



## **The Iron Curtain Filtration System**



**Chemical Free:**  
**No Potassium Permanganate**  
**No Salt**  
**No Chlorine**

**Guards Against:**  
**Iron Stains**  
**Iron Tasting Water**  
**Rotten Egg Odor**

  
***Hellenbrand***

## Hellenbrand's Iron Curtain™ System Means Quality and Reliability

The only Waunakee in the world, a village of nearly 9,000 people in South Central Wisconsin, is the home of Hellenbrand Water Conditioners, Inc. Waunakee, an Indian name that means "Peaceful Valley", is the ideal setting for a company with neighborly, small-town concern for its customers. Since it opened its doors in 1967, Hellenbrand has offered something you rarely find anywhere today -- well designed, quality products backed up with fast reliable service. These products have provided water solutions to the water treatment industry in the U.S. and around the world. Perhaps the best example of this, is the Patented Hellenbrand Iron Curtain Filtration System.

Patented in 1992, Hellenbrand has sold thousands of Iron Curtain Filtration Systems for a wide range of applications including: residential homes, irrigation systems, trailer parks, schools, motels, hotels, restaurants, industry, fish farms, food processing plants, livestock applications and pre-treatment for ground water reclamation applications.

## Our Revolutionary Design Means Efficient Operation

The Iron Curtain is unlike old fashioned iron filters. Its unique operation reduces the cost and maintenance while delivering years of trouble-free service.



- Requires no chemicals such as potassium permanganate, chlorine or salt for operation or regeneration. Just imagine the chemical cost savings and problems associated with hazardous chemicals like potassium permanganate.
- Requires no air injectors, venturis, or micronizers, eliminating both excessive pressure drops and service problems associated with these.
- Precipitates and removes dissolved, soluble and/or colorless Ferrous Iron Fe<sup>++</sup> and removes, insoluble and/or "red water" Ferric Iron Fe<sup>+++</sup> in high concentrations.
- A wide range of system designs are available to meet both your service flow rate and backwash rate requirements. The two most critical elements in filtration design.

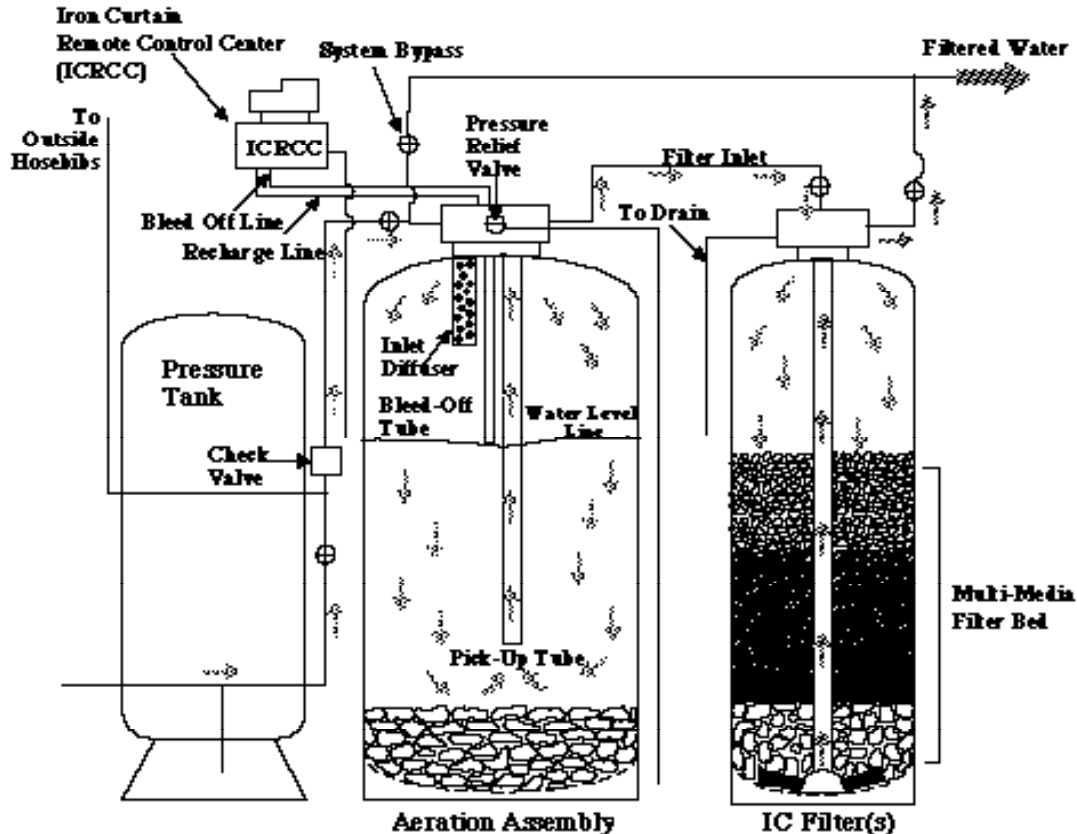
## Manganese Greensand Chemical Cost Comparison

