

Returned Goods Authorization (RGA) Procedure

This bulletin provides information and instructions for the return of membrane elements and other products purchased from Hydranautics for examination, credit, or exchange.

Membrane Element /Module Evaluation Return Procedure

The following steps apply for all membrane element(s) and modules that are to be returned to Hydranautics for evaluation:

1. **FM-9102** The customer/OEM must complete Hydranautics Returned Goods Information Sheet, **Form FM-9102**. This form provides Hydranautics with background information such as how long the elements have been in use, the operating conditions, serial numbers of elements, and their relative positions in the vessels.

Note Hazard information:

If there are hazards associated with the return, the customer must list these specifically in FM-9102 line item 19. Hydranautics reserves the right to deny any RGA application based on the associated hazards.

2. **FM-9090** The customer/OEM must complete Returned Goods Authorization Form, **FM-9090**. This form communicates the customer claim and what action is requested of Hydranautics.
3. **Purchase Order** The customer/OEM must issue a **purchase order** for membrane elements returned for examination and/or evaluation. Credit card is also acceptable for customers who do not have an account with Hydranautics. Hydranautics will not conduct an element evaluation without a P.O. number or credit card number from the customer/OEM.
4. Customer/OEM submits Forms FM-9102, FM-9090 and PO/Credit Card information to the RGA Coordinator.
5. **RGA number & RGA Shipper** The RGA Coordinator provides customer an RGA number and an RGA shipper.
6. **Pre-pay Shipment** The elements / modules must be **shipped freight prepaid**, unless otherwise authorized by the RGA Coordinator.
7. The shipment must be labeled with the RGA number, and include the RGA shipper obtained from Hydranautics.

NOTE! Products returned without Hydranautics' authorization will be refused or returned to customer/OEM freight collect.

Packaging and Storage

1. Prior to shipment, the membrane elements should be flushed with feed water in the pH range of 6-8, as a safety precaution for all persons handling the membranes upon arrival. Elements filled with acids or high pH cleaning solutions pose a danger for material handlers without appropriate protective gear.
2. Prior to shipment, membrane element(s) should be preserved and stored according to storage procedures described in Hydranautics Technical Service Bulletin (TSB) 108 depending on membrane composition.
3. For shipping purposes, membrane element(s) should be packaged in a sealed polyethylene bag and placed in a cardboard box to protect element(s) from physical damage and to prevent drying and exposure to light. Hydracap modules should be returned in original crate or similar protective packaging.

NOTE!

After return authorization has been received from the RGA Coordinator, membrane element(s) should be sent as soon as possible. This helps to ensure that element condition will not change as a result of prolonged storage, and enables complete element evaluation within the stated period of time.

Examination Procedure of Returned RO Elements

Hydranautics will perform 1 or more of the following evaluations depending on the nature of the failure.

A. Element Inspection and Retest (non-destructive test)

ELEMENT INSPECTION: The objective of the element inspection is to evaluate the mechanical integrity of the membrane element components (i.e. core tube, anti-telescoping device, outerwrap, etc.) and to test for large mechanical leaks.

This procedure also includes:

- Visual inspection
- Weighing
- Vacuum and/or air test (as necessary)

RETEST: The objective of the Retest is to verify current element performance data at standard test conditions as compared to ex-factory data.

PRICING OF ELEMENT INSPECTION AND RETEST

2" to 4" diameter membrane element - **\$200.00** per element.

6" to 8" diameter membrane element - **\$400.00** per element.

B. Element Autopsy (destructive test)

FULL AUTOPSY: The objective of element autopsy and the following tests is to examine internal components of the membrane element, and to check the integrity of the glue lines and the condition of the membrane surface with regard to fouling deposits and some chemical damages.

This procedure may include:

- SEM/EDAX
- Element disassembly
- Visual inspection of element components
- Visual inspection of membrane surface
- Inspection of glue lines
- Optical Microscope
- Cell test analysis to determine and/or verify flow and salt rejection of membrane samples (if necessary)
- Dye test (if necessary)
- Fujiwara (if necessary)
- WLOI (if necessary)

PRICING OF ELEMENT AUTOPSY:

\$2000.00 per element (The full autopsy includes Inspection and Retest outlined in Section A, as well as the tests outlined in Section B. SEM/EDAX services cost \$1000, which are included in the \$2000 per element price).

