

GE
Water & Process Technologies

Equipment Technical Specifications

PRO Series Premium Platform – AB



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Water & Process Technologies
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Minnetonka, MN 55343
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1 Scope of Work

The seller shall furnish all labor, equipment and materials required to manufacture and supply a complete skid-mounted reverse osmosis (RO) membrane treatment skid(s). The seller shall also furnish all labor, equipment and materials required for the automatic control of the RO skid using the components described below. The RO skid shall include one common control system that includes both a Programmable Logic Controller (PLC) and Human Machine Interface (HMI) panel supplied, programmed, and tested by the seller's in-house programmers prior to shipment. The PLC/HMI system will also control/monitor the following pretreatment and post-treatment equipment supplied by the seller to perform as a completely integrated water treatment system:

- Feed pump
- Multi-Media Filter(s) (maximum 2)
- Chemical Injection System(s) (maximum 3)
- Clean-In-Place (CIP) system
- Permeate Transfer Pump
- Permeate Storage Tank Level (analog or discrete)

2 Project Schedule

Manufacturing Completion	7 to 9 weeks ARO
Factory QA Test	<u>0.5 to 1 week AEC</u>
Total Delivery Schedule	8 to 10 weeks ARO

Note: ARO = After Receipt of Order, AEC = After Equipment Completion

3 Documentation

3.1 Drawings

Drawings and product data shall be provided for the equipment included in the scope of work. The seller shall submit the following documents after equipment fabrication.

- Process and Instrument Drawing (P&ID)
- General Arrangement Drawings
- Electrical Drawings
- High-pressure pump curves

3.2 Operation and Maintenance Manuals

Operation and maintenance manuals will be supplied for the equipment listed in the scope of work. The manuals shall include the following sections:

- Operation & Maintenance Instructions
- Equipment drawings
- Control narrative



- Vendor manuals and instructions where appropriate

Operation and maintenance manuals will be provided in electronic form via a CD-ROM compact disc.

4 Equipment Specifications

4.1 Pretreatment

4.1.1 Multi-Media Filtration – Mechanical Design

- The media filter design flow shall be rated at 60°F at a hydraulic loading not to exceed 7 gpm per square foot.
- The system shall include a flow transmitter on the inlet to monitor service and backwash flow.
- A sight glass shall be included on the backwash/rinse outlet of the unit for visual confirmation that no media is entrained in the backwash effluent and that the bed has been sufficiently rinsed prior to placing in service mode.
- Sample ports shall be provided on the inlet and outlet to allow for monitoring of the system as necessary.
- Each vessel shall include a manual air vent valve to prevent air lock while filling the units.
- The following media will be provided with each system to be loaded in the field: anthracite, silica sand, and gravel sub fill.

Table 1. Multi-Media Specifications

	PRO-MM-72	PRO-MM-84
Tank Diameter [Empty Weight]*	72-Inch [4,800 lb (2,177 Kg)]	84-Inch [5,900 lb (2,676 Kg)]
Surface Square Footage	28.3 Ft ² (2.63 m ²)	38.5 Ft ² (3.58 m ²)
Total Vessel Volume*	220 Ft ³ [1,650 Gal (6246 L)]	310 Ft ³ [2,320 Gal (8782L)]
Silica Sand Quantity (Weight)	57 Ft ³ [5,000 lbs (2268 kg)]	77 Ft ³ [6,750 lbs (3062)]
Anthracite Quantity (Weight)	28 Ft ³ [1,450 lbs (658 kg)]	38 Ft ³ [2,000 lbs (907 kg)]
Coarse Gravel (¾"x ½") (Weight)*	25 Ft ³ [2,500 lbs (1134 kg)]	31 Ft ³ [3,000 lbs (1360 kg)]
Medium (½"x ¼") (Weight)*	7 Ft ³ [700 lbs (318 kg)]	10 F Ft ³ (1,000 lbs (454 kg))
Fine Gravel (1/8"x1/16") (Weight)*	7 Ft ³ [700 lbs (318 kg)]	10 Ft ³ [1,000 lbs (454 kg)]
Service Weight*	28,000 lb (12,700 kg)	36,000 lb (16329 kg)
Service Flow Rate	Max 200 GPM (757 LMP)	270 GPM (1,022 LPM)
Service Flow Rate Load	7 GPM/ Ft ² (285 LPM/m2)	7 GPM/ Ft ² (285 LPM/m2)
Backwash Flow Rate	340 GPM (1287 LPM)	460 GPM (1741 LPM)



