



Category: Thermo-Pak™

Another new gasket product manufactured by Thermody

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE



TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY



INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

Features

- Malleable, putty-like consistency makes it easy to use and install
- Utilizes latest chemistry and fiber technology
- Works well on worn shafts by conforming to odd shapes
- Low coefficient of friction reduces heat
- Operates virtually leak free
- Convenient packaging
- Unlimited Self Life

Benefits

- Reduces operating costs
- Less costly over the life of the pump or valve
- Saves on energy consumption
- Reduces or eliminates downtime
- Extends equipment life
- Never needs replacing
- Reduces shaft and sleeve wear
- No flushing or Cooling Water is required while in operation
- Runs cooler than Braided Packing

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

Now, Thermo-Pak™ injectable pump and valve sealant from Thermodynamics combines a malleable packing material with space-age chemistry and technology to produce a superior pump and valve packing material that can be injected while the pump is running without interrupting production. Thermo-Pak™ injectable sealant is made from a blend of high-tech, non-asbestos, non-hazardous synthetic fibers and carefully selected blends of greases, oils and other proprietary binders. It is this unique blend of fibers and binding agents that allows the sealant to be run virtually leak free. And, because it does not depend on product leakage for lubrication, the frictional heat buildup that so often leads to compression packing failure is eliminated.



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The sealant's low friction coefficient and non-stick properties help extend equipment life by reducing shaft and sleeve wear. There is no need to worry about sizes, because Thermo-Pak™ sealant is a malleable, putty-like product packed in bulk form. You can't leave the shop with the wrong size Thermo-Pak™.

The Thermo-Pak™ sealants are easily installed with any flat-bladed tool, such as a putty knife or wide-bladed screw driver. Or, the material can be finger-packed into the box.

An anti-extrusion ring of the appropriate material is placed in the stuffing box around the shaft. A second ring is put in place after the sealant is installed.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

When repacking becomes necessary, you do not have to remove the old packing. Just add more sealant packing material by using the Thermo-Pak™ injection gun to inject new packing through a fitting installed on the pump or valve stuffing box.

All Thermo-Pak™ injectable sealants are available in bulk containers of 1 kg (2.2 lb), 5 kg (11 lb), 10 kg (22 lb) and in convenient 10-pack stick cartridges which greatly simplify injection gun loading.

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TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY



Available in four standard Non-Asbestos grades to suit a variety of applications, the sealants can be used to replace conventional compression packing in centrifugal pumps, valves and other rotating equipment where compression are being used.

Quickly and easily replaces packing with virtually zero leakage. Reduces friction, runs cooler, compensates for damaged shafts.

Braided packing is designed to leak and **MUST LEAK** to prevent burn-up. This is messy and expensive.



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By contrast Thermo-Pak™ Sealant is designed NOT to leak and in most cases runs virtually leak free.

Compatibility may be ascertained by matching the pH of the media to the pH capability of Thermo-Pak™ Sealant as shown.

We always recommend a 24 hour "soak test" for all critical applications.

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Thermo-Pak™ TP002

A blend of synthetic fibers and non-staining lubricants for General services & Pulp & Paper Mills, Slurries, Sewage.

Color: Cream

Linear Speed: 2350FPM

pH Range: 2 to 12

Max. Temp.: 500 °F(260°C)

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Thermo-Pak™ TP004

A blend of high performance fibers and chemically resistant lubricants. General services, Waste Water, Sewage, Sea Water, Slurries, Pulp & Paper, Mills, Brine and Hot Oil.

Color: Black

Linear Speed: 2350FPM

pH Range: 0 to 14

Max. Temp.: 500 °F(260°C)



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Thermo-Pak™ TP005

A non-staining, non-toxic fiber blended with FDA approved lubricants for clean or food grade applications, Slurries, Potable Water, Pulp & Paper.

Color: Pure White

Linear Speed: 2350FPM

pH Range: 0 to 14

Max. Temp.: 500°F(260°C)

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

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Thermo-Pak™ TP2000

A blend of exfoliated graphite particles and high temperature sacrificial lubricants for extreme service applications.

Boiler Feed Pumps, Hot Oil.

Color: Black

Linear Speed: 4000FPM

pH Range: 0 to 14

Max. Temp.: 1112°F(600°C)

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

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Thermodynamics™ has developed Thermo-Pak™ Seal Cage to stabilize compression packing.

It has been found that holding a high quality low friction compression packing in proper position in the stuffing box while maintaining spacing for injectable sealant packing compounds eliminates the extrusion problem that has been associated with this new injectable technology.



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Thermo-Pak™ Seal Cage is available in sizes that fit most shaft seal applications.

Spacing Pins are available in sizes tailored to fit most pack-ing ring and lantern ring re-placement sizes. Master Kits are available for Thermo-Pak™ Seal Cages and Pins. These Master Kits contain all of the standard sizes.

Custom sizes are available upon request.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE



TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

Now you can have a low cost highly reliable shaft sealing technology available as an alternative to expensive mechanical seals in most industrial and utility applications.

