

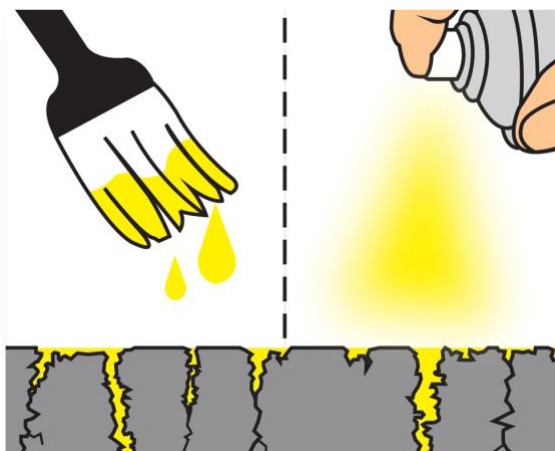
## FST TS-Sealer for Thermal Sprayed Coatings

### Introduction

Thermal spray coatings always have process-related residual porosities. Due to the residual porosity coating might not be gas, vapour or liquid tight. The consequence can be corrosion underneath the sprayed coating and finally might result in micro-cracks in the coating or even complete delamination of the coating.

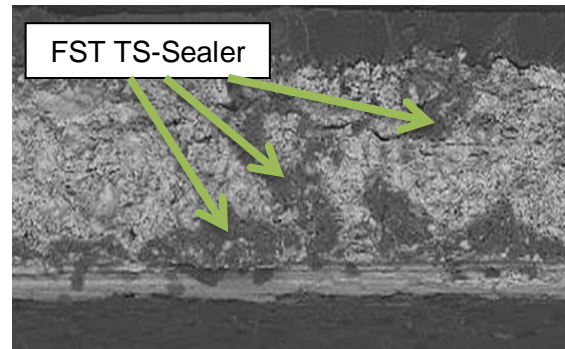
FST TS-Sealers are capillary sealers which penetrate the porous and micro-cracks of thermally sprayed coatings deeper than comparable products.

The versatile and straightforward application of FST TS-Sealer (brush or spray) makes it user-friendly – even on complex structures. Flame-, Plasma-, ARC- and even HVOF-sprayed coatings resist premature failure by sealing the porosity with FST TS-Sealer.



The FST TS-Sealer Products are materials designed to penetrate deep into the pores or cracks of thermal spray coatings. Once dried and cured, they form a protective barrier to gases and liquids that the coat is exposed to.

This barrier becomes even more critical in situations where a galvanic potential between the coating and the substrate is a concern.



Sealers are recommended for porous coating systems, such as ceramics, that are designed to be used in liquid or atmospheric chemical environments, and for metallic coatings that have higher nobility than the substrate. Coatings that are anodic with respect to the substrate may be sealed to improve coating service life.

In many applications, the porous nature of thermally sprayed coatings is an advantage, such as retaining lubricants to prevent wear. However, in some cases, it is best to seal the porosity, such for thin coatings or when a corrosive reagent or damaging environment is present, such as sea water, steam, dilute acids, corrosive gases or elevated temperatures.

Coating porosity can entrap corrosive elements, setting up an electrochemical attack on both the coating and the underlying substrate. This could lead to coating and bond failure.

FST TS-Sealers protect both the thermally sprayed coating and the metal substrate underneath.

In machine element applications, FST TS-Sealers applied before finishing, prevent contamination of the coating pores and provides a cleaner initial ground finish.

Sealers can also be used to fill coating pores where high pressures are encountered, such as hydraulic rams and pump shafts, preventing fluid seepage through pores.

Where ceramic materials are utilised for their dielectric properties, sealing of the coating helps to maintain dielectric constants. If left unprotected, coating porosity could lead to the absorption of moisture and contaminants, resulting in the form of unwanted conductive paths in the coating.

### Typical Uses and Applications

- Pump seals, shafts, plungers and housings
- Bridges, trestles and other outdoor structures
- Hydraulic pistons
- Petrochemical plants
- Farm equipment
- Printing cylinders
- Pulp and paper machinery
- Marine equipment and structures
- Transformer cases
- Storage vessels, tanks and waste containers

There are many more application where FST TS-Sealer can be used.



