

# KOHLER® Engines

November 2014

## **KDI 3404: Discover what makes it unique**

*The KDI family of diesel engines have expanded with the new KDI 3404 model; this is now the new standard of reference for engines with an output of 56 kW to 100 kW.*

The KDI 3404 is the effective, practical and innovative answer to the market's increasing demands for compact engines that generate the highest levels of productivity. Thanks to the high power density, low fuel consumption and smooth yet uniform delivery of power throughout the entire RPM range, the engine offers an approach to limiting emissions that is effective, yet easy to manage from the technical standpoint and requires minimal maintenance.

Produced in the KOHLER Engines diesel production facility at Reggio Emilia in Italy, the new KDI 3404 engine is available in two models and four power ratings. The new engine complies with Tier 4 Final – STAGE IV regulations within the 56 -100 kW power range and offers remarkable performance that translates into solid operational benefits for OEMs and end users alike.

## **KDI 3404: Unique for more than performance**

The new KDI 3404 engine is the latest development of the KDI design into a product line with higher power through the use of advanced technologies such as a high-pressure (2000 bar) Common Rail injection system and an electronically controlled EGR valve for recirculating exhaust gasses, the four valves per cylinder allow for a more efficient combustion while reducing the fuel consumption and delivering levels of power equivalent to engines with larger displacements. With the new KDI 3404; KOHLER Engines is bringing these concepts to the next and higher level in terms of performance and operating efficiency. It should be noted this is achieved without the use of a diesel-particulate filter (DPF).

The new engine is available in two 4-cylinder models with a displacement of 3.4 litres:

- KDI 3404TCR (Turbo Common Rail) → rated at 56.4 kW, compliant to Tier 4 Final / Stage IIIB standards
- KDI 3404TCR-SCR (Turbo Common Rail with SCR) → rated at 100 kW, compliant to Tier 4 Final / Stage IV standards and is also available in power ratings of 75 kW and 90 kW.

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GENERAL TECHNICAL DATA				
Model	KDI 3404TCR - (55.4kW)	KDI 3404TCR-SCR (75kW)	KDI 3404TCR-SCR (90kW)	KDI 3404TCR-SCR (100kW)
Thermodynamic cycle	Diesel 4 stroke	Diesel 4 stroke	Diesel 4 stroke	Diesel 4 stroke
Air intake	TCA	TCA	TCA	TCA
Arrangement	In line 4 cylinder	In line 4 cylinder	In line 4 cylinder	In line 4 cylinder
Swept volume [cm <sup>3</sup> ]	3359	3359	3359	3359
Fuel injection system	DI Common Rail	DI Common Rail	DI Common Rail	DI Common Rail
Valves per cylinder	4	4	4	4
Cooling	Liquid	Liquid	Liquid	Liquid
Max Power [kW@rpm]	55.4@2200	75@2200	90@2200	100@2200
Peak torque [Nm@rpm]	375@1400	475@1400	480@1400	500@1400
After-treatment device	DOC	SCR	SCR	SCR
Emission compliance	Stage IIIB - Tier 4 Final	Stage IV - Tier 4 Final	Stage IV - Tier 4 Final	Stage IV - Tier 4 Final

Consistent with the "Best Fit" philosophy for OEMs and end users, the new engine developed by KOHLER Engines is optimised for performance, load capacity, sturdiness and low levels of noise and vibration. Reduced fuel consumption translating to a minimum operating cost, long maintenance intervals coupled with a compact size and ease of adaptation for diverse applications makes for a truly unique and advanced engine.

## KDI 3404: Unique for more than technical innovation

Performance that is equivalent to engines with larger displacements, thanks to excellent power density (30 kW/l); torque and power values that increase the productivity of machines by up to 15% and up to 10% lower fuel consumption than its closest competitors.

As is true for the entire KDI family, the new KDI 3404 has no DPF, so customers enjoy 100% performance under the most severe operating conditions without being concerned about regenerating the filter.

A sophisticated electronic control system that guarantees smooth, immediate response, and the lowest possible levels of noise and vibration: the new engine offers a host of operating benefits which demonstrate how unique it really is.

The new engine complies with Stage IV – Tier 4 Final standards for engines rated over 56 kW, thanks to the compact, high-efficiency SCR (Selective Catalyst Reduction) system, which is essential for reducing NOx in exhaust gases.

The new engine is manufactured in the KOHLER Engines diesel factory in Reggio Emilia, Italy, which features the latest machining and assembly technologies.

Technologically speaking, the remarkable characteristics of the KDI design derive from the use of a high-pressure (2000 bar) Common Rail injection system of the latest generation, combined with G3S solenoid-type injectors for precise metering of fuel during injection. An electronically controlled EGR valve is included for recirculating the right amount of exhaust gasses that are liquid-cooled by

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a water/air heat exchanger.

The EGR system consists of two cooling stages that optimise heat exchange without increasing external dimensions. Also, the system is installed on the hot side, thus preventing the EGR valve from seizing. The final result is unmatched reliability.

The valve train incorporates architecture with 4 valves per cylinder that houses the injector in a perfectly vertical position and in the very centre of the combustion chamber. In this way, the cylinder is filled with the exact amount of fuel, which is atomised and mixed with air in the best way possible.

