

EQUIPMENT INSTALLATION INSTRUCTIONS

These instructions are for the purpose of assisting erectors of AATech's equipment to obtaining the best possible results. The instruction can only supplement the experience and judgment of those in charge of erection. They should be interpreted and applied after due consideration of the requirements of other equipment and/or any particular set of circumstances.

These instructions do not purport to cover all details or variations in local conditions, nor to provide for every contingency to be met in conjunction with erection of this equipment.

The recommendations contained in these instructions is based on the knowledge and experienced gained by AATech and represent our best judgment at the time of issuance. In offering these instructions for the erection and assembly, AATech assumes no responsibility for the resulting conditions or consequences which shall be entirely at the risk of the erector and/or purchaser.

The presence of AATech, on either new or existing projects, is for the purpose of advising and consulting with regard to the erection of the equipment. The field engineers are not responsible for the procurement or supervision of labor, quality of work performed by others, or failure of the erector's personnel to properly carry out the instructions contained herein.

NOTE: The system supplied is an assembly of components purchased from sub-vendors. Additional information for these components is covered in sub-vendor literature in the rear of this manual.

Since this system is usually one component of the entire plant, the scope of this manual can only cover the extent of the equipment supplied. The coordination of all peripheral equipment with the procedures and/or functions within this manual is to be performed by personnel responsible for the total plant operation.

LOCATION

The equipment should be located near an industrial waste receptacle to minimize excessive drain waste piping runs.

Due to the high volume of backwash waste flow the equipment should be located in a brim or dammed area to retain drain overflow spillage should it occur. If possible this brimmed containment area should be equipped with a secondary drain to prevent over-spillage.

The equipment should be located in an adequately ventilated and dry area to minimize external corrosion.

UTILITIES AND SERVICES REQUIRED

To operate the equipment the following listed service and utilities will be required. It should not be operated with pressures and temperatures greater than that stated below without first checking with AATech Inc. If the operating pressure is greater than that stated it is recommended that a pressure reducing valve be installed upstream for protection.

The following utilities and service are required to operate this equipment;

Incoming feed water..... 116 gpm @ 40 psi minimum
100 psi maximum

Backwash feed water

(Soft Water Preferred) Uses System Storage Tank for Source

Industrial Waste Drain Receptacle

capable of handling.....100 gpm @ Atmos. Press.

Electrical Power, Control 115-120VAC, 1 phase, 60 Hz
(grounded)

Compressed Air, Clean, Dry and Free of Oil..... None Required

Should any of the above services not be available, AATech can furnish support equipment to treat or provide the required services.

INSTALLATION

The equipment and components should be installed in accordance with the documentation (drawing, manuals, etc.).

The equipment or skid should be installed on a level concrete housekeeping pad and must be leveled by shimming or blocking if necessary, then grouting the finished level to prevent settling.

The leg base pads or skid should be anchored to the pad using the anchor bolts holes provided.

CARE SHOULD BE EXCERISED IN HANDLING THE EQUIPMENT DURING THIS ERECTION OPERATION (Refer to Handling section of these instructions)

PLUMBING

Refer to the General Arrangement drawing for the location of the feed inlet & outlet, brine inlet and drain waste connections.

The connection plumbing materials should be compatible with the furnished equipment piping materials. If this cannot be provided it is recommended that dielectric unions (or gasketed flanged joints) be installed in the water lines whenever dissimilar metals will be joined.

The external connection piping provided should be independently supported to prevent undue stresses and strain on the equipment manifold piping.

The connection piping should be adequately sized to provide the flow and pressure necessary to operate this equipment (see Utilities and Services above). In no case should the connection pipe size be reduced from that furnished on the equipment.

The feed water supply and treated water outlet connections should be provided with a manual isolation valve to enable isolation of the equipment for service and maintenance.

The equipment waste drain connection should be connected to an industrial waste sewer which is capable of accepting the high suspended solids backwashed from this equipment during its cleaning sequence. The waste drain Receptacle should be of suitable size to accept the waste flow produced. In cases, when an undersized receptacle is the only thing available, a waste inception tank should be installed to collect the waste and allow it to be discharged at a suitable rate.

- DO NOT connect the drain line directly to the sewer connection. The law requires that an AIR GAP be provided between the drain pipe termination and the sewer connection.
- DO NOT reduce the size of the drain pipe below the size of the equipment connection. If the drain piping run is in excess of 10 feet, enlarge the size of the drain pipe, one size for each 25 foot of run encountered.

ELECTRICAL

Refer to Electrical Schematic provided with this manual. Check the voltage, cycle and phase of the power before connecting to the controls.

The system is equipped with Electric Operated Control Valve and Electric Motorized Transfer Pumps, therefore no compressed air is required.

The incoming power should be connected to protection circuit breaker located within sight of the equipment. This source connection should be identified for emergency shut-down if required.

The incoming power must be connected to the designated terminals within the main control enclosure(s). Since no opening has been provided for the entrance of the power, the installer can enter at his option, preferable through the bottom of the enclosure(s).