This system is being used successfully in many industrial plants and municipal water treatment facilities across the country and around the world.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE



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Thermo-Pak™ Seal Cage Kit Sizes in Brass Spacer Pins

Part No.	Description	Pins Included
TPC-375	3/8" x 20"(Used for 3/8" Packing)	12-(1-1/4" Length)
TPC-438	7/16" x 20"(Used for 7/16" Packing)	12-(1-1/2" Length)
TPC-500	1/2" x 20" & 48" (Used for 1/2" Packing)	12 & 28-(1-7/8" Length)
TPC-563	9/16" x 20" & 48" (Used for 9/16" Packing)	12 & 28-(2" Length)
TPC-625	5/8" x 24" & 48" (Used for 5/8" Packing)	14 & 28-(2-1/4" Length)
TPC-750	3/4" x 24" & 48" (Used for 3/4" Packing)	14 & 28-(2-5/8" Length)



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Thermo-Pak™ Seal Cage Kit Sizes in Delrin Spacer Pins are available for Part No. TPC-438, TPC-500, TPC-563, TPC-625 and TPC-750.

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

The Thermo-Pak™ Seal Cage / Injectable Sealing Compound System offers your plant many impressive advantages. For today's industry, reducing effluent is an essential part of staying competitive.

The Thermo-Pak™ Seal Cage by Thermodynamics., (Patent Numbers 5,718,435 & 6,126,170) is providing the necessary technology to enhance the performance of injectable sealing compounds allowing pumping facilities to reduce water waste, lower effluent loads, increase profits and improve plant safety. Your facility can realize the following benefits with each Thermo-Pak™ Seal Cage/ Injectable Sealing Compound System installation.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

Safety

Eliminate slimy bacterial growth and associated slip hazards that develop from leaking pumps. The safety advantages of running process equipment shaft seals flushless and leak free are numerous.

By eliminating flush water and product leaks, you can prevent the slimy algae that grows on facility floors and walkways. This eliminates slip hazards, lowering all personnel exposure to hazardous conditions, and generally improves plant housekeeping.

Reducing flush water and product leaks lowers unscheduled maintenance hours and the associated risks associated with exposure to equipment and operating dangers. This in turn, lowers a facilities expenses from lost time and accident claims and improves workman's compensation rates from fewer on the job accidents.

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Ecology

Eliminate flush water requirements, reduce loss of fluids to the environment, and waste produced by the clean-up of leaked materials.

It's not hard to see that just one pump can be wasting enough water to supply 26.3 average households per year. Imagine what a facility operating 100 pumps is wasting. Better yet, imagine what that same facility can give back to the community if it were to convert those pumps to the water saving technology using the

Thermo-Pak™ Seal Cage with an injectable sealing compound.

A 100 pump facility could save enough water to supply a community of over 8,000 people for a year.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

Economy

System cost is less than 20% of conventional Mechanical Seals and provides many additional economic benefits.

Most industrial pumps leak profusely and use enormous amounts of flush water to cool the seal stuffing box. Water that leaks into the process combined with flush water that leaks onto the ground adds up to significant water usage even in a small plant. Consider a facility that has 100 pumps on line leaking 1 gallon per minute and using 1 gallon per minute of flush water per pump. In one year, this facility is losing over 100 million gallons of water. This is water that must be paid for and is lost needlessly.

**Sample Calculation: 2 gal./min. X 60 min./hr. X 24 hr./day X 365 day/yr.. X 100 pumps/facility
= 105,120,000 gal.pumps/facility**

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

Lets stop throwing it down the drain!!



Before...Using conventional packing, lantern ring and flush water - This pump is leaking at the rate of about 3 gallons per minute not counting the consumption of flush water being consumed.

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After...Using the Thermo-Pak™ Seal Cage with an Injectable Sealing Compound - This pump is now running leak free without the use of flush water



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Economic Savings

Reduce the need for expensive mechanical seals in applications where they may not be needed. A typical Thermo-Pak™ Seal Cage / Injectable Sealing Compound installation will cost less than US\$300.00 per 3" pump shaft.

Save the cost of significant amounts of water. Water rates vary from location to location, but if you have a facility with 100 pumps losing one gallon of water per minute due to leaks and one gallon per minute of flush water, your facility is paying for over 100 million gallons of water needlessly. Our experience tells us the numbers are actually much higher. This means your potential savings can be much greater.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

Energy Savings

Save the energy cost to re-heat a heated process when flush water leaks into the process stream. Leaks can be both into the process and onto the ground. If you see a pump leaking onto the floor in your facility, you can be assured that the process is getting diluted with an equal amount of flush water. The leaks that dilute the process will be robbing a facility of energy. The energy required to re-claim the lost heat in a heated process can be significant.

Save the energy cost to reclaim and decontaminate water that has leaked onto the ground and into the drain system. Today's environmental regulations require reclamation of water spilled or leaked onto the ground. This water must be contained and moved to a reclaiming process where even more energy is spent in the reclaiming process. This all becomes unnecessary with the use of the Thermo-Pak™ Seal System.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

Lower Down Time

Save down time re-packing seals with conventional seal material.

With the Thermo-Pak™ Seal Cage System you can stop minor leaks without process interruption by re-injecting small amounts of injectable compound as the pumping equipment continues to work.

If a pump requires two to three repacks per year using conventional packing, your facility will save at least one manhour per packing job.

That can be well over \$100 per pump per year. A facility equipped with 100 pumps using conventional packing could save \$10,000 or more per year.

