

DIAMANT[®]
The Metalplastic Company

dichtol

capillary sealer

Impregnation of thermal spray coatings both
on the surface and sealing all the porosity to
the parent material



Safety in depth: capillary impregnation and sealing of thermal spray coatings. Reliable protection against the infiltration of corrosive materials like water, oils, air, gases and foreign bodies. Sustainable quality with extremely short process time and low costs.

Situation

Thermal spray coatings always have process-related low residual porosities. Due to this they are not gastight and permeable to liquids. Corrosion may occur underneath the sprayed coating and finally cause corrosion which creates micro cracks in the coating. Deterioration of the structure caused by corrosion resistance of the parent material causes a decrease in the mechanical bonding properties and consequently the wear resistance of the coating fails. Ultimately the expense of coating has not been able to reach its supposedly expectancy.

Solution

To prevent the infiltration of corrosion to the substrate the sealer has to be equipped with a more than protective coating but must close the porosity. The aim of sealing by impregnation is close and fill all those open voids.

dichtol is a capillary sealer which penetrates porous thermal spray layers deeper than comparable products. The simple and versatile application of dichtol (brush or spray) makes it user-friendly – even on complex structures. Flame-, Plasma-, ARC- and even HVOF-sprayed coatings will resist premature failure by sealing the porosity with dichtol.

Benefits

- Deep capillary impregnation
- Extended service life
- High temperature resistant - permanent up to 500°C / 932°F
- High chemical resistance
- Partial impregnation possible - on the spot
- Transparent
- Drinking-water approved by the *Hygiene-Institut Gelsenkirchen*, Germany
- Increases the dielectric constant for ceramic coatings and extends their life



Analysis

Microscopic analysis of a wire arc sprayed ZnAl15 coating. The sealer is visible as a dark veil in the microscopic view.

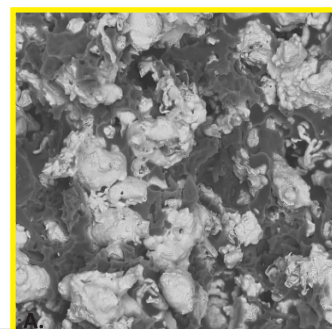
Shows dichtol HM #2407:

- A. in the layer structure [SEM (scanning electron microscope), 500 x (from the edge)]
- B. in the layer structure [SE detector, 10.000 x]
- C. sealer detectable up to the interface

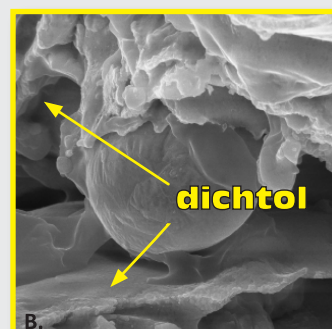
Conventional sealers protect only to a certain extent, since they are limited to the surface and are often removed by machining and grinding the surface to size – instead of infiltrating deeply. With dichtol, DIAMANT Metallplastic has developed a polymer sealing system that impregnates even the smallest cracks and pores, entirely without using vacuum or pressure. The principle of the extraordinary protective effect of DIAMANT dichtol is its special capillary effect: The polymer infiltrates the narrowest porosities and micro-cracks – even against the earth's gravitational force. dichtol also ensures a protective effect in high-density layers such as HVOF-sprayed coatings.



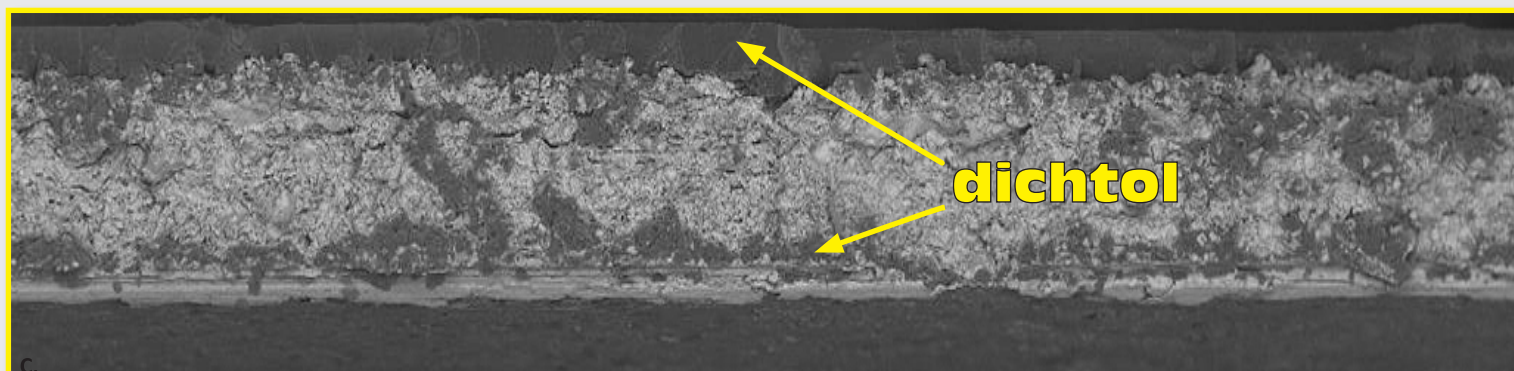
Failed Coating due to undercorrosion



(Source: IOT RWTH Aachen)