Connection wire size should be a minimum of 12 gauge stranded copper and a separate ground wire should be provided to ground the equipment control circuit to the main electrical supply. Prior to energizing the electrical supply, make sure the valve control outputs are properly disabled to prevent accidental valve actuation.

FINAL INSTALLATION CHECKOUT

Prior to startup, disconnect all services connected at the equipment and flush the connection lines before reconnecting to the equipment. Prior to loading the ion exchange media, fill the system with water by overriding and opening the automatic inlet valve. Allow the system to pressurize and check for pressure leaks.

Allow the system to remain pressurized for at least 12 hours. When no leaks are present drain the system in preparation for media loading and start-up.

EQUIPMENT START-UP INSTRUCTIONS

Before loading the softening media, it is advisable to have completed all equipment and control checkouts. It is also advisable to "dry" cycle the equipment through a simulated cleaning sequence.

To "dry" cycle the equipment, electrical power should be applied to the system. The vessels should be filled with water and allowed to pressurize with the manual inlet isolation valve left open.

Initiate a simulated cleaning sequence, and allow it to proceed automatically step by step as prescribed in the following instructions. During the simulated sequence, adjust the flows and cycle times as required.

After both units have been checked out and the flows properly adjusted, drain the water from the system in preparation for loading of the filter media.

LOADING SOFTENING MEDIA

The ion exchange vessel must be loaded with the following amounts of media. This operation is important, since the capacity and the quality of the effluent water depend on the method and care the vessel is loaded.

Separate the media and check the following quantities of media;

50 cu. ft. Strong Acid Action Resin (By Others)

Remove the side manway cover and gasket.

Visually inspect, with a flashlight, all the internal vessel piping. Inspect for damaged and/or loose fitting, laterals, lateral screening or broken components. The vessel internals were installed and carefully checked at the factory, however, may have received damage during shipment. Loading the vessel with damaged internal components may result in immediate loss of expensive media or contamination of your downstream process.

With satisfactory internal inspection, Install the Softener Resin as follows,

Remove the top manway cover (being careful not to drop the cover into the vessel when loosening and removing the manway locking lugs).

SLOWLY POUR THE ION EXCHANGE MEDIA INTO THE TANK. This media may be poured through the top manway opening and will self level with the first backwashing operation.

50 cu.ft. Water Softening Resin

With the softener resin installed, fill the vessel with **FRESH WATER ONLY**. Fill the vessel to above the surface of the ion exchange media bed. Replace the manway cover, again being careful not to

drop the cover into the vessel. Tighten the manway lug bolts being careful not to over-tighten them to prevent damage to the gasket and internal lining.

Allow the media to soak, if possible, for a period of 24 hrs before placing the exchanger in service in service.

LOADING GRAVEL MEDIA IN THE SATURATED BRINE STORAGE TANK

A layer of gravel must be installed in the brine storage tank prior to filling it with rock salt. The gravel must cover the lower underdrain collection laterals which will act as a filter media to keep rock salt from entering and plugging the lower collection system.

The following media should be isolated and installed in the Saturated Brine Storage Tank BEFORE ROCK SALT IS INSTALLED.

32 cu.ft. (3,200 lbs) ½"x3/8" Clean Gravel (Furnished by AATech with system)

SYSTEM FLOW SETTINGS

The PROGRAMMABLE CONTROLLER will direct the Automatic Electric-Operated Softener Control Valves and pumps to automatically sequence each step during regeneration

It will also control the time duration of each step.

No automatic flow control valves have been installed in this system and all the flow will have to be manually set. Once initially set they should repeat the set flow for all future regeneration.

STEP NO. 1 (UNIT A) OR (UNIT B) PRIMARY BACKWASH

STEP TIME: 10 MINUTES

STEP NO. 1 – BACKWASH

The PROGRAMMABLE CONTROLLER will direct the Automatic Electric-Operated Softener Control Valve to automatically sequence to this step. It will also control the time duration of this step

During the time that the softener remains in this step, the following flows should be adjusted during initial startup, which will then remain preset for all future regenerations. No operator adjustment will be necessary for future operations

Backwash Flow Rate 120 gpm

During this cycle, soft water from the soft water storage tank is pumped (P2 & P3) to the “bottom” of the softener vessel. The soft water is directed up flow (thru Backwash Inlet XV-4A or XV-4B) to the internal resin bed and out to drain (thru Backwash Outlet XV-3A or XV-3B). The backwash water, flowing upward through the internal resin bed expands and re-grades the resin from bottom to top, while at the same time releases any accumulated sediment, flushing it to the drain through the Backwash Outlet Valve.

Backwash flow is controlled by a 2” Manual Ball Valve (RSV-3) installed upstream of the Flow Indicator (FI-01). Once this manual valve is set to allow passage of the above flow, it should not be adjusted for future flows.

Completion of this step should be indicated by a clean-clear backwash waste effluent leaving the softener unit.

STEP NO. 2 (UNIT A) OR (UNIT B)

BRINE TRANSFER

STEP TIME: 50 MINUTES

(Regeneration)

The PROGRAMABLE CONTROLLER will direct the sequencing of components in this step and It will also control the time duration of this step.

