0 engine in Shanghai

In November, representatives of the international construction industry met at Bauma China 2016 in Shanghai – Asia's largest trade fair for construction machinery. DEUTZ presented itself there together with its Chinese Joint Venture DEUTZ (Dalian) Engine (DDE) as a specialist for drive systems in the construction machinery, mining vehicles and material handling industry. The trade fair takes place in Shanghai New International Expo Centre every two years and addresses the industry, trade and service providers of this sector.

Im November trafen sich in Shanghai Vertreter der internationalen Bauwirtschaft auf der Bauma China 2016 – Asiens größter Fachmesse für Baumaschinen. DEUTZ präsentierte sich dort gemeinsam mit seinem chinesischen Joint Venture DEUTZ (Dalian)



Scan the QR code and download the DEUTZ TCD 9.0 data sheet.

Engine (DDE) als Spezialist für Antriebssysteme im Bereich Baumaschinen, Minenfahrzeuge und Material Handling. Die Messe findet alle zwei Jahre im Shanghai New International Expo Centre statt und richtet sich an Industrie, Handel und Dienstleister der Branche.



„DEUTZ is continuously expanding its engine range and has long-standing expertise in modular solutions for exhaust aftertreatment. This means we are extremely well positioned to cater for the rapidly tightening emissions requirements in China“.

Michael Wellenzohn

The engines made by Liebherr within this cooperation will be sold by DEUTZ under its own brand.

The plan is for DEUTZ's Chinese joint venture to manufacture the TCD 9.0 under licence so that it can more easily serve the local market. The engine has a power rating of 300 kW and produces 1,700 Nm of torque. It also features a highly compact design that makes it easy to install in a wide range of applications and is particularly well suited for excavators and wheel loaders.

All new engines are being developed for the EU Stage V, US Tier 4, China IV and EU Stage IIIA emissions standards and will be ready to go into series production in 2019. They will follow a standardised concept with a common customer interface and a high proportion of shared parts and are to be distributed via DEUTZ's global network of dealers and service outlets.

Michael Wellenzohn, member of the Board of Management of DEUTZ AG with responsibility for Sales / Service & Marketing: "By adding new engines from the alliance with Liebherr, we are enhancing our product portfolio and can now cover further power output ranges and applications. Furthermore, having the TCD 9.0 made in Dalian will give us the proximity to our Chinese partners that we need. We continue to see a great deal of growth potential in this market when it comes to advanced technology."



Scan the QR code and download the DEUTZ TCD 2.9 data sheet.

In addition to the TCD 9.0, DEUTZ exhibited the successful TCD 2.9 in Shanghai as an example of its compact engines. This small four-cylinder engine is now also available as a High Power (HP) version with a power rating of 75kW and as a High Torque (HT) version with 375 Nm of torque. The High Torque variant still falls below the relevant power output threshold of 56kW and consequently does not need an SCR system to comply with EU Stage V. Because of these engines' increased power rating and torque, they can be used in place of much bigger engines, leading to savings in weight, installation space and costs. From 2019, the TCD 2.9 will also be manufactured in China by DEUTZ's Chinese joint venture DEUTZ (Dalian) Engine.



Michael Wellenzohn, member of the management board of DEUTZ AG for field of Sales / Service & Marketing (2nd from the right), presents the DEUTZ trade fair highlight – the new TCD 9.0.

The final countdown

The DEUTZ Shaft Centre

Today, the crankshafts are produced on a surface of about 5,800 sm and the camshafts on a surface of approx. 3,700 sm. The remaining surfaces offer space, e.g. for logistics, maintenance, as well as social and office rooms. About 140 permanent employees are working in the shaft centre.

13,500 sm – this corresponds with an area of almost two football fields and marks the total surface area of the new DEUTZ shaft centre at Ottostraße in Cologne-Porz. Since April of this year, in a large-scale project and within the framework of its site optimisation, DEUTZ has been relocating the crankshaft and camshaft production subsections from the Deutz-Mülheimer Straße location in Cologne to the new building.



