HARBIN ROPV INDUSTRY DEVELOPMENT CENTER

ROPV R80 UF Series User Manual

For Use with the Following ROPV Pressure Vessel Models:

R8060N150S R8060U150S

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General Product Description – R80 S Series
Side Port Pressure Vessel

R80 150S Design Pressure:	150PSI / 1.0Mpa / 10Bar (at 150°F / 66°C)
Min. Operating Temp.:	14°F / -10°C
Max. Operating Temp.:	150°F / 10°C
Factory Test Pressure:	ASME: 1.1x Design Pressure Standard: 1.5x Design Pressure
Burst Pressure:	6 x Design Pressure
Operating pH Range:	3 – 11
Cleaning pH Range:	2 – 12 (less than 30 minutes)

General Warning – High Pressure

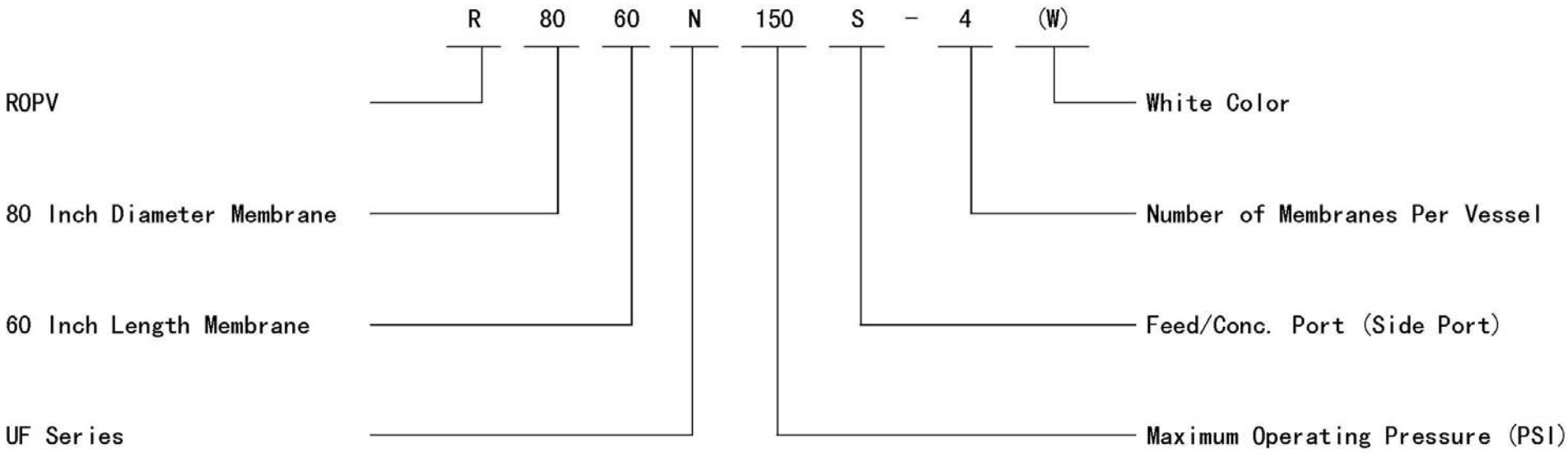
ROPV Pressure Vessels are designed to provide safe operation over a long service life if properly installed, operated, and maintained. The vessel may cause loss of life, severe bodily harm, or property damage if not correctly installed, operated, or maintained. Read and understand all guidelines provided in the vessel User Manual. Observe every precaution contained therein. Failure to do so may result in malfunction and potential catastrophic failure. It is recommended that only qualified technicians experienced in servicing hydraulic systems work with this vessel. Misuse, incorrect assembly, or use of damaged/corroded components may result in catastrophic failure.