Brine Transfer is the second cycle in the softener regeneration sequence.

During the time that the cycle remains in this step, the following flows will be should be initially set by the operator and occasionally check there after. After these flows have been obtained, the valve setting should remain.

Regenerant Brine concentration is prepared by blending saturated brine with fresh soft water. The blend consists of the following

Saturate Brine Flow Rate..Approx. 10_gpm
Pressurized by Sat. Brine Pump (P-05)
Flow Indicated by Sat Brine Flow Indicator (FI-03)
Flow Adjust by Manual Ball Valve located upstream
of the Flow Indicator

Brine Dilution Flow Rate..Approx 3.4_gpm
Pressurized by Brine Dilution Pump (P-04)
Flow Indicated by Dilution Flow Indicator (FI-02)
Flow Adjust by Manual Ball Valve located upstream
of the Flow Indicator

Specific Gravity..... The specific gravity of the brine should be checked
with a salometer during brine

The brine transfer sequence as a check to verify the adjustment of the brine and dilution flow rates.

The transfer brine can be checked by sampling the brine stream using the downstream sample valve (P1-1)

Brine concentration. To do so you will be a hydrometer or
Salometer.

Specific Gravity 1.148
Salometer..... 20%

During this cycle, Sat Brine is pumped w/ (P-05) thru the opened auto valve (XV-11) to the mixing tee blending with dilution water pumped w/ (P-04) thru the opened auto valve (XV-12). This controlled blend of brine and dilution water should result as a 20% brine solution used for regeneration of each resin bed.

Depending on which softener is in regeneration this 20% brine is directed to the specific softener thru the regen brine inlet valves (XV-8A) or (XV8B). This directs the flow upward thru the softener resin.

If set properly the saturated brine and dilution water flow will produce a (20%) regenerant brine solution entering the vessel upflow (thru Backwash Inlet XV-8A or XV-8B) leaving the vessel to waste thru internal brine collector and out through the rinse outlet valve (XV-5A or XV-5B).

The flow of regenerant brine will recondition the exhausted resin from bottom to top by removing the accumulated calcium and magnesium hardness ions, replacing them with sodium ions from the incoming sodium chloride (NaCl) regenerant solution. The upflow brine will place the bottom portion of the bed at the highest regenerant level thus reducing lower bed hardness leakage

Time-out will terminate this step; discontinue operation of the Brine Pump (P1-05) stopping the flow of saturated brine which will only allowing only dilution water/blocking water to flow to the system. This dilution water will displace the remaining brine in the system.

STEP NO. 3 (UNIT A) OR (UNIT B) BRINE DISPLACE

STEP TIME: 40 MINUTES

The PROGRAMABLE CONTROLLER will direct the sequencing of components in this step and It will also control the time duration of this step.

Brine Transfer is the third cycle in the softener regeneration sequence.

During the time that the cycle remains in this step, the following flows will be should be initially set by the operator and occasionally check there after. After these flows have been obtained, the valve setting should remain.

During this cycle, soft water from the soft water storage tank is pumped to the "top" of the softener vessel (thru the common displace rinse inlet valve XV-12). This allows soft displace water directed to be downflow (thru Individual displacement rinse Inlets XV-9A or XV-B) thru the internal resin bed and out to waste (Rinse Outlet XV-6A or XV-6B). This displaces the residual brine left in the bed from the brine transfer step.

The Brine Displacement Rinse is adjusted as follows;

Displacement Flow Rate ..Approx 13_gpm
Pressurized by Dilution Pump (P-04)
Flow Indicated by Dilution Flow Indicator (FI-02)
Flow Adjust by Manual Ball Valve located upstream
Of (displacement rinse Inlet XV-9A or XV-9B)

Time-out will terminate completion of this step, discontinue operation of the Displacement Rinse Pump (P1-04) stopping the flow of soft water regenerant water to the system.

STEP NO. 4 (UNIT A) OR (UNIT B) FAST RINSE

STEP TIME: 35 MINUTES

The PROGRAMABLE CONTROLLER will direct the sequencing of components in this step and It will also control the time duration of this step.

Brine Transfer is the fourth cycle in the softener regeneration sequence.

During the time that the cycle remains in this step, the following flows will be should be initially set by the operator and occasionally check there after. After these flows have been obtained, the valve setting should remain.

During this cycle, hard water from the customer water supply is directed to the "top" of the softener vessel downflow (thru Individual service Inlets XV-1A or XV-1B) thru the internal resin bed and out to waste (Rinse Outlet XV-6A or XV-6B). This quickly displaces any residual brine left in the bed from the brine transfer/displacement rinse step.