The shaft centre relocation project, which started with the official ground-breaking ceremony in July 2015 in the presence of the former mayor, Jürgen Roters, is now close to completion. Although the relocation is not completely finalised yet, the shaft production in its interior is already running smoothly. This is due to the fact that the step-by-step relocation of the crankshaft and camshaft production from Cologne-Deutz to Porz had already begun in April 2016 – a large-scale project within the context of the site optimisation of DEUTZ. “The relocation is executed parallel to the running serial production. With the relocation of the total of 130 machines, our most important goal is that of ensuring that we can provide our customers with the respective shafts at all times,” explains Michael Reimer, Head of Component Production.

With its surface of 13,500 sm and an investment volume of about 26 million euros, the construction of the shaft centre is the largest individual investment of the past years. During the construction of the hall it was especially the casting of the base plate that represented a challenging and important milestone. The casting ensued at the turn of the year 2015/2016 to January 2016 and, in particular due to the mild temperatures during winter, which allowed rapid hardening of the base plate, this proceeded quickly and without problems. Also the further construction was completed punctually and in line with planning. However, there were numerous challenges within the context of the machine relocation, said Olaf Trebo, Head of Production Technology: “At numerous points within the process, we have machines that are con-

nected with one another via automation. To successfully relocate this whole network and retract it again is a challenge due to the large number of variants. However, to date, we have mastered this well,” says Trebo. Apart from this, a central coolant supply was installed for the grinding machine in the camshaft production. “This is a new step because, until now, every machine was individually supplied with cooling agent. This saved us a lot of space. However, the goal of realising a route-optimised layout also means a large number of changes,” explains Gerhard Fischer, works manager of shaft production. Space definitely was the decisive cue. Because, what it was meant to look like inside, and where exactly which machines and which workplaces were to be positioned so as to ensure ergonomically ideal work flow sequences was already tested by the team prior to this with the help of 1:1 models made of cardboard: “Within a time window of 15 months, every single shaft centre workplace was built up in our so-called cardboard factory. By means of this, together with the employees, we could already simulate the new sequences of the workplace and optimise these while the new factory was still being built,” explains Michael Reimer.

The so-called “stresstech” machines, by means of which a quality inspection is carried out for the camshafts, represent a special highlight in the new shaft centre. By means of this, the inner structure of the shaft can be inspected for damage, yet without destroying the shaft. This inspection is carried out at the end of the processing of the shaft and is carried out for 100% of all camshafts of the 4-8l models. The stresstech system is integrated in

the shaft centre in a fully-automated robot cell inclusive of a cleaning process, and it represents an important part of the quality strategy in the shaft centre.

Also if there were a number of challenges to be mastered within the context of the construction work, generally speaking, the work remained right on schedule and in some cases was even completed significantly faster than planned. As a result, the last machine of the camshaft production could already be relocated at the beginning of November 2016 instead of only at the end of December 2016. This means two months earlier than originally planned. What is more, the completion of the relocation of the crankshaft production is currently also expected in February 2017 instead of the end of March 2017.

The DEUTZ shaft centre – a successful large-scale project we can be proud of!





to be in line with this endeavour, so that a responsible contact person with detailed knowledge and who would be able to coordinate accordingly, would always be on site. Ultimately, by means of the mutual dedication of all stakeholders, the complete electronic training, together with the workplaces for idea management, inVia, as well as the secretariat of the training centre could already move to the new building P014 and P001 in Porz on the 1st of July 2016.

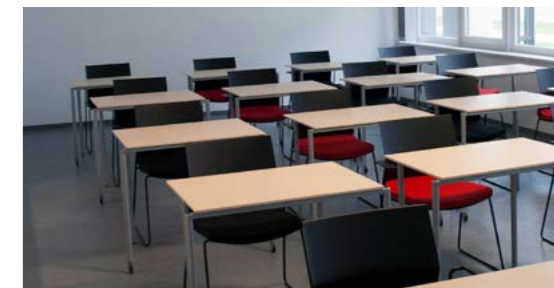
A modern design and the latest technical furnishings

The premises are a true eye-catcher, because the office equipment is completely state-of-the-art. Clear, bright structures are given a modern character with red and white seating furniture; the training rooms are equipped with projectors and mobile whiteboards as well as a number of different network connections. As such, cutting-edge technology is guaranteed.

