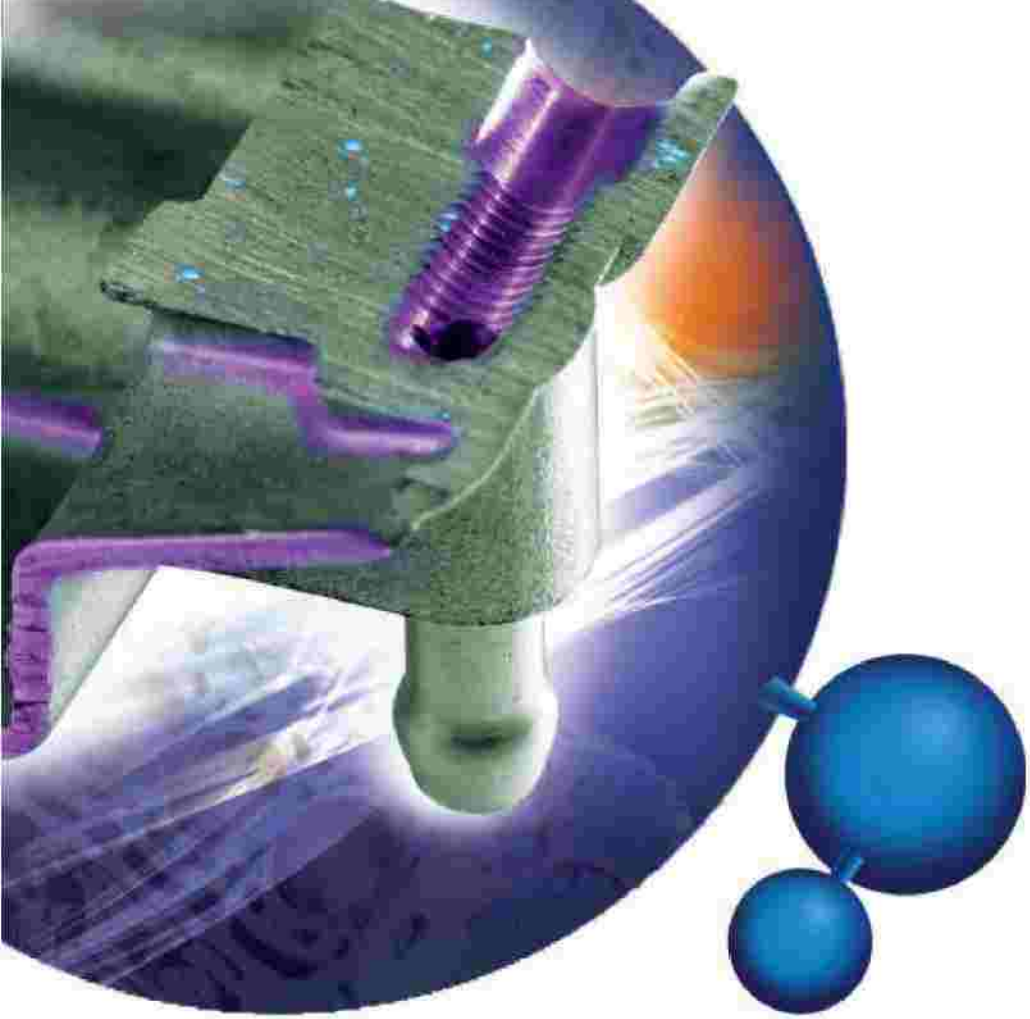


Tekno Seal

SPECIALITY CHEMICALS
AND SEALANTS

Sealants

that make a world of difference!

TeknoSeal...

The world of manufacturing is balanced today on a three pointed axis - Quality, Cost and Delivery. No matter what the product, no matter what the market conditions, these parameters are the cornerstones of success in the highly competitive global manufacturing sector .

These considerations are especially significant in the automotive industry, in the precision equipment manufacturing sector, and in other industries where high volume operations are involved. Today, impregnation of components is one of the industries' most important processes to produce leak tight castings and to create finished products that provide quality.

Quality - Cost - Delivery !

The world has realised that impregnation significantly reduces machining losses, creates a reputation for reliability and positively impacts on the cost reduction of production. It also allows for on-time deliveries by reducing both production and assembly downtime. Quality is a major concern for manufacturers through out the world. This concern is paramount to all manufacturers in the automotive industry, of precision equipment, computer hard disks, high voltage circuit breakers, etc. The process of impregnation ensures top quality assurance in all these fields.

APPROVAL & CERTIFICATIONS

Our range of Sealants are world approved by most major automobile manufacturers and also confirm to the tringent quality standards and specifications such as, UL-87 (under Writers Laboratory - USA), US-MIL 17563 rev C (US Military Specification for Impregnation Sealants), Llyods Register of shipping and the test were conducted at ARAI (Automotive Research Association of India and also NSF. Our quality management system is certified as per EN ISO 9001:2008. Environmental Thermal & Pressure Conditioning tests conducted as per US MIL 17563 C.

AWARDS :

Metal Impregnations India Pvt. Ltd. has been awarded MAHRATTA CHAMBER OF COMMERCE, INDUSTRIES & AGRICULTURE (MCCIA) Annual Award 2021, G.S. PARKHE AWARD for Innovation in Enterpreneurship.

The definition of Porosity?

Porosity : It is generally recognized that all cast metal products contain micro porosity in varying degrees regardless of the manufacturing process route. Interconnected porosity exposed by machining is likely to provide a passage for gas or liquid through the casting wall even when subjected to low pressure or gravity. Unfortunately at this stage in production the components are normally in a fully machined high value condition.

Holes or defects may be created that are too small to be seen by the naked eye and if these are permeated by gas or fluid, significant and costly quality problems can arise, even leading to the failure of the component in service through leaks or surface defects.

Vacuum impregnation is the permanent solution to this problem, filling any voids with a stable yet flexible material that is resistant to attack from heat, oils or chemicals. The process is sub-surface and can be performed on raw materials or the finished machined part, causing no dimensional change or contamination to the component.

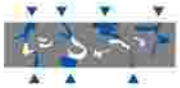
Impregnation as a means of treating porosity has been employed since the 1940s, although traditional sealants such as sodium silicate or polyesters have since been replaced by more effective and environmentally friendly methacrylate based products

How to seal porosity?

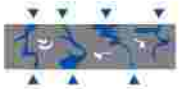
Sealing : The porosity sealing system provides industry with the opportunity to treat components themselves as a matter of Insurance and not as a means of recovery, and in many cases to economically replace expensive pressure testing. Expensive finished components facing rejection due to micro porosity are Vacuumed Impregnated with TSP99.

Process of Vacuum Impregnation

By applying a dry vacuum of under 5 mbar the air trapped in the porosities is evacuated.



The sealant is allowed into the chamber. It now penetrates into the porosities under vacuum



After the vacuum has been released the sealant is retained by the atmospheric pressure into the porosities and thus reaches the finest porosities.

In a water bath the components are rinsed to remove any traces of the sealant adhering to the component surfaces.

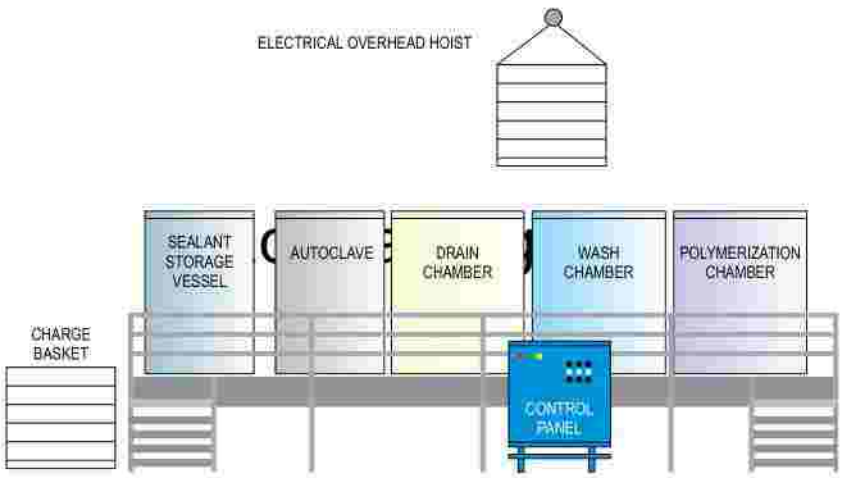
The rinsed components are now immersed in a hot water bath. This causes curing of the impregnate by polymerisation at 90°C.

