



INFINITY FLUIDS CORPORATION

**INFINITY FLUIDS CORPORATION
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WORCESTER, MA 01522**

**888-565-8137
508-347-3674**

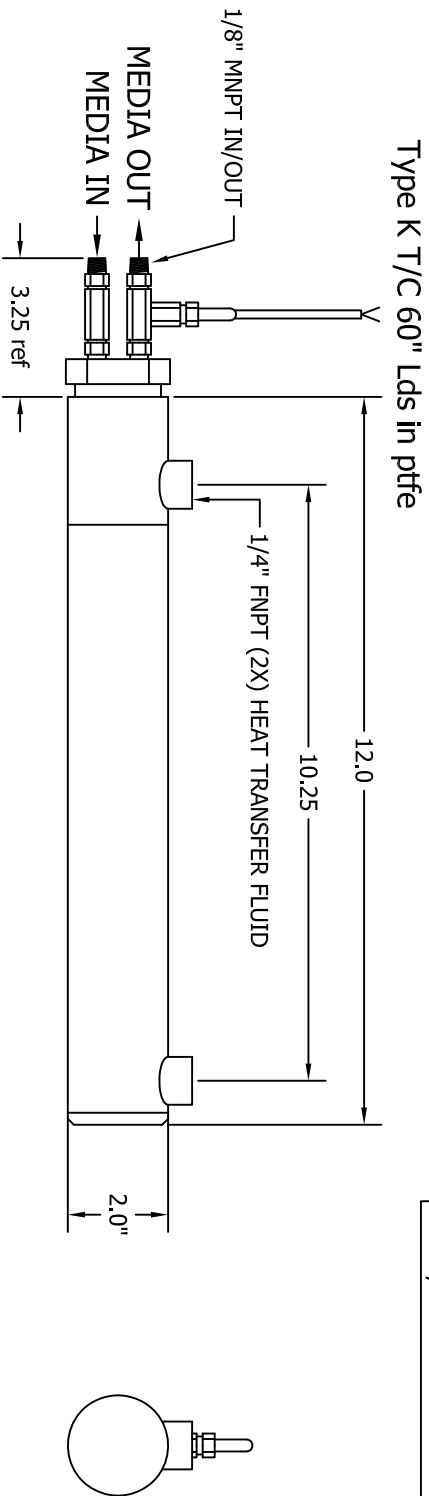
CRES PRODUCT:

**WATER/LIQUID HEATER
AIR/GAS HEATER
INLINE/INSTANTANEOUS STEAM GENERATORS
INLINE HEATER
PACKAGED THERMAL SYSTEMS**

CRES Shell-Tube heat exchanger : b125
SS Construction, Welded Pipe 1.5" w/1.25" NPT tube array
Tube material 316ss total surface, 145 sqin / 1.0 sqft
Heater Housing Body 304L-316L Construction

COMPACT HEAT-X B125

Other Thermal Fluid ports available:
Compression/Swage
Sanitary
Tube ends
VCR / vacuum
BSPT, etc....



Other Media ports available:
Compression/Swage
Sanitary
Tube ends
VCR / vacuum
BSPT, etc....

PROPRIETARY

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TOLERANCES
XXX +/- 1.0
XX.X +/- 0.1"
X.XX +/- 0.05"
.XXX +/- 0.01"

