

Performance of Big End Bearings

In the scope of our product control today we give you the operating results of the big end bearings on aluminium basis on the M 32 engine.

After having gained good experience already previously with aluminium bearings on our C engines and on our M 20 engine later on, together with introduction of the series M 32 we had switched over to big end bearings with a running layer based on an aluminium two-component alloy.

In connection with the robust design of the crankshaft and the connecting rod after a running period of up to 30,000 operating hours these bearings have proven reliability and insensitiveness on the first M 32 engines, even under extreme operating conditions.

There were indeed some few failures, when cracks started locally and material broke off in the low- loaded **bottom shell**. In the high-loaded **top shells** this was not observed. These phenomena were noticed after particles of bearing material from the running layer were found in the oil sump or in the lub. oil filter. But in no case a bearing failure with consequential damages resulted. Only the bearing shells were exchanged in these cases.

In cooperation with the bearing manufacturer intensive investigations of the described problems were initiated. Apart from the described appearance in the bearing shells concerned, local material weakness was clearly revealed which had been caused by an unstable process flow in the manufacturer's works. It was not possible to allocate these deficiencies to certain batches. As cause of the few failures without doubt fatigue phenomena of the aluminium bearing material were detected in the area of the material weakness. The process flow for production of the bearing material has been optimized meanwhile. Nevertheless, further incidents on bearing shells already delivered cannot be completely excluded. **For this reason we recommend special attention with regard to check of the oil sump and maintenance of the lub. oil filter.**

However, the experience gained from practice – not only by MaK – has also shown that the judgment of the wear condition of aluminium bearings is more difficult than e.g. of lead bronze bearings.

On closer examination dirt striae and uneven running patterns are still clearly visible.

However, judging the wear condition of the running layer after long running periods is difficult. A definite result is only attained if the wear is measured. This requires a lot of experience, perfect measuring tools and the actual wall thickness during commissioning.

It is impossible, however, to determine the remaining lifetime of the bearing regarding the durability of the bearing material.

Like all aluminium materials, the bearing material on aluminium basis is also not fatigue-resistant contrary to other bearing materials. This was taken into account when the bearing was dimensioned so that the necessary safety exists even under unfavourable operating conditions if the maintenance intervals of 24,000 to 30,000 running hours prescribed by MaK are observed. However, the bearings must be replaced in the scope of the normal maintenance intervals after 36,000 operating hours at the latest, so that further checks before the next scheduled maintenance are not required and fatigue phenomena after a very long running period can be excluded.

Taking this knowledge into account and based on the product development, after extensive tests we have introduced a new bearing into the series now which is also delivered in case of spare parts orders.

It is based on the improved lead bronze technology and is fully interchangeable.

The approved bearing geometry was not changed so that exchange is possible without problems.

We will inform you about long-term experience with these bearings in due time. Until then the previous maintenance intervals of 24,000 – 30,000 operating hours will remain valid.