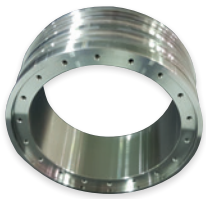
TITANIUM		AUSTENITIC		DUPLEX
	MARTENSITIC		FERRITIC	

EXPANITEHARD-TI

Surface hardening of titanium, all you need to know

- ExpaniteHard-Ti is a solid solution diffusion-based hardening process. No titanium nitrides are formed i.e. no coating is present and no 'golden colour!
- Titanium grade 5 and other alloyed titanium grades can be hardened by ExpaniteHard-Ti.
- Surface hardness is governed by compressive stresses and typically, a surface hardness of 1000HV+/-100HV is reached. Case depths are typically in the range of 10 to 40µm.

Relevant industries

MEDICAL DEVICE

CONSUMER GOODS

DEFENSE & AEROSPACE

TITANIUM

Titanium is known for its light weight, high-strength and very good corrosion resistance. However, in some areas titanium is often coming short; due to its softness the material suffers from poor wear and galling resistance. This is limiting the use of titanium and forcing design engineers to make compromises. Expanite is changing the game by introducing ExpaniteHard-Ti.

BENEFITS & CHARACTERISTICS AFTER EXPANITEHARD-TI

- Surface hardness increased approx. 5 times over untreated material which gives unprecedented wear resistance!
- No affect on corrosion resistance.
- No coating, no titanium nitrides, no spalling risk and no 'golden colour'.
- Possible to post-polish to mirror finish.

EXPANITE

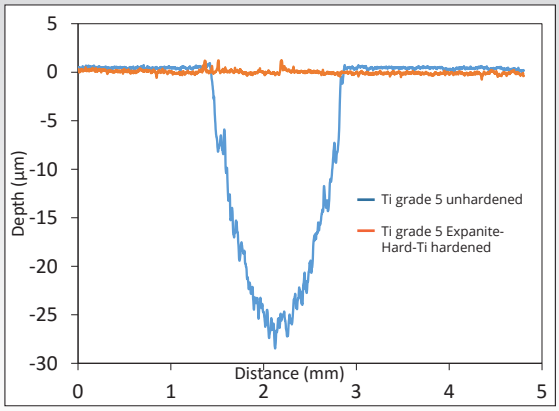
Titanium, beyond the surface

Conclusion: superior wear resistance and corrosion resistance goes hand-in-hand.

TEST

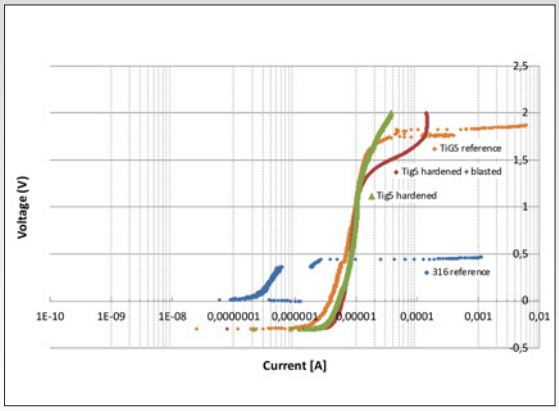
Superior wear resistance

The widely accepted ASTM G133 linear wear test performed titanium grade 5 with and without ExpaniteHard-Ti shows clearly the effect of the hardening. Where the unhardened reference part – standard "off the shelf" titanium grade 5 – shows severe wear, the part with ExpaniteHard-Ti is completely unaffected.



Exceptional corrosion resistance maintained

Not surprisingly, standard unhardened titanium shows very strong results in a cyclic polarization pitting corrosion test, and significantly better than standard AISI316L stainless steel. Much more surprisingly, the ExpaniteHard-Ti hardened titanium sample matches if not improves the pitting corrosion performance of the unhardened reference.



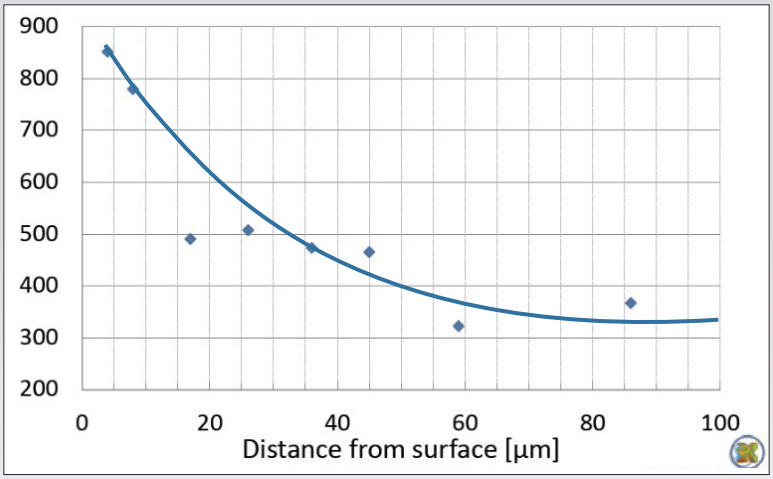
Application examples

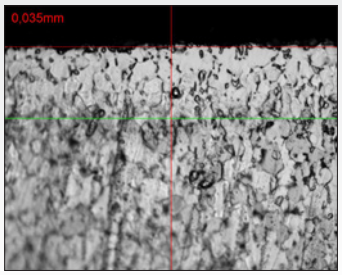
APPLICATIONS

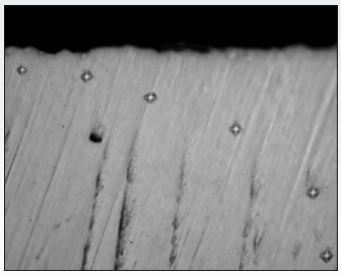
Standard solution

Hardness profile

Case depth of approx. 30µm and surface hardness of approx. 930HV0.05

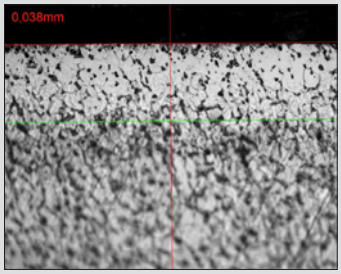






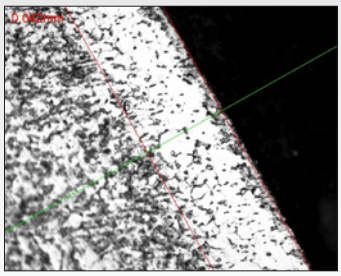
Watch cases

Magnification: x40
No polishing



Case depth: 42 µm
Surface hardness: 1144 HV0.05

Magnification: x40
After polishing



Case depth: 38 µm
Surface hardness: 771 HV0.05