

Sealers for Thermal Spray Coatings Designed Sealers for the Right Application

Thermal spray coatings can be designed for vast number of different operating environments. Choice of material, spray method and parameters can be done according to the requirements of the part, operating environment and possible limitations set by other factors, like cost and application efficiency.

Often the inherent structure of thermal spray coatings limits their performance. Porosity, splat boundaries, cracks and other defects can lower their performance in corrosive environments. Often it is not the coating that fails, but the part underneath corrodes and coating delaminates as a result of this undercorrosion.

Sealers are low-viscosity liquids that are designed to penetrate the internal porosity and cracks of thermal spray coatings and after proper curing make the coating layer impermeable to gases and liquids in the operating environment.

Correctly designed sealer selected for the right application typically prolongs the service life of the coated part significantly and most importantly acts as a safety measure towards possible coating defects that can be hard to control while spraying.

In addition to corrosion performance improvement, sealers can be used to significantly improve the dielectric performance of the coatings and also improve mechanical properties of especially ceramic coatings,

Oerlikon Metco has a completely renewed line of sealers for various industrial applications and purposes, from wet corrosion protection to high gas tightness, from hot corrosion prevention to improving dielectric properties.

Typical Uses and Applications

Prevention of undercorrosion and improving gas tightness in humid or wet conditions

- Preventing undercorrosion in wet or high temperature environment
- Improving gas tightness
- Increasing dielectric strength
- Improving mechanical properties of ceramic coatings



Quick Facts

Classification	Auxiliary, Sealers
Purpose	Seal porosity within thermal spray coatings
Process	All thermal spray processes

2 Material Information

2.1 Quick Selector

Sealer	Data Sheet	Description	Curing	Application examples	Applicable Service Conditions		
					pH	Max Service Temp	Solvent resistance
Metcoseal LP-20	DSM-0419	2-component low viscosity sealer for low porosity carbide coatings	24 h @ 20 °C/70 °F 30 min @ 50 °C/122 °F	Ball/Gate valves in O&G mud motor rotors, pump seals, shafts, plungers & housings Alkaline environments	2 to 14	300 °C 572 °F	good ^{a,b}
Metcoseal LP-40	DSM-0420	2-component low viscosity sealer for low porosity carbide and oxide coatings	24 h @ 20 °C/70 °F 8 h @ 40 °C/104 °F 2h @ 60 °C/140 °F	Mud motor rotors Anilox rolls Rolls for paper industry Hydraulic rods	2 to 12	200 °C 392 °F	good ^{a,b}
Metcoseal HP-30	DSM-0421	2-component solvent free sealer for low and high porosity oxide coatings and porous metallic and carbide coatings	1 h @ 110 °C/230 °F Shorter possible with light weight parts or higher temperature	For preventing sub-coating corrosion in humid or wet environment Dielectric coatings	2 to 12	250 °C 482 °F Short 300 °C 572 °F	good ^{a,b}
Metcoseal HT-20	DSM-0422	1-component high temperature sealer for oxide and metal (EAW) coatings	35 min @ 250 °C/482 °F	High temperature breakdown strength Zinc bath rolls	2 to 12	Up to 650 °C 1202 °F	good ^{a,b}
Metcoseal HT-30	DSM-0423	1-component special resin system for corrosion prevention in carbides and oxides and also high temperature applications	14 h @ 20 °C/70 °F 1 h @ 150 °C/302 °F (RH > 50% during application)	Carbide and oxide coatings in corrosive environments Boiler components	2 to 12	Up to 700 °C 1292 °F	good ^{a,b}
Metcoseal AP/AP-70	DSM-0230	1-component sealer (phenolic resin) for high pressure applications	Air dry at room temperature Full cure 15 to 30 min at 135 °C/275 °F	Hydraulic rams Shaft seals Renders coatings impermeable to high pressure	2 to 7	205 °C 400 °F	limited
Metcoseal APT/APT-70	DSM-0230	APT Thinner for Metcoseal AP APT-70 Thinner for Metcoseal AP-70	N/A		N/A	N/A	limited
Metcoseal SA/SA-70	DSM-0230	1-component sealer (silicone resin with aluminum flake) for aluminum coatings on iron and steel	Air dry at room temperature Full cure 45 min at 250 °C/480 °F	Protects aluminum coatings exposed to high temperature atmospheric conditions in rural, industrial and salt environments	approx. 7	593 °C 1100 °F	limited
Metco 185 Sealer	DSM-0230	1-component sealer (petroleum-based wax)	melt @ >85 °C/185 °F heat parts @ 93 °C/200 °F	Low temperature applications requiring sealing and lubrication	2 to 12	82 °C 180 °F	limited
Metcoseal HT-10	DSM-0230	1-component sealer for high temperature	30 min @ 20 °C/70 °F 2 h @ 205 °C/400 °F	High temperature, erosive and corrosive environments Boiler waterwalls	2 to 12	1620 °C 2950 °F	good ^{a,b}

^a Short time exposure with common industrial solvents accepted. Long term exposure should be tested prior to use.

