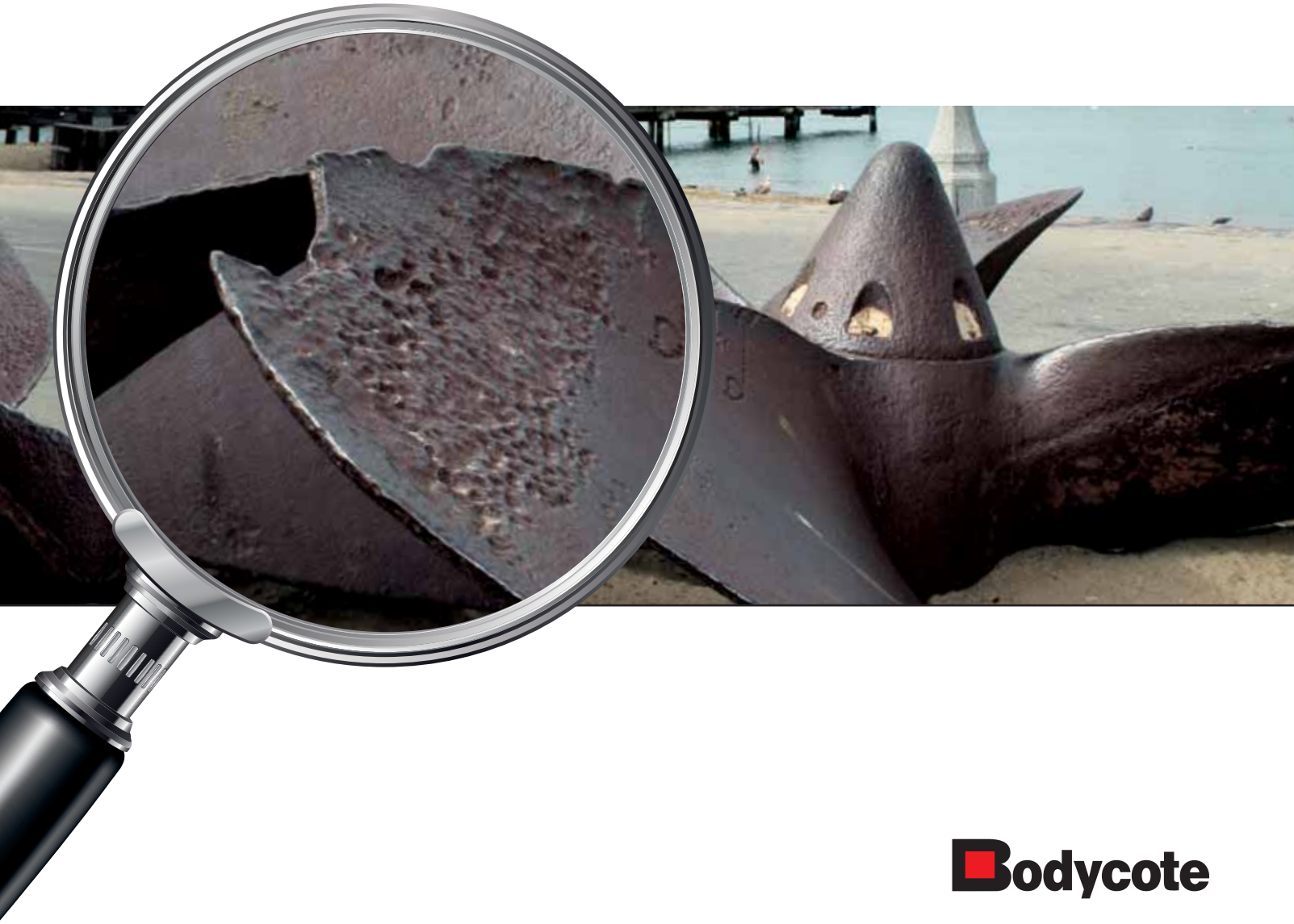
In the SPOTLIGHT

S³P PREVENTS CAVITATION EROSION

PREVENT DELAMINATION

MAINTAIN CORROSION RESISTANCE

INCREASE SERVICE LIFE



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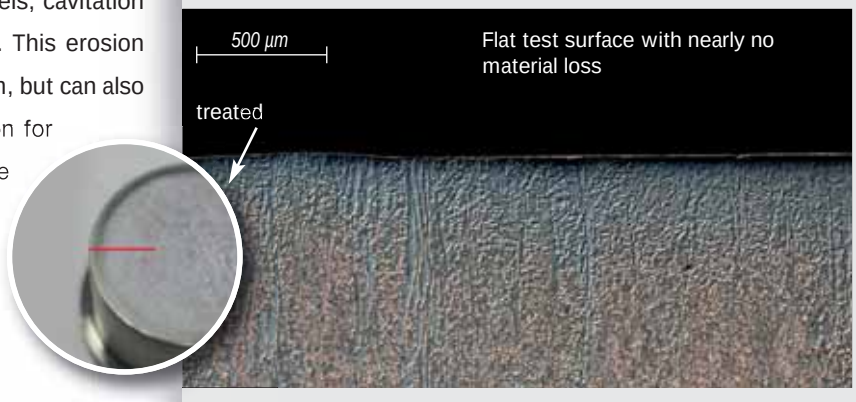
S³P – Specialty Stainless Steel Processes
Cavitation Erosion

