

REPORT FROM VOLKSWAGEN ON MILITEC-1 FOR WORMGEAR PROTECTION

São Bernardo do Campo, August 10, 1995

Report on the application of special lubricant "MILITEC" at Volkswagen do Brasil S/A, Water Cooled Engines and Axle Manufacture.

We hereby testify that the use of the special lubricant "MILITEC" in our drilling machine for exhaust manifold, manufactured by "GROB", model GB 247, fabrication year 1973, as follows.

Description of the "MILITEC" use:

In the month of June 1995, subject machine presented a failure in its drilling header, which caused a premature wear on the bronze gear in the dragging unit of the cutting tool.

The wear became so critical, that the bronze particles would mix with the lubricating oil at a high concentration level, to the point it started to seize the system's bearings and to cause a total shut down of this machine.

The header was taken out of the machine, and transported to the Mechanical Maintenance Workshop, where the following jobs were done:

Cleaning of all the inside of the header to take out all bronze particles generated by the gear's wear-out.

All bearings were changed (the real cause for failure: bearing and worm shaft with radial idleness yielding the misalignment with respect to the gear).

Since this machine rarely presents any problems with the header, we did not have the new spare parts needed, i.e. "gear and worm shaft", and we decided for assembling the old parts. When the assembly was done, we ran some tests at the workbench, and after 40 minutes of running, a seizure occurred. In the analysis for the cause of this seizure, a diagnosis showed that the gear inside had been damaged as a result of the worm shaft being out of alignment, generating a radial idleness of its bearing which caused the premature wear of the gear and its first failure (the header's seizure).

As a result of this second seizure, we re-made all the necessary services at the workbench again, and before we started the tests on the workbench, we added lubricant oil, of which 20% of its volume was the special lubricant "MILITEC".

Under this condition, with the special lubricant "MILITEC", the header ran in the workbench for three hours without interruptions, and the header temperature reached 45 degrees Centigrade (113 degrees Fahrenheit) without any irregularities.

After three hours of testing, we took out all the lubricant oil which we found, had some remains of bronze particles. We washed the internal part of the header again, and we assembled it on the machine, adding lubricant oil, with 20% of the special lubricant "MILITEC".

Conclusion:

We verified that the action of the special lubricant "MILITEC" inhibited the wear-off for the gear, and up to date, the Grob machine is still producing, without interruptions of the header drill.

We consider the special oil "MILITEC" approved for the use, in all machines of the Water Cooled Engines and Axles Manufacture unit, as an anti-seizure agent, at Volkswagen do Brasil S/A.

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Note: The MILITEC product is of North American origin and it is distributed in Brasil by:

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