Types of Porosity :

Enclosed Porosity : This is not a problem unless uncovered by machining operations.

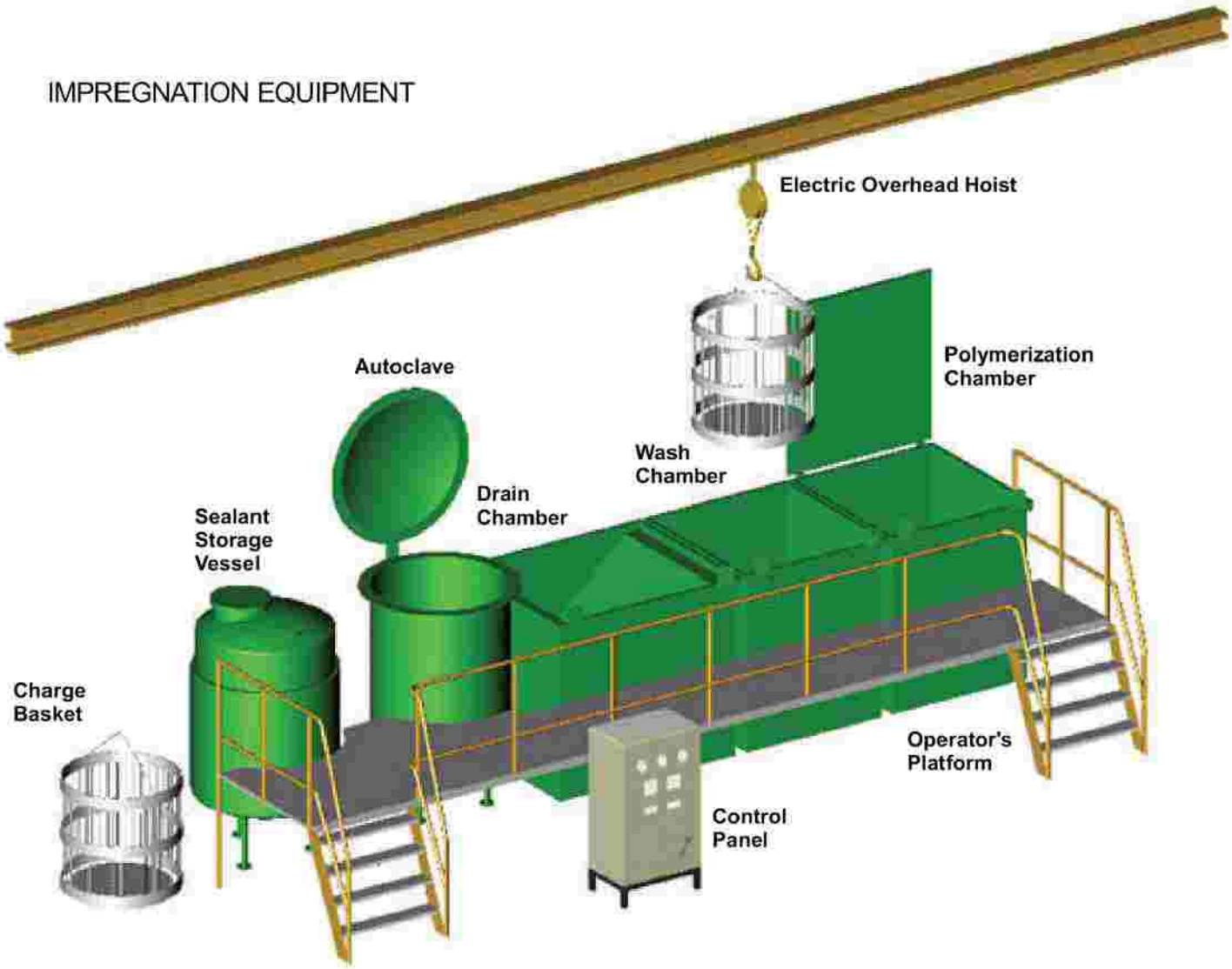
Blind Porosity : This encourages internal corrosion, leading to 'spotting out' of plating and 'blow out' of paintwork

Through Porosity : This allows gas or liquid to leak through the casting. The size of porosity need bear no resemblance to that seen on the surface. Porosity is often an regular phenomenon within the casting.



Tekno Seal

IMPREGNATION EQUIPMENT



SPECIFICATION SHEET

Model	Dimensions of charge Basket (mm)	Maximum Charge Weight (kgs) Ferrous	Floor space L x W (m)	Operating height up to crane hook ()	Power 3ϕ (KW)	Sealant initial fill (kgs)
TSP 450	ϕ325 x 400 ht.	300	5.5 x 2.50	2.6	5	100
TSP 600	ϕ520 x 550 ht.	400	6.60 x 3.00	2.75	13	200
TSP 750	ϕ700 x 700 ht.	500	8.1 x 3.25	2.75	12	300
TSP 950	ϕ850 x 700 ht.	600	9.25 x 3.75	3.25	22	600
TSP 1100	ϕ1000 x 900 ht.	1000	10.0 x 4.1	4.0	28	1000
TSP 1200	ϕ1100 x 1100 ht.	1100	10.5 x 5.10	3.60	32	1200
TSP 1500	ϕ1300 x 1300 ht.	1600	11.8 x 5.65	4.60	50	2000
TSP 1600	ϕ1450 x 1450 ht.	1700	12.5 x 6.00	5.0	50	2400

SAFEGUARD YOUR ASSETS USING VACUUM IMPREGNATION

A few of the typical applications of Vacuum Impregnation using Special Impregnation Sealant TSP99 are listed below. Although there are several applications of the process, only a few of the more common applications are given. For further details please contact us and our application engineers shall be too glad to answer your queries.

Even minor leakage of gases, air or liquid can cause entire batches of production to be rejected. Impregnation as a de rigueur procedure, therefore, has received easy and complete acceptance among the people who are primarily responsible for the quality of products. Industries all over the world have experienced huge machining losses because leakages have been discovered after a casting has been machined. In such cases there is no choice but to scrap the casting. And if a casting is scrapped after it has undergone an expensive machine process, there is no way which that cast can be recovered. The solution is mandatory, pre-emptive impregnation of all castings so that QCD considerations may be well taken care of. It is, in contemporary business, the smartest way of ensuring a healthy consistent bottom line for all users of leak tight casting.

Impregnation systems find application in today's world driven by QCD consideration in all industry segments that use casting, plastics, sintered metal parts, powder coated and chrome plated parts. The most obvious examples of industries:

- AIR COMPRESSORS
- AEROSPACE COMPONENTS
- HYDRAULIC PUMPS/VALVES
- FILTRATION EQUIPMENTS
- FUEL SUPPLY SYSTEMS
- PNEUMATIC COMPONENTS
- TRANSMISSION HOUSINGS
- FIRE FIGHTING EQUIPMENTS
- MANIFOLDS & BLOCKS

Impregnation with TSP99 can be performed on casting before or after machining. If porosity is accessible before machining, as in the case of powdered metal parts and some castings, it may be of benefit to impregnate at that time. For some cases it may also be done after full machining.