PARAMETERS Capacity per Cu. Ft	IRON CURTAIN 10,000 mg/l	MANGANESE GREENSAND 10,000 mg/l (1)
Potassium Permanganate (KMNO4) Required	none	2 -4 oz. per cu. ft.
<u>EXAMPLE APPLICATION</u> Raw Water	3 ppm Fe Iron	3 ppm Fe Iron
Gallons/Day Removal	10,000	10,000
Removal Mg/L per Day	30,000	30,000
Cu. Ft. Filter Req'd.	3	3
KMN04 Oz/Day Required	none	6 - 12 oz.
KMN04 Lbs/Year Required	none	137 - 274 Lbs.
KMN04 Cost @ \$5/Lb	none	\$685 - \$1,370
(5) Year KMN04 Cost	none	\$3,425 - \$6,850

1. Removal Capacities for Manganese Greensand  
For Iron Fe<sup>++</sup> Alone 10,000 mg/l Fe/Cu.Ft.  
For Manganese Mn<sup>++</sup> Alone 5,000 mg/l Mn/Cu.Ft.  
For Hydrogen Sulfide H<sub>2</sub>S Alone 2,000 - 3,000 mg/l H<sub>2</sub>S/Cu.Ft.  
Source: Inversand Company Bulletin: RV2 1-87
2. KMNO<sub>4</sub> costs do not reflect the ordering, shipping, handling, mixing and storage of this hazardous chemical.

## Iron Curtain Operation

Operation of the Iron Curtain™ system is simple. Mineral rich water is forced through a pressurized aeration tank which converts dissolved Ferrous Iron ( $\text{Fe}^{++}$ ) into physical particles as Ferric Iron ( $\text{Fe}^{+++}$ ). These tiny mineral particles then circulate in the system for enough time to grow to a size large enough to be trapped in the filter. This way the highest level of dissolved minerals can be easily removed from your water. Imagine no more iron stains, iron taste or rotten egg odor.



*Hellenbrand's reputation for being a very strong service oriented organization, is displayed throughout the system design. Well thought out design, simple operation and reliable controls make the Iron Curtain System the standard in which all other systems are judged.*

## Performance

For iron to oxidize and precipitate within the filter system at the various flow rates shown, the influent water must have:

1. A pH of at least 6.8. If the pH is below this, it should be increased accordingly.
2. No organics such as tannins. Organics may prevent the oxidation process from occurring.
3. Sequestering agents such as polyphosphates must not be present. They also prevent the oxidation process from occurring.
4. Manganese is not effectively removed by oxidation filtration, unless the pH is 8.5 or higher. When it is not practical to increase the pH to this level, manganese should be removed by ion exchange.
5. If Hydrogen sulfide is present, it will consume the oxygen in the water very quickly, leaving less available for oxidizing and precipitating the iron. Going to a larger aeration tank(s) and more frequent recharge of the aeration system and a special media bed for hydrogen sulfide applications will improve the results for these types of applications dramatically. **Always use the special hydrogen sulfide media bed, when hydrogen sulfide levels are above 2 ppm.**

# Single, Twin, Triplex and Fourplex Iron Curtain™ Sizing Guide for Commercial Applications

Hellenbrand offers a wide range of filter designs to meet both end-user and dealer needs, including fiberglass, polyglass and composite tanks with top-mounted controls and steel tank systems with side-mount controls.