Backwash Flow Rate Load	12 GPM / Ft ² (489 LPM/m ²)	12 GPM / Ft ² (489 LPM/m ²)
Backwash Cycle Duration	15-20 min	15-20 Min
Rinse Flow	Rate Max 200 GPM (757 LPM)	270 GPM (1022 LPM)
Rinse Cycle Duration	5-7 min	5-7 min
Valve Type	Air to spring actuated butterfly, lugged type	Air to spring actuated butterfly, lugged type
Backwash timer / controller	AquaMatic 962	AquaMatic 962

*All quantities are estimates only.

4.1.2 Components

Each unit shall include air-actuated system valves with travel-stops on the tank face piping as manufactured by Bray or equal. A stager/controller shall be provided to operate the butterfly valves on the face piping. The AquaMatic® 962 Controller or equal is acceptable. The backwash and rinse cycles can be initiated automatically by the Controller based on time, or manually stepped through the stages at the controller's interface.

4.1.3 Materials of Construction

Vessels shall be constructed of epoxy lined carbon steel finished with a two-part epoxy primer with an aliphatic acrylic polyurethane overcoat. Face piping and internals shall be schedule 80 PVC.

Table 2. Materials of Construction

	MM-72	MM-84
Face Piping	Sch 80 PVC	Sch 80 PVC
Tank	Epoxy lined Carbon Steel, rated 100 psig (6.9 bar)	Epoxy lined Carbon Steel, rated 100 psig (6.9 bar)
Upper Distributor	316 SS 3-inch centered elbow	316 SS 4-inch centered elbow
Lower Distributor	PVC 3-inch hub and radial	PVC 4-inch hub and radial

4.1.4 Instrumentation

A flow transmitter shall be provided on the inlet of the media filtration system. A pressure gauge shall be located on the backwash inlet and outlet of the media filter.



Table 3. Media Filtration Instrumentation

Instrument	Signal	Manufacturer	Locations
Flow	Transmitter	GF Signet	Service inlet
Pressure	Indication	Flow-tek	Backwash inlet/outlet

4.1.5 Installation and Utility Requirements

A 120 VAC power supply is required to the controller.

Table 4. Installation and Utility Requirements

	MM-72	MM-84
Connections	3"	4"
Power Requirements	110VAC, 60 Hz to controller	110VAC, 60 Hz to controller
Pneumatic Requirements	80 - 100 PSIG (5.5 - 6.9 bar)	80 - 100 PSIG (5.5 - 6.9 bar)

4.2 Reverse Osmosis System

4.2.1 Mechanical Design

The RO system design flow rate shall be rated at 60°F. The system shall be designed for a recovery of 75 percent ($\pm 5\%$). The RO system shall be designed with a three-stage array.

Table 5. Membrane Element Array

Model	Banking	Housing Length	Membrane Element Quantity
PRO-50	1:1:1	4 long	12
PRO-100	3:2:1	4 long	24
PRO-150	3:2:1	6 long	36
PRO-200	6:4:2	4 long	48
PRO-300	6:4:2	6 long	72
PRO-450	9:6:3	6 long	108

Table 6. Flow Specifications at 75% Recovery*

Model	Permeate Rate (gpm)	Concentrate Rate (gpm)	Recycle Rate (gpm)	Feed Rate (gpm)
PRO-50	50	17	12	67
PRO-100	100	33	13.3	133



PRO-150	150	50	0	200
PRO-200	200	67	16.7	267
PRO-300	300	100	0	400
PRO-450	450	150	0	600

* Recovery rate can vary $\pm 5\%$.