It has been proven to be more cost effective to impregnate rather than to scrap castings. If a casting has had expensive machining processes there is no way to recover that cost if the casting is scrapped. It has been calculated by engineers that impregnation is a small cost when recovering expensive components.

CYLINDER BLOCK

CYLINDER HEAD

CAM CARRIER

R CASE

OTHER CASTINGS

DI Pipe

I2 Meter Casting

AC Casting

AC Casting

Compressor Casting

DI Fitting

Cylinder Head

Oil Filter Cover

Steering Column

Hard Disk

SEALANT-WATER RECYCLE TECHNOLOGY

The quest for improvement never ends. Moreover the urgent needs and necessities for the environment has moved all of us to a world of recycling and we at Teknoseal have also addressed this present need for environmental protection by introducing our revolutionary Teknoseal TSP 99 R recycle sealant. This sealant is a unique combination of performance and protection that is today's need in the industry. This unique concept will reduce effluent from the Impregnation plant to almost negligible quantities thereby helping industry to meet the norms of environment if required by the local industry boards. Moreover this also exhibits excellent sealing performance coupled with excellent thermal resistance and environmental conditioning in line with the stringent tests performed in our laboratories.
Thus as compared to TSP 99 the recycle sealant TSP 99 R allows all the sealant that goes into the wash water to be recycled back to the Impregnation Plant. This reduces both sealant consumption and water effluent drastically, leading to a near zero discharge system

What is a recycle sealant ?

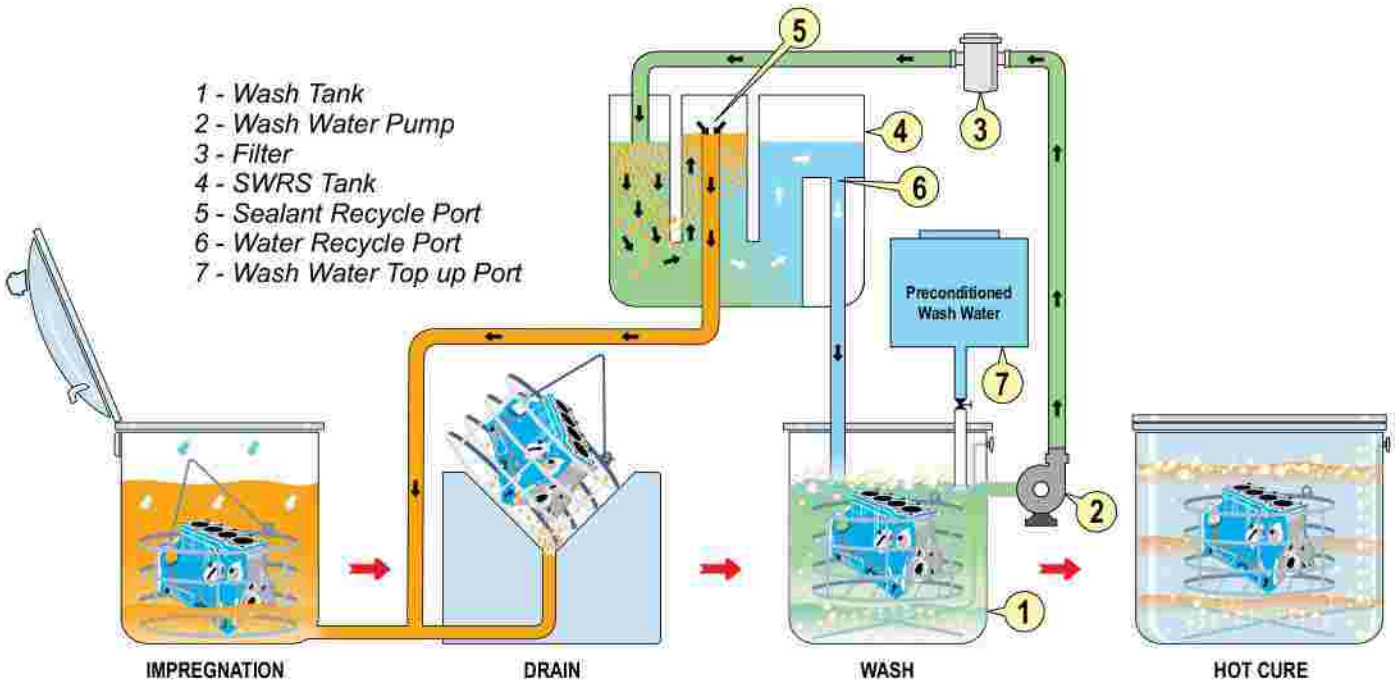
The TSP 99 R Sealant has a specific gravity less than 1 & therefore floats on the water surfaces. Our Sealant Water Recycle System - SWRS uses traditional mechanical separation methods which along with the conditioned wash water helps to separate out the sealant and water. Thereby instead of directly being washed down the drain and wasted, the Sealant and Wash Water are both recovered and reused.

How do we recycle ?

The basis of this sealant is to use modern Separation Techniques using the unique Teknoseal Recycle Technology coupled with excellent process control methods to make sure that the recycled sealant is the right quality each and every time.

The TSP 99 R Sealant has a specific gravity less than 1 & therefore floats on the water surfaces. Our Sealant Water Recycle System - SWRS uses traditional mechanical separation methods which along with the conditioned wash water helps to separate out the sealant and water.

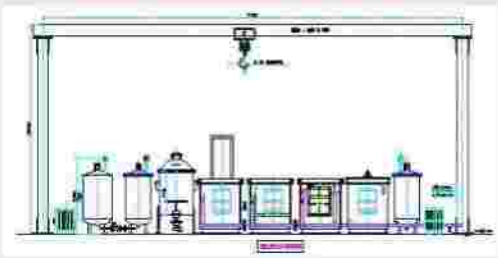
As shown in the figure below the wash water is pumped from the wash tank through a filtration system into the SWRS which then recycles the water and sealant.



VACUUM IMPREGNATION FOR HELIUM HARD DISK DRIVE

We at Teknoseal Engineering Solutions have also made good experience in leakages sealing of HDD castings for helium gas leakage. This is a special process sequence designed specifically for HDD drive castings to enable absolutely clear and perfect castings at post impregnation, ready for assemblies.

MACHINE & PROCESS

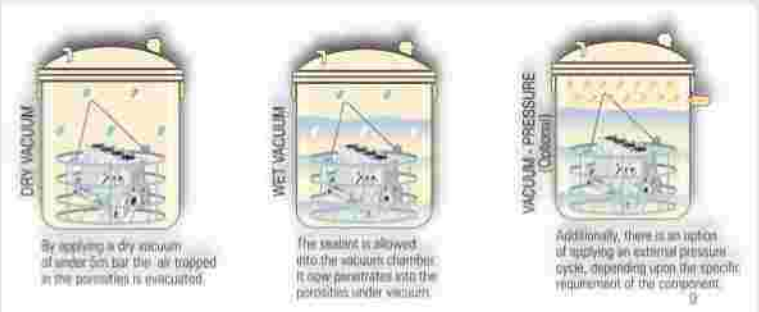


COMPONENT PRECLEANING & BASKET FIXTURING

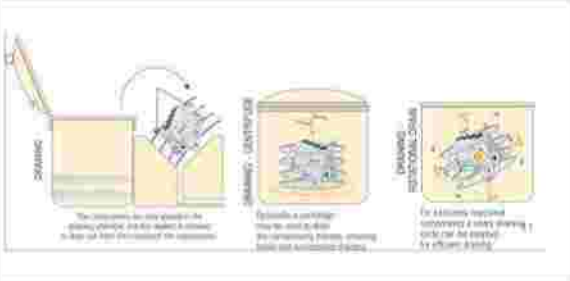

Plant2


Plant3

DRY WET VACUUM CYCLE



SEALANT DRAIN CYCLE



Plant7

DUNK WASH CYCLE 1

The dunk wash option can also be used for vigorous and quick washing of the components.