^b Always test before using any halogenated solvents.

2.2 Physical Properties

Sealer	Base	Appearance	Coverage (Approx.)	Cure Method	Applicable Service Conditions				
					Dielectric Strength	Flash Point ^a	Max Service Temp	Shelf Life ^b	Volatile Organic Compounds (VOC) ^c
Metcoseal LP-20	Furfuryl Alcohol Resin (2 components)	Black	120 g/m ² 0.4 oz/ft ²	Polymerization		65 °C TCC 149 °F TCC	230 to 300 °C 446 to 572 °F	12 months	<10 g/l < 0.08 lb/gal
Metcoseal LP-40	Special Epoxide Resin (2 components)	Transparent	120 g/m ² 0.4 oz/ft ²	Polymerization		31 °C TCC 88 °F TCC	200 °C 392 °F	12 months	865 g/l 7.2 lb/gal
Metcoseal HP-30	Special Epoxide Resin (2 components)	Transparent	120 g/m ² 0.4 oz/ft ²	Polymerization		>60 °C TCC >140 °F TCC	300 °C 572 °F	12 months	<10 g/l < 0.08 lb/gal
Metcoseal HT-20	Special Resin (1 component)	Transparent	110 ml/m ² 0.35 fl.oz/ft ²	Polymerization		25 °C TCC 77 °F TCC	650 °C 1202 °F	12 months	491 g/l 4.1 lb/gal
Metcoseal HT-30	Special Resin (1 component)	Transparent	100 ml/m ² 0.3 fl.oz/ft ²	Condensation + Polymerization		24 °C TCC 75 °F TCC	700 °C 1292 °F	12 months	497 g/l 4.1 lb/gal
Metcoseal AP / AP-70	Phenolic Resin	Clear	355 ml/m ² 1.1 fl.oz/ft ²	Air Dry / Heat Cure		18 °C TCC 65 °F TCC	205 °C 400 °F	9 months	n-Butanol = 782 g/l 6.5 lb/gal
Metcoseal APT / APT-70 Thinner	N/A	Clear	N/A	N/A		35 °C TCC 95 °F TCC	N/A	18 months	n-Butanol = 100%
Metcoseal SA/SA-70	Silicone Resin with Aluminum Flake	Metallic	140 ml/m ² 0.44 fl.oz/ft ²	Air Dry/Heat Cure		44 °C TCC 111 °F TCC	593 °C 1100 °F	12 months	Propylene Glycol Monomethyl Ether Acetate = 730 g/l 6.1 lb/gal
Metco 185 Sealer	Petroleum-Based Wax	White	96 g/m ² 0.31 oz/ft ²	Solid at < 85 °C < 185 °F		274 °C TCC 525 °F TCC	82 °C 180 °F	---	none
Metcoseal HT-10	Inorganic Aluminum Phosphate (1 component)	White	0.1 l/m ² 0.3 fl.oz/ft ²	Air Dry + Heat Cure	67.3 kV/cm 171 V/0.001 in	none	1620 °C 2950 °F	6 months	none

^a TCC = Tag Closed Cup per ASTM D56, TOC = Tag Open Cup per ASTM D1310, PM = Pensky-Martens per ASTM D93

^b At room temperature, unsealed

^c VOC content expressed according to Directive 2004/42/CE

2.3 Key Selection Criteria

■ Metcoseal LP-20

Recommended for sealing of thermal spray carbide coatings with low porosity for corrosion protection in acidic or alkaline environment and high-pressure applications. Best resistance against harsh chemical environment. Typical applications are gate and ball valves in oil & gas industry and other parts in process industry requiring high chemical stability. Metcoseal LP-20 can be cured at room temperature and used at service temperatures up to 230 °C (446 °F).

■ Metcoseal LP-40

Recommended for sealing of thermal spray carbide and oxide coatings with low porosity for general wet corrosion protection. Typical applications are mud motor rotors, anilox rolls, rolls for paper industry and hydraulic rods. Metcoseal LP-40 can be cured at room temperature and used at service temperatures up to 200 °C (392°F).

■ **Metcoseal HP-30**

Recommended for sealing of thermal spray oxide coatings with medium and high porosity for wet corrosion protection and to improve dielectric performance also in humid conditions. Typical applications are insulating bearings, thermal spray heating elements and process industry components requiring corrosion protection. Metcoseal HP-30 can also be used to seal arc spray coatings. Metcoseal HP-30 must be cured at 110 °C (230 °F) and can be used at service temperatures up to 300 °C (572 °F).

■ **Metcoseal HT-20**

Recommended for sealing of internal porosity in thermal spray oxide coatings with medium and high porosity for corrosion protection in high-temperature applications. Typical applications are boiler components and zinc bath rolls. Metcoseal HT-20 can also be used to enhance the electrical insulation of oxide coatings at high temperature. Metcoseal HT-20 must be cured at 250 °C (482 °F) and can be used at service temperatures up to 600 °C (1202 °F).