PATENT PENDING

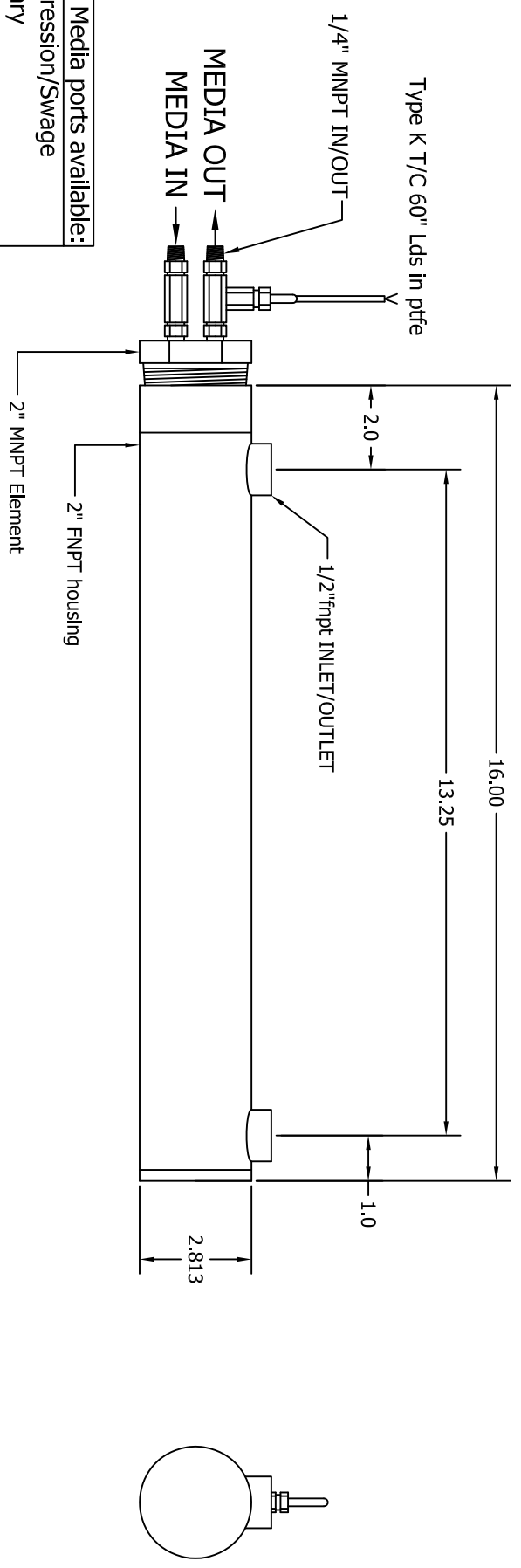
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DRAWN BY	MJD
DATE	072012
APPROVAL	RCC
REVISION	0

INFINITY FLUIDS CORP	
SHELL-TUBE HEAT EXCHANGER Infinity HXC Stainless B125	
B CRES-HXC-018-025-125	NTS 072012-02 Sheet 1 of 1
REV	0

GRES Shell-Tube heat exchanger : B200
 SS Construction, Welded Pipe 2.5" w/2" NPT tube array
 Tube material 316ss total surface, 290 sqin / 2.01 sqft
 Heater Housing Body 304L-316L Construction

COMPACT HEAT-X B200

Other Thermal Fluid ports available:
 Compression/Swage
 Sanitary
 Tube ends
 VCR / vacuum
 BSPT, etc...



Other Media ports available:
 Compression/Swage
 Sanitary
 Tube ends
 VCR / vacuum
 BSPT, etc...

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TOLERANCES

XXX +/- 1.0
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PATENT PENDING

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DATE	072012
APPROVAL	RCC
REVISION	0