Plant11

ROTARY WASH CYCLE 2

For intricately machined components with fine tapped & drilled holes a rotary wash cycle can be adopted for efficient washing.

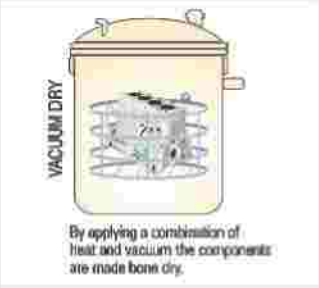

Plant13

ROTARY HOT CURE CYCLE

Can be used for very intricate components with fine tapped and drilled holes.


Plant14

DRIER CYCLE

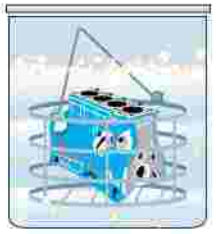


By applying a combination of heat and vacuum the components are made bone dry.

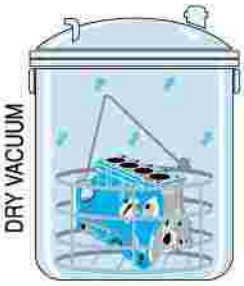

Plant15

PROCESS OPTIONS

STEP 1



The components are thoroughly cleaned of any cutting oils, grease and metal swarf during degreasing to prepare the components for impregnation.

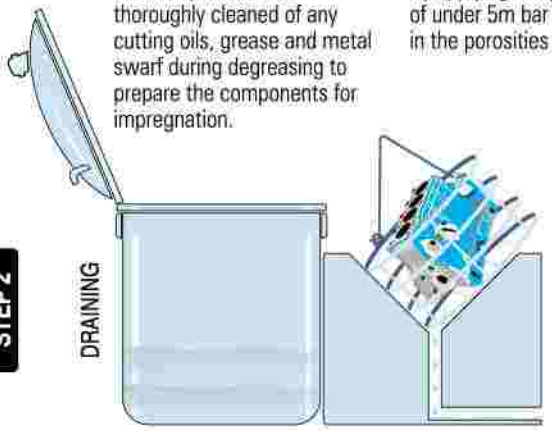


By applying a dry vacuum of under 5m bar the air trapped in the porosities is evacuated.

The sealant is allowed into the vacuum chamber. It now penetrates into the porosities under vacuum.

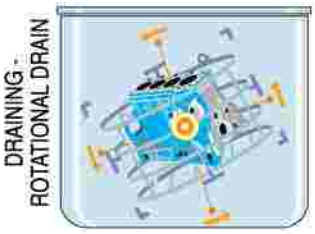
Additionally, there is an option of applying an external pressure cycle, depending upon the specific requirement of the component.

STEP 2



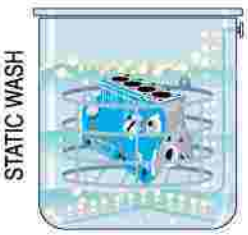
The components are now placed in the draining chamber and the sealant is allowed to drain out from the crevicesof the components.

Optionally a centrifuge may be used to drain the components thereby ensuring faster and economized draining.



For intricately machined components a rotary draining cycle can be adopted for efficient draining.

STEP 3

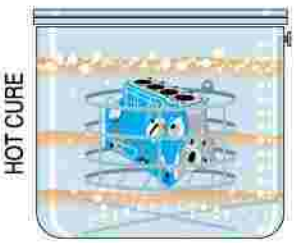


In a water bath the components are rinsed to remove any traces of the sealant adhering to the component surfaces.

The dunk wash option can also be used for vigorous and quick washing of the components.

For intricately machined components with fine tapped & drilled holes a rotary wash cycle can be adopted for efficient washing.

STEP 4



The rinsed components are now immersed in a hot water bath. This causes curing of the impregnant by polymerisation at 90°C.

Can be used for very intricate components with fine tapped and drilled holes.

STEP 5

By applying a combination of heat and vacuum the components are made bone dry.

Quality Standards to meet Global Automotive norms

To comply to the stringent quality requirements and standards of the Automotive Industry. Teknoseal TSP 99 has been tested in accordance with US MIL-I-17563C specifications for class 1, 1A and 3, the Universally accepted Bench Mark for performance testing of Casting Impregnation Materials.

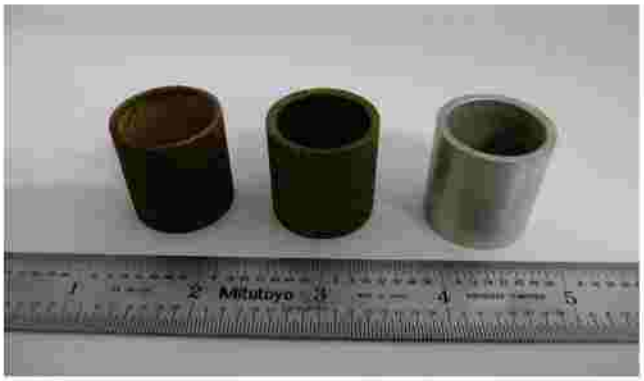
Research & Development and extensive Laboratory tests ensure that Teknoseal TSP 99 conforms to the universally accepted US MIL Specifications. Conditioning test results as per Table III of MIL-I-17563C and Pressure Penetration Tests were performed on test specimens. No leakage was observed and all samples were satisfactory after conditioning.

Fluid	Specification	Time (Hrs.)	Temp (°F)	Results
Ethylene Glycol	MIL-E-9500	336	300	Satisfactory
Thermal Resistance		336	300	Satisfactory
Lubricating Oil	MIL-L-7808	48	255	Satisfactory
Water		336	212	Satisfactory
Oil	MIL-H-17672	336	210	Satisfactory
Hydraulic Flud	MIL-F-17111	336	210	Satisfactory
Hydrocarbon Fluid	TT-S-735	336	73.4	Satisfactory
Carbon Removal	P-C-111	0.5	73.4	Satisfactory
Turbine Fuel	MIL-T-5624	48	73.4	Satisfactory
Fuel	ASTMD910	48	73.4	Satisfactory
Diester Grease	MIL-G-23827	48	73.4	Satisfactory
18% Sulfuric Acid	O-S-809	2	73.4	Satisfactory
Stoddard Solvent	P-D-680	47	73.4	Satisfactory
Ethyl Alcohol	MIL-E-463	48	73.4	Satisfactory

As seen above our sealants can withstand rigorous environmental pressure conditioning coupled with thermal testing and thus our customers have great reliance on our quality statements / data for tests carried out by internationally recognised testing organisations.



Pressure Penetration Test data



Type	Serial No.	Original OD (in.)	Machined OD (in.)	Etched OD (in.)
Type I	PP 1	1.017	.964	.955
Type II	PP 2	1.026	.966	.954
Type III	PP 3	1.035	.970	.961

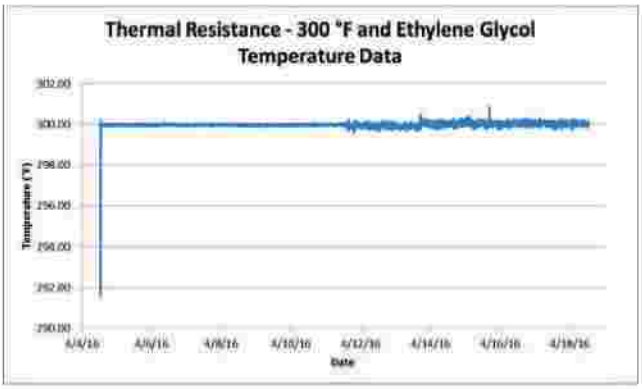
POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	PP 1	SAT.	SAT.	Yes
Type II	PP 2	SAT.	SAT.	Yes
Type III	PP 3	SAT.	SAT.	Yes

NOTES:

Environmental & Thermal Pressure Conditioning Test data

Ethylene Glycol : MIL-E-9500



Plot of the Ethylene Glycol (MIL-E-9500) and the Thermal Resistance at 300°F temperature data during conditioning of the samples.

