

Engines from Liebherr for successful Kamaz racing trucks in Dakar rally

Bulle, FR (Switzerland) March 31, 2014 – Among the 75 trucks that took up the starting position in January 2014 for the Dakar rally, five were trucks from Kamaz Master, the motor sport team from the Russian company Kamaz OJSC. Three of the trucks were equipped with 8-cylinder engines from Liebherr.

In the overall ranking, the trucks gained third and fifth place. The third truck had to retire during the second stage of the race due to an accident on difficult terrain. In mid-March 2014, one of the trucks used in the rally and its driver, Eduard Nikolaev, came to visit Liebherr Machines Bulle SA where the engines were developed and manufactured.

Kamaz in Dakar rally

The Dakar rally, or better known simply as The Dakar, is one of the toughest challenges for drivers, vehicles and their components. Since 2009, for reasons of safety, its venue is no longer North Africa but Latin America instead. In 2014, a total of 204 vehicles crossed the finishing line in Valparaíso, Chile, in the motorcycle, quad, car and truck categories – which equates to only about 47% of all of the vehicles that started. In the trucks category, 71 vehicles started from Rosario in Argentina. Of that number, 50 reached the finish line after an overall distance of about 9370 km, spread over 13 stages.

The Kamaz Master team, formed 25 years ago, has dominated the event in the truck sector for many years and has won a total of twelve times since 1996. One of those wins was in 2013 with driver Eduard Nikolaev and team, and another in 2014 with driver Andrey Karginov and team.

Liebherr engines for Kamaz Master

Following changes to the engine regulations which, among other things, prescribe a 16.5 litre displacement limit, Kamaz Master will no longer be able to employ the same engines from 2016 that it has used until now. Of the companies competing to supply

the engines, Liebherr ultimately came out as victor. Vladimir Guba, Technical Director of the Kamaz racing team, chose Liebherr engines mainly because of their reliability: "To win a race, not only are high engine performance and high speed decisive but also low failure probability and the shortest possible repair times." In this regard, he had a great amount of faith in the engines from Liebherr right from the outset, given that they prove their worth day in and day out in mining excavators and other equipment in extreme conditions, similar to those experienced during the Dakar rally.

Most of the teams employ special racing engines for the Dakar rally. Kamaz specifically opts for series production components in order to test their durability during the race and to gain knowledge for further development of the Kamaz product range. By choosing the 8-cylinder D9508 A7 engine from Liebherr, whose performance is rated at 505 kW or 686 HP in the series production version and whose maximum torque is just over 3000 Nm, both companies were confident that they would be able to utilise large power reserves.

In the race configuration developed by Kamaz and Liebherr, a maximum output of 720 kW or 965 HP is achieved alongside a maximum torque of 4000 Nm. The engine has a common rail injection system from Liebherr and a displacement of 16.2 litres. The 8.9 ton trucks can reach a maximum speed of 140 km/h for racing. They accelerate from 0 to 100 km/h in 10 seconds.

In the race configuration, the main change involved the supercharger/turbocharger in order to allow higher charge pressures and thereby facilitate optimal combustion of the likewise greater fuel injection volume. Within the existing engine building blocks, additional core components such as piston and bearing shells were chosen to withstand the particularly high loads experienced during racing. The supporting structure of the engine, for example the crankcase and engine mountings, has already been engineered by Liebherr for series production engines to cope with heavy impact loads and high vibrations. The lubrication system also needed no modification as the engines are generally built to allow operation at angles up to 45°. With the specific performance and torque increase, the effectiveness of the special race configuration was backed up by a detailed thermodynamic layout and comprehensive trials on the test beds at Liebherr Machines Bulle SA.

Deployment at high altitudes

The engines and injection system proved their effectiveness under extremely tough conditions during the Dakar rally – even at altitudes of up to almost 4300m in the Andes, as well as in the extreme heat of the Atacama desert. The truck navigated by Eduard Nikolaev not only achieved third place in the overall ranking but also won the particularly challenging seventh stage. The 755km long route, with an average altitude of almost 3500m, runs from Salta in Argentina, returns back to Salta again and crosses a mountain pass in the Andes in the process at nearly 4300m. At these extreme altitudes, the maximum performance of the engine is no longer available, even with modified injection system and high performance turbochargers. However, the loss in performance of the Liebherr engine was still relatively low. It is often used for high altitude mining operations and, therefore, even its series production version is engineered to work in elevated positions up to 2500m without performance restriction.

About the driving response of the new engine during the race, Eduard Nikolaev says: "The difference compared with the previous engine is mainly that the new engine is very quiet. At the beginning it required a bit of adjustment because I had to listen much more carefully to the engine." Even at low speeds, the Liebherr engine produces a lot of torque – making it, in Eduard Nikolaev's opinion, ideal for desert tracks. Vladimir Guba also praised, above all, the good and efficient cooling of the engine: "At times, the coolant and engine oil temperatures peaked at 100°C and 113°C. With the old engine, the values were well above this." The outside temperatures during the rally were in excess of 40°C in some parts of the desert.

Plans to continue working relationship

In all, Kamaz Master has so far procured six engines from Liebherr for racing events. Initially put to the test on various test routes, the Liebherr engines' ability was also proven in the "Silk Way Rally 2013", during which several stages of the race were won. For the Dakar Rally 2014, three of the five trucks from the Kamaz Master racing team were fitted with engines from Liebherr. The working relationship necessary to achieve this is to continue in future, too. Vladimir Guba from Kamaz Master says: "We are pleased to have found such a good and reliable partner in Liebherr for the heart of our

vehicles. We hope that working together in the future will help us to secure continued success."

Captions

liebherr-components-kamaz-truck-rallye-dakar.jpg

The Kamaz truck No. 500 with Liebherr engine gained the third place at the Dakar 2014 rally.

liebherr-components-kamaz-truck-with-drivers-liebherr-machines-bulle-sa.jpg

Team manager Vladimir Chagin (left) and driver Eduard Nikolaev (right) were more than happy with the performance of the Liebherr Common Rail V8 engine with 720 kW maximum power output.

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