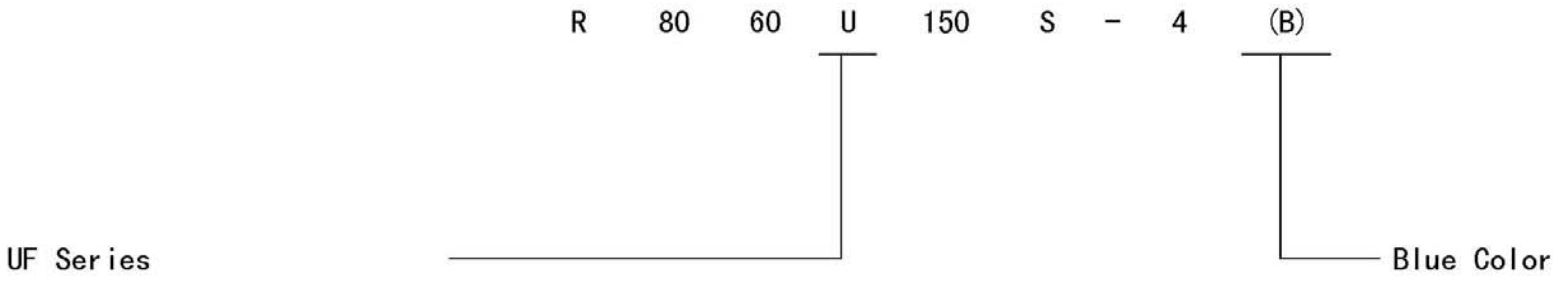
Vessel Use and Precautions

- Positive pressure up to the design pressure (PSI) of the specific model being used.
- Accommodates standard 8” nominal diameter spiral-wound element.
- The required vessel/element interface hardware is supplied with the vessel. Ensure that an element adapter is installed at each end of the vessel before use.
- Vessel expands under pressure and careful consideration must be taken when installing straps/saddles and system connection piping.
- Installation with the straps/saddles provided is strongly recommended
- Vessel should not support any other system components. Connections should be non-load bearing.
- Periodic inspection of the vessel end closure is recommended to ensure all parts are dry and free of corrosion.
- Failure to understand and follow all precautions may void warranty and result in catastrophic failure of the vessel.
- These guidelines are subject to change. Please check with ROPV to ensure that the User Manual is the latest version for the vessel model being used.
- Mount vessel using strap/saddle hardware provided and span recommended in the engineering drawing.
- Do not over tighten the straps – vessel must be allowed to expand under operation.
- Maximize the connection flexibility to allow for vessel growth under pressure.
- Align the side ports with the system manifold, correcting any misalignment before final installation.
- Provide overpressure protection in the system safety devices.
- Inspect end closures regularly for signs of corrosion. Immediate corrective action and/or replacement is suggested in case of corrosion.

- Relieve system pressure before working on the vessel.
- Do not attempt to over-tighten the Permeate Port connections as this may damage the end closure. One turn past hand tight should be sufficient.
- Ensure that the Trust Cone is installed on the downstream end of the vessel.
- Never operate the vessel in excess of its ratings. This may void the warranty and cause bodily or property damage.
- Do not operate the vessel permeate port over 125PSI.
- Flush the vessel with permeate before system shutdown to reduce the chance of corrosion.
- Do not install the vessel in direct sunlight.
- Operate the vessel within the recommended pH range - Operating pH Range: 3 – 11, Cleaning pH Range: 2 – 12 (less than 30 minutes).