C. Element Dissection (destructive test)

Disassembly of the element in order to obtain samples for further testing to include SEM, EDX, Cell Test and/or any other test found to be necessary in order to complete evaluation.

Pricing of Element Dissection:

\$300.00 per element, not including analytical costs outlined in Section D.

(The element dissection does not include the inspection and retest. Pricing of the Dissection does NOT include costs of analytical tests requested).

D. In House Analysis

In House Analysis: The objective is to analyze the condition of the membrane surface and composition of possible deposit layer.

This may include:

- Optical Microscopy examination of membrane surface **(\$100/sample)**
- Dye Test **(\$300/element)**
- Scanning Electron Microscopy (SEM) examination of membrane surface **(EDAX included \$1000/sample)**
- Electron Dispersive X-Ray analysis (EDX) of surface deposits **(SEM included \$1000/sample)**
- Cell Test analysis to determine flow and salt rejection of membrane samples **(\$200/sample)**
- Carbonate Testing **(\$100/sample)**
- Fujiwara Oxidation Test **(\$300/sample)**
- Weight Loss On Ignition Test **(\$300/sample)**

Tests performed by outside laboratories

- Infrared Spectrum (IR) of membrane surface and deposits
- X-Ray Fluorescence (XRF) analysis of foulant deposits

Outside laboratory analysis: Actual charges plus shipping and handling.

E. Water Sample Analysis

The objective is to obtain the chemical composition of water samples collected from the system.

Pricing of Laboratory Analysis:

In house analysis: **\$300.00** per procedure.

\$2000 for full ion spectrum of IMS Design Software

Ca	CO ₂
Mg	CO ₃
Na	HCO ₃
K	SO ₄
NH ₄	Cl
Ba	F
Sr	NO ₃
H ₂ S	B
Fe	SiO ₂

F. Element Deshell and Reshell

The objective is to replace damaged element housings before return to customer. In most cases the warranty will be void following reshelling.

Element Deshell & Reshell:

4" diameter membrane element - **\$250.00** per element.

6" to 8" diameter membrane element - **\$500.00** per element.

NOTE!

Customer/OEM should be aware that in some cases, even after applying the most advanced analytical methods available, it might not be possible to identify the exact cause of membrane degradation. This could be the result of inadequate analytical techniques presently available, or that the membrane degradation was a result of transient conditions which are difficult to identify.

NOTE!

Except for membrane element inspection and performance testing at standard conditions, the majority of analytical procedures are both destructive and expensive. Hydranautics personnel will advise what tests may be applicable in specific cases, but will not conduct them without authorization from the customer/OEM.

Examination Procedure of Returned UF (Hydracap) Modules

Hydranautics will perform one or more of the following evaluations depending on the nature of the failure.

A. Element Inspection and Performance Evaluation (non-destructive test)

Objective of the inspection is to evaluate the integrity of the Hydracap module components (i.e. shell, clamps, endcaps, ports, o-rings, core tube, etc.). Objective of the Performance Test is to verify current module performance data at standard test conditions. Integrity and bubble testing provide information on the integrity of the module and fibers.

This procedure includes:

- 1) Visual inspection
- 2) Performance Test
- 3) Integrity test
- 4) Bubble / leak detection test

Pricing of Inspection and Performance test (includes report):

\$900.00 for first module
\$500.00 per each additional module

CHARGES FOR INSPECTION AND PERFORMANCE TEST WILL BE WAIVED IF A MODULE AUTOPSY IS PERFORMED.

B. Module Autopsy (destructive test)

Objective of module autopsy and the following tests is to examine internal components of the module and to check for chemical deposits, debris and any materials that may cause fouling or other damage to the fibers. Also, individual fibers may be removed for further inspection, testing and analyses.

