

# You Get What You Pay For.

Quick access to quality parts is critical for your business – often making all the difference in uptime and staying profitable. Genuine MaK parts are designed and manufactured to function reliably as a complete system and may often be rebuilt for a second life, adding value to your investment.

Design and manufacturing techniques are continually improved to ensure that using original MaK parts enhances engine performance, reliability, and reduces overall owning and operating costs – benefits you may not get from ‘grey market’ competitive parts. And, as you would expect, all Genuine MaK parts are backed by the Caterpillar Motoren parts warranty.



■ Inductive Hardening.

# Better Engineering, Materials, and Manufacturing. Better Product.

Our engineering, quality materials, and strong process controls create wear-resistant valves guaranteed to offer long service life with minimal risk of failure – claims that can’t be made by non-original parts manufacturers.

As an OEM engine builder with the goal of helping customers succeed, Caterpillar Motoren manufactures its own MaK exhaust valves to the highest quality standards, giving you the assurance of long component life. For more than 25 years, MaK exhaust valves have been manufactured at the Caterpillar-owned factory in Kiel, Germany, by highly qualified personnel utilizing the same quality manufacturing processes used for our engines.



■ Powder Welding.



■ Last Inspection.

Genuine MaK valves are the only valves engineered and manufactured to the specific standards and tolerances required to work optimally with MaK engines.

Our exhaust valves are faced with one of the most sophisticated heat and corrosion resistant material available today. Powder welding to the valve, using a proprietary process designed by MaK engineers, ensures complete fusion and bonding to the parent material.

## The Power You Need.

The Cat® and MaK™ brands of Caterpillar Marine offer premier high- and medium-speed propulsion, auxiliary, and generator set solutions, as well as optional dual fuel, diesel-electric, and hybrid system configurations. With the launch of Caterpillar Propulsion our comprehensive and evolving product line gives customers one source for the most extensive engine power range available, as well as for complete propulsion systems, controllable pitch propellers, transverse and azimuth thrusters, and controls. Cat and MaK products and technologies have proven reliability and are built to last in all marine applications, demonstrating superior productivity and the lowest lifecycle cost.

The Cat Global Dealer Network, more than 2,200 global service locations strong, ensures that you will have local expertise, highly-trained technicians, rapid parts delivery, and the proper equipment and services to keep you working – anytime, anywhere.

Construction, term, or repower financing through Cat Financial will help you make Cat and MaK power a reality. With our knowledge of customer needs, local markets, and legal and regulatory requirements, we have been providing tailored financing solutions and exceeding expectations since 1986.

For more information or to find your local dealer, visit our website: [www.cat.com/marine](http://www.cat.com/marine)  
Visit Cat Financial at: [www.CatPowerFinance.com](http://www.CatPowerFinance.com)

## BUILT FOR IT.

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# Exhaust Valves

## Genuine MaK Parts





# Why Insist on Genuine MaK Parts?

- ➔ **More Profit**  
Greater reliability and longevity maximizes your uptime and reduces Total Cost of Operation.
- ➔ **Lower Operating Cost**  
With longer life and longer Time Between Overhauls, MaK engines cost less to operate.
- ➔ **Greater Safety**  
Parts made by Caterpillar specifically for an MaK engine perform longer with fewer unplanned maintenance events or risk of failure.
- ➔ **Availability**  
All parts are dispatched within 24 hours, and our strategically-located distribution center efficiently delivers globally.



■ Valve Production, Kiel/Germany.

# What’s the Risk?

## Grey Market Exhaust Valve

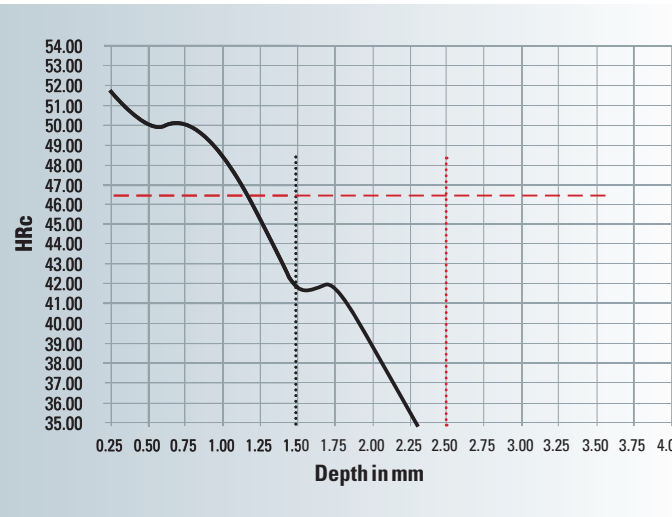
Continuous pressure to control costs can cause unwary customers to purchase low-priced, non-original parts that pose enormous risk to their engine.

Our own examinations and tests on ‘grey market’ exhaust valves have revealed major differences in material and quality when compared to the original MaK designed product.

During our recent investigations into these grey market parts, we found internal tensile stresses up to 20 % higher than are specified. Also hardness values that do not meet our MaK standards, incomplete hardening layers, missing undercut, and weaker bonding of facing material.

These multiple defects translate into increased wear, early failure, and reduced life of the components. While the initial upfront cost for non-MaK parts may be attractive, the risks of failure, damage, and downtime associated with them demonstrate that they are not a viable or economical alternative.

Actual residual stress distribution, measured tangentially on the valve seat, shows tensile stresses much higher than allowed for original MaK valves – in some samples, 20% more than the maximum allowed.



■ Hardening depth 1.5+1 max 42 HRC.



The nitriding layer (a heat treat hardening process) in the valve clamping area is not complete.



The depth of hardening on the stem face does not conform to specification, and the hardness of the grey market part is 25% lower, which will lead to increased wear.



Transverse microsections through the hard facing depth up to 1.0 mm below the original dimension of the valve, meaning that a first regrinding step would not be possible because there is no more undercut.

■ Grey Market Exhaust Valve.



# Longer Life and Longer TBO. Lower Operating Cost.

Customers using MaK manufactured exhaust valves have benefitted from their exceptional service life. Due to the high wear resistance of the facing material, MaK exhaust valves may be re-used several times. Through the support of our service network, customers have reassembled original MaK exhaust valves whose condition allowed further operation after 30,000 hours, especially when using HFO.

MaK aims to provide our customers with the longest life valves available in the industry and thus the lowest operating costs. Less will be spent on replacement valves, and less on labor for removing cylinder heads and the grinding of faces and seats. Equally important, less downtime and limited risk of offhire.



## MaK Exhaust Valve

### New

Genuine and original MaK exhaust valve showing the valve face, stem and underside of the valve plate after the final stages of manufacture.



### Used

Genuine and original MaK exhaust valve showing the valve face, stem and underside of the valve plate after 30,000 hrs of reliable HFO operation.

# Faster. Less Expensive. Damage-Free Parts.

All MaK spare parts originate from the Caterpillar factory in Kiel, and are delivered through our distribution center located near the major international port of Hamburg. With its close proximity to both the international airport and the port infrastructure in Hamburg, the logistics center makes parts available quickly, with all parts dispatched within 24 hours.

Parts are optimally packed to ensure protection from damage. Generally, we use the VCI method that offers corrosion protection we optimized through our own testing. We maintain close contacts with logistic partners worldwide who specialize in ground, air, and sea transport, so that each shipment is collected and dispatched as efficiently as possible.