Apprentices and instructors are equally delighted about the new rooms. "We are very happy about our new training centre and the signal provided by the company that it

wishes to invest in educating its own future staff to ensure that the skilled workers needs of tomorrow are covered," says Frank Opitz. The apprentices are also enthusiastic. "The new rooms are very bright and friendly. This is really modern and one feels very good there," says Anne Bischof, skilled employee for metal technology in the 2nd year of apprenticeship.

Also Svenja Heinrich, mechatronics engineer in the 4th year of apprenticeship is really happy with the new premises. "In particular, I like that the workshop area is now so bright. This makes working here twice as much fun!" A big word of praise for the result of this strenuous relocation.



The new

DEUTZ training centre

The time had finally come in the summer of 2016. After 20 years at Deutz-Mülheimer Straße, at the Cologne-Deutz location, the training centre could move into its new premises in Ottostraße in Cologne-Porz in July. Many months of elaborate planning were required for this because almost all technical equipment of the training centre was to be taken along to Porz.

The apprenticeship workshop at Deutz-Mülheimer Straße had a long tradition. Already since 1996, the young professionals started their working life at the historical DEUTZ premises. Even though the young professionals had an impressive surface of 2,100 sm at their disposal, the signs of the times were clearly visible. When the location optimisation project was planned at DEUTZ, it quickly became apparent that the education should also move to the Porz location, where they can look forward to new, more modern premises. A decisive advantage in this regard was also the proximity to the apprentices employed in the company. Since,

for the largest part, they will be deployed in the Porz location in the future. Within the context of the considerations pertaining to location optimisation, one building turned out to be suitable, in which a surface of about 600 sm was planned for the training centre. In addition to this, a large part of another building was to be made available for the apprentices, where they can in future receive the "practical-technical" training instruction at the workbenches and machines. However, until then, patience was needed.

► "In particular, I like that the workshop area is now so bright. This makes working here twice as much fun!"

This was because the new premises first had to undergo a general renovation.

A challenge, both regarding the time and logistical planning needed

In June 2014, the comprehensive refurbishment of building P014 started. The interior was gutted, and the façade was also completely renovated. In August 2015, after slightly more than one year, these construction measures were then completed.

The washing and changing rooms could already be used in September, and the purchasing and occupational safety departments could move into the first office areas already in October. After the occupational health centre and the IT department moved in at the beginning of 2016, this was followed by the training centre.

For this, prior to the transportation to the new location, ten milling machines and ten turning machines were overhauled and

thoroughly cleaned in June 2016, in a first step. Still to be added, in the next step, were 24 workbenches. To start with, these were also first reworked, freshly painted and then given new workplace surfaces, so that they could shine in new splendour in the new building. In addition to this, the workbenches were upgraded with new connections such as, e.g. electrical engineering and pneumatics, ensuring everything is state-of-the-art.

"The actual challenge was that there was merely a time window of about eight weeks for the relocation of the training centre," says the instruction head Frank Opitz. "On the one hand, the previously used premises, with a large share of the machine park and the workbenches, still had to be used to be able to carry out the final examination in the summer of 2016. On the other, the focus was on the start of training of the next year of apprentices in September 2016, which was already to take place in the new premises," says Opitz. Correspondingly, the holiday plan of the instructors was coordinated