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Hidden Costs

Save on facility infrastructure.

There are hidden savings that may not be obvious when using the Thermo-Pak™ Seal System. Many facilities have reported that with lower water usage, they have eliminated the need for reclamation equipment expansion, reduced the demand on municipal water supplies, and lowered electrical demand on their local power systems.

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An Easy and Convenient Product to Use

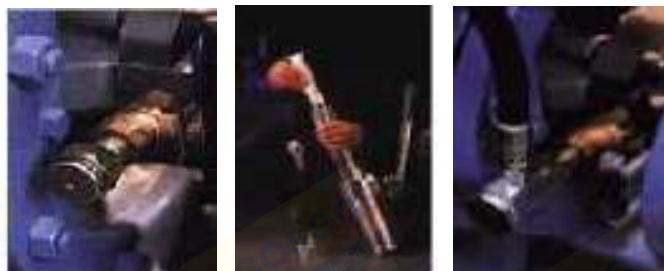
Thermo-Pak™ injectable sealant are easy to install. The initial installation of packing and Thermo-Pak™ Seal Cage materials are done by hand. Tightening the gland nut compresses the Thermo-Pak™ material and forces it to conform to any irregular spaces caused by wear.



An anti-extrusion ring composed of suitably sized braided packing material is set at the top and bottom of the stuffing box or packing gland to prevent the Thermo-Pak™ sealant from being forced out when pressure is applied.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

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Thermo-Pak™ Injection Gun

Thermo-Pak™ injection gun utilizes a button-head or flow-through fitting which is permanently installed on the pump or valve stuffing box.

Since it requires no electricity, Thermo-Pak™ injection gun can be used anywhere to replenish sealant easily and conveniently.



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Thermo-Pak™ Injection Gun

The all-steel hydraulic gun is completely portable and is very easy to use.

The valve or pump stuffing box fitting allows Thermo-Pak™ sealant to be hand-injected into the shaft stuffing box using the injection gun. No downtime is required for the re-packing operation since the equipment can continue to run during the re-packing operation.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE



TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

How to Use Thermo-Pak™ Injection Gun

To properly replenish the packing material, the stuffing box fitting must be located. Next, the injection gun is coupled to the fitting.

When the gun is properly coupled to the fitting, the on-off handle on the fitting is turned to the open position and the new Thermo-Pak™ sealant is pumped into the fitting until the required amount of sealant is injected.

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TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

How to Use Thermo-Pak™ Injection Gun

When the operation is complete, the fitting handle is placed in the off position and the injection gun is disconnected from the stuffing box fitting.

Remember to properly disassemble and return your injection gun to its container where it may be stored until needed again. Note: Button-head fittings with check ball valve do not require ball valve for on-line re-packing.

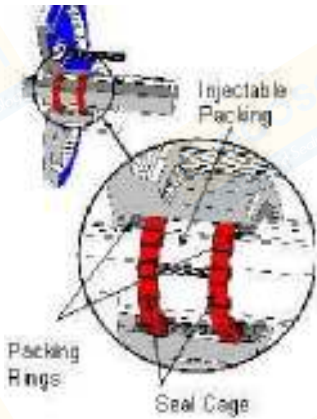


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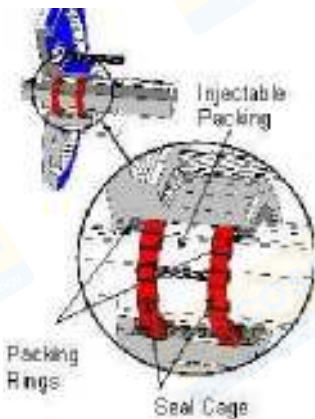


This Seal Cage is a time proven innovative system designed to stabilize both inboard and outboard shaft seal packing rings while containing injectable packing and eliminating extrusion. This system has brought new life to injectable technology and is being used successfully in a wide array of applications across the country and around the world.

Seal Cages are available for most packing sizes and spacer pins are available to accommodate most stuffing box depths.

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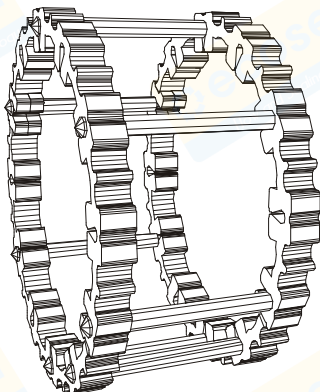


This Seal Cage improves the performance and reliability of injectable packing compounds

It's a fact - using this Seal Cage significantly improves the integrity and reliability of injectable packing compounds for shaft sealing. Our research has shown that process or equipment disturbances are the leading causes of Injectable packing compound failures. Sudden pressure or flow fluctuations, suction or discharge cavitation, shaft deflection, vibrations or worn shafts all contribute to extrusion failures.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY



This Seal Cage improves the performance and reliability of injectable packing compounds

The Seal Cage is designed specifically to prevent injectable compound extrusion. The rails of the Seal cage act like a rake to grip the injectable packing compound holding it in place. This system also enables the packing end rings to be pre-loaded to the shaft and bore of the stuffing box which further helps to prevent extrusion.



