GRANIT
QUALITY PARTS

TOP AND LOWER LINK BALLS

PRODUCT BENCHMARK REPORT

Test report no. 2023-01 / 1205 - 2023-01 / 1209

Steinbeis-Transferzentrum Werkstoff- und Bauteilprüfung (WBP)

The following GRANIT top and lower link balls were compared with the equivalent products from an original equipment manufacturer and three competitors.

CUSTOMER INFORMATION

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The original equipment manufacturer does not have any equivalent category II / III top or lower link balls, which is why these could only be compared with the products from the other competitors.

Type	Category	GRANIT
Lower link	IV	**200120039**
Lower link	III	**200120037**
Lower link	II / III	**200120036**
Top link	III	**200120030**
Top link	II / III	**200120029**

COMPARISON OF FEATURES

→ Analysis of the material composition
→ Hardness test

TEST RESULTS:

MATERIAL COMPOSITION:

This analysis provides information about the materials used. Selecting the right materials is crucial to ensuring the resilience and durability of the top and lower link balls.
The material analysis is carried out using an optical emission spectrometer.

MATERIAL						
Type	**Category**	**GRANIT**	**OEM**	**Competitor 1**	**Competitor 2**	**Competitor 3**
Lower link	IV	100Cr6	100Cr6	16MnCr5	16MnCr5	-/-
Lower link	III	100Cr6	100Cr6	16MnCr5	16MnCr5	16MnCr5
Lower link	II / III	100CR6	-/-	16MnCr5	16MnCr5	16MnCr5
Top link	III	100Cr6	100Cr6	16MnCr5	16MnCr5	16MnCr5
Top link	II / III	100Cr6	-/-	16MnCr5	16MnCr5	16MnCr5

The table above shows that GRANIT and the original equipment manufacturer use the material 100Cr6 with the material number 1.3505. This material hardens completely and is used to manufacture bearings in particular. The remaining competitors use a 16MnCr5. This material is a case-hardening steel that is normally used for surface hardening.

CONCLUSION

The material chosen by GRANIT and the original equipment manufacturer is perfect for a heavy-duty premium product range. A 16MnCr5 is the right choice for a standard range and boasts very good material properties in this quality class.

HARDNESS TEST:

The hardness test was carried out according to the Vickers method, and provides information about whether a hardness suitable for the material and the load was used. In order to be able to make precise statements about any existing hardness profile and the structure, metallographic sections from each test part were prepared.

RESULTS:

VICKERS HARDNESS AND HARDENING DEPTH

Type	Category	GRANIT	OEM	Competitor 1	Competitor 2	Competitor 3
Lower link	IV	604HV1 Fully hardened	591HV1 Fully hardened	660HV1 EHT: 0.7 mm	713HV1 EHT: 0.7 mm	-/-
Lower link	III	591HV1 Fully hardened	602HV1 Fully hardened	636HV1 EHT: 0.3 mm	686HV1 EHT: 1.0 mm	602HV1 EHT: 0.55 mm
Lower link	II / III	591HV1 Fully hardened	-/-	636HV1 EHT: 0.3 mm	772HV1 EHT: 0.55 mm	686HV1 EHT: 0.6 mm
Top link	III	571HV1 Fully hardened	561HV1 Fully hardened	660HV1 EHT: 0.5 mm	602HV1 EHT: 1.6 mm	660HV1 EHT: 0.5 mm
Top link	II / III	591HV1 Fully hardened	/-	593HV1 EHT: 0.3 mm	686HV1 EHT: 0.52 mm	686HV1 EHT: 0.35 mm

EHT = Hardening depth

As was to be expected from the material analysis, the table shows that GRANIT and the original equipment manufacturer allow the balls to harden completely. The other competitors only used surface hardening.

CONCLUSION

As a result of the complete hardening of the GRANIT and OEM top and lower link balls, these products boast a much higher compressive strength and wear resistance than those that have only undergone surface hardening.

CONCLUSION:

Offering the appropriate performance is important, especially in the heavy-duty sector. By choosing a bearing material with perfectly matched hardness values, the products from GRANIT and the original equipment manufacturer are able to meet the highest demands.

The black colour of the GRANIT and OEM products gives them a high-quality appearance, but the report above shows that both manufacturers convey a sense of premium quality through both colour and internal values.