DEUTZ education once again among the best in NRW in 2016

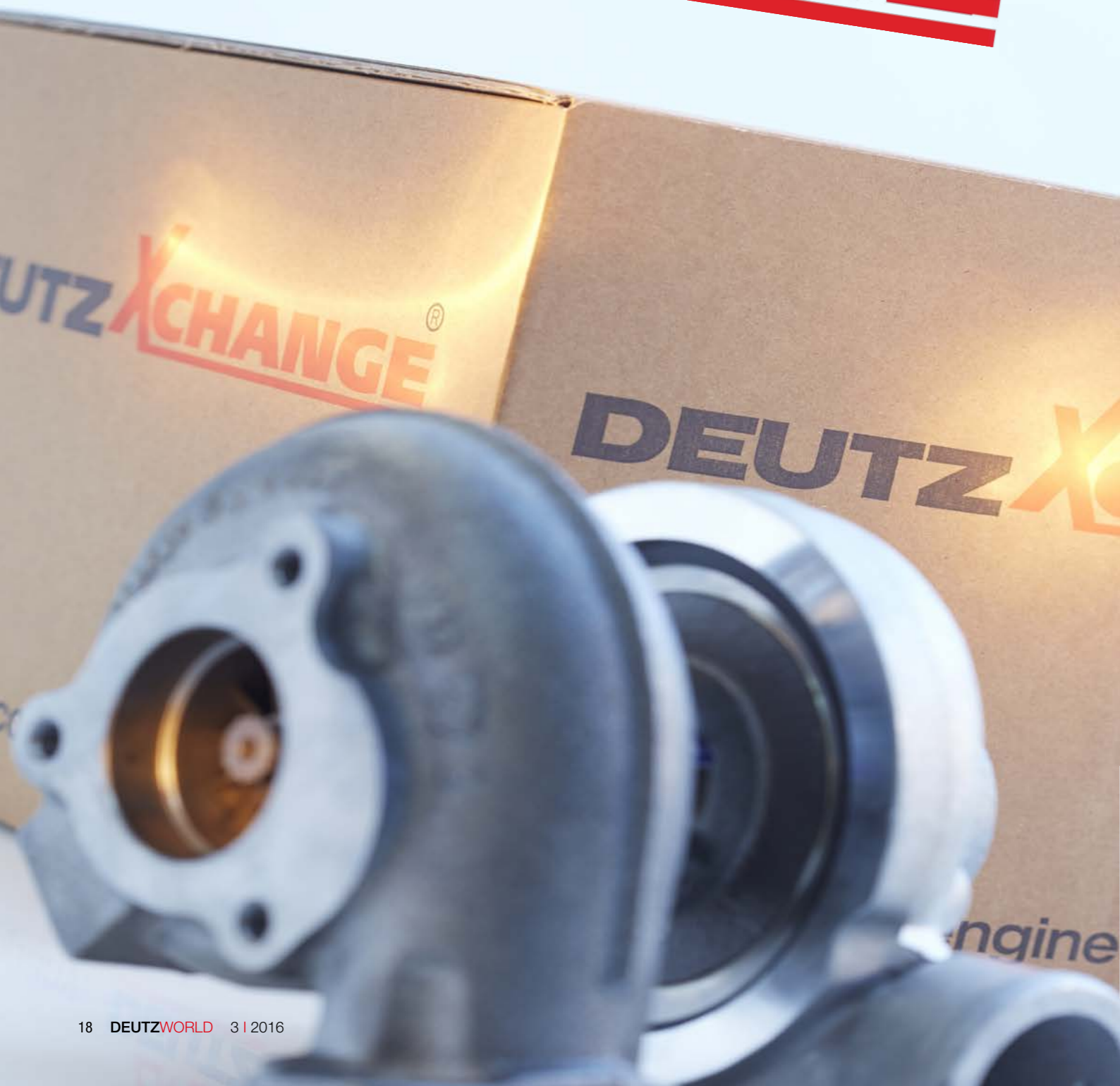


Also in this year DEUTZ was honoured for outstanding performance in the field of vocational education. Two apprentices were distinguished by the Chamber of Industry and Commerce Düsseldorf as the best in the country, and six apprentices are among the best in Cologne in 2016.

