COMMERCIAL

HUF®

HIGH-CAPACITY ULTRAFILTRATION

ENGINEERING GUIDE

seccua®
German Hollow-Fiber Membrane Technology

Point-of-Entry Systems

LEGIONELLA & PATHOGEN CONTROL

WCC
Where NATURE & SCIENCE meet.™

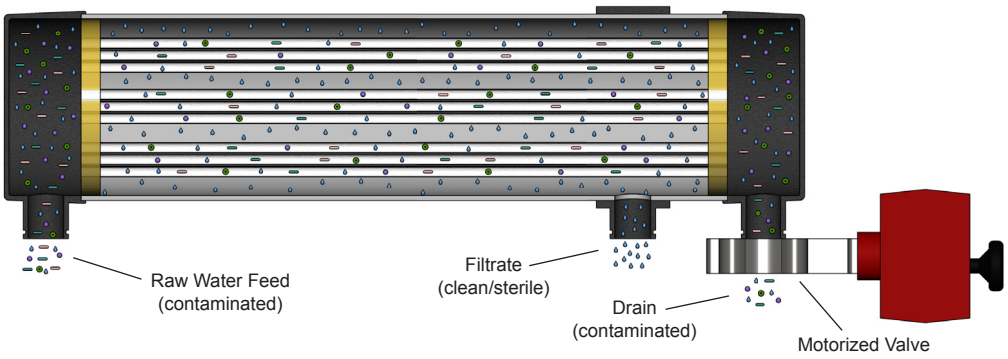
Water Control Corporation
An Employee-Owned Company

HUF®

LEGIONELLA & PATHOGEN CONTROL MADE SIMPLE

WCCaa offers several High-Capacity Ultrafiltration (HUF®) tools in the fight to control Legionella *and pathogen levels in building water systems. Our HUF® systems filter out nearly ALL bacteria, parasites, viruses, and nutrient particulates, with minimal pressure loss. This keeps systems clean, reducing biofilms, fouling, corrosion, and risk of disease outbreak.*

HOW IT WORKS: *High-Capacity Ultrafiltration (HUF®) utilizes hollow-fiber membrane technology to catch and remove virtually ANY non-dissolved particulates from flowing water, including (but not limited to) bacteria, protozoans, viruses, and biological nutrients. The filters are comprised of hundreds of tiny 'straw-like' membranes. Raw water enters via the 'straw' end. Each membrane has millions of microscopic pores along its surface. The pores are so tiny that water and disinfectants flow through freely, yet microorganisms and other suspended solids remain trapped inside. System controls continuously monitor flow rate vs pressure loss. When the membranes begin to foul (and lose their permeability), a drain valve is opened at the opposite 'straw' end. Water flows out to drain at high-velocity, carrying away the particulates. The membranes are clean and the system goes back into service.*