## General specifications

PRODUCT RANGE		TS-SEALER D	TS-SEALER P	TS-SEALER HT	TS-SEALER SR	TS-SEALER HS
Version		standard	macro (high porosities)	high temp.	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
Consumption per m <sup>2</sup>		~ 100 ml	~ 170 ml	~ 100 ml	~ 100 – 200 ml	75 g
CURING TIME						
<b>Dust-dry / Touch Proof</b>	20°C	6 min	6 min	1 hour after processing anneal at 200 °C for 1 hour	45 min	20 h
	40°C	3 min	3 min		30 min	12 h
	80°C	√	√		√	1 h
<b>Machinable</b>	20°C	90 min	90 min	1 hour after processing anneal at 200 °C for 1 hour	120 min	36 h
	40°C	60 min	60 min		75 min	20 h
	80°C	√	√		√	90 min
<b>Chemically Resistant</b>	20°C	after 36 h	after 36 h	1 hour after processing anneal at 200 °C for 1 hour	after 144 h	after 192 h
	40°C	after 24 h	after 24 h		after 96 h	after 120 h
	80°C	√	√		√	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 [mav]		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

### Resistant to .....

Chemicals	Conc. %	FST TS-Sealer			
		D	SR	HT	HS
acetate		X	✓	0	✓
acetylene		✓	✓	✓	✓
alkanes		✓	✓	✓	✓
alcohols		✓	✓	✓	✓
animal based oils		✓	✓	✓	✓
brake oil		✓	✓	✓	✓
citric acid		0	✓	✓	✓
crude oil		✓	✓	✓	✓
cutting oil		✓	✓	✓	✓
diesel fuels		✓	✓	✓	✓
diethyl ether		X	X	0	✓
engine oil		✓	✓	✓	✓
glycol		✓	✓	✓	✓
hydraulic fluid		✓	✓	✓	✓
hydrocarbons		✓	✓	✓	✓
- aromatics		✓	✓	✓	✓
hydrochloric acid	< 20	X	0	0	✓
hydrochloric acid	> 20	0	✓	✓	✓
keton		X	0	X	X
kerosene		✓	✓	✓	✓
lubricating oil		✓	✓	✓	✓
machine oil		✓	✓	✓	✓
machiefat		✓	✓	✓	✓
natural gas		✓	✓	✓	✓
nitric acid		0	0	0	✓
petrol		✓	✓	✓	✓
phthalates		0	✓	✓	✓
plantbase oils		✓	✓	✓	✓
potassium chloride, hs		✓	✓	✓	✓
potassium hydroVide		✓	✓	✓	✓
potassium phosphate		✓	✓	✓	✓
salicylic acid		0	✓	✓	✓
sulphuric acid	< 20	X	0	0	✓
sulphuric acid	> 20	0	✓	✓	✓

**Nomenclature:** hs = aqueous solution / conc. = concentration

**Symbols:** ✓ = resistant / 0 = limited resistant / X = unstable The measurements were conducted at a temperature of 20°C  
Individual resistance tests can be carried out after arrangement.

## General Sealer Preparation and Application

As a general rule, all sealers should be applied after spraying and prior to finishing. Sealers have maximum performance when surfaces are clean, dry and free of oil, grease, dirt, corrosives, paint, mill scale and any other foreign matter.

All sealers should be cured prior to finishing. The heat generated during machining may cause premature and non-uniform curing of the sealer. Grinding uncured sealers may clog grinding wheels.

It is recommended that a light coat of sealer be reapplied after finishing to assure optimum sealing.

For maximum resistance to corrosion, all sealers must be fully cured before placing in service.

## Handling Recommendations

- Sealers should be stored and handled with the same precautions as used for ordinary paints and thinners.
- Store in environmentally-controlled conditions. Avoid extremely hot or cold storage conditions.
- As some settling may occur, liquid sealers should be stirred or mixed thoroughly prior to use.
- Ensure that opened containers of liquid sealers are tightly sealed when not in use.

## Safety Recommendations

FST TS-Sealer typically contains flammable materials and must be handled accordingly. See the MSDS (Material Safety Data Sheet) for the applicable product and localised for the country where the material is used. MSDS are available at Flame Spray Technologies.





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