The following Iron Curtain Application Sizing Guide will provide you with a quick reference to various system designs including single, twin and multiple filter systems to meet your particular application needs for service flow rate and backwash rate requirements.

## Sizing Instructions

1. Select the filter(s) that meets both your service and backwash rate requirements. Water service supply must be able to maintain backwash rate at a minimum of 30 psi.

NOTE: Filter backwash rates are always higher than service flow rates. The available backwash water in gallons per minute (gpm) at a minimum continuous pressure of 30 psi, will limit the size of the filter for your application. For most applications multiple filters will be needed to obtain the necessary service flow rate. Multiple filters are also necessary when there is a continuous need for filtered water. Backwashing and rinsing with filtered water is recommended for higher water quality.

2. Select the correct aeration tank that meets the service flow rate needed. See next page for aeration tank options.
3. Select the correct Iron Curtain Remote Control Center (ICRCC) for the aeration tank selected.

## Service Flow Rates (GPM)

Model No.	Sq. Ft. Area	Filter Tank Size	Single Flow Rate			Twin Flow Rate			Tri-Plex Flow Rate			Four-Plex Flow Rate			Backwash Rate GPM <sup>1</sup>
			Continuous <sup>1</sup> 3 gpm	5 gpm	Peak <sup>2</sup> 7 gpm	Continuous <sup>1</sup> 3 gpm	5 gpm	Peak <sup>2</sup> 7 gpm	Continuous <sup>1</sup> 3 gpm	5 gpm	Peak <sup>2</sup> 7 gpm	Continuous <sup>1</sup> 3 gpm	5 gpm	Peak <sup>2</sup> 7 gpm	
IC-10	.545	10x54 PG	1.6	2.7	3.8	3.2	5.4	7.6	4.8	8.1	11.4	6.4	10.8	15.2	5
IC-12	.785	12x52 PG	2.4	3.9	5.5	4.8	7.8	11.0	7.2	11.7	16.5	9.6	15.6	22.0	8
IC-13	.921	13x54 FRP	2.8	4.6	6.4	5.6	9.2	12.8	8.4	13.8	19.2	11.2	18.4	25.6	10
IC-14	1.07	14x65 FRP	3.4	5.3	7.5	6.8	10.6	15	10.2	15.9	22.5	13.6	21.2	30.0	12
IC-16	1.38	16x65 FRP	4	7	10	8	14	20	12	21	30	16	28	40	15
IC-18	1.76	18x65 PG	5	9	12	10	18	24	15	27	36	20	36	48	20
IC-21	2.4	21x62 FRP	7	12	17	14	24	34	21	36	51	28	48	68	25
IC-24	3.14	24x71 FRP	9	16	22	18	32	44	27	48	66	36	64	88	35
IC-30	4.9	30x72 PG	15	25	34	30	50	68	45	75	102	60	100	136	50
IC-36	7.06	36x72 PG	21	35	49	42	70	98	63	105	147	84	140	196	70
IC-42	9.62	42x60 STL	29	48	67	58	96	134	87	144	201	116	192	268	115
IC-48	12.57	48x60 STL	38	63	88	76	126	176	114	189	264	152	252	352	150
IC-54	15.90	54x60 STL	48	80	111	96	160	222	144	240	333	192	320	444	190
IC-60	19.63	60x60 STL	59	98	137	118	196	274	177	294	411	236	392	548	235
IC-66	23.76	66x60 STL	71	119	166	142	238	332	213	357	498	284	476	664	285

<sup>1</sup>Backwash rates are based upon water temperature of 50°. Warmer water temperatures require higher backwash rates.

1. See definition of Continuous Flow Rates on Page 5.
2. See definition of Peak Flow Rates on Page 5.

## Flow Rates

**Continuous Flow** The process where a steady flow of water is being processed for treatment through the filter system. Typical flow rates for continuous flow filter applications are from 3-5 gpm/sq. ft. of surface area.