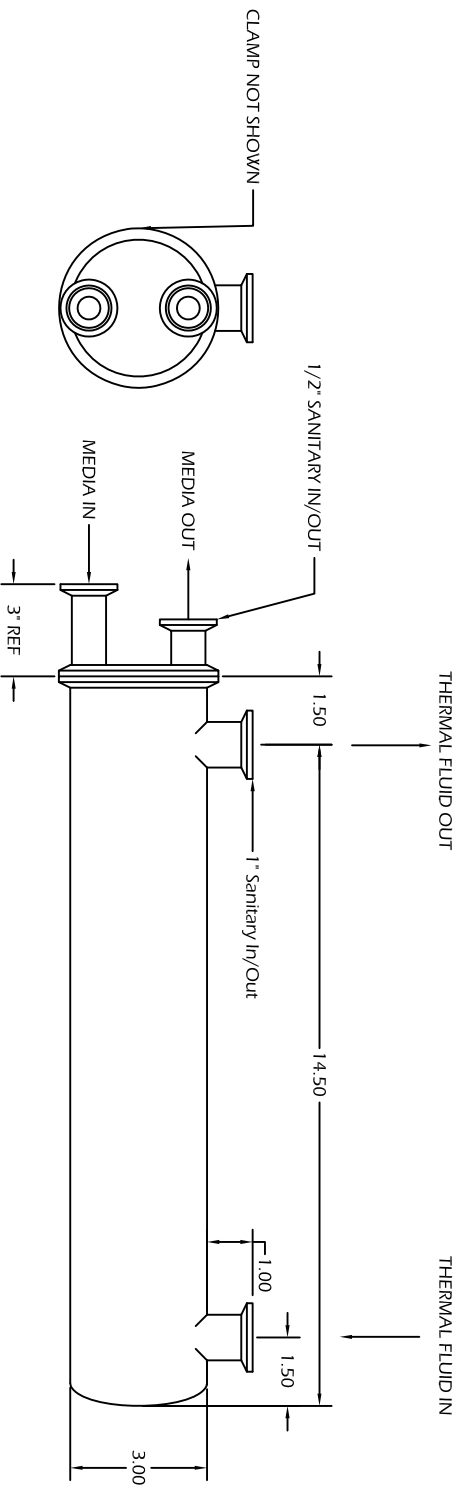
Infinity INFINITY FLUIDS CORP

SHELL-TUBE HEAT EXCHANGER
 Infinity HXC Stainless B125

B	CRES-HXC-025-050-200	REV
NTS	072012-02	0
Sheet 1 of 1		

CRES-HSF-300

SANITARY STYLE HCS STAINLESS COMPACT HEAT EXCHANGER
 SANITARY THERMAL FLUID AND MEDIA IN/OUT PORTS
 XFER SURFACE AREA - 290 SQIN / 2.01 SQFT



OTHER MEDIA FITTINGS AVAILABLE:
 COMPRESSION/SWAGE
 VCR/VACCUUM
 FLANGE
 NPT, BSPT, ETC.

OTHER THERMAL FLUID FITTINGS AVAILABLE:
 COMPRESSION/SWAGE
 VCR/VACCUUM
 FLANGE
 NPT, BSPT, ETC.


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TOLERANCES

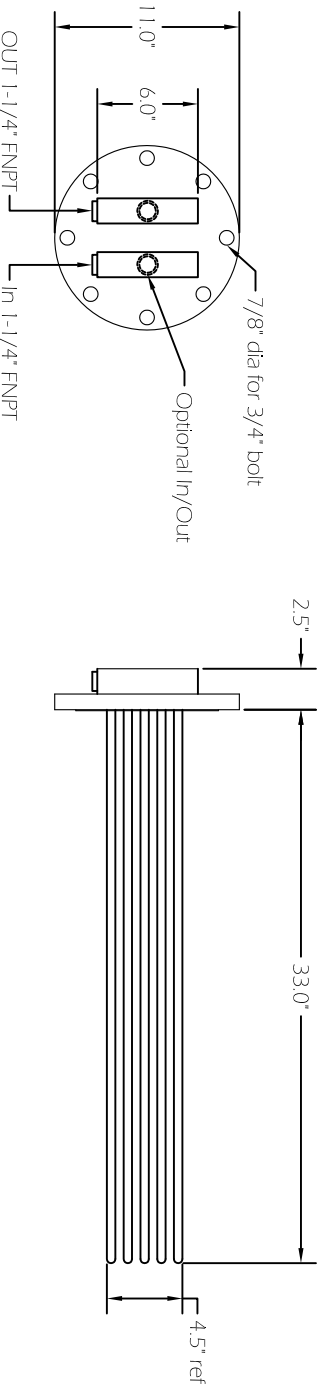
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Unless otherwise specified drawing should be used for estimation purposes only	
DRAWN BY	MJD
DATE	080504
APPROVAL	RCC
REVISION	0

 INFINITY FLUIDS CORP	
INFINITY CRES-HXS HEAT EXCHANGER SANITARY / ULTRA CLEAN DESIGN	
B CRES-HSF-050-100-300	REV 0
NTS 080504-01	Sheet 1 of 1

ILHX heater:
 Housing welded 304 SS construction.
 Elements 304 SS

REVISIONS			
REV	DESCRIPTIONS	DATE	APPD



- * All Surfaces 304 SS construction
- * Min 400 sq in surface
- * 6" 150# ANSI Flange