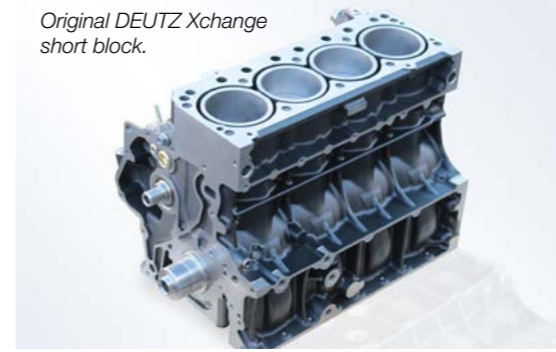
The Chamber of Industry and Commerce Cologne also confirmed DEUTZ AG an outstanding education performance in this year, within the framework of the distinction of the best of the year. For their very good examination results, the Chamber of Industry and Commerce Cologne distinguished six DEUTZ apprentices with the "Die Besten" (The Best) award in the vocations of metal technology, production mechanics, mechatronics engineer and electronics technician for operating technology. Within the framework of the initial vocational training, DEUTZ was also distinguished for its special performance. By means of this, the Cologne training centre of DEUTZ AG can congratulate itself on the sixth award in succession by the Chamber of Industry and Commerce Cologne. Thanks to their outstanding examination results, two apprentices with the job profile of production mechanic also secured themselves participation in the Best in the Country Distinction of the 16 Chambers of Industry and Trade in North Rhine Westphalia in Düsseldorf. Here the two apprentices and also DEUTZ AG were awarded the coveted distinction "The Best in the Country 2016", within the framework of a ceremony hosted on 4.11.2016. Already in the previous year, a DEUTZ apprentice was distinguished as the "Best Metal Technology Specialist in Germany".

"We are very proud of the performances of our apprentices and our instructors. That both in Cologne and also in Germany we are once again among the best training companies, is a special distinction for us, and it confirms the high quality of our vocational education," says Dr Margarete Haase, member of the DEUTZ management board for the sectors Finances, Personnel, Press and Investor Relations. Also Frank Opitz, head of the DEUTZ training centre in Cologne, is delighted about the distinctions by the Chamber of Industry and Commerce: "We are very delighted that, also in 2016, we can once again count ourselves among the "Best", because it is very important for us to provide our apprentices the best possible entry into their professional future."

DEUTZ XCHANGE



Original DEUTZ Xchange short block.



All engines and parts are diligently inspected to verify quality, function and precision fit.

New life for old machines – professionally refurbished engines and parts are a speedy, economically viable and environmentally-friendly alternative to purchasing a new product. In this regard, DEUTZ Xchange products parts guarantee optimum functionality and safety. Regarding the quality aspiration, the same standards that are used for the serial production of new parts apply. All engines and parts are diligently inspected to ensure quality, functionality and precision fits in the plant – and beyond this, every engine is subjected to a bench test. The result: technical products that are as good as new and comply with the original in every regard – and this also applies for serial production lines that have been discontinued for years. Thereby, DEUTZ Xchange engines and parts always comply with state-of-the-art technology. This is because the reworking always incorporates the latest technical insights regarding serial parts.

We are committed to this promise of quality: the warranty for Xchange products corresponds with that of a new part or engine. For our customers this means series-identical quality – with cost savings of up to 40 per cent.

DEUTZ Xchange parts

For essential engine components, reprocessed parts are available in the DEUTZ portfolio as an alternative to a new part. With all Xchange components, compatibility and quality are paramount – this way, full performance and reliability is ensured.

- All wear parts are renewed with Original DEUTZ original parts
- All components are state-of-the-art as regards the technical aspects.
- Up to 40 per cent lower price when compared with the original part, with guaranteed quality and functionality

One year warranty, as with original parts

Regardless of whether in the application segments of construction machines, material handling or in the agricultural sector: DEUTZ Xchange engines are available for all operations and model ranges, and this applies almost independently of the age of the engine. DEUTZ Xchange engines have the decisive advantage of rapid availability and a warranty of two years. This ensures that the machine downtime is kept as short as possible – because time is money.

DEUTZ short blocks and long blocks

For engine overhauls, DEUTZ offers short or long blocks as a rapid and economically-priced alternative to a complete Xchange engine. Common versions are available on stock and can be shipped like spare parts within the shortest time. Short blocks comprise of the overhauled basic engine that consists of a crankcase and core components, such as a crank- and camshaft, connecting rod and piston. Long blocks have a cylinder head as an additional component.

connecting rod and piston. Long blocks have a cylinder head as an additional component.