For iron removal only, with no outside interference for oxidation, the 5 gpm/sq. ft. flow rate for continuous flow may be used.

For iron and manganese and/or hydrogen sulfide removal, use the 3 gpm/sq. ft. flow rate for continuous flow.

**Peak Flow** Interrupted patterns of water usage which occur in a commercial business, as opposed to the steady flow patterns common in industry, such as factories. Flow rates for peak flows are from 5-7 gpm/sq. ft. of surface area.

**Residential Homes** Service flow rates for residential homes for intermittent usage may be increased up to 7 - 10 gpm/sq.ft of surface area. These flow rates should not be used for irrigation systems, filling up whirlpool type tubs or swimming pools.

**Square Foot of Surface Area** The amount of surface area based on the tank diameter of the filter tank for that model.

## Aeration Tank Sizing

The chart below may be used as a guideline for sizing aeration tanks for your particular application. On some water supplies, additional contact time may be needed to fully oxidize the contaminants you're trying to remove, such as hydrogen sulfide or manganese. Other contaminants in your water supply which you may not have tested for, could also have an oxygen demand and/or require additional contact time to effectively oxidize iron, manganese and/or hydrogen sulfide.

### Polyglass and/or Fiberglass Top Inlet & Outlet

Tank Size	Contact Gallons	Flow Rate		ICRCC <sup>3</sup> Model No.
		Cont. GPM <sup>1</sup>	Peak GPM <sup>2</sup>	
10 x 54	10.8	3.6	5.4	60407-405
12 x 52	14.6	4.9	7.3	60407-405
13 x 54	18.0	6.0	9.0	60407-405
14 x 65	26.8	8.9	13.4	60407-405
16 x 65	32.4	10.8	16.2	60407-405
18 x 65	44.0	14.7	22.0	60407-405
21 x 62	54.0	18.0	27.0	60407-607
24 x 71	79.2	26.3	39.6	60407-607
30 x 72	122.0	40.7	73.3	60407-607E/HD
36 x 72	163.0	54.3	81.5	60407-607E/HD
<sup>4</sup> 42 x 72	224.4	74.8	112.2	7G3
<sup>4</sup> 48 x 78	305.6	101.9	152.8	7G5

**NOTE:** On applications requiring higher flow rates than shown for the aeration systems below, two aeration tanks may be used. When using two or more aeration tanks, top tank inlet and bottom tank outlet must be used when using one ICRCC. Top only inlet/outlet aeration tanks may be used with individual ICRCC for each aeration tank. Consult factory for ICRCC sizing.

### Steel Aeration Tanks Top Inlet & Bottom Outlet

Tank Size	Contact Gallons	Flow Rate		ICRCC Model No.
		Cont. GPM <sup>1</sup>	Peak GPM <sup>2</sup>	
30 x 60	133	44	67	60407-607E/HD
36 x 60	196	65	98	60407-607E/HD
42 x 60	271	90	136	7G5
48 x 60	365	121	183	7G5
54 x 60	469	156	235	7G5
60 x 60	588	196	294	7G7
66 x 60	722	241	361	7G7
72 x 60	875	292	438	7G7

<sup>1</sup> Designed to provide a minimum of 3 minutes contact time at the flow rate shown. Use this rating for iron and manganese and/or hydrogen sulfide removal.

<sup>2</sup> Designed to provide a minimum of 2 minutes contact time at the flow rate stated. Use this rating for iron removal only.

<sup>3</sup> ICRCC - Iron Curtain Remote Control Center with aeration pump assembly needed for this aeration tank size.

<sup>4</sup> 42"x48" Aeration tank assemblies have a 3" top inlet and 3" bottom outlet connection.