Table 7. Feed Water Requirements

Temperature	Minimum: 35°F (2°C) Nominal: 60 – 75°F (16 – 24°C) Maximum: 85°F (29°C)
Inlet Pressure	Minimum: 30 psig (2.1 bar) Maximum: 60 psig (4.1 bar)
Chlorine (continuous feed)	0 ppm
Iron	< 0.1 ppm
LSI	Negative
Operating pH	4 – 9
Silt Density Index (SDI)	< 5

- The system shall have a 1-micron pre-filter. This filter shall be of melt-blown polyethylene construction. The flow per ten-inch equivalent (TIE) shall not exceed 5 gpm/TIE. This filter housing(s) shall be RO skid mounted.
- The system shall have a sufficient quantity of membrane elements not to exceed 18 gallons per square foot of membrane surface area per day.
- The system shall have a pneumatic inlet butterfly valve, which closes whenever the system is shut down. This valve shall open five seconds prior to the start of the high-pressure pump during normal start-up.
- The system shall have a high-pressure pump(s) with a TEFC motor rated 460 volts, 3 phase, 60 Hz with a service factor greater than 1.10. Multiple pumps in parallel shall be used if necessary to maintain an individual motor horsepower less than 100 Hp. The high-pressure pump shall be skid mounted with the RO system.
- The pump shall have a manual throttling stainless steel ball valve with gear operator on the outlet of the high-pressure pump(s) to control membrane pressure. If multiple pumps are provided, the valve shall be placed after the pump outlets are merged.
- Membrane housings shall have mechanical coupling connections for feed and concentrate. These ports must be mounted on the side of the housings. End entry high-pressure connections are not acceptable.
- Each element housing shall include a sample port to allow for monitoring the performance of each housing as necessary.
- Sample ports shall be provided on the feed, permeate, and concentrate lines to allow for monitoring of the system as necessary.
- The RO shall include an adjustable orifice plate in the concentrate line to set the system recovery. An orifice bypass line with manual ball valve shall be included to provide limited recovery variability to adjust cross-flow during the clean-in-place process. An adjustable orifice shall also be included on the recycle line, where applicable, to set the recycle flow rate.



- The system shall be designed to facilitate a full system cleaning procedure. The cartridge filter housings mounted on the RO skid shall be used during cleaning.
- The system shall include the provisions to implement an internal permeate flush upon shut down. As the machine shuts off during normal service, the inlet valve will remain open and the RO will operate recycling the permeate back to the inlet of the RO in order to flush the machine with clean permeate. The duration of the permeate flush procedure shall be adjustable at the RO system HMI.

4.2.2 Components

- Pretreatment cartridge filter housings shall be 316 stainless steel and accept industry standard replacement cartridges as manufactured by GE Water & Process Technologies or equal. Each housing shall have the capacity to hold seven cartridge filters.
- Pretreatment cartridge filters shall be melt-blown 100% polypropylene graded density filters rated for 1-micron GE Infrastructure Water & Process Technologies ROSave.Z® brand.

Table 8. Cartridge Filtration Pretreatment Schedule

Model	Filter Housing Quantity	Cartridge Filter Quantity per Change-out
PRO-50	1	7
PRO-100	1	7
PRO-150	2	14
PRO-200	2	14
PRO-300	3	21
PRO-450	4	28

- High-pressure pumps shall be multi-stage horizontal centrifugal type Tonkaflo® brand as manufactured by GE Infrastructure Water & Process Technologies or equal.

Table 9. High-Pressure Pump Models

RO Model	Tonkaflo Pump Model	Pump Quantity	Pump Horsepower
PRO-50	SS8516KC	1	25 HP
PRO-100	SS12512KZE	1	40 HP
PRO-150	SS24009KZE	1	60 HP
PRO-200	AS40407KZE	1	60 HP
PRO-300	AS40409KTE	1	75 HP
PRO-450	AS40409KTE	2	75 HP

- Membrane element housings shall be fiberglass reinforced plastic (FRP) designed to hold standard 8-inch diameter x 40-inch spiral-wound membrane elements. The housings shall be rated for a working pressure of 450 psi.
- Membrane elements shall be industry standard 8-inch diameter x 40-inch long spiral-wound. Elements shall be OSMO PRO RO 365 polyamide high rejection membrane (TFC) as manufactured by GE Infrastructure Water & Process Technologies.



Table 10. OSMO PRO RO 365 Membrane Element Specifications

Outer Cover Material	FRP
Typical Ionic Rejection (TDS)*	99.0 – 99.5%
Nominal Permeate Flow Rate at 225 psi (15.5 bar)	9,600 gpd (36.3 m ³ /day)
Maximum Temperature Range	32 – 122°F (0 – 50°C)
Operating pH Range	4.0 – 11.0
Chlorine Tolerance	1,000 ppm hours
Active Membrane Area	365 ft ² (33.9 m ²)

*Based on 24 hours of operation at 225 psig, 77°F, 7 – 8 pH, 2,000 ppm NaCl solution.