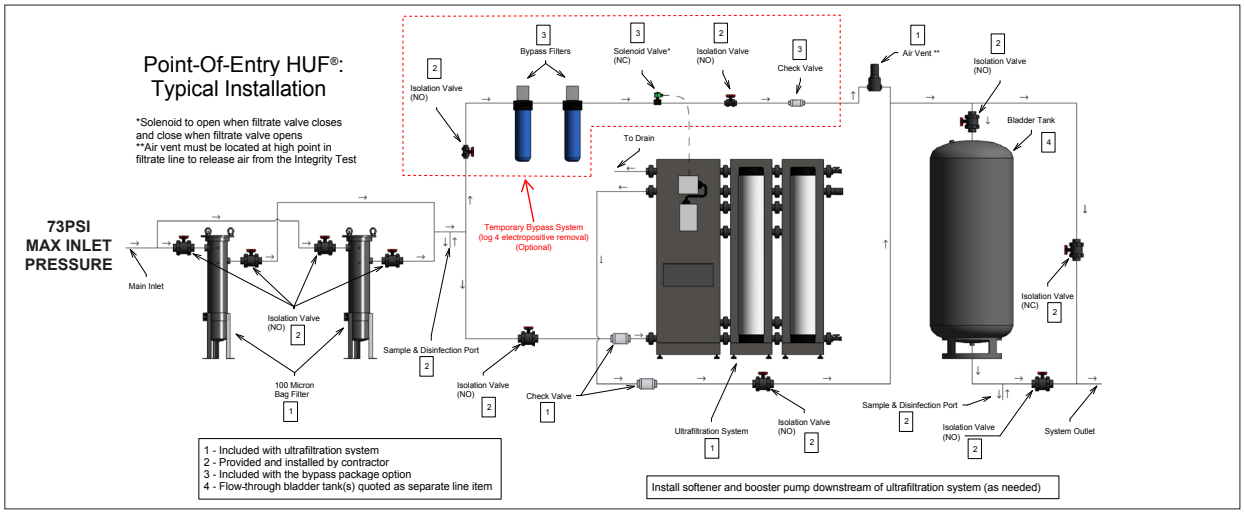


Features:

- >99.999% bacterial, protozoan, and sediment reduction. >99.99% viral reduction (third party verified)
- <0.02µ absolute filtration
- Flow-through filter design (no constant waste stream) with minimal pressure loss
- Dissolved substances remain in water (disinfectants, minerals, etc.)
- Long membrane life (10+ year typical) with EPA-compliant integrity verification system (included)

seccua®

Water Control proudly features hollow-fiber membrane systems by German innovators Seccua GmbH



System and accessory characteristics (including dimensions) are subject to change without notification.

POINT-OF-ENTRY SYSTEMS: Standard Units

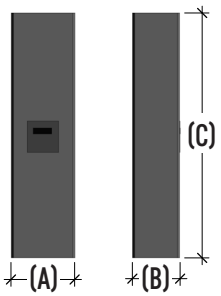
TYPICAL SYSTEM SPECIFICATIONS												
System	# of membranes	Continuous Flow GPM[1]				Short Term Peak GPM[2] (flush valve % of total fixture units)[3]			Standard Hydro Tank Vol (gal)	Req. Space (LxWxH)[4] (inch)	Connections (inch)[6]	Flush Volume (gal)[7]
		5 PSID	10 PSID	15 PSID	20 PSID	60 sec draw (0-25%)	45 sec draw (26-50%)	30 sec draw (51+%)				
Virex Pro	2	6	8	10	12	39	47	65	106	70 x 32 x 78 [5]	1 NPT	1
Phoenix GT-1	1	40	56	69	79	119	132	158	158	124 x 36 x 84 [5]	2 FLG	4
Phoenix GT-2	2	71	101	124	143	196	213	249	211	146 x 48 x 84 [5]	3 FLG	9
Phoenix GT-3	3	94	132	162	187	293	328	398	211 x 2	204 x 48 x 84 [5]	3 FLG	13
Phoenix GT-4	4	108	153	187	215	373	426	532	211 x 3	262 x 48 x 84 [5]	4 FLG	17

[1]Assumes 50°F, reasonable-quality city water supply and normal membrane fouling
[2]Equals possible GPM flow for indicated draw duration @20 PSID, using 25% of nominal hydro tank volume
[3]Percentage of total calculated fixture units derived from flush valves and other "short-cycle" fixtures
[4]Other configs. possible. Includes (bag) pre-filter(s) and standard hydro tanks
[5]Virex Pro filter unit is wall-mounted. All other systems (including pre-filters and hydro tanks) are floor-mounted
[6]Drain line connection is 1" on Virex Pro and 2" on all GT models
[7]Standard flush duration is 10 seconds (may be increased, dependent on feed water quality)

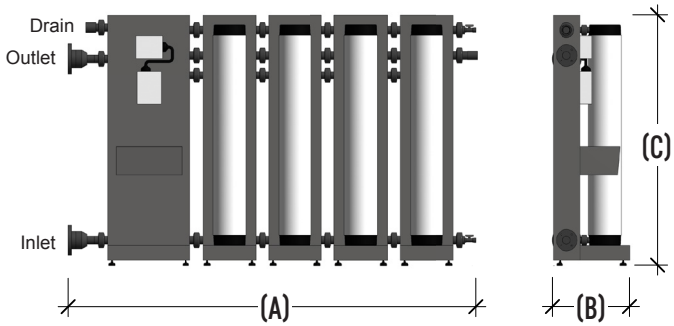
Standard System Dimensions:

(May be assembled for left side or right side connections)