# Commercial Sizing For Hellenbrand Iron Curtain Filtration Systems

Job Name: \_\_\_\_\_ Date: \_\_\_\_\_

Address: \_\_\_\_\_

Contact Person: \_\_\_\_\_ Telephone: \_\_\_\_\_

Dealer: \_\_\_\_\_ City: \_\_\_\_\_

Dealer Contact Person(s): \_\_\_\_\_

Dealer Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

## A. Application

- |                                     |                                     |  |                                     |
|-------------------------------------|-------------------------------------|--|-------------------------------------|
| <input type="checkbox"/> Home       | <input type="checkbox"/> Restaurant | <input type="checkbox"/> Mobile Home Park      | <input type="checkbox"/> Motel      |
| <input type="checkbox"/> Laundry    | <input type="checkbox"/> School     | <input type="checkbox"/> Ground Water Clean-Up | <input type="checkbox"/> Fish Farm  |
| <input type="checkbox"/> Livestock: | <input type="checkbox"/> Apartment  | <input type="checkbox"/> Nursing Home          | <input type="checkbox"/> Irrigation |
| # _____ Dairy Cows                  | # _____ Beef Cows                   | # _____ Hogs                                   |                                     |
| # _____ Horses                      | # _____ Sheep                       | # _____ Chickens                               |                                     |
| # _____ Turkeys                     | # _____ Other (specify) _____       |  |                                     |

## B. Describe any special circumstances for this application

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

C. Hours per day operation \_\_\_\_\_ Days per week -  5  6  7

## D. Water requirements

- (a) Constant flow rate \_\_\_\_\_ gpm Peak flow rate \_\_\_\_\_ gpm
- (b) Daily water usage/24 hours \_\_\_\_\_ gal
- (c) Monthly water usage \_\_\_\_\_  gal \_\_\_\_\_  cu. ft.
- (d) Water usage was determined by:
- Water Bill  Flow Meter  Fixture Count  Other

## E. Raw Water Test

Iron \_\_\_\_\_ mg/l Manganese \_\_\_\_\_ mg/l pH \_\_\_\_\_

Hydrogen Sulfide \_\_\_\_\_ mg/l Total Dissolved Solids \_\_\_\_\_ mg/l

Hardness \_\_\_\_\_ gpg Total Alkalinity \_\_\_\_\_ mg/l

Tannins \_\_\_\_\_ mg/l Iron Bacteria Present \_\_\_\_\_ yes \_\_\_\_\_ no

(If multiple wells are used, include water analysis or sample for each well.)

## F. Water Supply Information

- City Water  Supply Well  Other specify \_\_\_\_\_
- Well Casing Diameter \_\_\_\_\_ Well Depth \_\_\_\_\_
- Well Pump Capacity \_\_\_\_\_ GPM Operating pressure \_\_\_\_\_ to \_\_\_\_\_ psi
- Supply pipe size \_\_\_\_\_ inches
- Is there more than one well? \_\_\_\_\_ If so, please specify: \_\_\_\_\_
- Pressure at point of installation \_\_\_\_\_ psi
- Number of floors in building \_\_\_\_\_
- Minimum pressure allowed after unit \_\_\_\_\_ psi
- Available drain line size \_\_\_\_\_ inches

**G. Installation details or limitations**

Available floor space:

\_\_\_\_\_ length x \_\_\_\_\_ width/depth x \_\_\_\_\_ height

\_\_\_\_\_ Concrete floor \_\_\_\_\_ Weight limitations

Door openings \_\_\_\_\_ width x \_\_\_\_\_ height

Stairway limitations \_\_\_\_\_

\_\_\_\_\_

Any unusual installation requirements \_\_\_\_\_

\_\_\_\_\_

**H. Existing equipment at this project**

Tank size \_\_\_\_\_" diameter x \_\_\_\_\_" height - Number of filter tanks \_\_\_\_\_

Valve size \_\_\_\_\_" Make \_\_\_\_\_ Model \_\_\_\_\_

Approximate age \_\_\_\_\_ years

**I. Please list any special equipment requests such as:**

\_\_\_\_\_ External backwash water source

\_\_\_\_\_ No raw water by-pass during regeneration

\_\_\_\_\_ Filtered water for regeneration

\_\_\_\_\_ Number of filters desired (single, twin, tri-plex, four-plex . . . etc.)