- Conductivity, pH, and ORP meters shall be panel-mounted with an in-line sensor as manufactured by Thornton.
- Paddle-wheel flow sensors to be GF Signet or equal.
- Pressure transmitters to be GE Sensing or equal.
- Pressure switches to be United Electric or equal.
- Low pressure on/off control valves shall be air actuated wafer-style butterfly valves as manufactured by Bray or equal.
- High-pressure throttling valves shall be stainless steel ball valves with gear operator as manufactured by Flow-tek or equal.

4.2.3 Instrumentation

- The system shall have a pH and ORP probe in the inlet line after the pre-filters. This probe shall be connected to the Thornton monitor in the RO enclosure.
- The system shall have a conductivity probe on the feed and permeate line of each system connected to a panel-mounted transmitter. The PLC will calculate and display rejection data based on conductivity values.
- Two flow meters (concentrate and permeate) shall be provided for each membrane system. The feed flow shall be calculated and displayed on the HMI.
- Pressure transmitters to be provided to monitor the primary and final pressure of the membrane element array. The individual pressures and the PLC calculated differential pressure shall be displayed on the HMI.
- Pressure switches to be provided on the pump suction, the concentrate outlet, and the permeate outlet.
- Pressure gauges shall be included pre-cartridge filter, post-cartridge filter, pre- and post- pump throttling valve, and before and after each housing bank. Pressure gauges shall also be included in the permeate and concentrate lines.



Table 11. System Instrumentation

Instrument	Signal	Manufacturer	Locations	
Flow Meters	Transmitter (from Thornton)	GF Signet	Permeate	Concentrate
Pressure Indicators	Local Indication	Ashcroft or equal	Before inlet cartridge filter	After inlet cartridge filter (<i>low alarm</i>)
			After high-pressure pump discharge	After pump throttling valve
			Post bank one concentrate line	Post bank two concentrate line
			Before concentrate orifice	After concentrate orifice, (<i>high alarm</i>)
			Permeate line	
Pressure Indicators	Transmitter	GE Sensing	After pump throttling valve	Before concentrate valve
pH/ORP	Transmitter	Thornton 770	Inlet	
Conductivity	Transmitter	Thornton 770	Inlet	Permeate
Temperature	Transmitter	Thornton 770	Permeate	

4.2.4 Materials of Construction

- The skid and frame of the system shall be manufactured of structural carbon steel. The finish shall be a two-part epoxy primer with an aliphatic acrylic polyurethane overcoat. The color shall be RAL 5019.
- Electrical enclosure to be NEMA 12 rated painted carbon steel. The color shall be the same as the skid and frame.
- The high-pressure pump shall have stainless steel or Noryl impellers.
- The pre-filter housings shall be stainless steel.
- The low-pressure piping (<100 psig) shall be schedule 80 PVC.
- The high-pressure piping (>100 psig) shall be schedule 10 304 stainless steel.
- The membrane housings shall be constructed of FRP or 316 stainless steel.
- All low-pressure valves shall be stainless steel with EPDM seats.
- All high-pressure valves shall be 304 stainless steel.



4.2.5 Installation and Utility Requirements

Table 12. Connections*

	PRO-50	PRO-100	PRO-150	PRO-200	PRO-300	PRO-450
Feed water Inlet	2"	3"	3"	4"	4"	6"
Permeate Outlet	2"	3"	3"	3"	4"	4"
Concentrate Outlet	1.5"	1.5"	1.5"	2"	2"	3"

*All connections are 125/150# I.P.S. Flanges

4.3 Clean-in-Place System

One cone-bottomed, polyethylene tank supported by a freestanding frame shall be included for recirculation of the cleaning chemicals. A single stage centrifugal feed pump with a TEFC motor shall be provided shipped loose for field installation. Clean-In-Place system shall be configured to utilize the cartridge filters mounted on the RO skid during the process.