Fast Rinse Flow Rate..Approx 58_gpm

Pressurized by customer water supply

Flow Indicated by Service Inlet Flow Indicator/Transmitter (FIT-01)

Flow Adjust by Manual Rate Set Ball Valve (RSV-5A or RSV-5B))

Manifold Face Piping upstream of the service inlet valves (XV-1A or XV-1B)

Note: During regeneration of either Unit A or Unit B, service water flow is also delivering soft water to the system soft water storage tank, therefore since the (FIT-01) is a common inlet flow meter which monitors the fast rinse during this cycle it will be necessary to add the fast rinse flow to the normal system flow by a total of 58 Gpm.

The flow Indicator should indicate 116 gpm (58 gpm normal flow thru the on-line unit + 58 Gpm thru the off-line unit during Fast Rinse.

STEP NO. 4 (UNIT A) OR (UNIT B) RETURN TO STANDBY

STEP TIME: UNTIL OPPOSITE UNIT IS EXHAUSTED

The PROGRAMABLE CONTROLLER will direct the sequencing of components in this step. Since it may remain in this step for a under determined time regeneration is complete and the unit will be idle until the opposite unit reaches exhaustion.

During the time that the remains in this step, no flow of water will occur.

During this cycle, hard water from the customer water supply is blocked by closure of the respective Service Outlet (XV-2A or XV-2B)

During this cycle, the hard water inlet valve (XV-2A or XV-2B) will remain open in preparation for the unit to return to service when required. from the customer water supply is blocked by

All other valve will remain closed, however during regeneration the opposite unit will remain in service delivering water to the system storage tank which is re-pressurize to process by the (P1) pump.

STEP NO. 4 (UNIT A) OR (UNIT B) RETURN TO SERVICE

STEP TIME: UNTIL THE UNIT IS EXHAUSTED

The PROGRAMABLE CONTROLLER will direct the sequencing of components in this step. Since it may remain in this step for an undetermined time. The opposite exhausted unit will be regenerated and returned to service.

During this cycle, hard water from the customer water supply is softened by the freshly regenerated resin.

The respective Service Outlet (XV-2A or XV-2B) and Service Inlet (XV-1A or XV-1B) will remain open. All other valves on the respective unit will remain closed

Fast Rinse Flow Rate ..Approx 58_gpm

- Pressurized by customer water supply

- Flow Indicated by Service Inlet Flow Indicator/Transmitter (FIT-01)

- Flow Adjust by Manual Rate Set Ball Valve (RSV-5A or RSV-5B))

- Manifold Face Piping upstream of the service inlet valves (XV-1A or XV-1B)



CUSTOMER

HATHAWAY
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TITLE

TITLE
PROCESS AND INSTRUMENTATION DIAGRAM SAC SOFTENERS

AA Tech Incorporated
ENGINEERING DEPARTMENT

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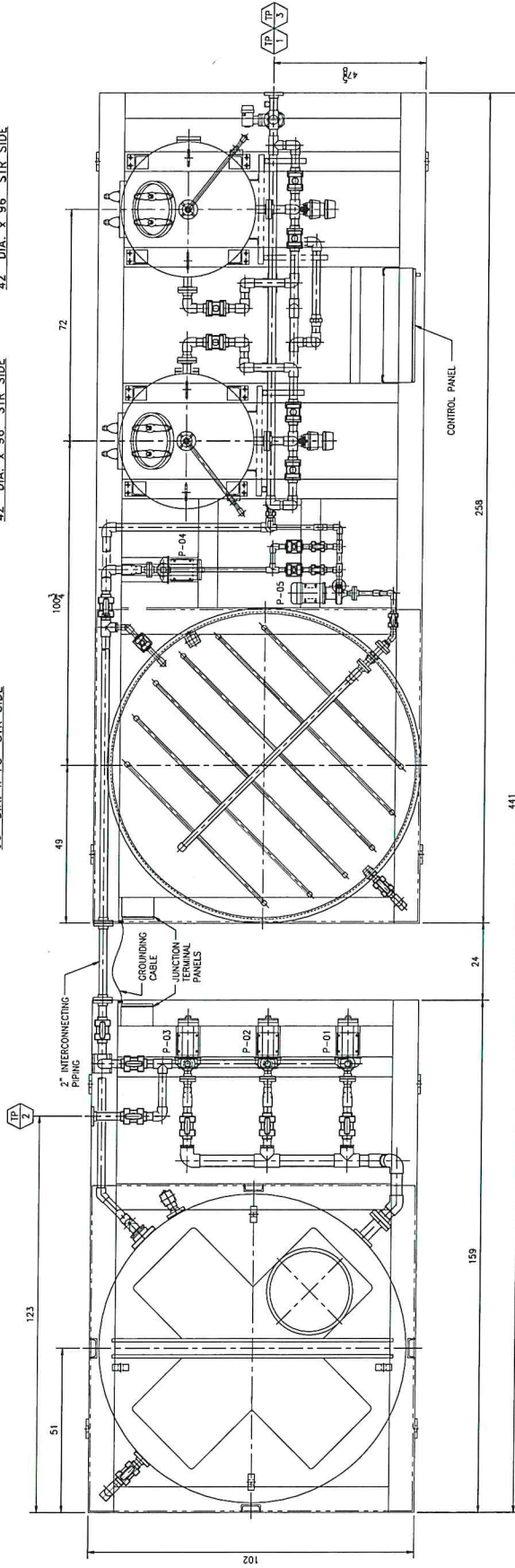
- GENERAL NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
 2. ALL DIMENSIONS ARE TO CENTERLINES UNLESS OTHERWISE NOTED.
 3. ALL EXTERNAL PIPING TO BE SCH 80 CPVC.
 4. VESSEL INTERNALS TO 316SS.
 5. WEIGHTS (APPROX.):
 SHIPING WEIGHTS --- LBS
 OPERATING WEIGHTS --- LBS