■ **Metcoseal HT-30**

Recommended for sealing of internal porosity in thermal spray coatings for general wet corrosion protection of carbide coatings as well as high-temperature applications of oxide coatings. Metcoseal HT-30 is a one-component sealer. It can be cured at room temperature for general corrosion or at 150 °C (302 °F) for high-temperature applications and can be used at service temperatures up to 700 °C (1292 °F).

■ **Metcoseal AP/AP-70**

Recommended for sealing sprayed coatings for high pressure applications where the coating must be impermeable. Typical applications are hydraulic rams and shaft seals. Resists boiling water, salt spray, acids, oils, gasoline, greases and most organic chemicals. Metcoseal AP and AP-70 can be air dried at room temperature and cured at 135 °C for best performance. They can be used at service temperatures up to 205 °C (400 °F) in continuous service or intermittently up to 260 °C (500 °F).

■ **Metcoseal APT/APT-70 Thinner**

Metcoseal APT Thinner for Metcoseal AP.
Metcoseal APT-70 Thinner for Metcoseal AP-70.

■ **Metcoseal SA/SA-70**

Recommended for corrosion resistance when used as a top sealing coat over sprayed aluminum on iron and steel. The high heat resistance of this material makes it an excellent sealer for atmospheric exposure in rural, industrial and salt environments. Metcoseal SA-70 can be cured at room temperature and used at service temperatures up to 593 °C (1100 °F).

■ **Metco 185 Sealer**

Recommended for sealing and lubrication of sprayed coatings at low temperature. It is useful in sealing shafts and parts to insure a cleaner initial finish when machined or ground. The sealer prevents grit from the grinding operation from entering the pores of the coating, contributing to an easier cleaning operation and longer bearing life. Has excellent high pressure lubrication properties and is sometimes used for “dry” applications, which cannot be adequately lubricated in service. It is resistant to salt and freshwater and to nearly all acids and bases. It does not resist solvents and hydrocarbons. It will gradually be displaced from the coating by oils and greases when used in lubricated service. Metco 185 sealer must be applied on coated parts at temperature over 93 °C (200 °F) and does not require curing. Service temperatures are up to 82 °C (180 °F).

■ **Metcoseal HT-10**

Inorganic sealer recommended for high temperature applications and for metallic thermal spray coatings in corrosive and/or erosive environments. It is particularly suitable for sealing coatings on boiler waterwalls. Metcoseal HT-10 can be cured at room temperature and is stable at service temperatures up to 1620 °C (2950 °F), thereby achieving an extremely dense and hard coating.

2.4 Customer Specifications

Product	Customer Specification
Metcoseal AP-70	GE A8B35A1
Metcoseal APT-70 Thinner	GE A8B35B1

3 Commercial Information

3.1 Ordering Information and Availability

	Order No.	Container Size	Availability	Distribution
Metcoseal LP-20	2370952	1 l (approx. 1 kg) resin + 0.2 l (approx. 0.2 kg) curing agent	Special Order	Global
Metcoseal LP-40	2370953	0.5 l (approx. 0.45 kg) resin + 0.5 l (approx. 0.45 kg) curing agent	Special Order	Global
Metcoseal HP-30	2370954	0.5 l (approx. 0.5 kg) resin + 0.5 l (approx. 0.5 kg) curing agent	Special Order	Global
Metcoseal HT-20	2370955	1 l (approx. 1 kg)	Special Order	Global
Metcoseal HT-30	2373425	1 l (approx. 1 kg)	Special Order	Global
Metcoseal AP	1002891	1 l (approx. 1 kg)	Stock	
Metcoseal AP-70	2353787	1 gal (approx. 3.8 l)	Stock	Global
Metcoseal APT	1002892	1 l (approx. 1 kg)	Stock	
Metcoseal APT-70 Thinner	2353788	1 gal (approx. 3.8 l)	Stock	Global
Metcoseal SA	1002895	4 l	Stock	
Metcoseal SA-70	2305672	1 gal (approx 3.8 l)	Stock	Global
Metco 185 Sealer	1000022	1 lb (approx. 0.45 kg)	Stock	Global
Metcoseal HT-10	1485519	1 gal (approx 3.8 l)	Special Order	Global

3.2 Safety Recommendations

See the SDS (Safety Data Sheet) for the applicable product. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

Product	SDS No.
Metcoseal LP-20	50-2757 (base) 50-2758 (curing agent)
Metcoseal LP-40	50-2759 (base) 50-2760 (curing agent)
Metcoseal HP-30	50-2776 (base) 50-2777 (curing agent)
Metcoseal HT-20	50-2953
Metcoseal HT-30	50-2956
Metcoseal AP-70	50-2918
Metcoseal APT-70 Thinner	50-2917
Metcoseal SA/SA-70	50-2866
Metco 185 Sealer	50-249
Metcoseal HT-10	50-2427

Information is subject to change without prior notice.