This procedure consists of:

- 1) Module dis-assembly
- 2) Module dissection
- 3) Visual inspection of module components
- 4) Visual inspection of fibers and interior surface of shell and epoxy beds
- 5) When possible, isolation and identification of damaged fibers for further testing.

Pricing of Module Autopsy (includes report):

\$2200.00 for first module
\$1500.00 for each additional module

C. Module Dissection (destructive test)

Disassembly of the module in order to obtain samples for further testing to include SEM, EDX, ICP, and/or any other test found to be necessary in order to complete evaluation.

Pricing of Module Dissection:

\$700.00 per module.

D. In House Analysis

Objective is to analyze the condition of the fibers, determine the composition of possible foulants within the fibers or deposited upon the fibers and / or deposited in the filtrate area. Also, physical strength tests may be performed.

This may include:

- Optical Microscopy examination of membrane surface (**\$100/sample**)
- Dye Test (**\$300/element**)
- Scanning Electron Microscopy (SEM) examination of membrane surface (**EDAX included \$1000/sample**)
- Electron Dispersive X-Ray analysis (EDX) of surface deposits (**SEM included \$1000/sample**)
- Physical Strength Testing – flux, tensile strength, burst and collapse pressure testing (**\$500 for all physical strength tests**)

Tests performed by outside laboratories

- Infrared Spectrum (IR) of membrane surface and deposits
- X-Ray Fluorescence (XRF) analysis of foulant deposits

Outside laboratory analysis: Actual charges plus shipping and handling.

E. Laboratory Analysis (compositions) of Samples

Objective is to obtain the chemical composition of samples collected from the system or membrane element(s).

This may include:

- 1) Analysis of composition of foulant deposits
- 2) Analysis of composition of water samples
- 3) Analysis of composition of spent cleaning solutions

Pricing of Laboratory Analysis:

In house analysis: **\$300.00** per procedure.

Outside laboratory analysis: Actual charges plus shipping and handling.

NOTE!

Customer/OEM should be aware that in some cases, even after applying the most advanced analytical methods available, it might not be possible to identify the exact cause of membrane degradation. This could be the result of inadequate analytical techniques presently available, or that the membrane degradation was a result of transient conditions which are difficult to identify.

NOTE!

Except for module inspection and performance evaluation, the majority of analytical procedures are both destructive and expensive. Hydranautics personnel will advise what tests may be applicable in specific cases, but will not conduct them without authorization from the customer/OEM.

General Conditions

1. The customer is responsible for shipping charges of returned membrane element(s) / module(s). No goods will be accepted unless returned freight prepaid unless prior arrangements are made with the RGA Coordinator.
2. The customer/OEM will issue a P.O. number to Hydranautics for all examination and evaluation requirements of returned element(s) prior to any work being performed.
3. If membrane failure is not a result of materials or workmanship defects, the customer/OEM will be billed for evaluation charges. The membrane elements will either be disposed of or shipped back to the customer, per the customers' directive. The shipment will be charged freight collect.
4. All replacement elements / module(s) will be sent at full charge.
 - If the failure **is not** a result of materials or workmanship defects, the customer **will** be billed for evaluation charges and **will not** be issued warranty credit.
 - If the failure **is** a result of materials or workmanship defects, the customer **will not** be billed for evaluation charges and **will** be issued warranty credit.
5. If the membrane elements are not received by Hydranautics, San Diego, within **45 DAYS (North America)** and **60 DAYS (International)** of issuing the RGA, the file will be closed and the customer/OEM will be notified.
6. Hydranautics will try to make a complete membrane examination, including an evaluation report, within **4 weeks** of receipt of element(s) at Hydranautics in Oceanside, except in cases that involve outside laboratory analysis.
7. Under special circumstances, a Hydranautics representative will travel to the customer's premises and test the alleged defective elements / modules. If the element / module failure is **not** due to a materials or workmanship problem, the customer will pay Hydranautics **\$2000.00** per day plus direct travel expenses incurred by Hydranautics' employees in connection with any examination and testing of such elements / modules on buyer's premises.

NOTE!

Hydranautics will waive all evaluation charges if element(s) / module(s) failure is a result of materials or workmanship defects or if any specific warranties offered by Hydranautics apply. If this is the case, the Customer/OEM will be given new elements / modules at full charge and then Hydranautics will issue a credit to offset these charges.