SOFTWATER STORAGE
TANK
96" DIA. x 96" STR SIDE

COMMON BRINE
TANK
96" DIA. x 78" STR SIDE

UNIT A
-SOFTENER TANK
42" DIA. x 96" STR SIDE

UNIT B
-SOFTENER TANK
42" DIA. x 96" STR SIDE



PLAN VIEW

CONNECTION SCHEDULE

MARK	QTY	SIZE	RATING	TYPE	SERVICE	REMARK(S)
TP-1	1	2"	150#	FLG	SERVICE INLET	
TP-2	1	2"	150#	FLG	SERVICE OUTLET	
TP-3	1	2"	150#	FLG	WASTE OUTLET	

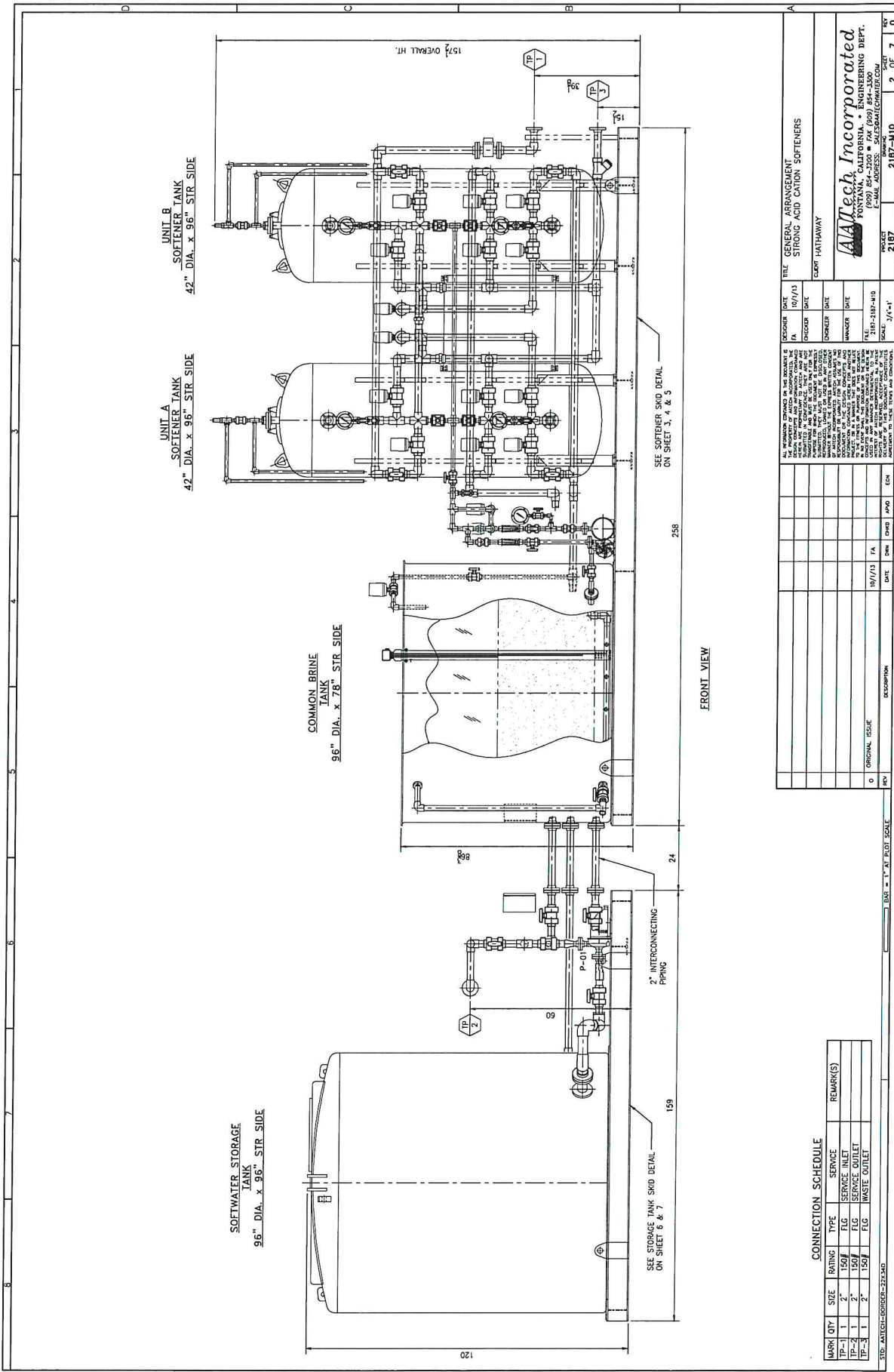
TOLERANCES UNLESS OTHERWISE SPECIFIED	
LINEAR	UNDER 48 DIVER 48
ANGULAR	±1/4

STD. ANGLE-ROUNDER-22.240

REVISION	DATE	BY	CHKD	APPD	DESCRIPTION
0	10/1/13	FA			ORIGINAL ISSUE
1	10/1/13	FA			
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CONNECTION SCHEDULE