Table 13. CIP Tank Schedule

Model	Tank Capacity (gallons)	Diameter	Height
CIP-50	250	47"	75"
CIP-100	250	47"	75"
CIP-150	400	47"	93"
CIP-200	550	64"	115"
CIP-300	1,000	86"	85"
CIP-450	1,000	86"	85"

Table 14. CIP Connection Schedule*

Model	Permeate Inlet	Concentrate Inlet	CIP Outlet
CIP-50	3"	1.5"	3"
CIP-100	3"	1.5"	3"
CIP-150	3"	1.5"	3"
CIP-200	3"	2"	3"
CIP-300	4"	2"	4"
CIP-450	4"	2"	4"

*All connections are 125/150# I.P.S. Flanges



Table 15. CIP Pump Schedule

Model	Pump Model	Power (HP)
CIP-50	Goulds SSH, 1X2-6	5
CIP-100	Goulds SSH 1.5X2.5-6	7.5
CIP-150	Goulds SSH 2X2.5-6	10
CIP-200	Goulds SSH 2.5X3-6	15
CIP-300	Goulds SSH 2.5X3-6	15
CIP-450	Goulds SSH, 3X4-8	20

4.4 Control System

4.4.1 Components

- The PLC shall be a SLC-5/04 as manufactured by Allen Bradley. Processor must be capable of transferring data via DH+ and DF1 communication protocols.
- HMI shall include a 6.5-inch PanelView Plus 700 color touch screen as manufactured by Allen Bradley.
- The Allen Bradley PLC shall be programmed with Rockwell Software RSLogix 500 industrial PLC programming software. The Allen Bradley PanelView Plus 700 terminal is programmed using the Rockwell Software RSView Studio ME OIT programming software. All programming software utilized shall be the latest revision.
- The touch screen shall have 18-bit resolution. The flat screen shall have the capability of providing 15 bits per pixel for a total of 32,768 colors for color TFT displays.
- The PanelView Plus 700 shall be powered with 18-32 VDC.
- Processor operating temperature shall be 0-60°C.
- The system shall include a programmable real time clock capable of reporting the current time in Year/Month/Day/Hour/Minute/Second.

Table 16. Input/Output

Description	Points/Module	Quantity
Discrete Input, 24VDC	16 pt	1
Output Relay	16 pt	1
Output Relay	8 pt	1
Analog Output, 0-20 mA	4 pt	1
Analog Input, 4-10 mA	8 pt	2

- The CPU shall be available with 1 serial port and 2 DH+ communication ports. The serial port is capable of communication at speeds up to 38.4 Kbaud using the DF1 or DH485 communication protocols. One 8-pin DH+ DIN connector is used for PLC programming while the remaining 3 terminal DH+ connectors can be used for programming or peer-to-peer communications. Up to 63 devices can be daisy chained to this port. Both DH+ ports can be configured to communicate at speeds up to 230.4 Kbaud.
- The PLC can be networked to other devices using the DH485 communication protocol (31 maximum devices) or the DH+ communication protocol (63 maximum devices).



- With the provided battery, data is retained for up to 24 months at 85 °C. An LED indicator on the face of the processor will denote when the battery capacity is low.
- The Windows compatible software shall provide the capability of reading, writing, and verifying the configuration and program.
- The programming software shall execute on a personal computer utilizing Windows 2000, Windows NT, or Windows XP OS platform.

4.4.2 Control Philosophy

The following components are controlled or monitored from the central processor.

- Multimedia Filters (up to two)
- Reverse Osmosis System
- Clean-In-Place pump
- Chemical Feed System(s)
- Permeate Storage Tank Level
- Permeate Transfer Pump
- Feed Pump

4.4.3 Alarms

The system shall have the following alarms:

- pH Alarm: High and Low alarm will shut down the machine if the pH is out of range.
- ORP Alarm: High alarm will shut down the machine if the ORP is out of range.
- High-Temperature: Adjustable; to automatically alarm and shut down the machine if the temperature goes above 105°F (40°C).
- Low Pump Inlet Pressure: Adjustable; switch is mounted in the feed line after the pre-filter. Should the pressure be less than the setting (typically 12 psig), the machine will shut down. This ensures a positive feed pressure to the main high-pressure pump.
- High-Pressure: Adjustable; switches are mounted in the permeate and concentrate lines. Should the pressure exceed the set point (usually 80 psig), the machine will immediately shut down.
- Permeate Tank Level: Adjustable; high and low level warnings.

5 Quality Assurance

All membrane elements will be tested for flow and rejection prior to installation. Test certificates for each element shall be maintained by seller and provided upon request. The entire membrane system shall have a wet pressure test prior to leaving the manufacturer's facility.