NOTE!

Element / module cleaning will only be performed for determining the effectiveness of a specific cleaning reagent and for limited numbers. It is within Hydranautics *own discretion* to decide to perform this service. Cleaning charges are as follows:

2" to 4" membrane elements- **\$600.00** per element and per cleaning procedure.

6" to 8" membrane elements- **\$800.00** per element and per cleaning procedure.

Hydracap modules - **\$1800.00** per module.

Element (Non-evaluation) and other Products Return Procedure

Products other than membrane elements returned for evaluation can be returned to Hydranautics only after the following conditions have been met:

1. Product return has to be authorized by the Hydranautics RGA Coordinator.
2. An RGA number has been issued to the customer/OEM, and an RGA shipper has been obtained.

Products returned due to customer/OEM order error should be sent freight prepaid to Hydranautics.

Customers who choose to return unused elements must do so within 6 months of the original shipping date. These elements must have been properly stored according to TSB108. A restocking fee will apply; see "General Conditions" below. After 6 months, unused elements may not be returned for credit. Note, properly stored elements (TSB108) can stay in storage for many years and still perform within expected ranges. In some cases, use of elements that are stored for many years should be done according to the "Long Term Storage" recommendations in TSB108.

Products returned due to a Hydranautics error may be sent freight collect to Hydranautics if arrangements are made with the RGA Coordinator.

Packaging

All products that are to be returned to stock must be returned to Hydranautics in original packaging.

Product Inspection

All returned products will be inspected by Hydranautics Quality Assurance (QA) Department to determine product condition before returning to stock and before credit/exchange is issued to customer/OEM.

General Conditions

1. There will be a **15% or \$150.00**, whichever is greater, restocking charge applied to all products returned due to customer order error.
2. If returned products are determined to be defective upon inspection by quality control they will be returned to customer/OEM freight collect and no credit/exchange will be issued.
3. If products are not received at Hydranautics, Oceanside within **45 DAYS (North America)** and **60 DAYS (International)** of issuing the RGA, the file will be closed and the customer/OEM will be notified.
4. Any warranty conditions or other commercial agreements between Hydranautics and the customer will be applied.

Summary of Costs for Procedures

Procedure.....	Element Type or Module.....	Price
Inspection and Retest.....	2"-4" Diameter Membrane Element.....	\$200/element
	6"-8" Diameter Membrane Element.....	\$400/element
	Hydracap Modules.....	\$900 for 1 st ; \$500 for add'l
Full Autopsy.....	All Elements except Hydracap.....	\$2000/element
	Hydracap Module.....	\$2200 for 1 st Module; \$1500 for add'l
Dissection.....	All Elements except Hydracap.....	\$300/element
	Hydracap Module.....	\$700/module
Element Deshell/Reshell.....	4" Diameter Membrane Element.....	\$250/element
	6"-8" Diameter Membrane Element.....	\$500/element
Cleaning.....	2"-4" Diameter Membrane Element.....	\$600/element/cleaning procedure
	6"-8" Diameter Membrane Element.....	\$800/element/cleaning procedure
	Hydracap Modules.....	\$1800/module
Dye Test.....	All Elements.....	\$300/element
Laboratory Analyses		
Optical Microscopy.....	All Elements and Modules.....	\$100/sample
SEM/EDaX (includes both).....	All Elements and Modules.....	\$1000/sample
Cell Test.....	All Elements.....	\$200/sample
Carbonate Test.....	All Elements.....	\$100/sample
Fujiwara Oxidation Test.....	All Elements.....	\$300/sample
Weight Loss on Ignition.....	All Elements.....	\$300/sample
Physical Strength Test.....	All Elements and Modules.....	\$500/sample
Water Sample.....	Typically for Membrane Elements.....	\$300/procedure; \$2000 full spectrum
Foulant Deposit Sample.....	Typically for Hydracaps.....	\$300/procedure
Spent Cleaning Sol'n Sample.....	Typically for Hydracaps.....	\$300/procedure

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