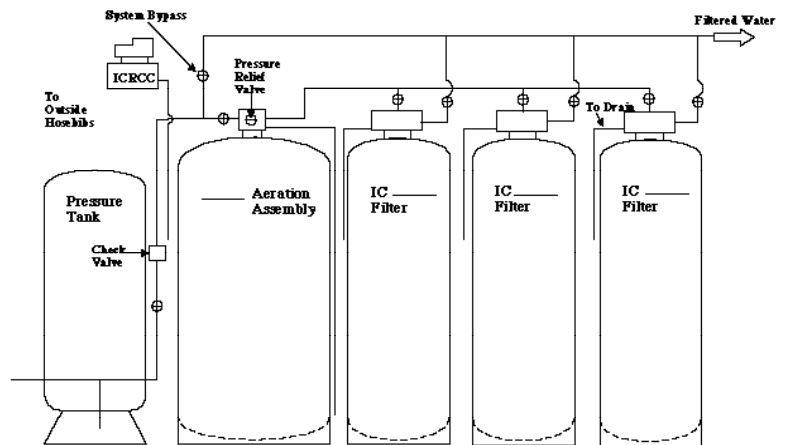
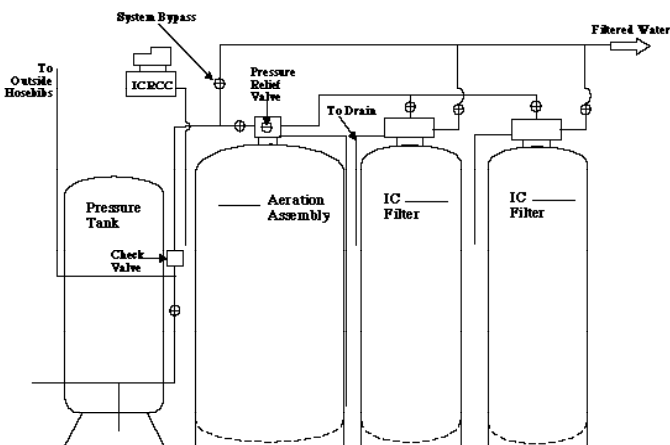
\_\_\_\_\_ 110 volt \_\_\_\_\_ 220 volt