Decades of experience and state-of-the-art logistics

DEUTZ Xchange products are reprocessed in highly-specialised production lines at the locations Ulm and Pendergrass (USA). The extremely high diversity - the product programme covers more than 10,000 variants – requires satisfaction of the highest demands regarding the employees' qualification and experience. In addition to this, there are highest demands as regards the availability in the service sector: Thanks to modern manufacturing methods and optimised co-ordination with the serial production, a complete Xchange engine can be made available for installation within just five days.

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Comprehensive product programme

The DEUTZ Xchange programme offers the most economically feasible solution for a fair-value, appropriate repair demand, ranging from an individual Xchange part to short blocks, and right up to the complete engine.

Ongoing expansion of the portfolio

The DEUTZ Xchange programme is comprehensive – and growing constantly. The need for reprocessed products for old and current model ranges is constantly and systematically analysed at DEUTZ, and the product portfolio is consistently expanded. This way we offer our customers cost efficient options in the event of repairs, for maximum engine availability and economic efficiency – for the engine's entire life.



Compressor



Injection valve



Starter

A second life for airport buses

When the plane parks on the airport apron, it is the airport bus that brings the passengers. The high standards that are to be satisfied by both the vehicle and the engine require professional service that covers everything, right up to a complete overhaul. In cooperation with the service specialist Serpista, DEUTZ now delivers new TCD 3.6 engines for the airport apron buses of the market leader Cobus Industries – and in so doing extends the service life in addition to, at the same time, providing favourable costs and reduced fuel consumption.

Most of the time, frequent fliers are less than happy when, to get to their plane, they first have to get onto the airport bus, instead of entering the convenient gangway directly at the gate. However, when the plane is parking in the second row, there is no alternative to this. In this regard, at almost every modern airport, the transport is taken care of by the airport buses of Cobus Industries, who have been a global leader in this industry since 1990. After years of demanding deployment around the clock, the vehicle operators however often face the choice of having to decide between expensive new investments or the price-conscious overhaul of the buses. The Spanish service provider Serpista has specialised in the maintenance of airport devices and vehicles and is currently represented with own service centres at 17 airports. Among other things, it offers the complete overhaul for airport buses, plus a new engine, by means of which the service life is extended by at least another 10 years. Whilst a new purchase costs an average of 250,000 euros, the cost for the overhaul of a complete bus is about 50,000 euros.

Eduardo Moraleda, General Manager at Serpista, explains: "In the past 12 months, we have overhauled more than 90 buses in Spain and in Africa. In so doing, the new engine is of course the most important part of the programme. In addition to this, we review and repair electrical harnesses and pneumatic installations, mount new seats, paint the bodywork, install a new air condi-

tioning and rework all necessary parts, so as to be able to deliver a bus in mint condition."

As a factory-new propulsion, the successful DEUTZ TCD 3.6 comes into play. Not only does this give the bus a second life cycle but at the same time this means a significant improvement when compared with the originally deployed propulsions. The engines are lighter, more compact and, first and foremost, more economical. Depending on the model version of the overhauled buses, considerably larger six-cylinder engines are replaced by 3.6 litre cylinder capacity engines, consisting of four cylinders. The DEUTZ aggregates have a performance of 90 kW at 2,300 revolutions and as such represent an efficient downsizing. For the exhaust gas treatment, with the EU Stage IV / US EPA Tier 4 engines, a so-called DOC-only solution is deployed. This means that a maintenance-free diesel oxidation catalyst is sufficient to satisfy the current emission limit values.

Individual comprehensive package

In this regard, the application of the engines in the buses is the actual challenge. In cooperation with Serpista, DEUTZ has elaborated a customised offer in this regard which, apart from the engine, among others also consists of the basic frame as well as the cooling system, pneumatic compressor and new wiring harnesses. The comprehensive package is ideally aligned to the requirements of the vehicles and can be integrated easily.