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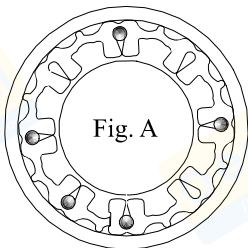
This Seal Cage improves the performance and reliability of injectable packing compounds

Customers are reordering the Seal Cage system because they know this system is an extremely cost effective insurance for process shaft sealing when using injectable packing. They have seen savings of time, money and significant amounts of flush-water in their facilities. We are seeing new customers converting to this technology at an increasing rate as facilities are pressured to reduce water consumption and are faced with even tighter budgets to work from. The Seal Cage system now provides your business with a unique profit opportunity.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

Over the past few months we have been working hard to make our Seal Cage system even better. Our new cage design features improved temperature performance, greater strength over the entire temperature envelope, improved functional stability and optimized circular shape uniformity.

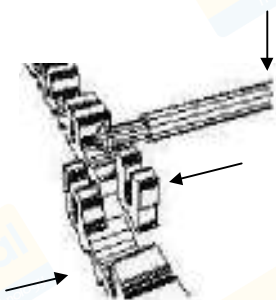


- Made of an extremely durable new proprietary polymer, the Seal Cage can now withstand stuffing box temperatures up to 230° F. This is a 70° F improvement in thermal performance.
- This new material and our new cage design provide greater strength for stabilizing the injectable sealant compound and the packing rings in the stuffing box. Improved pre-loading of the packing seal end rings during installation is now achieved without fear of collapsing the stabilizing system.

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Over the past few months we have been working hard to make our Seal Cage system even better. Our new cage design features improved temperature performance, greater strength over the entire temperature envelope, improved functional stability and optimized circular shape uniformity.



- Our new "tear-drop" pin support design provides uniform circular shaping for improved uniformity in conforming to stuffing box bores. (See Fig. A.) Spacer pins can be added or deleted, alternated or staggered without fear of changing the circular shape of the cage.
- Our new modular "glad-hand" design offers unlimited expandability. Any number of cage sections can be added to create cage lengths to fit any application. Just slide rail sections together and then snap a spacer pin into the joining pin tower slots to lock the sections together as shown in Fig. B.

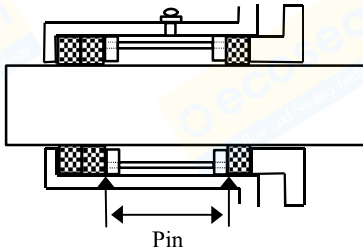


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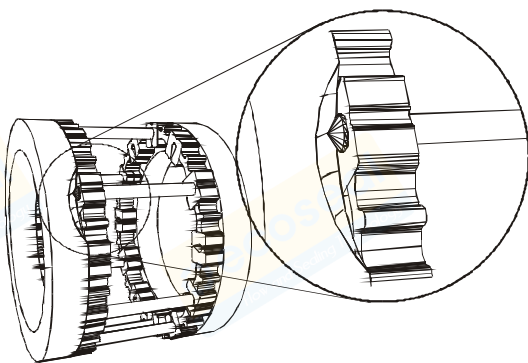


To determine the correct length of spacer pins for your application follow the steps below:

- 1.) Add up the cross sectional width of each ring of packing being removed.
- 2.) Add the width of the lantern ring being removed (if one was used).
- 3.) Add 1/8 inch for the inset of the gland follower ring.
- 4.) Measure the depth of the stuffing box.
- 5.) Subtract the sum of the removed packing rings and lantern ring and 1/8 inch gland follower recess from the stuffing box depth. The result is the length of the spacer pins required for this installation.

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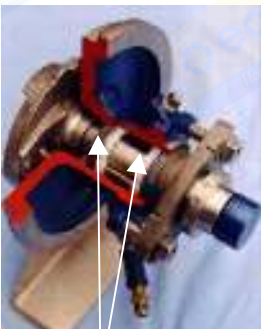


The pointed ends of the spacer pins are designed in such a way as to embed into the braided packing seal rings thus preventing these rings from spinning in the stuffing box.

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Installation Instructions for the Seal Cage / Injectable Packing



SEAL CAGE

Caution: *Observe all depressurizing, cooling and safety procedures before installation. Lockout pump before starting the job. Read all instructions before proceeding.*

1. Remove old packing rings and lantern ring from the stuffing box. These packing extraction tools can be very useful in removing old packing. Kit includes 1/4 and 5/16-inch diameter stainless steel tools. These handy tools can be obtained from your local dealer.



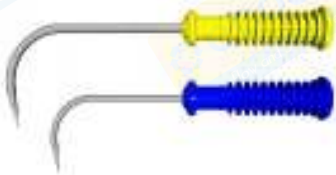
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Installation Instructions for the Seal Cage / Injectible Packing



2. Clean shaft or sleeve and gland follower.

3. Verify that flush water port is free of any obstructions. Replace any flush water fittings and piping that has rust build-up. Pictured is a port fitting that shows signs of build-up. This port must be replaced.



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Installation Instructions for the Seal Cage / Injectible Packing



Plugged injection
port piping

4. Cut new packing seal rings. Packing should be skive cut at 45°.

Note: The Sure-Cut Packing Cutter has been designed to make perfect 45° degree (skive) or 90° (butt) cuts. The spring-loaded fence locks in place at either angle. Keep your cutter sharp with our handy pocket sharpener. Sharpener has both fine and course ceramic rods. These handy tools and a replacement blade can be obtained from your local dealer.

