Versatile, Capillary Sealers





ABOUT DIAMANT - GERMANY

Tradition, Passion, Innovation



- Family owned since 1886
- 35 Employees
- More than 2.000 articles
- 100% own production
- R&D team with 5 employees





DIAMANT IN INDIA



- » DIAMANT Triumph Metallplastic Pvt Ltd, India
 - » J.V. of DIAMANT Metallplastic, Germany & Triumph Engineers Elastomeric Sealing Solutions Company Since 1995
 - » Family Owned Business with localised Production of India specific articles.
 - » 25 Employees





ONE COMPANY - MANY SOLUTIONS







RELEVANCE OF SEALERS



Technical Bulletin DVS 2320 (03/2015) Sealing of Thermal Sprayed Coatings <u>www.dvs-media.eu/en</u>

- » Abstract of DVS Technical Bulletin 2320 (2-1 & 2-7)
- » The term sealing refers to a method of applying and infiltrating porous surfaces with viscous substances, with the aim of achieving the complete proofing of the component against the penetration by external media.
- » Sealing of thermal spray coatings is carried out where open discontinuities in the layer structure cause an unacceptable reduction of performance



OTHER REFERENCES CALLING FOR SEALERS IN TSC



Figure 2: Job Reference Standard Illustration

SSPC-CS 23.00/AWS C2.23M/NACE No. 12 Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel





RELEVANCE OF SEALERS

- » All tThermal Spray coatings do have porosities. Size and abundance depending on the used process, sprayed material and spray parameters.
- » Typical porosities by Spray process

				area of coating	
	Flame Spray (Powder)	Arc Spray	Plasma	HVOF	.9
Carbide	5-15%	N.A.	2-3%	<1%	
Non-Ferrous to Metal	3-10%	3-10%	2-5%	<2%	
Ferrous to Metal	3-10%	3-10%	2-5%	<2%	

Ref: Einführung Thermisches Spritzen - 6. Ausgabe/www.oerlikon.com



The Indo-German Metal-Polymer Company

Don't forgot the sides / interface

Basically there are two reasons for the use of sealers:

- 1.) corrosion protection for the thermal spray coating
- 2.) Implementation of additional properties to the thermal spray

coating e.g. anti-stick, improved machinability, etc.







USES OF SEALERS IN TS COATINGS

- Number, size and frequency of pores are not a criteria for the relevance of sealers
- Typically the main reason for sealers is corrosion protection. They have to prevent corrosive substances (liquid or gas) penetrating through the thermal spray layer
- In many cases sealers can implement additional properties to the thermal spray coating:
 - Improved machinability
 - Increasing the structural stability
 - Changing the surface roughness
 - Anti-Stick properties
 - Changing surface wet ability
 - Increase the dielectric strength





WHAT ARE WE LOOKING FOR IN SEALERS?

- Deep penetration
- Seal all pores
- Cheap
- Temperature resistance
- Chemical resistance
- No aging, no weathering
- Compatible with different coating materials
- Survive thermal expansion and heat cycles
- Implementation of additional properties
- Easy application
- Fast processing, short curing time
- Environmental friendly...





SEALER PERFORMANCE STUDIES @ DIAMANT

Secondary electron microscope (SEM) picture of a sealed wire arc sprayed ZnAl15 coating



SE, 10.000 x

2 µm



SEALER PERFORMANCE STUDIES @ DIAMANT

SEM of sealed wire arc sprayed ZnAl15 coating using backscattering detector.





SELECTION CRITERIA

What can I do to check if my sealer is correct?

- 1.) Temperature resistance?
- 2.) Chemical resistance?
- 3.) Environment and health requirements?
- 4.) Application and processing parameters?
- 5.) Deep penetration?

600 µm





RIGHT SEALER FOR EACH PROJECT

PROCEDURE				
APS	HVOF	LDS	Wire flame spraying	
Detonation syringes	Cold gas spraying	Laser spraying	Powder flame spray	

SEAL				
to achieve special surface properties *	for hydraulic and pneumatic applications	to improve the corrosion resistance	to influence the Friction and sliding properties	
* ala atrical instructions and		www.www.www.www.www.		

* electrical insulation, non-stick properties, wetting or non-wetting, optical properties



THE RIGHT SEALER

- Size and distribution of the pores depend on
 - Coating process
 - Coating material
 - Coating parameters
- Different requirements for the sealer
 - Temperature resistance
 - Deep penetration
 - Application time
 - Environmental requirements





- (1) All thermal spray coatings do have porosities
- (2) Don't risk failures, use sealers for protection
- (3) Sealers do increase the service life of ts-coatings
- (4) There is no all-purpose sealer
- (5) Sealers have to be individually selected / developed
- (6) Deep penetration is a key factor for good performance







RANGE OF SEALERS

Deep Capillary impregnation and sealing

- Don't risk corrosion failures
- Extend the service life of the coating
- Add additional properties







GENERAL USAGE GUIDELINES

- » Apply Dichtol after the Sprayed coating has been cooled down to max. 40°C (Dichtol HM max. 120°C)
- » Maintain liquid film on surface for min. 5 min, if necessary keep adding material.
- » Cure Dichtol as room temperature (Except Grades where special requirements are mentioned)
- » Machine (Grind) the thermal sprat coating to final dimension



OCTO PORTFOLIO - STANDARD SEALERS

dichtol	Product No.	Key Applications	Base Composition	T⁰C Max	Recommended Spray Process	
WFT	1532	Corrosion protection - small pores	Acrylic	300	HVOF, APS, LDS	Х
WFT Macro	1546	Corrosion protection - medium pores	Acrylic	300	APS, LDS	Х
WFT Slow	2507	Corrosion protection - Small pores - Application on large surfaces	Acrylic	300	HVOF, APS, LDS	O/R
0210 Standard	0210	Corrosion protection - small pores - Fast evaporation - Compatible with Paint	PVC Copolymer	200	HVOF, APS, LDS	O/R
HTR	0977	Heat Resistant Corrosion protection - For small pores	Silicone	500	HVOF, APS, LDS	Х
HTR-HS-50S	2532	Based on HTR 0977 formulation with no thermal curing required & higher solid content	Silicone	500	HVOF, APS, LDS	O/R
HTR-HS-AS	2531	Based on HTR 0977 formulation with no thermal curing required & higher solid content & Anti-stick properties	Silicone	500	HVOF, APS, LDS	O/R



X - Available Ex-Stock ; O/R - Available On Request

OCTO PORTFOLIO - STANDARD SEALERS

dichtol	Product No.	Key Applications	Base Composition	T⁰C Max	Recommended Spray Process	
WF-49-1	2180	Solvent Resistant corrosion protection - Small pores	PUR	120	HVOF, APS, LDS	O/R
WF-49-2	2182	Solvent Resistant corrosion protection - Medium pores	PUR	120	APS, LDS	O/R
НМ	2407	2-Component Sealer - Application on 120°C hot surfaces - improvement of electrical insulation	Ероху	120	HVOF, APS, LDS, (depending on application temperature)	O/R
HM-RT	2510	2-Component Sealer - improvement of electrical insulation and electric strength	Ероху	200	APS, LDS, (depending on application temperature)	O/R
HTWG	2506	High Temperature sealer based on water	Anorganic	700	APS, LDS	O/R
HTWG-S	2505	High Temperature sealer based on solvents	Anorganic	700	APS, LDS	O/R



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