Model Explanation



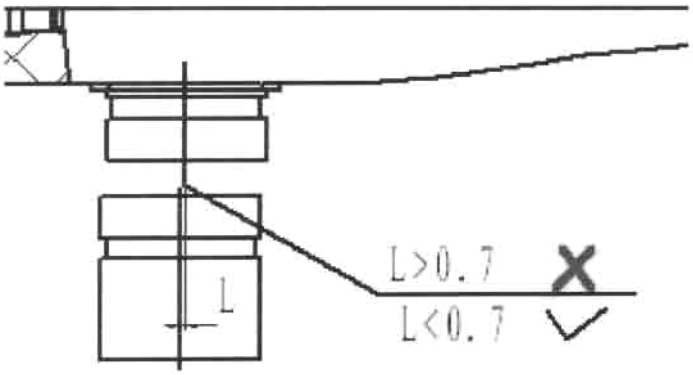


Preparation

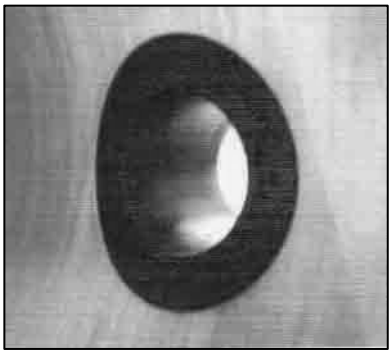
Step1 Fix the metallic frames - Fix the pressure vessel (PV) horizontally and firmly at the span(s) suggested by ROPV.
Step2 Clean the components and the inside surface of PV – Clean with a neutral solution of water. Acute acid or alkali solution is forbidden.
Step3 Mount PV with strap/saddle hardware provided and span recommended in the engineering drawing.- Trace No. of PV is at side A of its pack. Setting PV at the same direction is suggested.
Step4 Lubricate the seal rings and the seal area of PV with lubricant (glycerin suggested).

Installation

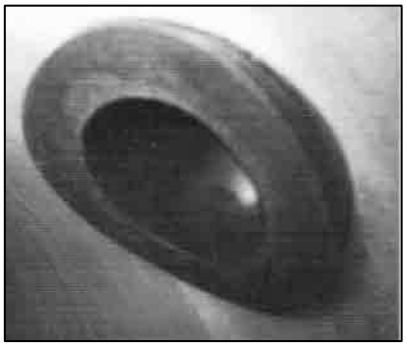
Step1 Fix the pipe of the feed/concerntrate ports freely. And the permitted deviation of their centers shall be no more than ±0.7㎜.



Do not attempt to turn the feed/concentrate port since that may damage the inside surface of membrane elements .

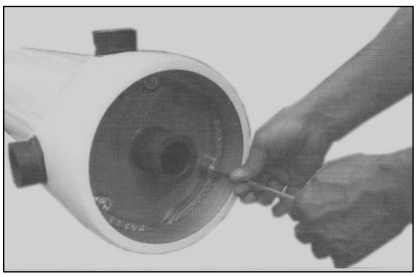


(Right)



(Wrong)

Step2 Install the end plate into PV-Hold the permeate port with both hands, till the end plate is pushed into PV. Install the locking ring set and screws.



Step3 Install membrane elements-Make sure that the feed/concentrate ports have not been turned through eyeballing and touching the inside surface of PV. Lubricate the seal rings of membrane elements with lubricant(glycerin suggested). Push the membrane element into PV, until the permeate port of the membrane element is connected with the adapter.

Step4 Install the end plate into the membrane installation side of PV-Hold the permeate port with both hands, till the end plate is pushed into PV. Install the locking ring set and screws.

Step5 Connect the pipe of the permeate port-Be sure to connect the pipes and permeate ports freely. And the permitted deviation of their centers shall be no more than ±0.7mm.

Running

Step1 Be sure that all the power cables have been connected correctly (Including gauging pump, high pressure pump, etc)

Step2 Be sure that all the components of PV have been correctly installed and secured before starting the system.
Clean all pipes and facilities and debug all the facilities to run well

Step3 Starting the system-Do not start the system at high pressure. Abnormal back pressure might cause bodily harm.

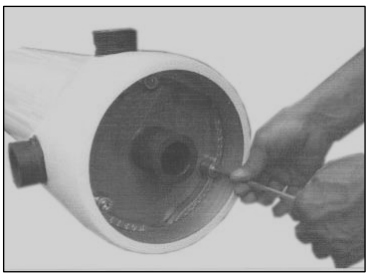
Head Removal

Step 1 Shut Down System and Relieve System Pressure – The system must be shut down and all pressure relieved before conducting any maintenance or repair on the vessel.

Step 2 Disconnect Permeate Piping – The system permeate piping must be carefully removed from the permeate port of the vessel.