PROPRIETARY

XXX ± 1.0

Unless otherwise specified drawing should be used for estimation purposes only

Drawn By	MJD
Date	061710
Approval	RCC
Revision	0



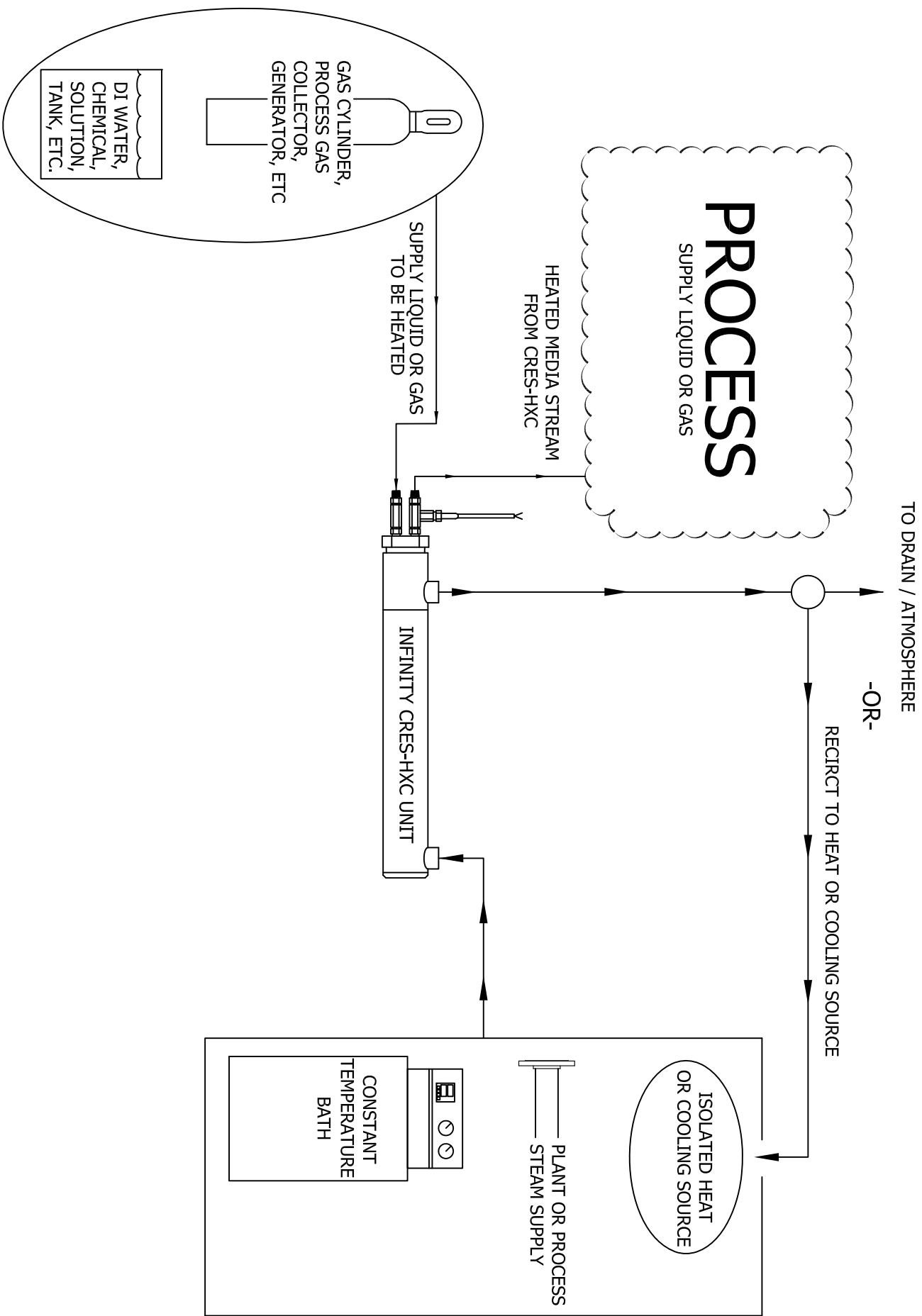
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HEATER ELEMENT
 Inline Gas Heater

B	CRES-HXR-050-33-6	REV	1
NTS	061710-02	SHEET	1 OF 1

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STANDARD FLOW DIAGRAM OF INFINITY CRES-HXC





EXPERTISE: HEATERS, CONTROLS, SYSTEMS, ENGINEERING

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INSTALLATION

Process and utility supply and return plumbing should be properly constructed by licensed personnel (pipe fitter, electrician, etc) with industry tested fittings and components to all INFINITY shell &/or tube heat exchanger, taking care to ensure proper flow direction and Inlet Outlet Ports. These will be labeled clearly on unit along with drawings which will identify the inlets and outlets. It is recommended to install isolation valves in the utility and process fluid lines to facilitate future maintenance.

Course protective screens or strainers are recommended in piping upstream of the heat exchanger. This prevents any dirt or debris from entering the exchanger and possibly plugging tubes.

Piping connections are made with the appropriate gaskets for the service intended. Exercise care to insure flat, full face contact with mating surfaces to eliminate leaks. All flange surfaces should be cleaned with a wire brush just prior to joining. Care must be taken to ensure foreign objects do not fall into the vessel during installation. Small parts, such as a hex nut, could be captured by the fluid flow tubes and expelled into the discharge piping, causing significant damage to down-stream equipment.

