

Porvair Sinterguard®

Duty Extension
Treatments for Sinterflo®
Cartridges and Media



To improve the performance and lifetime of our metallic filters, we have developed the Porvair Sinterguard® surface modification technologies.

Porvair Sinterguard® technologies are proprietary processes that can be applied to our metallic filter elements to enhance their material properties in challenging environments.

The treatments modify the surface of the filter by the application of a chemical vapour deposition process that enhances durability and system performance, reducing overall life cycle cost.

Applications

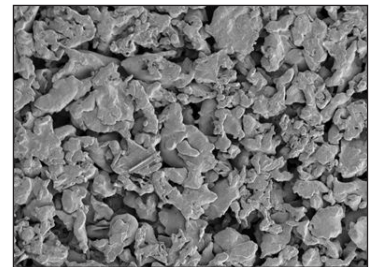
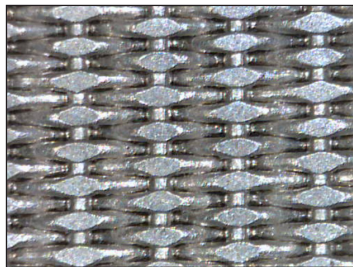
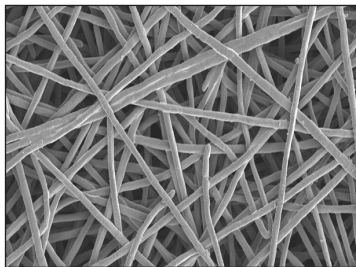
The technologies are suitable for a range of applications in demanding environments. Ideal for use in refinery or chemical processes where hot or corrosive fluids would otherwise be detrimental to filter lifetime or integrity.

As part of our pulse jet cleaning system, Porvair Sinterguard® provides enhanced *in-situ* cleaning to ensure differential pressure rise is minimised for increased on-stream lifetime.

Benefits

A Porvair Sinterguard® surface modification can provide a number of benefits, each of which can dramatically reduce whole life operating costs:

- Corrosion resistance
- Increased temperature resistance
- Enhanced chemical compatibility or inertness
- Improved cleanability, both *in-situ* within the process or offline
- Enhanced wear resistance.



Porvair Sinterguard® PHC

PHC Corrosion Resistance

Porvair Sinterguard® PHC extends the life of 316 stainless steel and exotic alloys in highly corrosive fluid environments up to 500°C (932°F) depending on the environment.

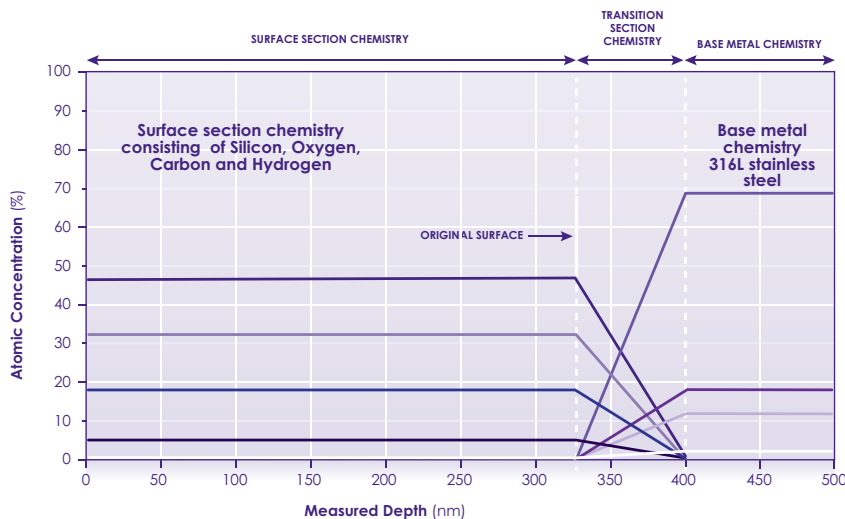
The graph depicts simplistically the elemental structure of the surface modification. It provides a modification of the base metal in the form of a transition layer, as well as a discrete surface coating, inhibiting the attack of corrosive fluids across a wide range of pH conditions.

Numerous specification based trials have been applied for wet corrosion trials including:

- Salt spray to ASTM D117
- Stress corrosion to ASTM G36
- Pitting and crevice corrosion to ASTM G48B
- Cyclic polarisation to ASTM G61
- Condensing humidity to ASTM D4585.

Corrosion rate comparisons (at 22°C)		
Corrosive agent	Untreated 316L SS MPY units (0.001" per year)	Porvair Sinterguard® PHC MPY units (0.001" per year)
6N HCl (21.88%)	114	2.7
6N HBr (48.55%)	3.4	0.8
5% HF	120	80.4
25% H2SO4	54.6	5.4
Conc. HNO3	0.78	0.10
85% H3PO4	0.62	0.08

Porvair Sinterguard® PHC Simplistic Structure Representation



Features and Benefits

• Increased chemical resistance

The stability of 316 is enhanced for many acidic applications including:

- hydrochloric acid (HCl)
- nitric acid (HNO3)
- sulphuric acid(H2SO4)

For H2SO4 (sulphuric acid) at a 0.3% concentration (w/w), the PHC treatment resulted in a 16 times improvement in reducing corrosion. At a 10% concentration (w/w) Sinterguard® PHC resulted in a 10 times improvement in reducing corrosion when compared to 316 stainless steel.