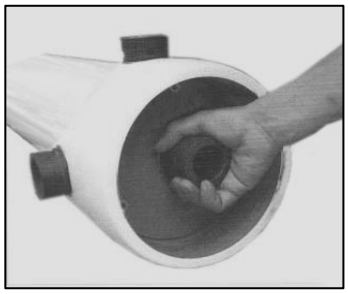
Step 3 Inspect End Closure – The end closure should be inspected for any signs of corrosion or damage. Surface corrosion can be removed with a wire brush, while flushing with water. Damaged components should be replaced with approved components from ROPV.

Step 4 Disconnect Locking Screws – Each of the three locking segments is held in place with a single locking screw. The locking screws can be unthreaded using an M6 / 7/32" hex wrench. The locking screws should be unthreaded from the head only, not from the locking segment. The locking screw and locking segment can be removed together.



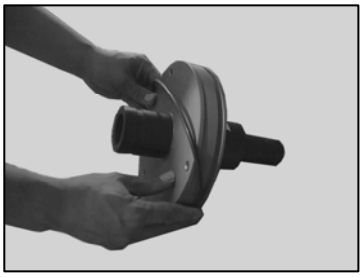
Step 5 Remove the Locking Segment/Screw Assemblies – The locking segment/screw assemblies should be easily removed from the retaining groove. Should the assemblies be difficult to remove, it may be necessary to rock the head slightly or tap the head inward with a rubber mallet. Be careful when using metal tools, avoiding leveraging against the sidewall of the vessel or scratching the inside surface of the bell area.

Step 6 Remove the Head Assembly .

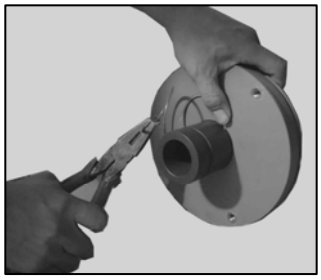


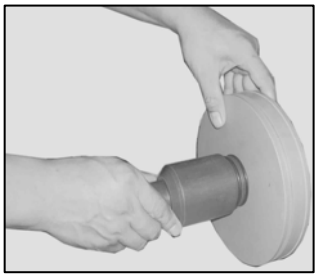
Head Disassembly and Inspection

Step 1 Remove the Head O-ring – Use a non-metallic, rounded tool to start the o-ring out of the o-ring groove. Once a small portion of the o-ring has been lifted out of the groove, use your hand to work the remainder of the o-ring out of the groove. Damaged or cut o-rings must be replaced during re-installation of the head.



Step 2 Remove the Permeate Port –Put out the retaining ring with slotted screwdriver and take care not to hurt the sealing area of the permeate port. Grasp the permeate port and slowly pull from the bearing plate. A slight rotating motion may ease the removal of the permeate port. There is a set of double o-rings on the outside diameter of the permeate port that must be inspected for damage once the permeate port is removed. Damaged o-rings must be replaced before re-installation.





Step 4 Clean All Components – All components should be cleaned with a mild soap solution or clean water. The components should be air dried or dried with a lint-free towel.

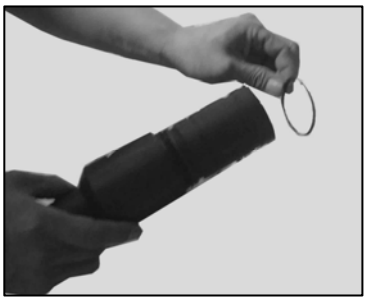
Step 5 Inspect All Components – All components should be carefully inspected for signs of corrosion and damage. Components exhibiting such should be replaced before re-installation. All o-rings should be carefully inspected for signs of damage. It is recommended that all o-rings be replaced during each complete servicing of the vessel. Failure to do so may cause poor system performance.

Step 6 Inspect Inside Vessel Surface – The inside surface of the vessel should also be inspected once the membrane elements have been removed. Special attention should be paid to identify any scratches, damage or foreign matter. Surface scratches can be repaired by carefully sanding the effected surface with 600-grit sandpaper. A combination of soapy water and fresh water should be used to flush the area during sanding. Clean water should be used to clean the area after sanding. Any extemporaneous matter can be removed with a soft cloth, soapy water, and a clean water flush. Damaged vessels should not be used under any circumstances.

