

I. OVERVIEW

The U.S. Filter/Plantsville Water Purification System for the Megabios Corporation, Burlingame, CA. consists of the following equipment:

- 1. Pretreatment Skid consisting of:**
 - a. Temperature Blend Valve HV-BV1
 - b. Multimedia Filter T-D
 - c. Duplex Water Softener T-WA and T-WB with Brine Tanks
 - d. Activated Carbon Service Units T-CA and T-CB
 - e. Dual 5 Micron Cartridge Filters F-1A and F-1B
- 2. Single Pass Reverse Osmosis Assembly Skid consisting of:**
 - a. RO Feed Pump
 - b. Single Pass Reverse Osmosis Unit
- 3. Storage and distribution Equipment consisting of:**
 - a. 500 Gallon Storage Tank T-T1
 - b. Heat Exchanger/Pump Skid consisting of:
 - (1) Distribution Pump P-E1
 - (2) Chiller E-2
 - (3) Heat Exchanger E-1
- 4. Ultrafilter System Equipment consisting of:**
 - a. Ultraviolet Sterilizer UV-UF1
 - b. UF Feed Pump P-UF1
 - c. Ultrafilter UF-1

A. MAJOR EQUIPMENT DESCRIPTION

1. Multimedia Filter

The Multimedia Filter will effectively remove sediment from industrial and municipal water supplies. It will improve the clarity and consistency of the feed water by removing various sized particles, from coarse sediment down to ten (10) microns. Filtering the feed water protects the water softener resin downstream from particulate fouling.

2. Water Softeners with Brine Tanks

Water Softeners are an effective means to remove hardness in the incoming water supply. Water softeners are typically used in boiler feed and as a pretreatment to Reverse Osmosis Units. Depending on salt dosages, Water Softeners can reduce water hardness to very low levels as determined by conventional testing methods.

The Brine Tank is used to store the chemical used to regenerate the softener resin back from its exhausted state.

3. Activated Carbon Service Units

The Carbon Units effectively reduces chlorine, undesirable tastes and odors from potable water supplies. It also reduces potentially harmful organics such as phenols and many pesticides and herbicides. Removing these protects the Reverse Osmosis Unit downstream.

4. Pretreatment Cartridge Filters

The Pretreatment cartridge filters will remove particles down to 5 microns from the RO feed water.

5. Single Pass Reverse Osmosis Assembly

The Single Pass Reverse Osmosis Unit processes water by means of semi-permeable membranes, which allow pressurized water to freely pass through the membranes, but almost totally rejects dissolved and suspended substances in the feed water.

6. Booster Pump P-E1/Chiller E2/Heat Exchanger E1 Assembly

Mixed-Bed Demineralizers purify water by using the ion exchange process and will typically produce pure water in the range of 0.5 to 18.3 megohms/cm (0.8 to 0.001 parts per million of total dissolved solids). The influent water will pass through a bed of Cation and Anion resin that are intimately mixed. The mixed-bed configuration functions similarly to the two-bed configuration in regards to the ion exchange process, however, it is much more efficient and therefore produces water of much greater purity.

7. Ultrafilter System

a. UV-UF1 Sterilizer

UV-UF1 Sterilizer reduces the bacteria level in the distribution loop water.

b. UF Feed Pump P-UF1

UF Feed Pump P-UF1 provides adequate flow and pressure through Ultrafilter UF-1 and out to the Distribution Loop.

c. Ultrafilter UF-1

The Membrastill Ultrafiltration Module which use cross filtration to remove pyrogens from the deionized feed water.

II. SPECIFICATIONS

A. PRETREATMENT ASSEMBLY

Pretreatment equipment consists of Multimedia Filter T-D, Primary Water Softener T-WA, Polishing Water Softener T-WB and Brine Tanks, Dual Parallel 3.6 CF Activated Carbon Service Units T-CA and T-CB

NOTE:

Refer to the Manufacturer's Data section of this manual for detailed specifications regarding the Multimedia Filter and Water Softener.

B. RO SYSTEM – 4.5 GPM

1. OPERATING PRESSURES	
a) Inlet Pressure	> 10 psig
b) Membrane Feed Pressure	172 psig
c) Product Effluent Pressure	< 10 psig
d) Concentrate Drain Pressure	143 psig
2. OPERATING FLOW RATES	
a) Make-Up flow rate	6 GPM
b) Feed Flow Rate	10 GPM
c) Product Flow Rate	4.5 GPM
d) Reject Recycle Flow Rate	4 GPM
e) Reject Drain Flow Rate	1.5
3. ELECTRICAL REQUIREMENTS	
a) From Plant Power supply to RO Power Distribution Panel	480 volts / 3 phase / 60 hertz, 30 amps
4. Air Requirements	2 SCFM @ 80 PSI (MIN.) – 110 PSI (MAX.)
5. RO Pump P-R1	
a) Manufacturer	G & L
b) Model No	1SVD1H5L0VIC
c) Rating	10 GPM @ 193 PSIG
c) Voltage - RO Pumps P6 and P7	460 volts / 3 phase / 60 hertz / 3 HP
6. RO MEMBRANES	
a) Manufacturer	Filmtec
b) Model No	BW30-4040LW
c) Type	Thin Film Composite
d) Salt Rejection	98%
7. PRESSURE VESSEL	
a) Manufacturer	Advanced Structures
b) Model	U4B-2W-2XX-HA
8. DIMENSIONS & WEIGHTS	
Overall Dimensions	
a) Height	74 inches
b) Width	116 inches
c) Depth	36 inches
Weights (Lbs.) (Calc.)	
a) Dry	1,820
b) Operating Weight	1,880