Media	Ethylene Glycol
Media Specification	MIL-E-9500

Test Conditions

	Required	Actual
Time	14 Days	14 DAYS
Temperature	300 ±5 °F	SAT. ; SEE TEMP DATA
Serial Nos. Tested	EG 1-1 EG 1-2 EG 2-1 EG 2-2 EG 3-1 EG 3-2	
DATA	SUBMERGED IN ALUMINA FOR 30 min. RAN TO PRESSURE RAN WITH THERMAL RESISTANCE SAMPLES	
Time Start: 4/4/16 12:50	Time Finish: 4/18/16 12:50	
See Temperature Data		

POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	EG 1-1	SAT.	SAT.	Yes
	EG 1-2	SAT.	SAT.	Yes
Type II	EG 2-1	SAT.	SAT.	Yes
	EG 2-2	SAT.	SAT.	Yes
Type III	EG 3-1	SAT.	SAT.	Yes
	EG 3-2	SAT.	SAT.	Yes

NOTES: No leakage observed

Thermal Resistance

Media	Thermal Resistance (Air)
Media Specification	NA

Test Conditions

	Required	Actual
Time	14 Days	14 Days
Temperature	300 ±5°F	SAT. SEE TEMP DATA
Serial Nos. Tested	TR 1-1 TR 1-2 TR 2-1 TR 2-2 TR 3-1 TR 3-2	
DATA	Specimens shall be cleaned in a suitable degreaser for not less than 30 minutes prior to exposure to the stated condition. SUBMERGED IN ALUMINA FOR 30 min. RAN WITH ETHYLENE GLYCOL SAMPLES	
Time Start: 4/4/16 12:50	Time Finish: 4/18/16 12:50	
See Temperature Data		

POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	TR 1-1	SAT.	SAT.	Yes
	TR 1-2	SAT.	SAT.	Yes
Type II	TR 2-1	SAT.	SAT.	Yes
	TR 2-2	SAT.	SAT.	Yes
Type III	TR 3-1	SAT.	SAT.	Yes
	TR 3-2	SAT.	SAT.	Yes

NOTES: No leakage observed

Environmental & Thermal Pressure Conditioning Test data

Water

Media	Water
Media Specification	NA

Test Conditions

	Required	Actual
Time	14 Days	14 DAYS
Temperature	212°F (Boiling)	SAT. SAT. TEMP DATA
Serial Nos. Tested	W 1-1, W 1-2, W 2-1, W 2-2, W 3-1, W 3-2	

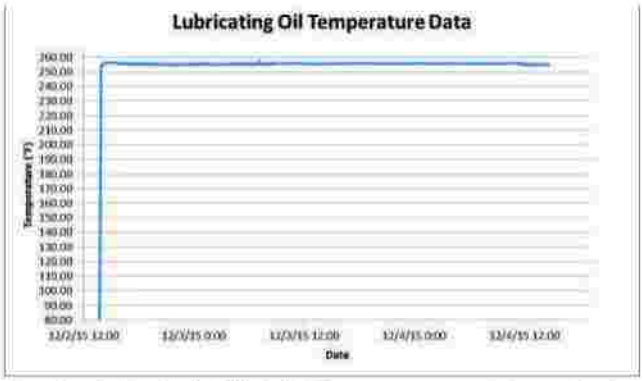
POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	W 1-1	SAT.	SAT.	YES
	W 1-2	SAT.	SAT.	YES
Type II	W 2-1	SAT.	SAT.	YES
	W 2-2	SAT.	SAT.	YES
Type III	W 3-1	SAT.	SAT.	YES
	W 3-2	SAT.	SAT.	YES

NOTES:

No LEAKAGE OBSERVED

Lubricating Oil : MIL-H-17672



Plot of the Lubricating Oil (MIL-H-17672) temperature data during conditioning of the samples.

Media	Lubricating Oil
Media Specification	MIL-L-7808

Test Conditions

	Required	Actual
Time	48 hours	48 HOURS
Temperature	255 ±5 °F	SAT. SAT. TEMP DATA
Serial Nos. Tested	LO 1-1, LO 1-2, LO 2-1, LO 2-2, LO 3-1, LO 3-2	

POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	LO 1-1	SAT.	SAT.	YES
	LO 1-2	SAT.	SAT.	YES
Type II	LO 2-1	SAT.	SAT.	YES
	LO 2-2	SAT.	SAT.	YES
Type III	LO 3-1	SAT.	SAT.	YES
	LO 3-2	SAT.	SAT.	YES

Oil : MIL-H-17672→MIL-PRF-17672D

Media	Oil
Media Specification	MIL-H-17672→MIL-PRF-17672D

Test Conditions

	Required	Actual
Time	14 Days	14 DAYS
Temperature	210 ±5 °F	SAT. SAT. TEMP DATA
Serial Nos. Tested	O1-1, O1-2, O2-1, O2-2, O3-1, O3-2	

POST TEST PRESSURE LEAKAGE DATA

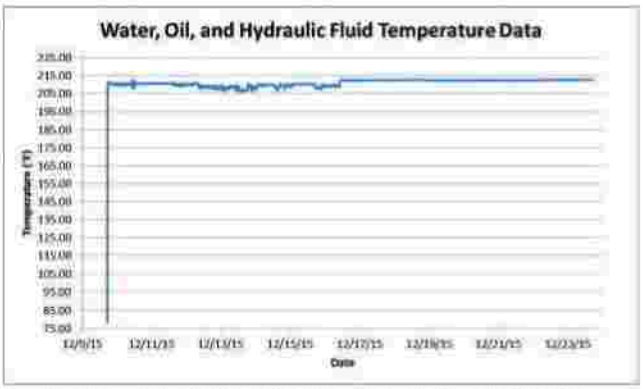
Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	O 1-1	SAT.	SAT.	YES
	O 1-2	SAT.	SAT.	YES
Type II	O 2-1	SAT.	SAT.	YES
	O 2-2	SAT.	SAT.	YES
Type III	O 3-1	SAT.	SAT.	YES
	O 3-2	SAT.	SAT.	YES

NOTES:

NO LEAKAGE OBSERVED

Environmental & Thermal Pressure Conditioning Test data

Hydraulic Fluid : MIL-F-17111



Plot of the WaterOil (MIL-H-17672) andHydraulic Fluid (MIL-F-17111) temperature data during conditioning of the samples.

Media	Hydraulic Fluid
Media Specification	MIL-F-17111

Test Conditions

	Required	Actual
Time	14 Days	14 Days
Temperature	210±8 °F	See Temp Data Sht
Serial Nos. Tested	HF 1-1, HF 1-2, HF 2-1, HF 2-2, HF 3-1, HF 3-2	

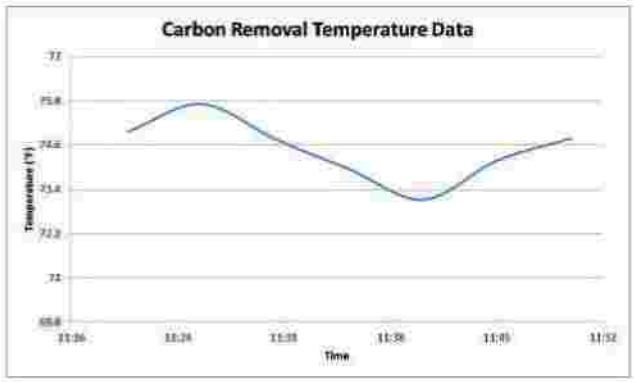
POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	HF 1-1	Sat.	Sat.	Yes
	HF 1-2	Sat.	Sat.	Yes
Type II	HF 2-1	Sat.	Sat.	Yes
	HF 2-2	Sat.	Sat.	Yes
Type III	HF 3-1	Sat.	Sat.	Yes
	HF 3-2	Sat.	Sat.	Yes

NOTES:

No Leakage Observed

Carbon Removal Fluid : P-C-111



Plot of the Carbon Removal Fluid (P-C-111) temperature data during conditioning of the samples.