Preventing cavitation means reducing service costs

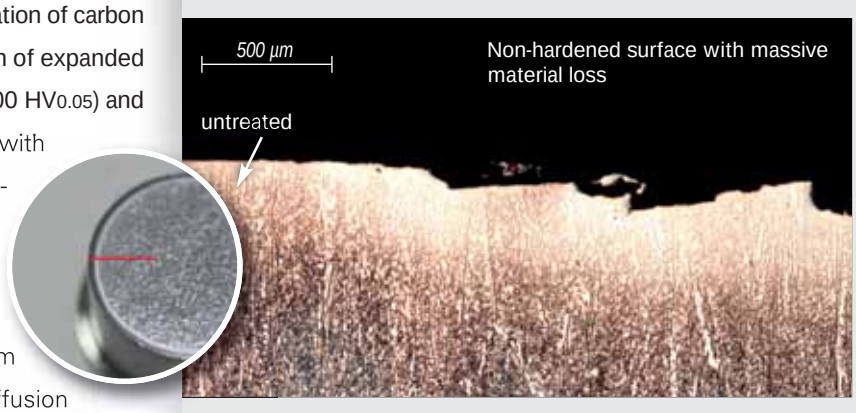
There is a risk of cavitation erosion wherever liquids come into contact with a metal surface under unfavorable flow conditions, and stainless steels are particularly affected. Whether it affects hydraulic machines such as pumps or high-pressure injection systems for fuels, cavitation erosion greatly reduces the service life of components. This erosion phenomenon not only impacts the efficiency of the system, but can also lead to component failure. S³P processes offer a solution for corrosion resistant alloys that significantly improves the performance when battling cavitation while maintaining the corrosion properties of the material.



S³P-treated Duplex2205 (1.4462) after cavitation testing in accordance with ASTM G32-10 (27h).

Significant improvement in product lifetime

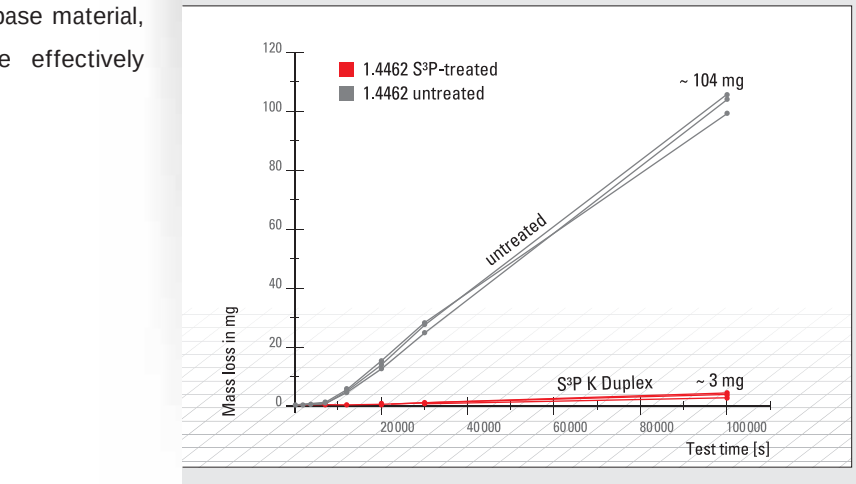
S³P processes can be applied to almost all corrosion-resistant Fe-, Ni- and Co-based materials. The interstitial supersaturation of carbon or a combination of carbon/nitrogen leads to the formation of expanded austenite, which is characterised by high hardness (> 1000 $HV_{0.05}$) and wear resistance. Due to the high ductility in combination with very high compressive stresses, the impact of void implosions – typical of cavitation – can be significantly decreased. Cavitation erosion is thus greatly reduced or even completely avoided for many applications and materials. The excellent ductility of the hardened zone derives from the gradual compressive stress gradient within this diffusion zone. As a result, flaking off and delamination, common issues affecting coatings, do not occur. In addition, S³P processes, featuring Kolsterising®, preserve the corrosion resistance of the base material, since chromium carbide/nitride precipitates can be effectively suppressed.



Untreated Duplex2205 (1.4462) after cavitation testing in accordance with ASTM G32-10 (27h).

Advantages of S³P

- Improves cavitation erosion resistance
- High surface hardness >1000 $HV_{0.05}$
- Improves wear resistance
- Homogeneous diffusion layer
- Increases fatigue resistance
- Diffusion-based processes, no flaking off is possible
- Maintains corrosion resistance
- Eliminates fretting and galling



Mass loss curve in demineralised water with a maximum test time of 100000 s. Material Duplex2205 (1.4462) in untreated (grey curve) and S³P-treated state (red curve).

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