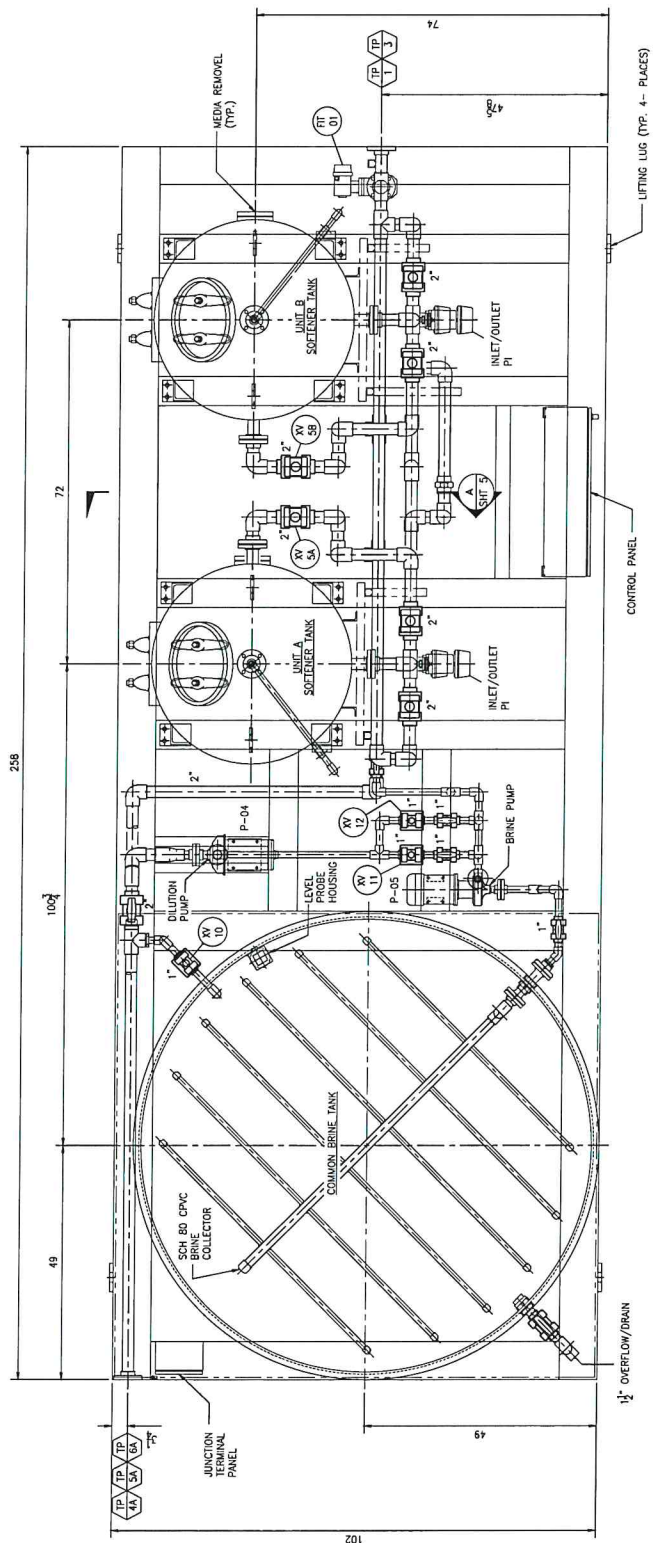
MARK	QTY	SIZE	RATING	TYPE	SERVICE	REMARK(S)
TP-1	1	2"	150#	FLG	SERVICE INLET	
TP-2	1	2"	150#	FLG	SERVICE INLET	
TP-3	1	2"	150#	FLG	WASTE OUTLET	