Virex Pro



Phoenix GT-Systems



System Dimensions & Weights				
Model	Length (A) (in)	Width (B) (in)	Height (C) (in)	Weight (lb)
Virex Pro	14	10.5	53.75	154
Phoenix GT-1	55.75	23	75	400
Phoenix GT-2	75.5	23	75	600
Phoenix GT-3	94.5	23	75	800
Phoenix GT-4	114.75	23	75	1000

Materials of Construction:

- Membranes: Modified polyethersulfone (PES) (hydrophilic, no plasticisers)
- Membrane potting material: Polyurethane
- Membrane housings: UPVC
- System piping: Sch. 80 PVC (std), 304 SS (optional)
- Skid base: 304 stainless steel

ALL WETTED COMPONENTS ARE NSF/ANSI 61 COMPLIANT

Operating Parameters	
Min/Max Water Temp	39°F / 104°F
Min/Max Room Temp	34°F / 104°F
Max Inlet Pressure[1]	73 PSI
Max ΔP Across Membrane[2]	36 PSID
Chlorine Tolerance	200,000 PPM hours[3]
Max Chlorine Concentration	200 PPM
Required Pre-Filtration[4]	100µ
Electrical Requirements	120V, 60 Hz, 7FLA[5]

[1]Exceeding max operating pressure will damage membrane. Utilize PRV if needed. Avoid water hammer
[2]Exceeding 36 PSID during filtration may damage membrane (system will automatically shut down)
[3]Equals chlorine concentration (PPM) x hours of operation
[4]Pre-filters are included with system quotation. In challenging water applications, additional pre-treatment may be required.
[5]Certain accessories may increase FLA requirements

POINT-OF-ENTRY SYSTEMS: Additional Components

100 Micron Pre-Filter Assemblies (included):

All Point-of-Entry HUF® systems include a required 100 micron pre-filter assembly (field installed) for membrane protection. 2 housings are provided for redundancy. Contractor to install in parallel, with isolation valves on each housing. Inlet/outlet pressure gauges recommended.

Pre-Filter Assembly

Pre-Filter Assembly Dimensions & Weights							
Model	Filter Type	Replacement Filter	Housing Material	Mount	Connection (in)	Housing Dimensions (in) (L x W x H)	Approx. Ship Weight (lb) (ea)
Virex Pro	4.5" x 20" BB	PS355226-43	Polypro	Wall	1	7.5 x 7.5 x 23.75	7.5
Phoenix GT-1	#2 Bag	BEG-100-2S	304 SS	Floor	3	16 x 16 x 50	83
Phoenix GT-2	#2 Bag	BEG-100-2S	304 SS	Floor	3	16 x 16 x 50	230
Phoenix GT-3	#2 Bag	BEG-100-2S	304 SS	Floor	4	16 x 16 x 50	250
Phoenix GT-4	#2 Bag	BEG-100-2S	304 SS	Floor	4	16 x 16 x 50	250

In challenging water applications, additional pre-treatment may be required.
Automatic backwashing filters also available (please inquire)

Hydropneumatic Tanks (Quoted Separately):

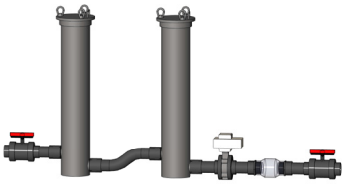
WCC recommends Wessels TXA Series™ (or comparable) full-acceptance expansion tanks with flow-through connections for prevention of stagnant water. Multiple tanks to be piped in reverse-return. Recommended dry-tank air charge: street pressure less 20 PSI.

Hydropneumatic Tank
(Photo courtesy of Wessels)

Hydropneumatic Tank Dimensions & Weights							
Model	Recommended Tank Model	Tank Volume (ea)	Tank Material	Bladder Material	Connection (in)	Dimension (in) (Dia x H)	Approx. Ship Weight (lb) (ea)
Virex Pro	TXA-400-FF (x1)	106	Carb. Steel	Butyl (NSF)	1.5	30 x 49	315
Phoenix GT-1	TXA-600-FF (x1)	158	Carb. Steel	Butyl (NSF)	2	30 x 65	378
Phoenix GT-2	TXA-800-FF (x1)	211	Carb. Steel	Butyl (NSF)	2	32 x 76	503
Phoenix GT-3	TXA-800-FF (x2)	211	Carb. Steel	Butyl (NSF)	2	32 x 76	503
Phoenix GT-4	TXA-800-FF (x3)	211	Carb. Steel	Butyl (NSF)	2	32 x 76	503

Optional Filtered Bypass Assemblies:

Bypass kits (field installed) include 24V motorized (NO) valve, controller, inline check valves (x2), inline isolation ball valves(x2), filter housings, and double-pleated electropositive cartridge filters (99.99% bacterial removal, 6-month intermittent/up to 10-day continuous use). Contractor to install in series for redundancy.