The INFINITY SHELL &/or TUBE HEAT EXCHANGER was not designed to support the weight of the user's piping. All user's piping must be adequately supported by other means. The user/owner may consider expansion joints in the piping to eliminate thermal stresses. Additional loads induced by the user's piping may result in an over stressed condition, violating the terms of the warranty.

To maintain a leak free system, the bolt tightening of all flanged joints should be performed in a diametrically opposed pattern, using a torque wrench in a minimum of two (2) equal steps. This will allow for proper seating of the gaskets. In the case of NPT connections, the use of TEFLON tape or other, compatible thread sealant is recommended to insure tight, leak free joints. After all piping has been completed, the user can begin the start-up procedure.

START-UP PROCEDURE

WARNINGALL INFINITY HEAT EXCHANGERS ARE TESTED AND DESIGNED FOR A MAXIMUM OPERATING PRESSURE OF 150 PSIG, AND A MAXIMUM TEMPERATURE OF 500 DEG F. IF PROCESS SUPPLY OR RETURN IS CAPABLE OF HIGHER PRESSURES AN ASME PRESSURE RELIEF VALVE SHOULD BE USED IN SUPPLY LINE FOR PERSONNEL AND EQUIPMENT PROTECTION. SEVERE BURNS AND DEATH CAN OCCUR IF PRODUCT IS NOT PROPERLY FITTED INTO SYSTEM WITH PROPER SAFETY RELIEFS AND FAIL SAFES.******

For all Infinity heat exchangers in steam service, provision must be made to drain accumulated condensate prior to start-up. This is to guard against water hammer. Vent valves should be opened before liquid is introduced to the heat exchanger. Start the flow of fluids gradually, introducing the cold fluid first. When the heat exchanger is filled and all air has been vented, the vent valves are closed. Check the INFINITY shell &/or tube heat exchanger for any leaks, tightening gasketed joints and sealed joints if necessary.

The INFINITY shell &/or tube heat exchanger was hydrostatically tested before shipment but gasketed joints and sealed joints may relax during transit and storage. Gasketed joint leakage may be corrected by tightening the bolts of the headers. Use a diametrically opposed bolting pattern, in a minimum of two (2) equal steps. Packed joint (TEMA type P rear head) leakage may be corrected by lightly tightening the packing gland with a hand wrench. This joint should never be over tightened. The packing gland should not have metal-to-metal contact with the shell flange.

OPERATION PROCEDURES

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It is important the INFINITY shell &/or tube heat exchanger is never operated at pressures and/or temperatures that exceed those stamped on the vessel's nameplate. This same information will be found on the enclosed drawing, along with terms and conditions of the as-built product.

Fixed tubesheet (TEMA type L, M and N rear heads) heat exchangers must not be subjected to thermal shock or premature failure may result. Thermal shock is a condition where excessive stress is created in heat exchanger components due to differential thermal expansion. Start the flow of both fluids gradually, introducing the cold fluid first. Reverse this sequence for shut-down; gradually stopping flow of both fluids, beginning with the hot fluid.

Fixed tubesheet exchangers have been evaluated for specific operating conditions, which are shown on the data sheet. The design should be re-evaluated before operating at conditions which differ substantially from the original.

Your INFINITY shell &/or tube heat exchanger has been designed for years of trouble free service. After a successful start-up little attention is required. Control forms of operation and operator logs of temperatures and pressure drops are your best guide to the health of your INFINITY shell &/or tube heat exchanger.

If the utility fluid is cooling water it should be periodically monitored for quantity and quality. Tower water sources are usually maintained for quality and pose little threat to any heat exchanger.

If using untreated pond, river or well water, consideration must be given to both particulate matter as well as ph. Water filters should be employed and checked periodically to remove debris so the flow of cooling water is not reduced.

The required quantity of water flow is specified on the data sheet and must be available to the INFINITY shell &/or tube heat exchanger. This will ensure ample water flow to help keep the tubes clean as well as maintain the correct heat transfer coefficient.

MAINTAINANCE PROCEDURES

Your INFINITY shell &/or tube heat exchanger will operate trouble free for extended periods of time but requires regular inspections like any other piece of plant equipment. Regular monitoring of the "approach" temperature (difference between the hot side outlet temperature and the cold side inlet temperature) is the best way to determine if the INFINITY shell &/or tube heat exchanger is performing as designed.