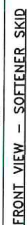
STD. ANCHOR-BOLTED-232-240

REV	DESCRIPTION	DATE	CHKD	APPD	ENR
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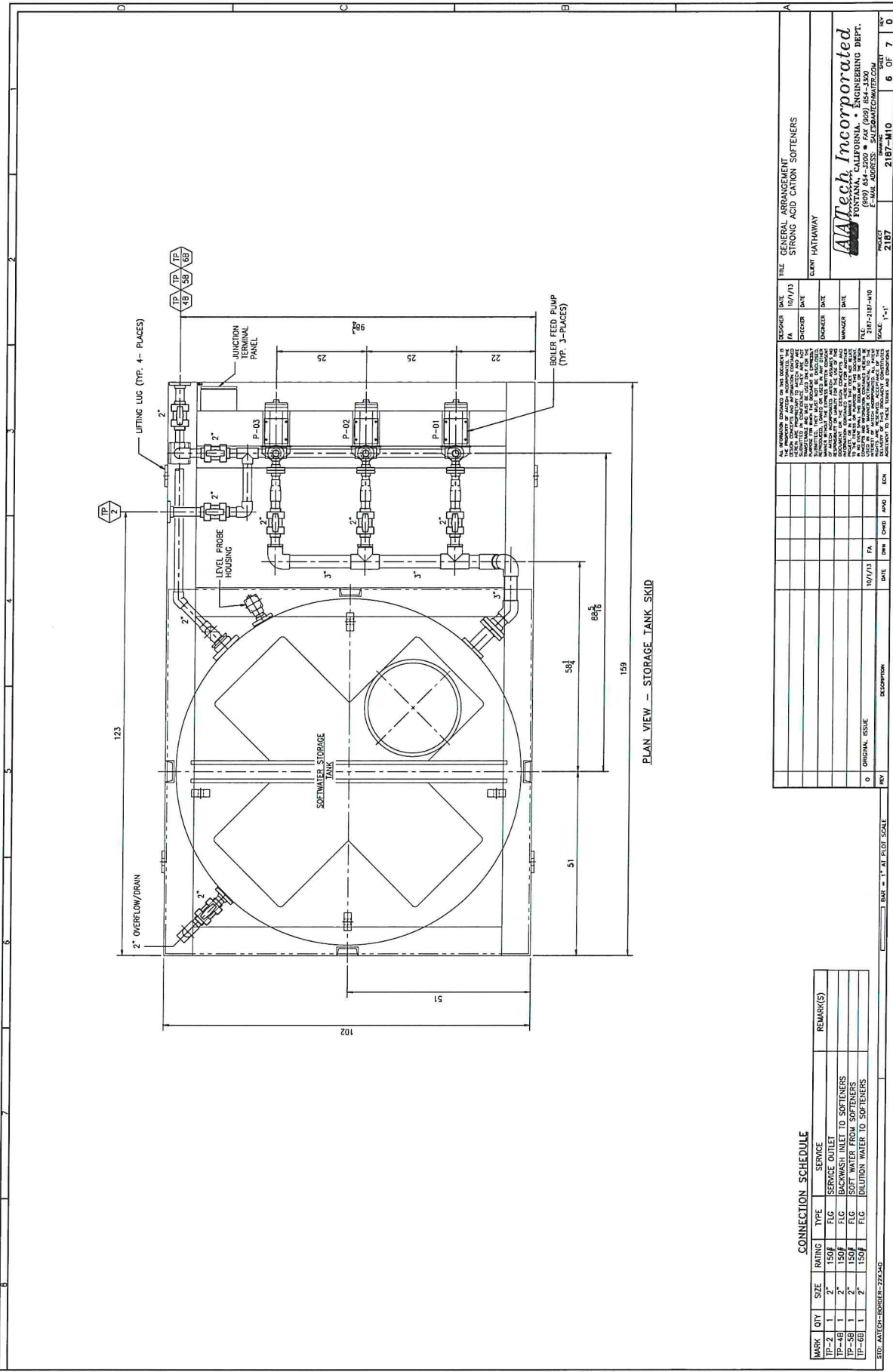
DESIGNER	DATE	10/1/13	FILE	2187-1187-H10
CHECKED	DATE		SCALE	1/4"=1'
APPROVED	DATE			
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 E-MAIL ADDRESS: SALES@AIAATECH.COM

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STD: ATECH-BORDER-22X340

AATech, Incorporated
FONTANA, CALIFORNIA • ENGINEERING DEPT.
(local) 941-3900 • FAX (local) 941-3901