► "The complete overhaul saves our customers almost 80 per cent of the costs of a new vehicle."

Eduardo Moraleda, General Manager at Serpista

Eduardo Moraleda: "When you think of the different versions of the original airport buses, exchanging the engine is anything but simple. There previously were six- and four-cylinder engines, with and without air-conditioning, with and without CAN bus. Thus it was an exceptional development performance DEUTZ supported us with."

Here DEUTZ could provide evidence of its competence as a system integrator and, with its compact and fuel-efficient TCD 3.6 engines, not only improved the performance of the Cobus buses – it was the overall operating costs that were significantly reduced.

"Airport buses are cost-intensive acquisitions. The complete overhaul saves our customers almost 80 per cent of the costs of a new vehicle. Regarding operation, first overhauled buses are reaching 2,000 operation hours with very good results. In particular, the drivers praise the quiet road handling and the noise reduction in the interior. What is more, we anticipate fuel savings of 15 per cent when compared with the old six-cylinder-engines," Moraleda summarises.

Apart from providing the buses with new engines, DEUTZ, with its large offer of original service parts, also ensures that the buses work reliably in their second life and are able to cope with the 24-hour airport operation.



With the compact DEUTZ TCD 3.6, Cobus Industries airport buses are overhauled. This saves costs, space, weight and fuel.



Airport buses by the global leader Cobus Industries are operating at nearly every modern airport.



In cooperation with the service specialist Serpista, DEUTZ has developed a complete package, including a cooling system and additional add-on components.



DEUTZ opens first Power Center in the USA

DEUTZ Corporation (Georgia, USA) has opened its first Power Center in North Kansas City (Georgia, USA). With this, the new concept supplements the current DEUTZ Service Center and not only offers parts, service and maintenance but also customer-specific planning, development and installation services. By means of this, DEUTZ can satisfy all machine and configuration requirements with individual solutions. What is more, in the Power Center's own sales area, customers can also purchase new diesel or natural gas engines as well as reprocessed DEUTZ Xchange engines.

"Our team is prepared. We are looking forward to presenting the new DEUTZ Power Center concept to our customers and suppliers in the Midwest," explains Dennis Romanson, Head of the DEUTZ Power Center Midwest. "It is great being able to offer OEMs and machine end-users improved access to trained DEUTZ technicians and engineers." In total, 17 employees, trained especially for small and medium-sized engine manufacturers, are available with additional services and technical sales resources. Michael Wellenzohn, member of the DEUTZ AG management board in the Distribution/Service & Marketing di-

vision, summarises: "The development of the Power Center was very important for our overall business, as this allows us to cooperate closely with a large number of local manufacturers in the Midwest. When it comes to service and product support, our goal is to provide solutions that satisfy their requirements optimally."

Provided there is sufficient demand in the region, the plan is to open additional DEUTZ Power Centers in the USA.

DEUTZ opens new company in Shanghai

Shanghai



DEUTZ has founded a new subsidiary in Shanghai. Under the name of DEUTZ (Shanghai) Co., Ltd, the company has the purpose of supporting the growing customer base in the region. By means of this, DEUTZ now has more than 49 employees at its two Chinese locations in Beijing and Shanghai. Because they are close to the cus-

tomers, they can satisfy their requirements in the best possible way. This includes, among others, the sale of engines as well as application engineering, service, maintenance, technical customer support, and training. What is more, DEUTZ Shanghai will be taking over new tasks in the logistics field. The goal is that of accelerating the market launch for engines from German manufacturing.

In addition to this, in its new company, DEUTZ will also focus its attention on its technical competence at China Stage IV engines. It is currently anticipated that this emission stage will be introduced in China in 2019. This corresponds with the EU Stage III B, which requires a number of different exhaust after-treatment systems. DEUTZ is already intensively preparing itself for this in China.