(Source: IOT RWTH Aachen)



SEM of sealed wire arc sprayed ZnAl15 coating using backscattering detector. RBSD, 100 x

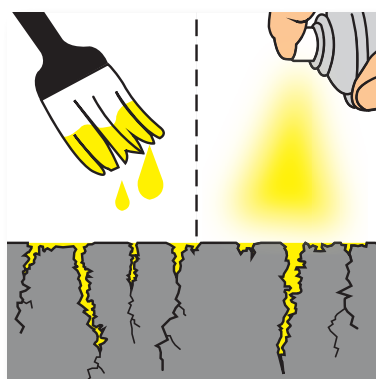
dichtol

Product Range		WFT FL #1532	WFT Macro #1546	HTR #0977	WF49 #1849	HM #2407
Version		standard	macro (high porosities)	high temperature	solvent resistant concentrate	high solid body content, appl. on hot surfaces
Thermal spray process		HVOF, APS, VPS, ARC, Flame	ARC, Flame	HVOF, APS, VPS, ARC, Flame	HVOF, APS, VPS, ARC, Flame	HVOF, APS, VPS, ARC, Flame
Porosity sizes [mm]		0 - 0,1	0,1 - 0,5	0 - 0,1	0 - 0,5	0 - 0,5
Shelf life [years]		5	5	5	0,5	1
Curing Time						
Dust-dry / Touch Proof	20°C	6 min	6 min	1 hour after processing anneal at 250 °C for 3 hours	45 min	20 h
	40°C	3 min	3 min		30 min	12 h
	80°C	x	x		x	1 h
Machinable	20°C	90 min	90 min	1 hour after processing anneal at 250 °C for 3 hours	120 min	36 h
	40°C	60 min	60 min		75 min	20 h
	80°C	x	x		x	90 min
Chemically Resistant	20°C	after 36 h	after 36 h	1 hour after processing anneal at 250 °C for 3 hours	after 144 h	after 192 h
	40°C	after 24 h	after 24 h		after 96 h	after 120 h
	80°C	x	x		x	after 60 h
Technical Data						
Permanent temp. resistance [°C]		-40 / +300	-40 / +300	-40 / +500	-40 / +200	-40 / +200
Temporary temp. resistance [°C]		-40 / +450	-40 / +450	-40 / +550	-40 / +220	-40 / +220
Remaining surface layer thickness [µm]		3	10	4	20	20
Surface temperature for application [max]		40°C	40°C	40°C	40°C	120°C
Viscosity (DIN4 cup, +23°C) DIN 53211 (4mm nozzle) [sec.]		13	17	12	varies by mixture	22

dichtol Thinner #1285

- Adjusts the viscosity after a long period of use to compensate the solvent loss of dichtol WFT, WF49 and HTR.
- Adjusts the processing viscosity of dichtol WF49.

Application





Resistance list

Chemicals	Conc.	dichtol			
		WFT	WF49	HTR	HM
acetate		—	x	o	x
acetylene		x	x	x	x
alkanes		x	x	x	x
alcohols		x	x	x	x
animal based oils		x	x	x	x
brake oil		x	x	x	x
citric acid		o	x	x	x
crude oil		x	x	x	x
cutting oil		x	x	x	x
diesel fuels		x	x	x	x
diethyl ether		—	—	o	x
engine oil		x	x	x	x
glycol		x	x	x	x
hydraulic fluid		x	x	x	x
hydrocarbons		x	x	x	x
- aromatics		x	x	x	x
hydrochloric acid	< 20	—	o	o	x
hydrochloric acid	> 20	o	x	x	x
keton		—	o	—	—
kerosene		x	x	x	x
lubricating oil		x	x	x	x
machine oil		x	x	x	x
machinefat		x	x	x	x
natural gas		x	x	x	x
nitric acid		o	o	o	x
petrol		x	x	x	x
phthalates		o	x	x	x
plantbase oils		x	x	x	x
potassium chloride, hs		x	x	x	x
potassium hydroxide		x	x	x	x
potassium phosphate		x	x	x	x
salicylic acid		o	x	x	x
sulphuric acid	< 20	—	o	o	x
sulphuric acid	> 20	o	x	x	x

Nomenclature: hs = aqueous solution / conc. = concentration
Symbols: x = resistant / o = limited resistant / — = unstable
 The measurements were conducted at a temperature of 20°C
 Individual resistance tests can be carried out after arrangement.

You need technical support?
 Call our Thermal Spraying Specialist (ETSS)
+49 (0) 2166 9836 - 13

or send an e-mail
pascal@diamant-polymer.de

Mr. Pascal Dettloff
FROSIO Coating Inspector (NS 476)
ETSS Thermal Spraying Specialist



**MADE
IN
GERMANY**

To produce here in Germany, this means for us to hold on to our family traditions. With the „Made in Germany“ seal we guarantee the highest quality of our products.



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