

WEARTECH® SHS™ 7574HV

Corrosion & Abrasion Resistant Thermal Spray Powder

Application Process

High Velocity Oxy-Fuel
Thermal Spraying (THSP-HVOF)

Material Chemistry (wt%)

Chromium	< 25%
Molybdenum	< 20%
Tungsten	< 10%
Boron	< 5%
Manganese	< 5%
Carbon	< 3%
Silicon	< 2%
Iron	Balance

Microhardness (HVO .3)

975 - 1075 kg/mm² Typical

Wear Resistance

ASTM G65-04 Procedure B
Typical mass loss 0.13 g

Corrosion Resistance

Cyclic Salt Fog Test
(GM9540P/B) - 54 cycles
(1296 hours) with an
appearance rating of 10

Corrosion Rate in Seawater
at 30° C - 83 mppy
(millimicron per year)

Bond Strength

ASTM C633-01
10 ksi (69MPa)

Coating Properties

Density (g/cm³) 7.65
Porosity/Oxides < 5%

Impact Resistance

Drop Impact Testing:
No delamination/cracking
at 480 in-lbs

Coating Description

SHS7574HV is an iron based steel alloy with a nanoscale microstructure that features extreme corrosion resistance in high chlorine, salt fog, concentrated salt and seawater environments. SHS7574HV is also a coating alternative to electrolytic hard chromium.

Key Performance Characteristics

- Outstanding corrosion resistance in high chlorine, salt fog, concentrated salt and seawater environments
- Can be finished to very high surface specifications for use as a replacement for hard chrome
- High bond strength, low porosity and high impact resistance
- Corrosion resistance is superior to crystalline austenitic stainless steel and nickel based superalloys

SHS7574HV coatings exhibit outstanding corrosion resistance in high chlorine, salt fog, concentrated salt and seawater environments. SHS7574HV can be finished to very high surface specifications for applications as a replacement for hard chrome. SHS7574HV also features superior bond strength and high impact resistance. In oxidizing and reducing environments, SHS7574HV develops extreme passive film stability at a range of pH. Corrosion resistance in extreme corrosive environments is superior to crystalline austenitic stainless steel and nickel based superalloys. High adhesion values highlight the extremely low residual stress (even at high thicknesses). High cohesion values mean that the probability of "pull-out" of individual particles from wear and erosion is extremely low. Low porosity means low coating permeability and results in a highly corrosion resistant barrier.

High Corrosion Resistance

Corrosion resistance of SHS7574HV is superior to conventional crystalline austenitic stainless steel and nickel based superalloys in extreme corrosive environments. SHS7574HV optimizes glass forming so that it readily forms nearly perfect metallic glass coatings, making it very difficult for the electrochemical system to set up specific sites for anodic attack. Simultaneously, the chemistry of SHS7574HV is optimized so that an extremely stable passive protective oxide layer forms in a wide range of oxidizing and reducing environments.

Damage Tolerance

While conventional high corrosion resistant coating materials exhibit reduced corrosion behavior, SHS7574HV coatings exhibit excellent corrosion resistance in seawater solutions and salt fog environments. Although conventional corrosion materials are soft, SHS7574HV coatings provide hardness and wear resistance equivalent to hard chrome. SHS7574HV has excellent damage tolerance applicable to a wide variety of harsh service environments, such as replacing electrolytic hard chrome.

Industrial Uses

Power Generation
Oil & Gas
Offshore & Marine

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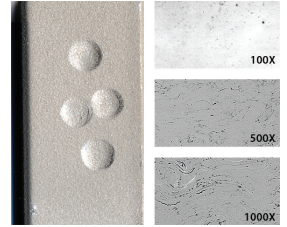
Hard Chrome Replacement

SHS7574HV is an alternative coating to electrolytic hard chrome and can offer several advantages, including much higher deposition rates, the ability to repair coatings in the field and corrosion resistance superior to hard chrome coatings and wrought austenitic and nickel based superalloys in plate form.

Impact Resistance

An SHS7574HV coating is shown to the right on a sample coupon with multiple drop impact tests at 480 in-lbs. The top right optical micrograph, taken at 100x, shows the typical high density as-sprayed SHS7574HV coating microstructure when applied with recommended spray parameters. The middle and bottom electron micrographs taken at 500x and 1000x by the backscattered electron detector in an SEM highlight the uniformity of the SHS 7574 coating microstructure, which enhances the ability to resist electrochemical attack.

Impact Testing



SHS7574HV coating applied to a sample coupon with multiple drop impact tests at 480 in-lbs

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Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

The Lincoln Electric Company

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www.lincolnelectric.com

WEARTECH® SHS® 7574HV

Severe Abrasion

KEY FEATURES

- Outstanding corrosion resistance in high chlorine, salt fog, concentrated salt and seawater environments
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TYPICAL APPLICATIONS

- Oil & Gas
- Power Generation
- Mining
- Pulp & Paper
- Offshore & Marine

Size Micron (µm)	10 lb (4.5 kg) Bottle
+15/-53	P7574-15/53 (ED035730*)

* EDO numbers have been discontinued and replaced by the Wearthech part numbers for the cross selling program.

MECHANICAL PROPERTIES

Vicker's Hardness (HV0.3)	Wear Resistance	Bond Strength ksi (MPa)
975 - 1075	ASTM G65-04 Procedure B 0.13 g mass loss	ASTM C633-01 Glue Failure 10 (69)

DEPOSIT COMPOSITION

%Fe	%C	%Cr	%B	%Mo	%Mn	%Si	%W
Balance	<3	<25	<5	<20	<5	<2	<10

TYPICAL OPERATING PROCEDURES

Feeder Speed (rpm)	Gas Flow (cfh)	Powder Feed Rate lb/hr (g/min)	Spray Distance in (mm)	Deposit Rate (mil/pass)
270 (6 pitch screw)	21	5 (37.8)	14 (356)	0.5-0.7
Fuel Flow Rate gal/hr (l/min)	Fuel Pressure (psi)	Oxygen Flow Rate (cfh)	Oxygen Pressure (psi)	Combustion (psi)
6 (0.45)	120	2100	135	100

* This procedure was developed on a TAFA JP5000. Changes in equipment, materials, and substrates may change optimum procedures. Listed procedures should only be used as a starting point.

IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED
Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m ³ maximum exposure guideline for general welding fume.
BEFORE USE, READ AND UNDERSTAND THE SAFETY DATA SHEET (SDS) FOR THIS PRODUCT AND SPECIFIC INFORMATION PRINTED ON THE PRODUCT CONTAINER.

Material Safety Data Sheets (MSDS) and Certificates of Conformance are available on our website at www.lincolnelectric.com

TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

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