• Increased performance

For applications involving various concentrations of hydrochloric acid (HCL) this surface modification has been compared with other materials such as Hastelloy® C-22 and has presented the lowest corrosion rate with a 103 times improvement over the 316 stainless steel corrosion rate.

• Improved cleanability

This surface modification is specifically functionalised to reduce the surface energy on the materials exposed surface, thereby inhibiting the ability of various contaminants to adhere to the filter media.

This reduction in adhesion improves the efficacy of *in-situ* cleaning processes such as pulsejet blowdown (gas) and backwash (liquid) extending the potential for increased on-stream operational or campaign life.

This benefit is also prevalent in offline or remote cleaning, permitting improved recovery of the differential pressure.

• Corrosion resistance

In specific trials, performed in accordance with standard controlled conditions, the rate of corrosion has been measured for a quantitative comparison to be produced.

HTR High Temperature Gaseous Duties

Porvair Sinterguard® HTR extends the service life of 316L stainless steel and exotic alloys at elevated temperatures.

The HTR treatment is application specific, formulated to suit the process conditions of more elevated temperature applications, up to 800°C (1,472°F), depending on the environment.

This treatment has the added ability to extend the operating conditions of the filter elements and cartridges in higher temperature gaseous duties.

Features and Benefits

- **Increased chemical compatibility**

The HTR surface modification is highly effective in providing a barrier resistance to the effect upon various base metals (316 stainless steel, Hastelloy®, Inconel® and various iron/ chrome/alumina alloys) in particular duties where sulphur (H₂S, COS) and/or chlorine (HCl) is present. The HTR surface modification is not suitable for basic solutions, pH limit being 8.

- **Increased filter life**

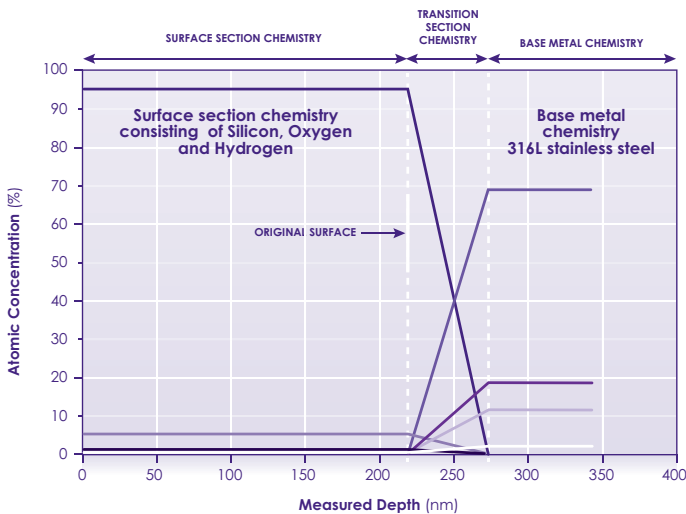
The addition of the HTR coating to 316 stainless steel can increase the filter durability by 20 times, given conditions of 2% H₂S at a temperature of 350°C.

- **Increased temperature resistance**

In specific applications the surface modification has provided protection and extended life of up to 15 times over 316 stainless steel including:

- Biomass gasification (3% H₂S, >20% H₂O and a temperature in excess of 500°C),
- Coal and petcoke gasification (0.4 to 2% H₂S, up to 50% H₂O and temperatures up to 380°C)
- A variety of other high temperature applications containing chlorine, fluorine or sulphur elements.

Porvair Sinterguard® HTR Simplistic Structure Representation





Porvair Filtration Group Ltd.

1 Concorde Close
Segensworth, Fareham
Hampshire, PO15 5RT, UK
Tel: +44 (0)1489 864330
Email: info@porvairfiltration.com

Porvair Filtration Group Inc.

301 Business Lane
Ashland, Virginia 23005, USA
Tel: +1 804 550 1600
Email: infoUS@porvairfiltration.com

www.porvairfiltration.com

Porvair Filtration India PVT. Ltd.

401, 4th floor, Plot No C-3, Centrum
IT Park, Wagle Estate, Near Mulund
Checknaka, S.G. Barve Road, Thane
West, Maharashtra, 400604
Tel: +91 22 2081 1148
Email: infoIN@porvairfiltration.com

Porvair, Sinterflo and Porvair Sinterguard are registered trademarks of Porvair plc.

Inconel and Monel are registered trademarks of Special Metals Corporation.

Hastelloy is a registered trademark of Haynes International Inc.

© Copyright 2019. Porvair Filtration Group Ltd. All rights reserved.

Whilst every effort has been made to ensure the accuracy of this document, due to continuous product development, the data contained is subject to constant revision and Porvair Filtration Group Ltd. reserves the right to change, alter or modify its contents.