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Installation Instructions for the Seal Cage / Injectible Packing

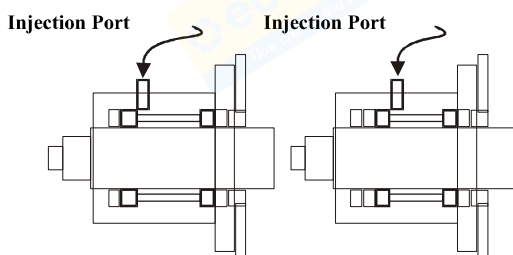


Fig. A-1

5. Determine the location of the flush water port in the stuffing box. Some pump designs will allow one packing ring below the flush water port (Fig. A-1.). Most often you will be able to install two packing rings in the bottom of the stuffing box (Fig. A-2.). The bottom ring (Bullring) can be a harder material; the second and third rings should be a softer, low friction material.



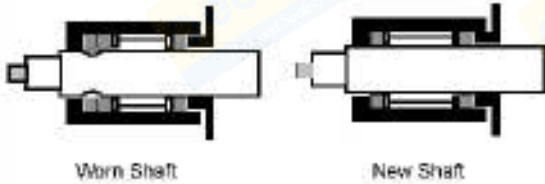
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TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

Installation Instructions for the Seal Cage / Injectable Packing



Note: If you are installing an injectable packing in a pump that has been running standard packing you will often find a wear groove in the sleeve or shaft. If these grooves are too deep you will not be able to obtain a seal between the packing rings and the shaft or sleeve thus allowing the injectable packing compound to extrude from the stuffing box.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

Installation Instructions for the Seal Cage / Injectable Packing

6. Determine pin length by adding up eliminated packing ring cross-sections and removed lantern ring width. The result is the length of the spacer pins required for this installation.

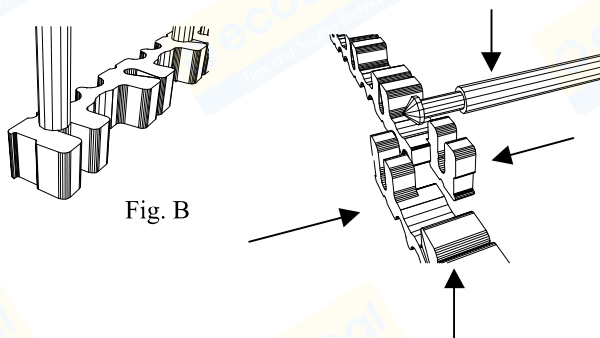
Note: Check the distance between the stuffing box flange and the first obstruction to insure that the Seal Cage has enough room to fit into the stuffing box bore.

Note: The Seal Cage comes with the standard pin pack to be used with a five-ring packing set. Our handy Master Pin Pack Kits are very useful when you are unsure of the number of rings in the stuffing box. The small pin pack kits come with 12 each of 1-1/4", 1-1/2", 1-5/8", 1-7/8" and 2" pins. The Long pin pack kits come with 12 each of 2-1/4", 2-3/8", 2-1/2", 2-5/8" and 2-7/8" pins. Other pin lengths are available by special orders.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

Installation Instructions for the Seal Cage / Injectable Packing



7. When assembling a Seal Cage rail section, you should always start with a full pin tower (Fig. B.) Add length to the Seal Cage rails by sliding "glad-hand" rail sections together and locking a spacer pin into the "glad hand" tower as shown in Fig. C-1 & 2. This allows rails to be created to any length.



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Installation Instructions for the Seal Cage / Injectible Packing



Fig. C-1& 2



Fig.D.

The "glad-hand" slot may need to be adjusted to ensure that the spacer pin is seated completely (See Fig. D).

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

Installation Instructions for the Seal Cage / Injectible Packing



Fig. E.

8. Determine the length of the Seal Cage from the cutting length chart on pg. 6 of these instructions or by installing the single rail assembly into the stuffing box. (Fig. E) Adjust the rail to a snug fit to the stuffing box bore. Mark overlapped rail section as shown.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

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Installation Instructions for the Seal Cage / Injectible Packing



Fig. F

9. Cut the cage rail to length as shown (Fig. F). It is very important that the cut ends be smooth and straight to prevent the ends of the Seal Cage rails from overlapping when they are installed in the stuffing box. A handy miter box and saw kit can be obtained from your local dealer.



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Installation Instructions for the Seal Cage / Injectible Packing



Fig.G

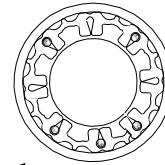
10. Install the rest of the spacer pins in the single rail section. (Fig. G) Start at the full pin tower end. Skip the next tower and install a pin in the next tower and so on. Flex each end of the cage rail as shown in Fig H. This is done to ensure that the rails fit closely to the bore of the stuffing box.

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Installation Instructions for the Seal Cage / Injectible Packing

Fig. H



NOTE: Slide the single assembled rail section into the stuffing box bore to verify the fit.

Note: Make sure all teardrop pin tower openings are closed around the spacer pins.