## **KDI 3404: Unique for more than operational benefits**

The KDI family of engines was developed according to the "Best Fit" philosophy. In fact, the new KDI 3404 boasts a series of advanced technological and build solutions that are not found on other industrial engines in this category. These solutions translate into major operational and functional benefits for both end users and OEMs.

With performance equivalent to engines with larger displacements (100 kW @ 2200 RPM and 500 Nm @ 1400 RPM), clean combustion made possible by the innovative high-pressure Common Rail injection system, and 4 valves per cylinder, an EGR valve and no DPF, the KDI 3404 consumes 10% less fuel than other engines in its category. With its high torque output at idle (412 Nm @ 1000 RPM), great specific performance and best-in-class torque and power in its category, the new engine maximises the productivity of the machines it powers (up to 15% better than its closest competitors) and immediately responds to load even at low RPM.

With these superior characteristics and perfect integration of the turbocharger with the engine and its electronic control system, the new KDI 3404 offers smooth, pleasant driving that can only be called "excellent". Driving smoothness is combined with exceptionally comfortable operation with minimum levels of noise and vibration, thanks to the use of "bedplate" architecture (crankcase + bedplate) for the engine block, and the (optional) counter-rotating shafts it contains. Also worth mentioning is a narrow profile that minimises steering radius for better handling - a feature that is particularly useful in agricultural applications.

Versatility in application is also guaranteed by four power take-offs, which include two additional PTOs at the sides (SAE A and SAE B). These PTOs supplement the main and secondary take-offs designed and positioned to draw the greatest amount of power from the engine. With this practical design feature, the new KDI 3404 is the perfect solution for OEMs and final users who demand the highest degree of flexibility in installation.

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The KDI 3404 offers maximum efficiency from the operating standpoint as well. Its maintenance intervals of no less than 500 hours are due to clean combustion that requires no DPF.

Since the engine has no DPF, less space is required in any application. And, productivity is enhanced because operation needs never be interrupted to regenerate the filter. What's more, no costly thermal protection is necessary for preventing excessive heat loss with resulting danger of fire.

The final result is that the machines powered by the new engine are compact and easy to handle, and the operator enjoys better visibility, which enhances safety and improves productivity.

## KDI 3404: Unique for more than service

KOHLER Engines is also redefining standards for customer service.

- To provide increasingly efficient service to customers and expand its coverage, a new mobile application called *Kohler-Lombardini Network* is now available. This app, which can be downloaded from the Apple Store and from Google Market Place, employs geo-location technology to find the nearest sales and service points, and even shows the relative route using Google Maps technology. Also, the results can be filtered according to the characteristics and services required. In this way, a high level of interaction with the user is provided, and the tool becomes the perfect solution for promoting the sales network and the services offered. Developed in Italian, English, French and Spanish, the app enables the dealer to be contacted directly and allows contact information to be shared via e-mail.
- The new app is called **iService** - a new multimedia platform which integrates the enhanced usability of advanced digital technology into a traditional tool for viewing technical manuals. **iService** is an innovative solution that combines complete, readily available information in a unique environment which contains the full range of Kohler Engines after-sales tools. This includes and is not limited to the use and maintenance manuals, workshop manuals, spare parts catalogues, and an entire area devoted to warranties. The system also allows the user to take advantage of an on-line distance learning platform, and levels of expertise can be assessed with an automatic testing system.

At present, the **iService** system is only available for KDI engines, but will gradually be extended to cover all the petrol and diesel engine families offered by KOHLER Engines.

The platform has been designed to meet the needs of both the service network and end users. It provides simple, self-explanatory interactive content that can be accessed easily from smartphones, tablets and PCs.

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## The KDI 3404: Unique for more than innovative communication

To accompany the unique technology and excellent build quality of the new KDI 3404 engine, KOHLER Engines has come up with an important communication strategy for launching this new product. A detailed promotional campaign has been developed for the KDI 3404 that takes full advantage of an entire spectrum of available marketing tools. This includes not only traditional methods such as printed adv and participation in trade fairs for conveying information and principles, but also more recent approaches such as the Internet and social networks, which are used to communicate actions in real time.

The KDI 3404 was launched at EIMA 2014 (held in Bologna, Italy on November 12-16, 2014), and its promotion will continue at major expositions worldwide: *BAUMA China, Canton Fair, BICES* and *Cemat Asia* in China; *SIMA* and *Intermat* in France; *Agritechnica* in Germany; *Executive Hire Show* in Great Britain; *World of Concrete, ARA and GIE Expo* in the USA.

## KDI 3404 - Unique for more than one reason

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KOHLER Engines, a world leader in the production of diesel and petrol engines, offers a complete line of units with power ratings of up to 100 kW.

With its headquarters in Kohler, WI (USA), KOHLER Engines can be found around the world with its 4 Regional Headquarters (Kohler, USA; Reggio Emilia, Italy; Shanghai, China; Aurangabad, India), 7 production facilities (Reggio Emilia, Italy; Rieti, Italy; Martin, Slovak Republic; Aurangabad, India; Kohler USA in Hattiesburgh, USA; Chongqing, Yinxiang, China) and 5 branch business offices (Lyon, France; Barcelona, Spain; Oxford, UK; Frankfurt, Germany; Singapore), and more than 1700 service locations that include distributors, engine sales/service centres and replacement parts centres worldwide.