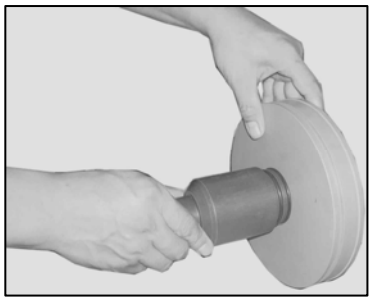
Head Reassembly

Step 1 Inspect All Head Components – All head components should be free from scratches, foreign matter, or any sign of damage. Please see Step 6 above for additional information about cleaning head components. Scratched or damaged components should be replaced with ROPV supplied replacement components. All o-rings should be carefully inspected for signs of damage. It is recommended that all o-rings be replaced during each complete servicing of the vessel. Failure to do so may cause poor system performance.

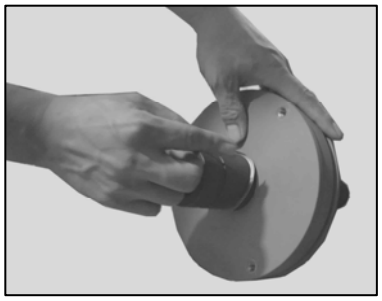
Step 2 Install Permeate Port O-rings - All o-rings should be coated with a thin layer of glycerine before installation. Care should be used to minimize the amount or glycerine applied and any excess should be removed. Petroleum based lubricants should not be used as they may cause membrane damage. Seat one o-ring into each of the two grooves located on the inside diameter of the permeate port.



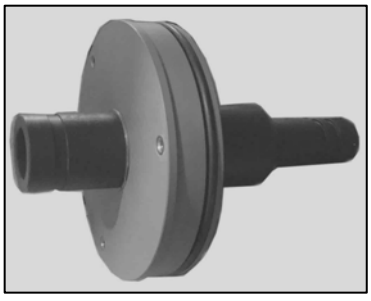
Step 3 Assemble End Plate and Permeate Port



Step 4 Place retaining ring



Complete Head Assembly



Step1 How to remove end plate

- Shut down system and relieve system pressure .

Disconnect permeate piping.

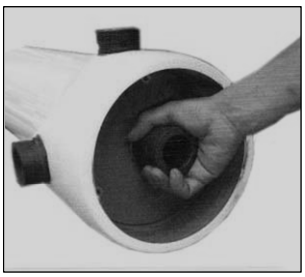
System permeate piping must be carefully removed from the permeate port of PV when maintain the end plate; All system piping must be carefully removed when maintain the feed/concentrate port.

Do not attempt to remove any component of PV when the system is at pressure.

- Disconnect the end plate

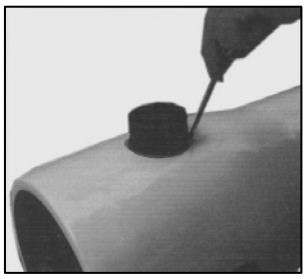
The locking screws can be unthreaded with an M6/7/32 hex wrench . If locking ring is hard to disconnected, put on piece of board on the end plate and then strike lightly with hammer until the locking ring can be put out easily.

Pull out the end plate with both hands. Try shaking the end plate to the four directions while pulling it out when difficult.

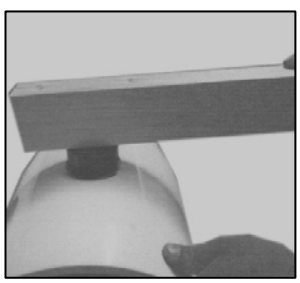


- Disconnect Feed/Concentrate port

Put out the retaining ring with slotted screwdriver and take care not to hurt the sealing area of the feed/concentrate port.



Push down or strike lightly on the feed/concentrate port till the port is separated from the shell.