PLAN VIEW - STORAGE TANK SKID

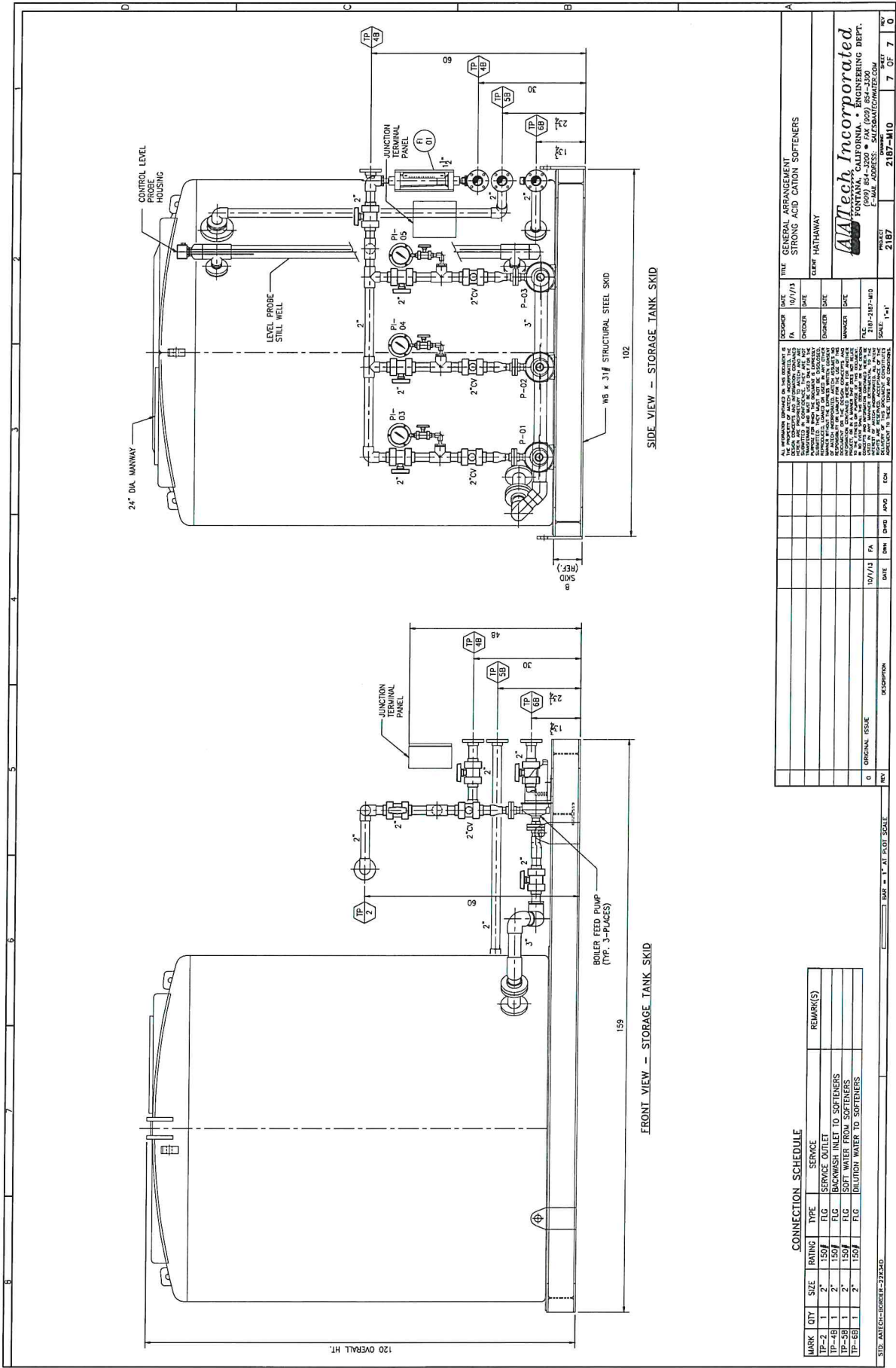
CONNECTION SCHEDULE

MARK	QTY	SIZE	RATING	TYPE	SERVICE	REMARK(S)
TP-2	1	2"	150#	FLG	SERVICE OUTLET	
TP-4B	1	2"	150#	FLG	BACKWASH INLET TO SOFTENERS	
TP-5B	1	2"	150#	FLG	SOFT WATER FROM SOFTENERS	
TP-6B	1	2"	150#	FLG	DILUTION WATER TO SOFTENERS	

STD: MATCH-BLOCK-222-240

TITLE: GENERAL ARRANGEMENT STRONG ACID CATION SOFTENERS		DESIGNED: 10/1/13 CHECKED: 10/1/13 DATE: 10/1/13
CLIENT: HATHAWAY		PROJECT: 2187 SHEET: 6 OF 7
PROJECT: 2187 SHEET: 6 OF 7		SCALE: 1"=1' DATE: 10/1/13
PROJECT: 2187 SHEET: 6 OF 7		PROJECT: 2187 SHEET: 6 OF 7

ATAtech Incorporated
 (800) 854-2200 • FAX (800) 854-3300
 TONTONA, CALIFORNIA • ENGINEERING DEPT.
 15000 S. HATHAWAY AVE. SUITE 100
 TONTONA, CA 95129



CONNECTION SCHEDULE

MARK	QTY	SIZE	RATING	TYPE	SERVICE	REMARK(S)
TP-2	1	2"	150#	FLG	SERVICE OUTLET	
TP-4B	1	2"	150#	FLG	BACKWASH INLET TO SOFTENERS	
TP-5B	1	2"	150#	FLG	SOFT WATER FROM SOFTENERS	
TP-6B	1	2"	150#	FLG	DILUTION WATER TO SOFTENERS	

STD. MATCH-BLOCK-22P450

SCALE = 1" = 1' AT PLOT SCALE

REV	DESCRIPTION	DATE	BY	CHKD	APPD	ECN
0	ORIGINAL ISSUE	10/7/13	FA			

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SECTION	DATE	DESIGNED BY	CHECKED BY	DATE
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FILE GENERAL ARRANGEMENT
STRONG ACID CATION SOFTENERS
CLIENT HATHAWAY

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PROJECT 2187
DRAWING 2187-M10
SHEET 7 OF 7