Media	Carbon Removal
Media Specification	P-C-111

Test Conditions

	Required	Actual
Time	30 minutes	30 min
Temperature	73.4 ±3.6 °F	Sat. See Temp Data
Serial Nos. Tested	CR 1-1, CR 1-2, CR 2-1, CR 2-2, CR 3-1, CR 3-2	

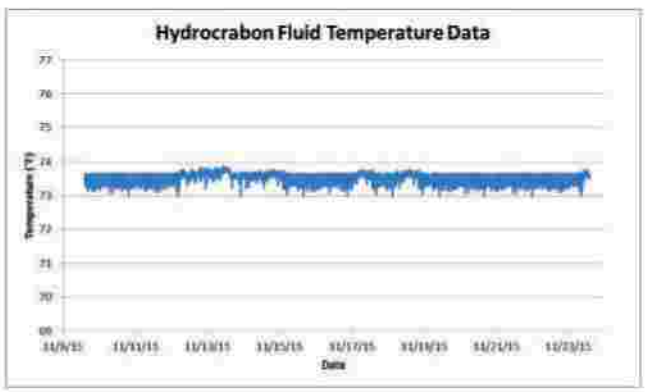
POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	CR 1-1	Sat.	Sat.	Yes
	CR 1-2	Sat.	Sat.	Yes
Type II	CR 2-1	Sat.	Sat.	Yes
	CR 2-2	Sat.	Sat.	Yes
Type III	CR 3-1	Sat.	Sat.	Yes
	CR 3-2	Sat.	Sat.	Yes

NOTES:

No Leakage

Hydrocarbon Fluid : TT-S-735



Media	Hydrocarbon Fluid
Media Specification	TT-S-735--ASTM D471

Test Conditions

	Required	Actual
Time	14 Days	14 Days
Temperature	73.4 ±3.6 °F	Sat. See Temp Data
Serial Nos. Tested	HC 1-1, HC 1-2, HC 2-1, HC 2-2, HC 3-1, HC 3-2	

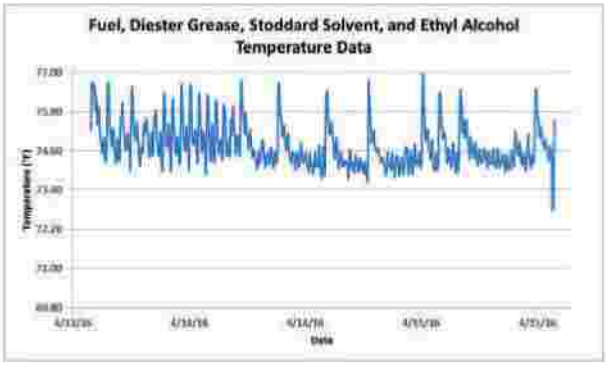
POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	HC 1-1	SAT.	SAT.	Yes
	HC 1-2	SAT.	SAT.	Yes
Type II	HC 2-1	Sat.	Sat.	Yes
	HC 2-2	SAT.	SAT.	Yes
Type III	HC 3-1	SAT.	SAT.	Yes
	HC 3-2	SAT.	SAT.	Yes

NOTES:

No Leakage Observed

Environmental & Thermal Pressure Conditioning Test data



Plot of the Fuel (ASTM D910), Diester Grease (MIL-G-23827), Stoddard Solvent (P-D-680), and Ethyl Alcohol (MIL-E-463) temperature data during conditioning of the samples.

Fuel (Avgas) : ASTM-D-910

Media	Fuel (Avgas)
Media Specification	ASTM-D-910

Test Conditions

	Required	Actual
Time	48 Hours	48 Hours
Temperature	73.4 ±3.6 °F	SAT. See Temp Data
Serial Nos. Tested	AG 1-1 AG 1-2 AG 2-1 AG 2-2 AG 3-1 AG 3-2	

POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	AG 1-1	SAT.	SAT.	Yes
	AG 1-2	SAT.	SAT.	Yes
Type II	AG 2-1	SAT.	SAT.	Yes
	AG 2-2	SAT.	SAT.	Yes
Type III	AG 3-1	SAT.	SAT.	Yes
	AG 3-2	SAT.	SAT.	Yes

NOTES:

No LEAKAGE OBSERVED

Diester Grease : MIL-G-23827

Media	Diester Grease
Media Specification	MIL-G-23827

Test Conditions

	Required	Actual
Time	48 hours	48 Hours
Temperature	73.4 ±3.6 °F	SAT. See Temp Data
Serial Nos. Tested	DG 1-1, DG 1-2, DG 2-1, DG 2-2, DG 3-1 DG 3-2	

POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	DG 1-1	SAT.	SAT.	Yes
	DG 1-2	SAT.	SAT.	Yes
Type II	DG 2-1	SAT.	SAT.	Yes
	DG 2-2	SAT.	SAT.	Yes
Type III	DG 3-1	SAT.	SAT.	Yes
	DG 3-2	SAT.	SAT.	Yes

NOTES:

No LEAKAGE OBSERVED

Stoddard Solvent : P-D-680

Media	Stoddard Solvent
Media Specification	P-D-680

Test Conditions

	Required	Actual
Time	48 hours	48 Hours
Temperature	73.4 ±3.6 °F	SAT. See Temp Data
Serial Nos. Tested	SS 1-1, SS 1-2, SS 2-1, SS 2-2, SS 3-1, SS 3-2	

POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	SS 1-1	SAT.	SAT.	Yes
	SS 1-2	SAT.	SAT.	Yes
Type II	SS 2-1	SAT.	SAT.	Yes
	SS 2-2	SAT.	SAT.	Yes
Type III	SS 3-1	SAT.	SAT.	Yes
	SS 3-2	SAT.	SAT.	Yes

NOTES:

No LEAKAGE OBSERVED

Ethyl Alcohol : MIL-E-463

Media	Ethyl Alcohol
Media Specification	MIL-E-463

Test Conditions

	Required	Actual
Time	48 hours	48 Hours
Temperature	73.4 ±3.6 °F	SAT. See Temp Data
Serial Nos. Tested	EA 1-1, EA 1-2, EA 2-1, EA 2-2, EA 3-1, EA 3-2	

POST TEST PRESSURE LEAKAGE DATA

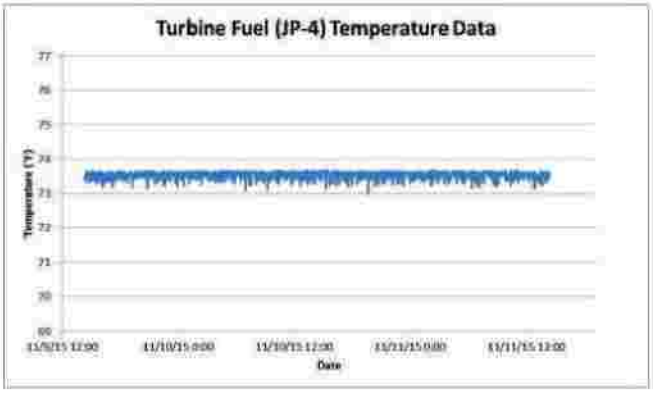
Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	EA 1-1	SAT.	SAT.	Yes
	EA 1-2	SAT.	SAT.	Yes
Type II	EA 2-1	SAT.	SAT.	Yes
	EA 2-2	SAT.	SAT.	Yes
Type III	EA 3-1	SAT.	SAT.	Yes
	EA 3-2	SAT.	SAT.	Yes

NOTES:

No LEAKAGE OBSERVED

Environmental & Thermal Pressure Conditioning Test data

Turbine Fuel : MIL-T-5624



Plot of the Turbine Fuel (MIL-T-5624) temperature data during conditioning of the samples.

