



Proven surface layer treated axles

Shock-resistant, durable, profitable

You really cannot expect more than these three attributes from a replacement axle. Nonetheless, we add more: The interfaces with gears, axles etc. will remain unchanged. And with their outstanding corrosion protection they are also the most profitable ones throughout their entire lifetime. We are able to make an assessment to this effect, since our surface layer treated axles have been in operation for more than eight years. Without any complaint.

For the hardening process, we from BVV decided in favour of a chemical-thermal process because it performed well in comparative tests. It is slightly more expensive; however, the costs pay off quickly.

Our process - nitriding inside the gas flow - has proven to be the best sustainable solution, since it penetrates the material deeply and changes its chemical composition. In the process, the heavily used surface layer is virtually subjected to a deep treatment and shows more resistance than when being subjected to other processes. In addition, the passive layer of the surface improves the corrosion protection.

The high fatigue strength and excellent corrosion protection are substantial factors in the reduction of the costs over the lifetime. This is another reason why we recommend high-strength materials for long-term investments such as these. After all, you do not want to be forced to replace the axles again after merely 20 years.

Durability →
Corrosion protection →
High economic efficiency →

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Facts & Figures

An example for the possibilities of the BVV surface layer treatment Reinforcement of a tramcar wheelset axle designed in 1973

	Material	Occuring stress	Permissible stress	Degree of load consumption	Fatigue strength of component
Bearing seat	EA4T in acc. with EN 13261	144,8 MPa	87 MPa	167%	100%
	BVV surface layer method according to EP 1 769 940		177 MPa	82%	203%

Calculating the cross-section of the “bearing seat“ with maximum load based on EN 13104 shows clearly the strengths of the patented BVV surface layer method: Compared to the standard material EA4T, this results in double the fatigue limit for sufficient reserve capacities. In the process, the interfaces to the gear unit and so forth remain unchanged; an unproblematic installation of the axle is ensured.



Outstanding corrosion protection

Three months under extreme conditions show clearly the corrosion resistance of the surface layer of treated axle sections: the acid content of the atmosphere left no traces, the untreated one was significantly damaged by corrosion.



Corrosion behaviour of surface layer treated axle segments compared to untreated axle segments; stored three month under extreme conditions in acidic atmosphere.

No findings even after being bombarded by ballast

Even after being bombarded by original ballast samples with a weight of 200 g and a speed of 360 km/h, the axle surface remains undamaged. The discolouring is caused by stone dust remaining after the break-up of the projectile.



Shaft surface without any damage after bombardment with 200 g ballast samples from 360 km/h