6 Storage Conditions

6.1 Shutdowns From 96 Hours to 1 Months

- Before storage procedure, the elements need to go through a CIP process and be flushed clean.
- Pump in a solution of 1% sodium bisulfite (food grade) and allow the elements to soak.
- The pH of the solution should be within 3.5-9.5 SU and monitored periodically. If it deviates from this range, a new solution should be used as long-term exposure to acidic or basic environments will harm the membranes.



- The concentration of bisulfite should be monitored periodically. If its concentration drops below 0.1%, then a new solution should be used.
- The temperature should be kept at 25°C or less.

6.2 Shutdowns longer than one month

- Before storage procedure, the elements need to go through a CIP process and be flushed clean.
- Unload the elements and allow them to drain and drip dry.
- Soak them in a solution of 1% sodium bisulfite (food grade) and 18% propylene glycol for 30 minutes. Monitor the concentrations of the soaking solution as it might become diluted over time and readjust accordingly.
- Allow the elements to drip dry. Put them in plastic bags and seal them. The bags should not contain the soaking solution.
- Store the elements in a cool, dark environment or have them boxed. The storage temperature should be kept between 10-20°C as lower temperatures lengthen storage life.

6.3 Preventing Freezing

If your machine is to be shipped or stored under circumstances that might cause freezing, completely drain the machine of all remaining water. Failure to do so may result in damaged pumps or piping. Do not the restart machine until it has been thawed for at least 24 hours.

6.4 Draining Machine

Prior to shipping or outside storage the system should be cleaned with the appropriate cleaner, flushed with water, and protected from biological attack with an appropriate solution. The membrane housings and piping lines of the machine must be completely drained. Any water remaining in the plumbing of a machine may freeze, causing damage to the piping, pump, membranes, etc.

7 WARRANTY AND CLAIMS

Seller warrants its products to be free from defects in material or workmanship for a period of 15 months from receipt or 12 months from start-up/first use of the product, whichever occurs first, but only when said products are operated at all times in accordance with Seller's written instructions. This warranty does not apply to replaceable parts or components normally subject to wear and replacement.

Unless stated specifically on a formal, official "Performance Warranty Document" signed by an officer or director-level employee of the Seller and an employee of the Buyer who is authorized to make such representations, there is no performance warranty on products or warranty on process results.

SELLER EXPRESSLY DISCLAIMS LIABILITY FOR INCIDENTAL AND/OR CONSEQUENTIAL DAMAGES INCLUDING, WITHOUT LIMITATION, LOST PROFITS. THIS WARRANTY IS MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. BUYER ASSUMES ALL LIABILITIES FOR USE AND MISUSE BY BUYER, ITS AGENTS OR ASSIGNEES.

Buyer shall give immediate notice in writing to Seller if products or components thereof or performance (where applicable) appear defective, and shall provide Seller with reasonable opportunity to make inspections, tests and repairs using the most efficient and cost-effective methods available for such products



or components. If Seller is not responsible under the terms of this document and/or any formal performance warranty, Buyer shall pay Seller the costs and expenses of such inspections, tests and repairs.

Seller's obligation under this warranty is limited to the repair or replacement at its factory, for the original user, of any product or component part thereof, which shall prove to have been defective. No allowance will be made for repairs or alterations made by Buyer without Seller's written consent or approval.

In no event shall Seller be liable to Buyer for any amount, including costs incurred or expended by Seller in attempting to correct any product deficiency, relating to any claim by Buyer against Seller in excess of the aggregate total purchase price under this contract. No charges or expenses incident to any claim will be allowed. The remedies provided herein are exclusive, and Seller shall incur no liability other than that stated herein.

Goods may not be returned to Seller without Seller's written permission. Seller will provide Buyer with a "Return Material Order" number to use for returned goods. All returns shall have freight and related costs prepaid by Buyer from point of origin.

Seller is not responsible for meeting state and local codes or ordinances, or other special codes not specifically stated in writing on the purchase document or contract.

TECHNICAL ADVICE - Seller may, at Buyer's request, furnish technical assistance, advice and information with respect to the products supplied under this contract, if and to the extent that such advice, assistance and information are conveniently available. Seller has no obligation to provide such information, which is provided without charge at the Buyer's risk, and which is provided subject to the limited warranty of paragraphs above.