Media	Turbine Fuel (JP-4)
Media Specification	MIL-T-5624

Test Conditions

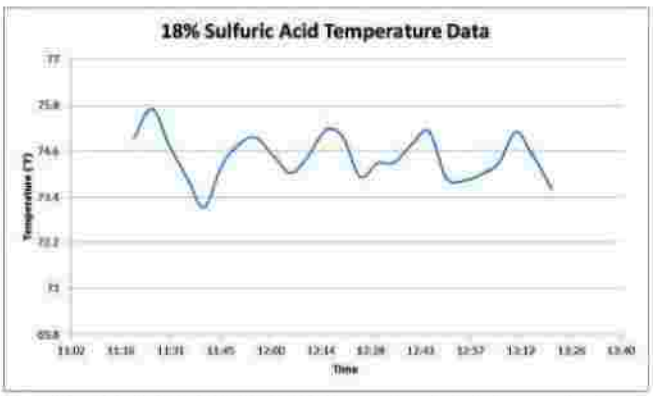
	Required	Actual
Time	48 hours	48 hours
Temperature	73.4 ±3.6 °F	SAT. See Temp Data
Serial Nos. Tested	TF 1-1 TF 1-2 TF 2-1 TF 2-2 TF 3-1 TF 3-2	

POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	TF 1-1	SAT.	SAT.	Yes
	TF 1-2	SAT.	SAT.	Yes
Type II	TF 2-1	SAT.	SAT.	Yes
	TF 2-2	SAT.	SAT.	Yes
Type III	TF 3-1	SAT.	SAT.	Yes
	TF 3-2	SAT.	SAT.	Yes

NOTES: No leakage

18% Sulfuric Acid : O-S-809



Plot of the 18% Sulfuric Acid (O-S-809) temperature data during conditioning of the samples.

Media	18% Sulfuric Acid
Media Specification	O-S-809

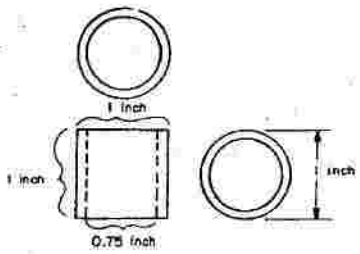
Test Conditions

	Required	Actual
Time	2 hours	2 hours
Temperature	73.4 ±3.6 °F	SAT. See Temp Data
Serial Nos. Tested	SA 1-1 SA 1-2 SA 2-1 SA 2-2 SA 3-1 SA 3-2	

POST TEST PRESSURE LEAKAGE DATA

Type	Serial No.	Pressure (50 psi)	Time (3 minutes min.)	Meets Requirements (Y/N)
Type I	SA 1-1	SAT.	SAT.	Yes
	SA 1-2	SAT.	SAT.	Yes
Type II	SA 2-1	SAT.	SAT.	Yes
	SA 2-2	SAT.	SAT.	Yes
Type III	SA 3-1	SAT.	SAT.	Yes
	SA 3-2	SAT.	SAT.	Yes

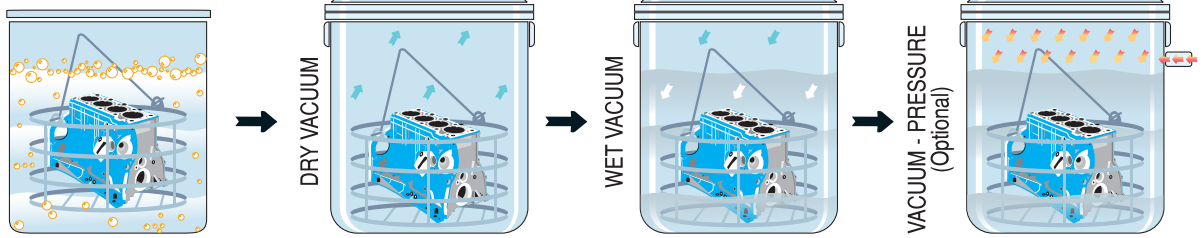
NOTES: No leakage observed



Test specimen dimensions (nominal)

PROCESS OPTIONS

STEP 1



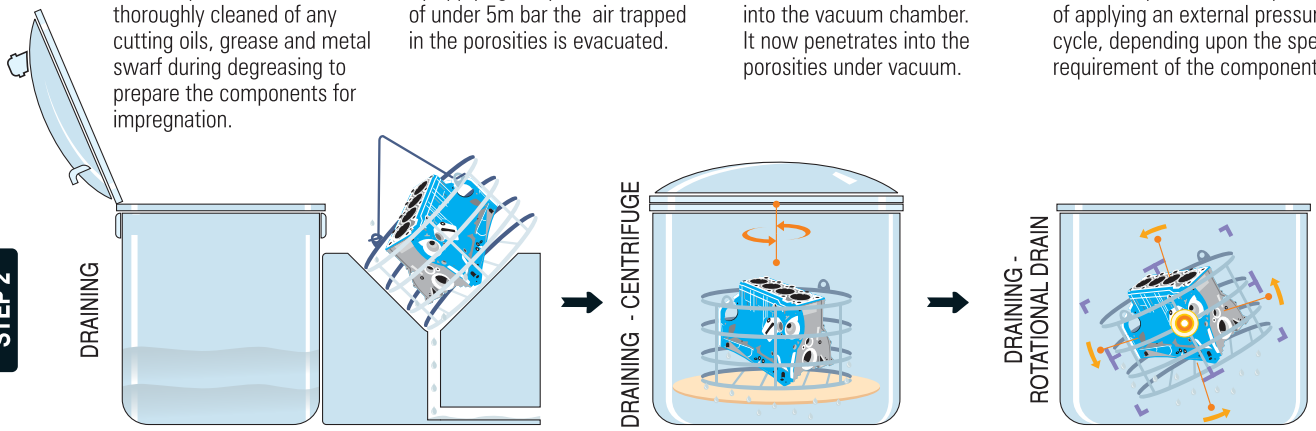
The components are thoroughly cleaned of any cutting oils, grease and metal swarf during degreasing to prepare the components for impregnation.

By applying a dry vacuum of under 5m bar the air trapped in the porosities is evacuated.

The sealant is allowed into the vacuum chamber. It now penetrates into the porosities under vacuum.

Additionally, there is an option of applying an external pressure cycle, depending upon the specific requirement of the component.

STEP 2

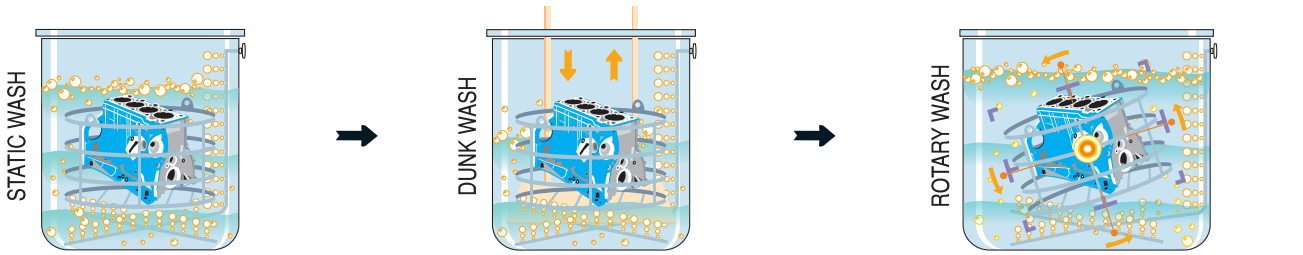


The components are now placed in the draining chamber and the sealant is allowed to drain out from the crevicesof the components.