Regular monitoring of the process side and utility side pressure drop is another reliable measurement of performance. Please refer to the INFINITY shell &/or tube heat exchanger data sheet for the approach temperature and pressure drops.

While the shell side pressure drop should remain constant over time, it is sensitive to any changes in the volume of fluid flowing and changes in the inlet temperature of the fluid. A sudden increase in pressure drop may indicate an upset condition in another part of the system. A gradual increase in pressure drop across the shell side indicates a decrease in flow area through the tube bundle. This is usually caused by particulate matter accumulating between the tubes, which may be indicative of dirty or inoperative filters. Once the tube bundle has been contaminated with particulate matter, it must be cleaned and/or replaced. If the thermal performance of the INFINITY shell &/or tube heat exchanger starts to decrease, the health of the tube side is the first area to check. Heat exchanger performance is sensitive to changes in tube side fluid temperature and quantity as well as tube side fouling activity. If the tube side supply

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temperature and quantity has not changed then the operator must consider tube side fouling as the cause of deteriorating performance.

Tube side decay or failure manifests itself in three ways:

Biological growth such as algae.

Chemical processes where dissolved minerals precipitate out of the water and accrete on the tube walls.

Mechanical fouling, such as suspended particulate matter accumulating in the tube side passages.

Regardless of the type of fouling, the tube side pressure drop and approach temperature will tend to increase and they all require the same corrective treatment. The tube side of the INFINITY shell &/or tube heat exchanger must be cleaned. This is accomplished by a partial disassembly of the INFINITY shell &/or tube heat exchanger.

PARTIAL DISASSEMBLY

Prior to disassembly collect all the required materials and tools needed to perform the task. The following will be required:

The final issue of the General Arrangement Drawing (GA) for your INFINITY shell &/or tube heat exchanger. A suitable lifting device, capable of supporting the weight of the headers.

Appropriate size hex wrenches, torque wrench, wire brushes, gasket cement and a gasket scraping tool.

Test covers for tube side nozzles (optional).

Replacement gaskets, from any plumbing supply house

Suitable wire brushes for cleaning the inside of the tubes. Follow the equipment manufacturer's shut down procedure. Once the hot fluid has stopped flowing through the INFINITY shell &/or tube heat exchanger, cold fluid flow is continued until the heat exchanger is no longer hot to the touch. The coolant flow is then stopped and the vent valves opened. The drain plugs are then removed, allowing both sides to drain. Tube side supply piping is then removed.

If deemed necessary, this is the ideal time to perform a pressure test of the tube side. Replace all vent/drain plugs and install the test covers on the tube side header nozzles. One test cover will have an NPT fitting to mount a pressure gauge; the other will have a suitable fitting to mount a pressure regulator.

Pressurize the tube side to line pressure psi using shop air. Never exceed the name plate design pressure. The pressure gauge indication should hold steady, indicating there are no leaks. A slow decrease in pressure indicates a bad tube joint(s). If the bundle can not be pressurized the problem is most likely a split tube.

To correct a split tube problem, refer to the section on FINDING AND PLUGGING A SPLIT TUBE at the end of this manual.

To correct bad tube joints the shell side must be pressurized. If you suspect bad tube joints, go to the TUBE JOINT TEST PROCEDURE section located at the end this manual.

Once the tube side has been drained, the headers should be matched-marked to ease reassembly. The heads are then unbolted and removed. Before proceeding farther it is a good idea make a sketch showing the orientation of any pass

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ribs, which will aid in reassembly. The interior of the heads should be cleaned with wire brushes to remove any scale, accumulated particulate matter and/or biological growth.

The tube interiors are cleanable by a number of methods. The least aggressive is flushing with water to remove accumulated particulate matter and biological growth. Precipitated solids require more aggressive cleaning methods such as rotary wire brushes or pressure washing with cold water. The use of steam or very hot water is not recommended as either of these may loosen the rolled tube joints. Any chemical cleaning solutions must be compatible and safe with the tube material metallurgy.

After the tube side has been cleaned and all the tube interiors are clear of biological growth, precipitated and particulate matter, the INFINITY shell &/or tube heat exchanger is ready for reassembly.

If you have any questions regarding the use or installation of your new heater, please call our technical department at 888-565-8137, they will be happy to assist in any way they can. All Infinity products are warranted for 6 months following the shipment of the units. Please contact us immediately if you have any concern/problem with any IFC product, it will promptly and courteously be handled. Thank you again for choosing Infinity Fluids Corporation for all of your heating and controls projects.

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