\_\_\_\_\_ Pnuematic Control Pressure

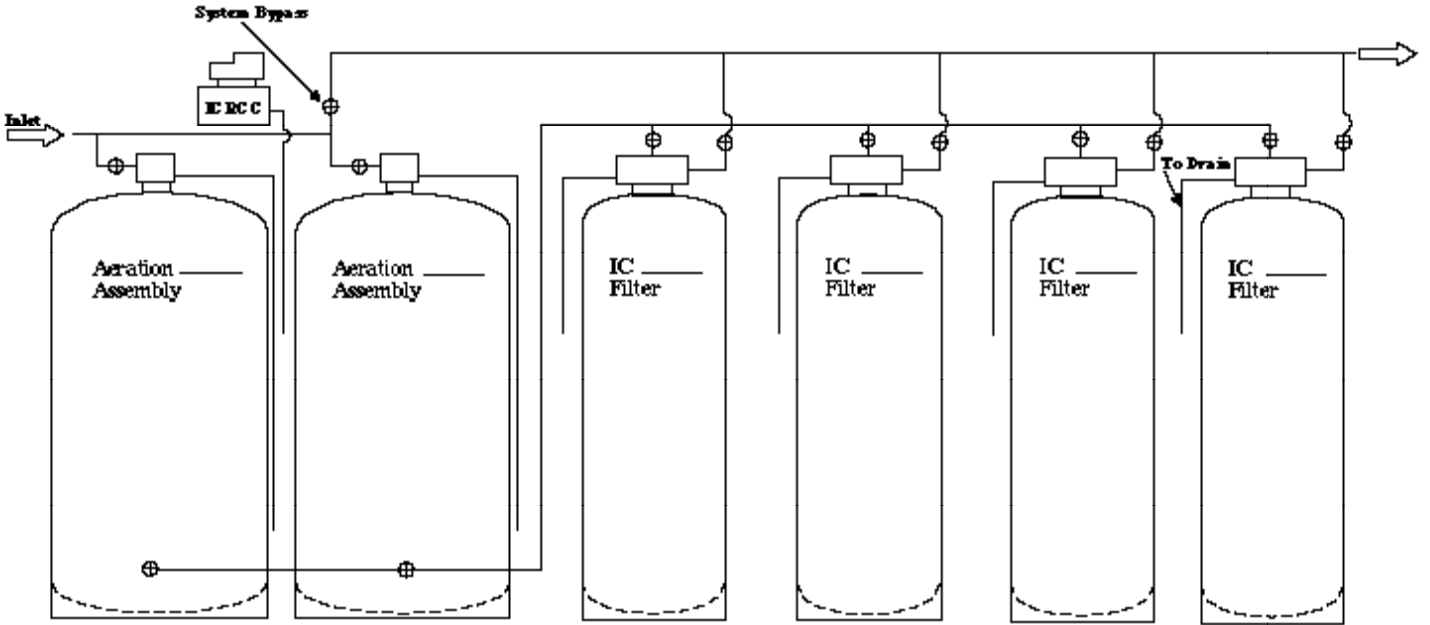
\_\_\_\_\_ Other (specify) \_\_\_\_\_

Twin with Remote - Top Mount Design

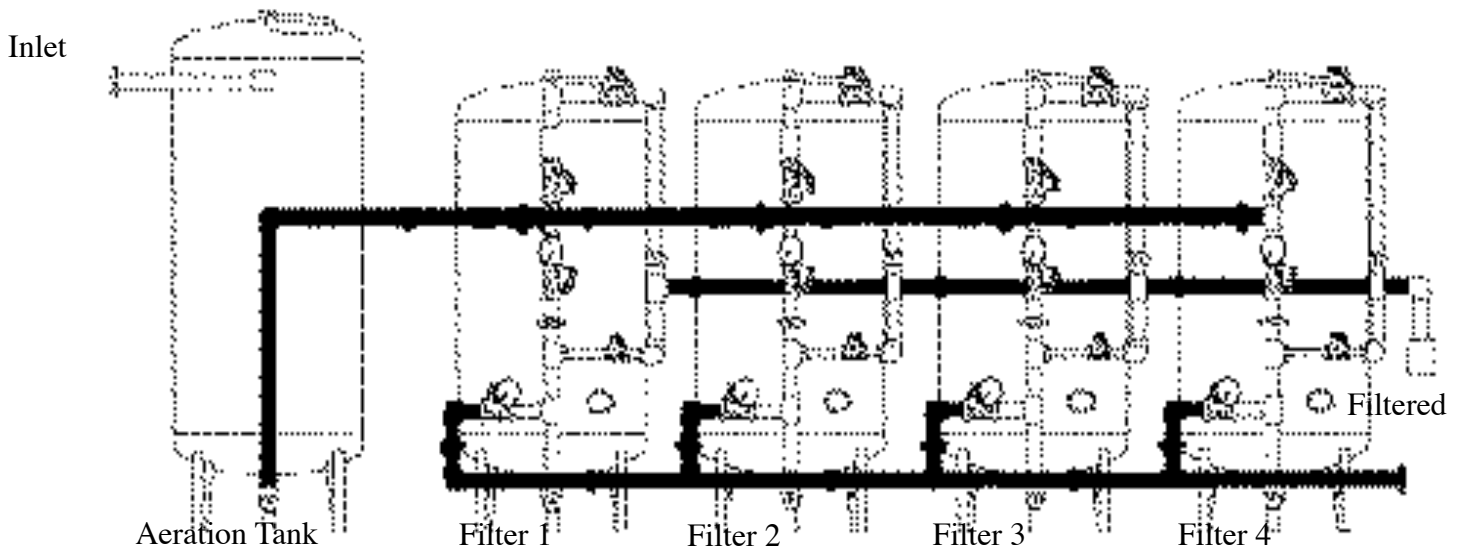
Tri-Plex with Remote Top-Mount Design



## Four-Plex with Twin Aeration Tanks, Top-Mount Design



## Valve Nest with Side-Mount Design-(ICRCC Not Shown)



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### HELLENBRAND WARRANTY

Hellenbrand warrants every Iron Curtain in accordance with the Magnuson-Moss Warranty Act. Ask your Iron Curtain Dealer for full details.