DEUTZ at CONEXPO

From 7 to 11 March 2017, with the motto „FUTURE DRIVEN – Engine Technology for Tomorrow“, DEUTZ will be presenting its amended product range for the construction machinery and material handling segments at CONEXPO-CON/AGG in Las Vegas (USA). Highlights are, among others:

- TCD 9.0 four-cylinder, nine-litre development
- TCD 5.0 four-cylinder, five-litre development
- TCD 2.2 three-cylinder diesel for the lower power range
- G 2.2 / 2.9 gas engines
- the tried-and-tested „Stage V ready“ engine programme

CONEXPO-CON/AGG is the largest leading trade fair on the American continent revolving around building and construction material machines, construction vehicles and devices, as well as building materials and the most important industry get-together in 2017. As a result, it is the perfect stage for the latest DEUTZ innovations. The DEUTZ Group is represented in the USA with the subsidiary DEUTZ Corporation.



DEUTZ was also represented at a number of different trade fairs in this year. We have compiled a small selection for you.

DEUTZ around the World



Hamburg: Trade fair for the shipping industry, boating and water sports



Finland: Finnmetko



Costa Rica: Strong trade fair presence in Costa Rica

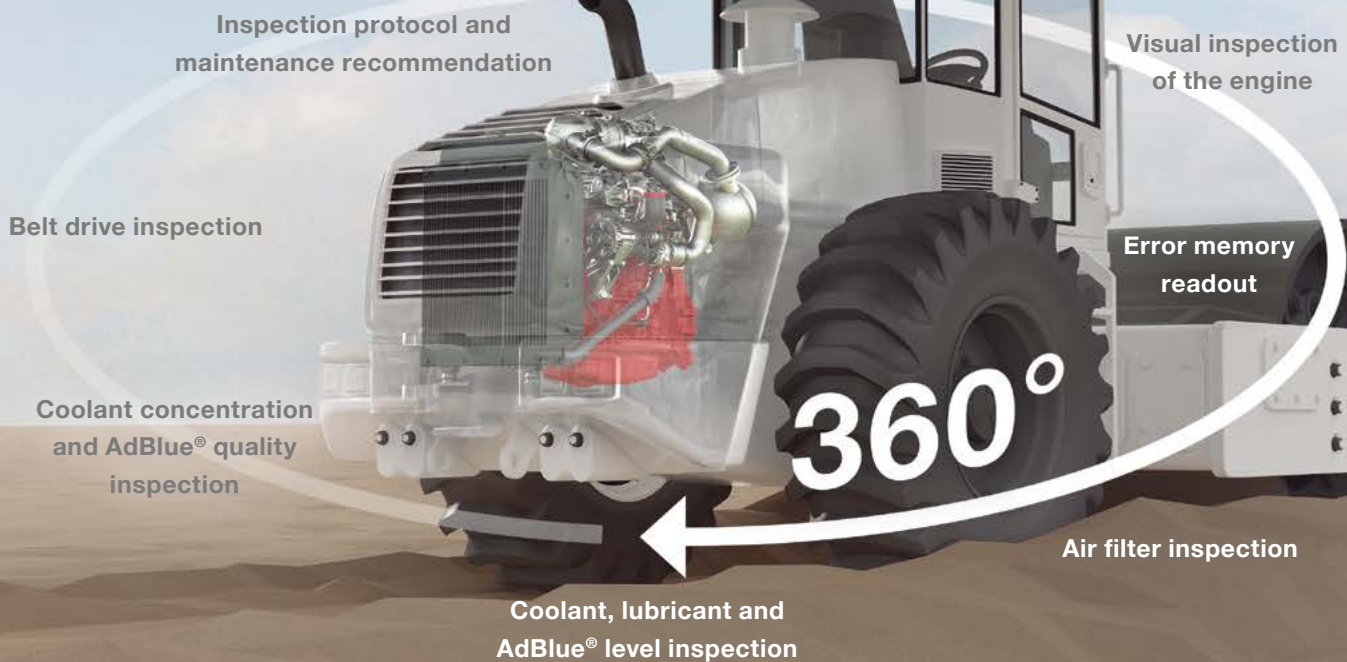


Turkey: Ankomak



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