WEARTECH® SHS™7570W

Abrasion & Corrosion Resistance, Wire Arc Spray

Application Process

THSB-ASP Twin Wire Arc Spraying

Material Chemistry (wt%)

Chromium	< 25%
Molybdenum	< 15%
Boron	< 5%
Tungsten	< 5%
Carbon	< 2%
Manganese	< 2%
Silicon	< 2%
Iron	Balance

Microhardness (HVO .3)

950 - 1150 kg/mm²

Wear Resistance

ASTM G65-04 Procedure B

Typical mass loss 0.20 g

Bond Strength

ASTM C633-01

8 ksi (55 MPa) typical

Coating Properties

Density (g/cm³)	7.59
Porosity/Oxides	< 5%

Impact Resistance

Drop Impact Testing:

No delamination/cracking at 480 in-lbs

Coating Description

SHS7570W is an iron based steel alloy with a nanoscale microstructure that features exceptional combined wear, impact and corrosion resistance in high chlorine, salt fog, concentrated salt and seawater environments.

Key Performance Characteristics

- Excellent corrosion resistance and high wear and impact resistance
- Especially resistant to corrosion in high chloride and seawater
- Alternative to nickel superalloys and stainless steels
- Cost-effective option for rebuilding worn out components and parts

SHS7570W coatings exhibit excellent corrosion resistance, high wear resistance, high impact resistance and superior bond strength. Superior bond strength values of these coatings signify that this material has exceptional adhesion and cohesion. High adhesion values highlight the extremely low residual stress (even at high thicknesses) that is an inherent factor in this coating type. High cohesion values mean that the probability of "pull-out" of individual particles is extremely low during wear, erosion and other service conditions. Low porosity means low coating permeability, resulting in a highly corrosion resistant barrier. Low oxide content is another key ingredient contributing to the high bond strength of SHS7570W due to the very limited presence of internal voids and other defects. These characteristics provide predictable coating performance across a broad variety of service environments. SHS7570W develops extreme passive film stability at a range of pH in both oxidizing and reducing environments. SHS7570W is especially resistant to corrosion in high chlorine and seawater environments, making it a viable alternative that offers significantly better wear performance than nickel superalloys and stainless steels.

Excellent Corrosion Resistance

SHS7570W forms a nearly perfect metallic glass coating. In the X-ray diffraction diagram to the right, the broad amorphous hump and almost complete lack of Bragg diffraction peaks indicates that the as-sprayed SHS7570W coating structure is primarily a metallic glass, representing the ultimate in uniformity. This extreme, almost atomic-level homogeneity makes it very difficult for the electrochemical system to set up specific sites for anodic attack. Simultaneously, the chemistry of SHS7570W has been optimized so that an extremely stable passive protective oxide layer forms in a wide range of both oxidizing and reducing environments. The combined approach of optimizing the passive film stability and the extreme refinement of the coating microstructure results in high corrosion resistance in a variety of environments, including seawater.

Industrial Uses

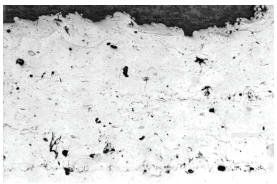
Power Generation

Oil & Gas

Corrosion Resistance

SHS7570W coating resisted corrosion for two years on the hull of an Alaskan ice breaker tugboat

Coating Microstructure



Optical micrograph at 100x of a typical SHS7570W coating

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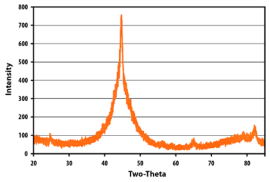
Damage Tolerance

SHS7570W coatings exhibit excellent corrosion resistance in seawater solutions and salt fog environments. SHS7570W coatings are also hard (HV300 950 - 1150 kg/mm² HVO .3) and wear resistant, with properties superior to other high corrosion materials such as nickel superalloys and stainless steels. This allows SHS7570W to exhibit damage tolerance in a wide variety of conditions. Since the majority of material failures occur at the surface from damage due to wear/abrasion, corrosive attack or the creation of defects leading to fatigue crack initiation, applying SHS7570W to the surfaces of parts, devices and machines will vastly extend service lifetime, reduce total ownership costs and spawn entirely new material applications in demanding environments and in ways previously not possible.

X-Ray Diffraction Diagram



The broad amorphous hump is indication that the as-sprayed SHS7570W coating structure is a metallic glass

CUSTOMER ASSISTANCE POLICY

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