

In the
SPOTLIGHT

BENEFITS OF S³P FOR MARTENSITIC AND PH STEELS USED IN TOUGH APPLICATIONS

UP TO 1400 HV_{0.05}

NO DELAMINATION

NO GALLING

IMPROVED WEAR AND
FATIGUE RESISTANCE



Bodycote

Tough, Tougher, S³P

Martensitic and precipitation hardened martensitic stainless alloys possess excellent mechanical properties, such as high strength and good corrosion resistance. However, martensitic hardening does not always provide sufficient abrasive wear resistance to meet demanding requirements for component durability in tough applications, such as aerospace, oil & gas and automotive. Bodycote's S³P M surface treatment provides a solution for these applications. S³P M is a unique process that results in extremely high wear resistance and an elimination of galling, while maintaining the corrosion resistance of the base material.

S³P M is the solution for martensitic and PH steels

The S³P M surface treatment involves a low temperature diffusion of carbon and nitrogen into the material. This results in an extremely hard and wear resistant surface. Depending on the material and alloy composition, a surface hardness up to 1 400 HV_{0.05} can be achieved to a case depth of 20 - 40 µm. Unlike conventional nitriding, S³P M treatment does not result in the formation of chromium nitrides and chromium carbides which would make the material more susceptible to corrosion. S³P M is suitable for both martensitic and precipitation hardened martensitic alloys.

Advantages of S³P

- Surface hardness up to 1 400 HV_{0.05}
- Improves wear resistance
- Homogeneous diffusion layer
- S³P M is not a coating – no flaking off
- Increases fatigue resistance
- Retention of corrosion resistance

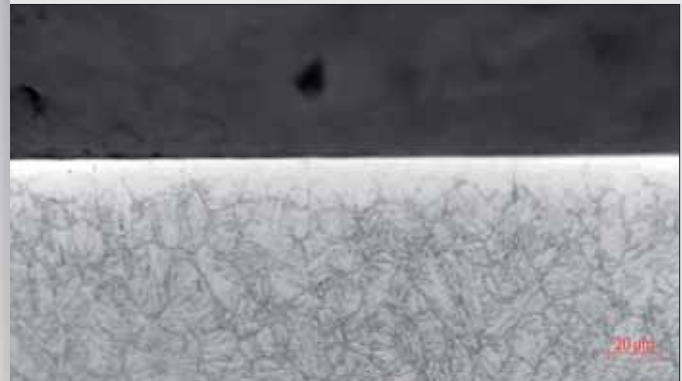
Material selection

Any martensitic stainless steel is suitable for S³P M. The final treatment result depends on the alloying elements, heat treatment before S³P M, and the condition of the machined surface. Individual components as well as serial parts weighing up to 4.0 t and up to 2.0 m in length, can all be treated. If you have further questions please contact your S³P representative for a feasibility study.

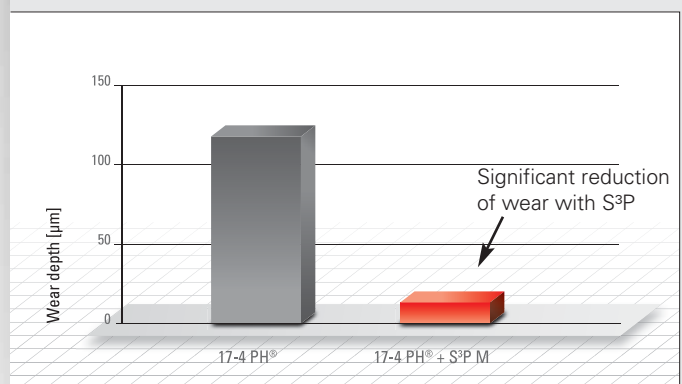
Examples of treatable alloys

- Martensitic steels
AISI 410 (1.4006), AISI 420 (1.4021), AISI 432 (1.4057),
AISI 440B (1.4112)...
- PH-steels
17-4 PH[®] (1.4542), 15-5 PH[®] (1.4545)...

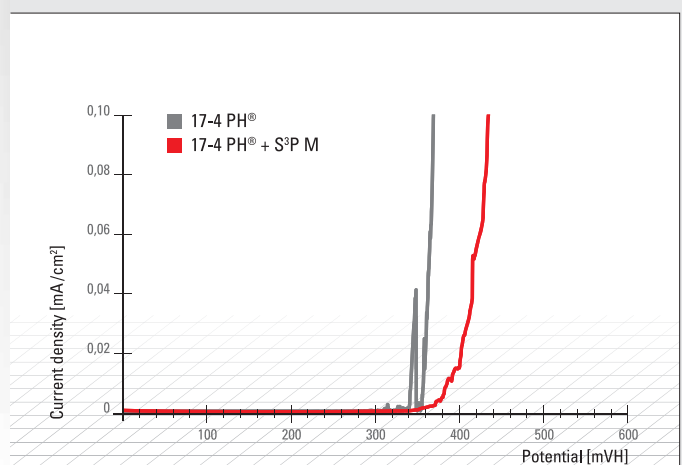
17-4 PH[®], 15-5 PH[®] are registered trademarks of AK Steel Corporation
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Microsection of S³PM-treated 17-4 PH[®]. The bright area represents the hardened diffusion zone.



Results of ball on disc test for 17-4 PH[®], indicating significant reduction of abrasive wear with S³P M.



Electrochemical corrosion tests show that the pitting corrosion potential of 17-4 PH[®] has not been compromised after S³P M.