Bypass Assembly

Bypass Assemblies Dimensions & Weights										
Model	Service Flow Rate (GPM)	# of Filter Housings	Cartidges per Housing	Electropositive Filter Size (in)	Replacement Cartridge	Housing Material	Mount	Component Connection (in)	Housing Dimensions (in) (L x W x H)	Total Ship Weight (lb)
HUF-BP-30	30	2	1	4.5 x 20	P4.5-20DP	Polypro	Wall	1.5	7.5 x 7.5 x 23.75	37
HUF-BP-60	60	4	1	4.5 x 20	P4.5-20DP	Polypro	Wall	1.5	7.5 x 7.5 x 23.75	67
HUF-BP-96	96	2	4	2.5 x 40	P2.5-40DP	304 SS	Floor	3	12 x 10.25 x 52.25	226
HUF-BP-120	120	2	5	2.5 x 40	P2.5-40DP	304 SS	Floor	3	12 x 10.25 x 52.25	241
HUF-BP-196	196	2	7	2.5 x 40	P2.5-40DP	304 SS	Floor	3	14 x 12.5 x 60.5	300
HUF-BP-288	288	2	12	2.5 x 40	P2.5-40DP	304 SS	Floor	4	16.75 x 16.75 x 67.5	452

POINT-OF-ENTRY SYSTEMS: Additional Features

Automatic Membrane Integrity Test:

A key feature of WCC's Point-of-Entry HUF® systems is the ability to automatically verify membrane integrity. Using a small, integral compressor, air pressure is applied to the filtrate (outlet) side of the hollow-fiber membranes. Air pressure loss is monitored for 25 minutes. We use a complex algorithm, per the USEPA Membrane Filtration Guidance Manual, to verify that membranes are intact – and high-log removal of microorganisms and nutrients is occurring. This process is compliant with the strict requirements of the USEPA's LT2 "Enhanced Surface Water Treatment Rules". If membranes are compromised (normally after 10+ years with 'typical-quality' city water), an alarm actuates, and flow can be stopped. Membrane Integrity Testing is normally initiated automatically, during off-peak hours (typically monthly in commercial building applications).NOTE: Membrane Integrity testing lasts 25 minutes. During this period, filtrate valves are closed – and water flow is stopped. Options for providing water to the facility during these periods include hydropneumatic tank storage, redundant Point-of-Entry systems, or one of WCC's Temporary Electropositive Bypass Assemblies, which provide up to 10 days of purified water between filter changes (dependent on incoming water quality).

Membrane Integrity Test Screen

Programmable Logic Controller (PLC):

Every Point-of-Entry HUF® system includes a standard PLC with lighted LCD display screen and LED light bar, indicating current membrane permeability status. From the control panel, users can access the following:

- View current mode, GPM flow rate, and PSID
- Initiate a membrane flush or Integrity Test
- Manually cycle individual valves, air compressor, and powered accessories
- View and reset system alarms
- Cycle system into Standby Mode (system OFF, but flushes to maintain clean membranes)

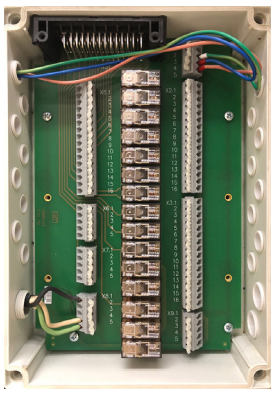
A laptop computer with USB connection to the PLC provides advanced setup, control, and monitoring options, including a 3-month datalog of operating parameters (PC laptop, pre-loaded with software drivers, is included with system).