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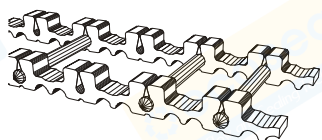
Installation Instructions for the Seal Cage / Injectible Packing



Fig.I

11. Cut the second cage rail to the same length as the first and then finish assembling the Seal Cage as shown in Fig. I. Remember to flex each end of the cage as shown in Fig. H. This will help shape the Seal Cage to the bore of the stuffing box and lock the pins in place.

Note: You may find that after cutting the Seal Cage assembly to length that you end up with an open pin tower at or near the end of the rail; if this is the case then install another pin in that tower.





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Installation Instructions for the Seal Cage / Injectible Packing



Shop Fitting



Field Fitting

Fig. J.

12. Hold the ends of the Seal Cage together as you slide the cage into the stuffing box bore (Fig. J.). This is done to prevent the ends from overlapping.

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Installation Instructions for the Seal Cage / Injectible Packing

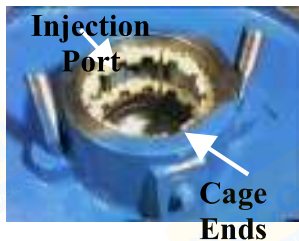


Fig. K.

13. Pre-packing the Seal Cage: Seal Cage Shop Installation

Using a spare stuffing box head on your work bench, follow the previous steps for fitting the Seal Cage to the stuffing box. Install two rings of packing in the bottom of the stuffing box. (DO NOT TAMP PACKING RINGS IN THIS PROCEDURE.) Install the assembled Seal cage into the stuffing box (Fig. K.). (If two or more rings of packing are being installed at this time make sure the skive-cut joints are staggered 180° from each other.)

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Installation Instructions for the Seal Cage / Injectible Packing



Fig. K.

Note: It is important that the butt joint of the Seal Cage be located 180° across from the injection port and make sure that a spacer pin is not in line with the injection port.



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Installation Instructions for the Seal Cage / Injectable Packing



Hand pack the area between the rails of the Seal Cage with injectable packing compound. The injectable compound should not protrude above either rail edge. Avoid any air pockets. (Trapped air will cause heat build-up). Pack the compound tightly around all spacer pins. Check for proper fit using a shaft sleeve or section of shafting of the proper size for your application. Insert the shaft into the Seal Cage pushing and turning it in until you reach the bottom of the stuffing box. Remove any excess packing compound that is pushed out the bottom of the box. Remove the shaft or sleeve and check for void areas in the compound.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

Installation Instructions for the Seal Cage / Injectable Packing



Fill with additional injectable packing compound as needed. Once you have finished this procedure you can install the last ring of packing and the gland follower. Do not adjust the follower nuts until after you have installed the stuffing box head on your pump. Once installed on the pump, adjust the gland follower nuts until the gland follower is nested approximately 1/8" into the stuffing box. (You may also remove the pre-packed Seal Cage and store it in a Zip-Lock™ bag until you are ready to install it at a later date.)



Proceed to step 18

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

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Installation Instructions for the Seal Cage / Injectable Packing



13. Pre-packing the Seal Cage: Seal Cage Field Installation

Lay the pre-sized Seal Cage on a clean flat surface. Hand-pack the area between the Seal Cage rails with injectable packing compound. The injectable packing compound should be packed in tight around all of the spacer pins preventing any air pockets. (Trapped air will cause heat build-up). The injectable packing compound should not protrude above either Seal Cage rail edge.



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INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

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Installation Instructions for the Seal Cage / Injectable Packing



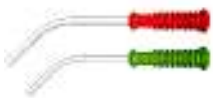
13. Pre-packing the Seal Cage: Seal Cage Field Installation

Using a section of shaft or sleeve, roll over the Seal Cage rail at a slight angle to pack the injectable packing compound into the Seal Cage as shown. Once you have finished this procedure you are ready to install the Seal Cage in your pump stuffing box or remove the pre-packed Seal Cage and put it into a Zip-Lock™ bag until you are ready to install it.

INJECTABLE PUMP & VALVE SEALANT THERMO-PAK™ SEAL CAGE

TOTAL SEALING SYSTEM SOLUTIONS BRING SEALING TECHNOLOGY TO THE INDUSTRY

Installation Instructions for the Seal Cage / Injectable Packing



Packing Tamping Tools

Installing the Seal Cage:

14. Install one or more packing rings into the bottom of the stuffing box. Thoroughly tamp each packing ring in place. (If two or more rings of packing are being installed at this time make sure the skive-cut joints are staggered 180° from each other.)

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Installation Instructions for the Seal Cage / Injectable Packing



15. Push the pre-sized hand packed Seal Cage assembly into the stuffing box.

Note: It is important that the butt joint of the Seal Cage be located 180° across from the injection port and that a spacer pin is not in line with the injection port. Make sure that the Seal Cage rail ends are not over-lapping and that the ends butt together as the assembly nests into its final position in the stuffing box.



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Installation Instructions for the Seal Cage / Injectable Packing



16. Install the third or outboard packing ring.

17. Install the gland follower and tighten the follower nuts to seat the packing rings to the walls of the stuffing box and to the shaft. The packing gland follower should be nested into the stuffing box about 1/8". Proceed to step 18.

SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

Injectable packing sealant compounds add to the choices for shaft sealing strategies in many industrial applications. As with most new technologies, injectable packing and its proper use are not well understood. When properly applied and maintained, this family of products can bring dramatic cost savings to facilities worldwide. We have seen reductions in costs by eliminating flush water consumption, saving significantly on the cost of seals, reducing process temperature recovery requirements, eliminating process dilution, lowering power requirements and reducing on the job accidents.

Like most developing technologies, original expectations are often tempered by real world field results. Early hopes were that maintenance personnel would be able to re-inject a leaking stuffing box with added compound while the process was running to stop developing leaks. It was quickly learned that re-injection would seldom correct the leak. It sometimes slowed it for a brief period but the leak would inevitably re-develop.

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Leaks were usually found to be the result of extrusion of the injectable past the retaining packing rings. The inboard or outboard packing rings would open at the butt or skive cut and the injectable packing compound would escape the stuffing box. Once an extrusion path was established, no amount of additional injectable compound would stop the stuffing box from leaking for very long. Packing would simply move through the extrusion path into the process or out onto the floor and the leak would continue.

We have learned a lot over the past three to four years about how to use this product correctly. Many facilities are having remarkable success with injectable packing sealant compounds once they follow some basic guidelines, maintenance troubleshooting practices and stabilizing techniques. Most of the gains with this technology have been through understanding the root causes of the failures.



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Although the stuffing box end packing rings are where extrusion ultimately takes place, the stability, spacing and conformability of these containment rings is of prime importance. The success in using injectable packing sealant compounds at our facility has been the result of using conforming types of end containment packing rings (such as low friction braided packing) that are stabilized and held in place with the **Thermo-Pak Seal Cage**.

We now know that stabilizing the packing rings that contain the injectable compound can make the difference between failure and success. We have used the patented Thermo-Pak Seal Cage stabilizing system for over three years successfully. This is the only system that positively holds the packing rings in place and eliminates extrusion problems.

SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

When leaks develop, this system allows the stuffing box to be re-injected without fear of loosing injectable past the packing rings. Stability, spacing and the containment packing ring's material properties are the magic bullets that make the difference at the stuffing box.

Experience has also taught us that process and/or equipment disturbances and pump capacity miss-match can be the greatest causes of injectable failures. Sudden pressure or flow fluctuations, pump cavitation, shaft deflection, vibration and worn shafts were all found to contribute to injectable extrusion failures. While determining why and how the injectable packing was failing we learned that a dedicated approach to troubleshooting both the process and the equipment was essential. Most failures have been discovered to be the result of process fluctuations at both near and distant points from the failing equipment.

SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

Cavitation would have to rank as the number one cause of injectable packing failure. Cavitation results when a pump can not move the process fluid within certain limits of the pumps rated capacity. This can happen due to input or output restrictions to the pump's ability to move its designed flow. As engineers work to increase production and lower manufacturing costs they sometimes design system installations with oversized pumps in an attempt to plan for future capacity. To offset the over capacity of the new pump the discharge is arbitrarily throttled back or restricted causing discharge cavitation. This situation will ultimately result in damage to the impeller, excessive bearing loads, pipe strain, failed welds and seal damage. Process restrictions to pump input lines can be similarly destructive. No pump should be running too far right or left of its best efficiency point.



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Another similarly destructive condition is when a pump is "dead-headed". This condition exists when the output is closed off all together. Many facilities are turning to computerized control systems. Care must be taken to guard against system valve closures that would cause a pump to "dead-head". This condition can result in violent system pressure swings and be extremely damaging.

Any system that has the potential to be subject to these conditions should be configured with a recirculation line. This allows a pump with a throttled back discharge line to pump fluid back into the supply without cavitation.

SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

Following are examples of situations we have seen supporting these observations:

1. A major leak developed on a Worthington FRBH-142 pump. This pump had been running for months without any problems. The pump was re-injected and the pump stopped leaking. A few hours later the leak re-developed. This continued for several days. Methodical troubleshooting revealed that a process level detecting sensor in a chest upstream from the pump was inoperative and from time to time a low level in the chest was causing pump cavitation. The level detecting sensor was cleared, the chest level was controlled and the cavitation was eliminated. Having the Thermo-Pak Seal Cage stabilizing system in place enabled successful re-injection of the injectable sealant compound and the pump stopped leaking. In this example, as in many others we have come across, it would have been easy to place blame for the failure on the injectable compound and miss the true cause.

SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

Following are examples of situations we have seen supporting these observations:

2. We had a pump that had been running with injectable packing sealant compound and the Thermo-Pak Seal Cage for month's leak free. One day it was found leaking and it was re-injected. A few hours later it began leaking again. This pump maintains the level in tank A. As tank "A" fills the flow is diverted to tank "B". Two flow control valves accomplish this. As the flow to tank "A" is cut back the control valve to tank "B" opens. The control valve to tank "B" was found to be sticking causing the pump to dead-head. This caused the pump to cavitate with excessive shaft deflection, which caused the stuffing box failure. Once the problem of the sticking control valve was repaired, the leaking stuffing box problem was eliminated.



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SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

In many facilities pumps may be supplying more than one piece of equipment. If there is an upset in the system and the flow demand is reduced the pump is subjected to being partly dead-headed and cavitation will result. To prevent this condition bypass or recirculation lines should be installed.