Step2 End plate leakage maintenance

- Remove the end plate and inspect if there is any scratch on the sealing area.

If the scratch depth is within 0.1mm, use 600# sand paper to eliminate the disfigurement.

- Put out the O-ring from the end plate, inspect if there is scratch or impurities.

Remove the impurities; If the scratch depth is within 0.1mm, use 600# sand paper to eliminate the disfigurement.

- Inspect whether there is any distortion or scratch on the O-ring. Damaged O-ring shall be replaced immediately.

Step3 Feed/concentrate port leakage maintenance

- Disconnect feed/concentrate port. Inspect if there is any scratch on the sealing area of the FRP shell opening.

If the scratch depth is within 0.1mm, use 600# sand paper to eliminate the disfigurement.

- Put out the O-ring from the feed/concentrate port, inspect if there is scratch or impurities.

Remove the impurities; If the scratch depth is within 0.1mm, use 600# sand paper to eliminate the disfigurement.

- Inspect whether there is any distortion or scratch on the O-ring. Damaged O-ring shall be replaced immediately.

ROPV Limited Warranty

Harbin ROPV Industry Development Center (hereinafter called “ROPV”) vessels (the “Product”) are warranted to the original purchaser (the “Customer”) under normal use and if installed, operated and maintained in accordance with applicable User Guides to be free of defects in material and/or workmanship for a period of one (1) year from date of manufacture subject to the following. Any replacement Product or Part will be warranted only for the remainder of the original warranty period or thirty (30) days, whichever is longer.

Exclusions from this Limited Warranty

The warranty shall be void if:

1. defects are not reported during the warranty period.
2. the Product is subject to accident, damage, incorrect installation, mishandling, abuse, misuse, negligence or accident by any other party.
3. problems caused by modification or alteration.
4. chemical exposure or acts of nature.
5. any item manufactured by other companies.
6. wear on replaceable components under normal conditions – seals are excluded from this warranty.

Procedure for Obtaining Warranty Performance

ROPV reserves the right to determine if a reported defect is a breach of this warranty. This may require, at ROPV’s discretion, one or more of the following: 1. an inspection or test of the Product and/or the system in which it was installed by an ROPV representative - the customer is responsible for arranging access to the Product. 2. an inspection or test of the product and/or the system in which it was installed by the Customer. 3. an inspection or test of the product and/or the system in which it was installed by third party inspector appointed by ROPV. 4. return of the Product to ROPV’s factory for inspection or testing. This is not a statement of limitations for warranty performance and ROPV reserves the right to conduct warranty performance outside of the items shown.

If the Product is found by ROPV to be defective under the terms of this warranty, ROPV will perform one of the following at its option: 1. supply a substantially similar replacement part based on FOB factory terms. 2. conduct a field repair of the Product. 3. issue a credit for the original cost of the Products. This is not a statement of limitations for warranty performance and ROPV reserves the right to conduct warranty performance outside of the items shown.

Products returned to ROPV for inspection or testing must be shipped freight prepaid at the Customer’s expense. If a breach of warranty is confirmed, ROPV will bear all costs related to the inspection and testing. If the Product failure is found to be caused by cause other than breach of warranty, all costs related to the inspection and testing of the Product will be borne by the Customer. This includes a USD$500 per day fee and all related travel expenses.

All reported defects must be submitted to ROPV in writing.

Disclaimer

ROPV makes no expressed or implied warranty other than that specifically set forth in this warranty statement. ROPV disclaims any warranty of merchantability or of fitness for a particular purpose.

ROPV’s liability under the terms of this warranty shall not exceed the purchase price of the Product which are claimed to be defective. ROPV shall not be liable for any consequential or incidental damages whatsoever, including but not limited to injuries or damages to person or property, loss of business profits, business interruption, loss of use, cost of removing/installing Products, or the claims of third parties.

Warranties or Representations by Others

No agent, employee, dealer, or other person has any authority to make any warranties or representations concerning ROPV or the Product. ROPV is not responsible for such claims of warranty or representation.