PLC Controller Home Screen

Connectivity Kit:

Systems come standard with an I/O panel for analog and digital inputs/outputs, as well as power to external accessories such as chemical dosing pumps and turbidity monitors. Available inputs/outputs include:

- Turbidity sensor signal in (4-20 mA)
- Powered (12 VDC) general alarm output
- GPM flow rate signal out (4-20mA)
- Dry contact general alarm output
- Chemical feed pump power (120VAC, 16 amp max)
- Inlet booster pump run signal (120VAC to external relay)
- Remote "alert" 12VDC input (used to enable/disable filtration)



Connectivity Kit

External Communication:

Optional gateway hardware is available for BUS integration into Building Automation Systems (Modbus/BACnet). System may also be accessed over the internet, with the addition of an active SIM card into the integral GPRS modem. Contact WCC for more details on these features.

HUF®

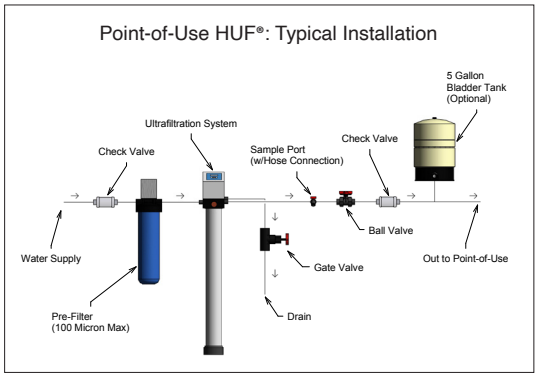
POINT-OF-ENTRY SYSTEMS: Required Maintenance

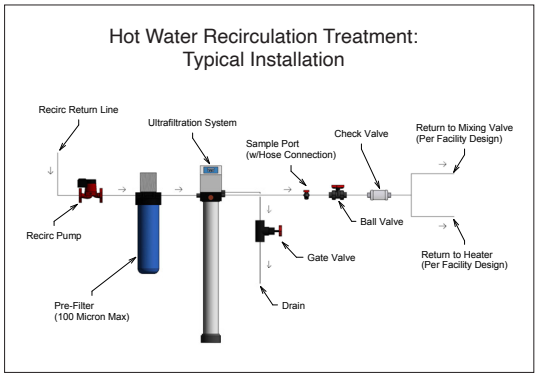
WCC's Point-of-Entry HUF® systems require significantly less maintenance than other pathogen control methods. Recommended schedules for ensuring optimal performance are:

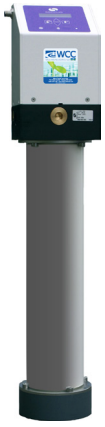
- **Flush/disinfect membranes:** Upon installation/replacement
  - New building: Every 36 months
  - Existing building: Every 6-12 months
- **Membrane Integrity Test (automated):** Every month
- **Replacement of pre-filters:** 2-6 months (dependent on water quality)
- **Replacement of optional Bypass Assembly filters:** 6 months (or post-event)
- **Calibration of pressure sensors:** Annually
- **Replacement of membranes:** Upon failure of Integrity Test (typically 10+ years)

OTHER AVAILABLE HUF® SYSTEMS:

- **Point-of-Use**
  Clean water to fixtures, cooling tower feed, humidification, misters, decorative fountains, etc.
- **Hot Water Recirc Treatment**
  Use your recirc system for 24-7 Legionella filtration!







UrSpring HotWater

THE WCC DIFFERENCE

- *Easy-to-use system design questionnaires*
- *3D (Revit®) renditions for every system*
- *Custom AIA® format specifications*
- *Detailed project submittals*
- *Project-specific installation diagrams*
- *Intuitive, adaptable controls*

TO GET STARTED ON YOUR HIGH-CAPACITY ULTRAFILTRATION PROJECT:

CONTACT YOUR LOCAL SALES REPRESENTATIVE

To find your authorized WCC representative, please visit: www.watercontrolinc.com/representative-locator/.

VISIT US ONLINE

Go to www.watercontrolinc.com, where you'll find detailed product specification info and application design questionnaires.

SPEAK DIRECTLY WITH ONE OF WCC'S DESIGN ENGINEERS

Call 1-866-405-1268 or email techsupport@watercontrolinc.com.

We look forward to working with you!

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