Experience has shown that most pumps are purposely oversized when they are installed to account for future expansion. Throttling the output is not the proper way to bring flows into process specifications. Fitting these pumps with smaller impellers or installing recirculation or bypass lines is more forgiving to systems and will result in less maintenance problems with the equipment.

SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

Most process applications in the pulp and paper industry are well suited to injectable packing sealant compounds when they are used with a good quality stabilizing device such as the Thermo-Pak Seal Cage. In pulp and paper plants as well as other industrial shaft sealing applications in North America, the economical injectable sealant compounds and Thermo-Pak Seal Cage stabilizing system are being used with a high degree of success. We have had more than 40 of the 60 stock pumps running with the Thermo-Pak Seal Cage and injectable packing sealant compound. These systems have performed nearly leak-free for more than two years without the use of any flush water. Savings have been realized in a number of ways. Reduced water consumption, lower effluent treatment loads, reduced product dilution, improved housekeeping and improved safety from the elimination of slippery floors around pumping stations are just some of the savings made at our facility.

SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

The following pumps are some of the applications using the Thermo-Pak Seal Cage & Injectable Packing.

West Pulper Pump	Worthington 6 FRBH 142	3.00" Shaft	1800 RPM
East Pulper Pump	Worthington 6 FRBH 142	3.00" Shaft	1800 RPM
East White Water Pump	Worthington 6 FRBH 142	3.00" Shaft	1800 RPM
North White Water Pump	Worthington 6 FRBH 142	3.00" Shaft	1800 RPM
South White Water Pump	Worthington 6 FRBH 142	3.00" Shaft	1800 RPM
Dilution Pump	Worthington 8 FRBH 152	3.00" Shaft	1800 RPM
Forward Cleaners Pump	Worthington 6 FRBH 142	3.00" Shaft	1800 RPM
Thickener Feed Pump	Worthington 18 FRBH 274	4.750" Shaft	1200 RPM
#1 West White Water Pump	Worthington 8 FRBH 152	3.00" Shaft	1800 RPM
South Clippings Tank Pump #1	Worthington 4 FRBH 141	2.00" Shaft	1800 RPM
Combisort Feed Pump	Worthington 4 FRBH 141	2.00" Shaft	1800 RPM



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The following pumps are some of the applications using the Thermo-Pak Seal Cage & Injectable Packing.

Low D Pump	Worthington 8 FRBH 152	3.00" Shaft	1800 RPM
Fiber Saver Feed Pump	Worthington 3 FRBH 101	2.00" Shaft	1800 RPM
Quarernary Feed Pump	Worthington 3 FRBH 121	2.00" Shaft	1800 RPM
Sand Separator Pump	Worthington 3 FRBH 121	2.00" Shaft	1800 RPM
Machine Chest Pump	Worthington 8 FRBH 152	3.00" Shaft	1800 RPM
Primary Rejects Pump	Worthington 8 FRBH 152	3.00" Shaft	1800 RPM
Tertiary Rejects Pump	Worthington 2 FRBH 121	2.00" Shaft	1200 RPM
Secondary Rejects Pump	Worthington 6 FRBH 142	3.00" Shaft	1200 RPM
Couch Pit Pump	Worthington 8 FRBH 152	3.00" Shaft	1800 RPM
Press Pit Pulper Pump	Worthington 8 FRBH 152	3.00" Shaft	1800 RPM
# 5 White Water Pump	Worthington 8 FRBH 152	3.00" Shaft	1800 RPM

SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

The following pumps are some of the applications using the Thermo-Pak Seal Cage & Injectable Packing.

East Saveall Pump	Worthington 6 CNG 84	2.125" Shaft	1200 RPM
West Saveall Pump	Worthington 4 CNG 104	2.125" Shaft	1200 RPM
South Clarified W. W. Pump	Worthington 4 CNG 104	2.125" Shaft	1800 RPM
Clearwell Pump	Worthington 6 CNG 84	2.125" Shaft	1800 RPM
Refined Stock Chest Pump	Worthington 8 FRBH 152	3.00" Shaft	1800 RPM
East Mill Water Booster Pump	Worthington 6 FRBH 142	3.00" Shaft	1800 RPM
South Effluent Pump	Worthington 6 FRBH 142	3.00" Shaft	1200 RPM
North Effluent Pump	Worthington 6 FRBH 142	3.00" Shaft	1200 RPM
South Effluent to Lagoon Pump	Worthington 6 FRBH 142	3.00" Shaft	1800 RPM
North Effluent to Lagoon Pump	Worthington 6 FRBH 142	3.00" Shaft	1800 RPM

SUCCESS WITH THERMO-PAK INJECTABLE PACKING & THERMO-PAK SEAL CAGE

Success using injectable packing sealant compounds and the Thermo-Pak Seal Cage stabilizing system expand the options for shaft sealing. Maintenance personnel and facility managers - particularly in older plants - have an additional tool for lowering costs and improving process and plant efficiencies. Of course, not all applications are necessarily candidates for any one sealing technology. Some situations require more complex mechanical sealing systems. In others, conventional braided packing or Mechanical Seals is the best answer. Many applications, however, will work extremely well with the economical injectable packing sealant compounds.