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9. PRESSURE SWITCHES - PS-R1 (LOW FEED PRESSURE)	
a) Manufacturer	Ashcroft
b) Model	B424B30PSI
c) Voltage	120 volts / 1 phase /60 hertz
10. PRESSURE SWITCHES - PS-R2 (HIGH PRODUCT PRESSURE)	
a) Manufacturer	United Electric
b) Model	H100566
c) Voltage	120 volts / 1 phase /60 hertz
11. PRESSURE SWITCH SETTINGS	
a) PS-R1 - RO Pump P-R1 Low Feed pressure	10 PSIG
b) PS-R2 - High Product Pressure	50 PSIG
12. PLUMBING CONNECTIONS	
a) Influent	1 inch ANSI FLG. PVC
b) Reject to Drain	3/4 inch PVC ANSI FLG.
c) Sanitization Inlet Connection	1 inch FLG. (Blind)
d) Sanitization Outlet Connection	3/4 inch ANSI FLG. PVC
e) RO Product	3/4 inch 316L SST SANITARY

II. SPECIFICATIONS

C. RO WATER STORAGE TANK T-T1 500 GALLONS

Catalog Number	52456-01
Dimensions (inches)	
Overall Height	128 ¼
Overall Width	51 7/8
Pressure Rating (PSIG)	
Design Pressure (Hydraulic)	40
Test Pressure (Hydrostatic)	N/A
Connection Sizes (Inches)	
RO Fill	1" 316 SST SANI. TUBE
DI Loop Return	1" 316 SST SANI. TUBE
Vent	1 1/2" SANI. 316 SST
V-T3 Drain	1" SANI. TUBE
Drain	1" 316 SST SANI.
Argon Inlet (by others)	3" 316 SST SANIT.
Effluent	2" Tri-C 316 SST
Weights (Calculated Pounds)	
Dry	1,325
Operating	4,825

D. BOOSTER PUMP/CHILLER/HEAT EXCHANGER SKID

Catalog Number	52457-01
Dimensions (inches)	
Overall Height	69 1/8
Overall Width	108
Overall Depth	44
Pressure Rating (PSIG) Process Water	
Design Pressure (Hydraulic)	100
Test Pressure (Hydrostatic)	150
Connection Sizes (Inches)	
Influent	2" SANITARY 316L SST
Chilled Water Inlet	1" NPT STL.
Chilled Water Outlet	1" NPT STL.
Steam Inlet	2" NPT STL.
Condensate	3/4" NPT STL.
Product	1" 316L SST SANI. TUBE
Booster Pump P-E1	
Manufacturer	Tri-Clover
Model	C216MDG-18T-S
Rating	11 gpm @ 73 psid
Electrical	460 volts / 3 phase / 60 hertz, 5 hp
Electrical Requirements	
From RO Power Distribution Panel to Motor Starter MS-E1	460 volts / 3 phase / 60 hertz, 20 amps
From Main Control Panel to Heat Exchanger Junction Panel	120 volts / 1 phase / 60 hertz and interconnecting wiring

II. SPECIFICATIONS

D. BOOSTER PUMP/CHILLER/HEAT EXCHANGER SKID (continued.....)

Air Requirements	2 SCFM @ 60 – 90 PSIG
Weights (Calculated Pounds)	
Dry	2,105
Operating	2,835
Electrical Drawings	
Electrical Schematics	02341
Heat Exchanger Junction Panel	02344

E. ULTRAFILTER SYSTEM SKID

Catalog Number	52458-01
Model Number	52458-01
Dimensions (inches)	
Overall Height	78
Overall Width	50 1/2
Overall Depth	51 5/8
Pressure Rating (PSIG)	
Design Pressure (Hydraulic)	100
Test Pressure (Hydrostatic)	150
Connection Sizes (Inches)	
Influent	1" 316LSST TUBE
Product	1" 316LSST TUBE
Reject Drain	1/2 " ANSI FLG. 316SST
Reject Recycle	3/4 " PVDF SANITARY TRI-CLAMP
UF Feed Pump P-UF1	
Manufacturer	Tri-Clover
Model	C216MDG-18T-S
Rating	11.1 gpm @ 73 psid
Electrical	460 volts / 3 phase / 60 hertz
Electrical Requirements	
From RO Power Distribution Panel to Motor Starter Panel MS-UF1	460 volts / 3 phase / 60 hertz, 12 amps
From Main Control Panel to UF Junction Panel	120 volts / 1 phase / 60 hertz and interconnecting wiring
Air Requirements	2 SCFM @ 60 – 90 PSIG
Weights (Calculated Pounds)	
Dry	1,117
Operating	1,231
Electrical Drawings	
Electrical Schematics	02341
UF Junction Panel	02345