Optionally a centrifuge may be used to drain the components thereby ensuring faster and economized draining.

For intricately machined components a rotary draining cycle can be adopted for efficient draining.

STEP 3

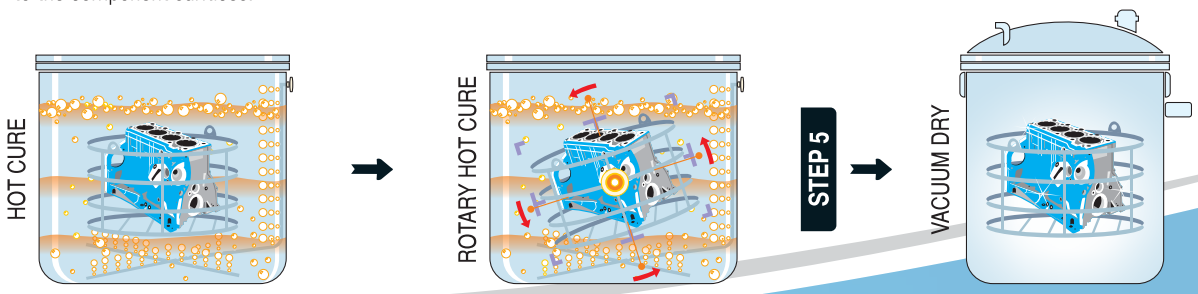


In a water bath the components are rinsed to remove any traces of the sealant adhering to the component surfaces.

The dunk wash option can also be used for vigorous and quick washing of the components.

For intricately machined components with fine tapped & drilled holes a rotary wash cycle can be adopted for efficient washing.

STEP 4



The rinsed components are now immersed in a hot water bath. This causes curing of the impregnant by polymerisation at 90°C.

Can be used for very intricate components with fine tapped and drilled holes.

STEP 5

By applying a combination of heat and vacuum the components are made bone dry.

TeknoSeal **TSP 99**

Special Impregnation Sealant

Technical Data Sheet

Description : Cross linking mixture of mono-and poly-functional methacrylic Monomers.

Physical data of liquid resin

Appearance	:	Yellow and clear
Smell	:	Like ester
Flash Point	:	102°C
Viscosity at 20°C	:	29 ± 3 Sec Zahn Cup No. 1
Specific Gravity	:	1.033 ± 0.03
Washability	:	Very good. Washes off well from all surfaces
Shelf Life	:	> 1 year if stored as recommended

Physical data of Hardened Resin :

Appearance	:	Upon curing the cured sealant appears like a clear plastic gel with or without some cracks. In cases where the sealant has fluorescence, the sealant gel will appear fluorescent blue under a Ultraviolet light.
Temperature Range	:	upto +230°C
Chemical Resistance	:	The resin sticks show excellent chemical resistance to most chemicals and is tested under the guidelines on US MIL specification17563 C against materials such as fuel and oil. Chemical stability list available upon request.
Pressure Resistance	:	Once impregnated into the parent casting material, the pressure resistence exhibited shall be that of the parent casting.
Gel Time at 90°C	:	1 - 4 minutes

Performance Test Data : Special Impregnation Sealant TSP 99 is tested for use as a casting Impregnation material when in contact with Fuel Oil, Kerosene, Diesel, Gasoline, LP-Gas and Natural or Manufactured Gas.

Packaging available in 20kg & 200kg containers

Fully Automatic Casting Impregnation Lines with Affordable Pricing

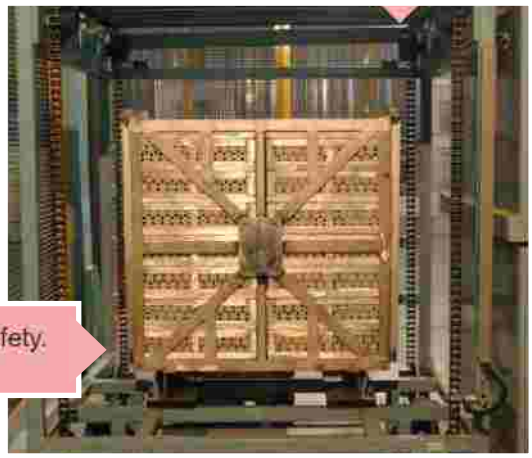
TeknoSeal

Complete freedom from sealant deposits and ensures absolutely clean castings.

Fully automatic operator less impregnation line.

Fully automated process control
High speed / low cycle times processing

Complete operator safety.



Flexible process with programmable cycles.

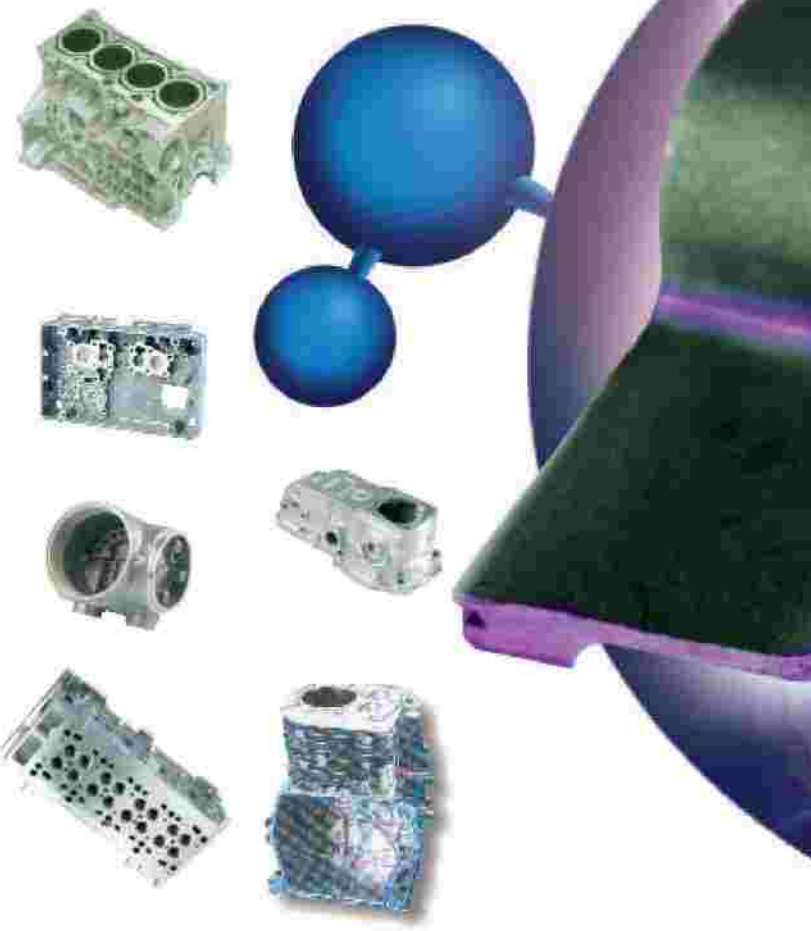
User Zones

Automotive Segment :
- Cylinder Block
- Cylinder Head
- Intake Manifold
- Transmission Case
- Power Steering Oil Pump
- Water Pump
- Fuel Injection Pump
- Car Air Conditioner
- Radiator Parts

Precision Machinery :
- Solenoid
- Casting
- Pneumatic Cylinder
- Hydraulic Cylinder

General Industry Segment :
- Pumps for Agriculture Machinery
- Transmission Case for Agriculture Machinery
- General Purpose Engine
- Oil Cylinder for Vehicle
- Hydraulic Circuit Parts for Heavy Machinery

Other Industries and Segment :
- City Valves & DI Pipes
- Gas Meter
- Aerospace Parts
- Marine Engineering



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