Attachment 18.4

Temporary Camp Sewage Tanks

(72 Pages)

1291 California Avenue, P.O. Box 1517
Brockville, ON, K6V 5Y6
T: 800.420.4056 F: 289.203.1319

Operation & Maintenance Manual 1704962 - Horizon North Wastewater Storage Tanks

Site:
Baffin Island, Nunavut

Prepared for:
Horizon North Camps & Catering
5637-67 Avenue NW
Edmonton, AB

1.0 General Documents
Safety, Quote, Packing List, Return Material Authorization

2.0 Mechanical Drawings
P&ID, Legend, System Layout

3.0 Electrical Drawings
Electrical Documents

4.0 Mechanical Components
Bill of Material

5.0 System Manuals
Manual Document List

6.0 Warranty

Section 1

General Documents

SAFETY

1.0 Introduction

This section provides general personal and environmental safety information for newterra system.

Always refer to local codes and regulations.

Specific equipment and parts safety information can be found in Section 6 of this manual.

Information and guidelines outlined in this manual **must** be followed at all times prior to system installation and during operation and maintenance.

2.0 ESSENTIAL FOR SAFE OPERATION:

1. Installation and operation of the newterra system must only be carried out by **trained and qualified** personnel.
2. All necessary **safety precautions must** be carefully exercised, including but not limited to proper use of personal protective equipment considering given working environment and conditions.
3. All **electrical installations and troubleshooting must** only be carried out by licensed electricians.
4. All **plumbing work must** only be carried out by licensed plumbers or qualified personnel.
5. Please keep in mind that trees and shrubs taller than two meters located in close proximity to the newterra system may become a safety concern at the time of installation or service.

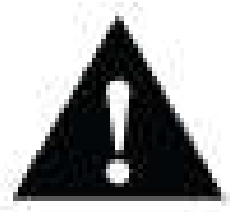
DEFINITION OF SAFETY AND WARNING SIGNS USED IN THE MANUAL

ATTENTION SYMBOL

Special attention is required to ensure compliance with instructions concerning correct operating sequences to prevent damage to the newterra system or its function.

GENERAL WARNING SIGN

This symbol accompanies all important instructions or warnings associated with risks of injury as well as possible equipment damage.



WARNING

CRITICAL WARNING SIGN

Warns against an unsafe situation or practice associated with severe injury as well as major equipment damage.

3.0 Personal Protective Equipment (PPE)

Personal protective equipment (PPE) refers to protective clothing, gloves, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter. ”Protective clothing" is applied to traditional categories of clothing, and "protective gear" applies to items such as pads, guards, shields, masks, and others.

The purpose of personal protective equipment is to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective to reduce these risks to acceptable levels. PPE is needed when there are hazards present. PPE has the serious limitation that it does not eliminate the hazard at source and may result in employees being exposed to the hazard if the equipment fails.

The following list includes the minimum scope of PPE that should be available to system operators:

3.1 Head protection

Hard hats, bump caps, or helmets are types of protection that should be considered if there is a hazard of head injury. Head injuries can occur under various circumstances including as the result of a slip or fall, working in confined areas or where there are low ceilings, where there may be falling objects. Hard hats should be worn at all times when overhead work is being conducted.

3.2 Eye and Face Protection

Eye protection with side shields should be used at all times while inside the newterra system as there may be a danger of flying objects, particles, liquids, sprays or other matter entering the eyes. Protection can take many forms including:

- safety glasses,
- goggles, or
- full face protection. This should be used if handling chemicals, waste product or working around pressurized lines (air of liquid).

3.3 Foot Protection

Foot protection should be used at all times within the newterra system. Foot protection is usually in the form of steel-toed work boots, with a steel shank to protect the bottom of the foot from puncture wounds. In wet environments, steel-toed boots that are waterproof and slip-resistant may be necessary.

3.4 Hand Protection

Hand protection should be worn within the newterra system. The workplace can create many hazards for hands, whether from chemicals, cuts or burns. No single glove can provide appropriate protection for every work situation, so it is important to assess the risk for each task and select a glove that provides specialized protection.

The following is a list of gloves and their suggested appropriate application:

- Coated fabric gloves: This type of glove can provide protection against some moderate concentrated chemicals. They can be used in laboratory work provided they are strong enough to protect against the specific chemical being handled.
- Rubber, plastic or synthetic gloves: These types of glove can be used when cleaning or working with oils, solvents and other chemicals.
- Leather gloves: These should be used when welding, as the leather can resist sparks and moderate heat. The risk of cuts and abrasions also can be minimized by wearing leather gloves.
- Kevlar gloves: These have a wide variety of industrial applications. They are cut- and abrasion-resistant and provide protection against both heat and cold.
- Chemical/liquid-resistant gloves: Several types of gloves help protect against specific chemicals:
    - Butyl rubber gloves: nitric acid, sulfuric acid, hydrochloric acid and peroxide
    - Natural latex/rubber gloves: water solutions or acids, alkalis, salts, and ketones
    - Neoprene gloves: hydraulic fluids, gasoline, alcohols and organic acids
    - Nitrile rubber gloves: chlorinated solvents

3.5 Body Protection

Body protection may be required in various situations including dusty environments or when spraying liquid pesticides or handling dangerous chemicals. The hazard to be controlled will determine the type of protection that is most appropriate, for example, an apron, coveralls or a full rain suit. As a minimum, the operator should be wearing work coveralls.

3.6 Chemical and Bacterial Safety

The newterra system wastewater may contains a mixture of chemical, viable bacteria and other biological organisms, depending on the system. System wastewater may pose a number of hazards and consequently potential health risk. Immunization protects operator against infection. The use of proper hygiene measures, protective equipment, good housekeeping and common sense prevent contact with pathogens.

These measures prevent infection!

Ensure that hands are washed with an antibacterial soap and warm water and dried by disposable towels on a regular basis, especially prior eating!

Do not expose cuts or open sores to system wastewater!

Use personal protective equipment (PPE) at all times in the newterra system!

Any concern about possible infection should be brought to the attention of medical physician immediately!

3.7 Hearing Protection

Hearing protection should be worn in work environments where noise levels exceed 85 decibels – such as around blowers and air compressors. There are many types of hearing protection, including earplugs or muffs. Hearing protection that is suitable for the work environment and provides adequate noise reduction should be chosen. Disposable ear plugs or headset style are acceptable.

4.0 Electrical Safety

Power may be supplied to control panels from various sources. Even if the disconnect is in the OFF position, certain electrical components inside the panel may be energized and servicing should not be conducted unless all incoming power is disconnected. Refer to the electrical drawings in Section 3 of this manual.

Ensure that the system is properly grounded before applying power to the system. Installation and servicing is only to be performed by **qualified authorized personnel**.

4.1 Lockout Procedures

Lockout procedures must be followed prior to performing mechanical or electrical maintenance to ensure that equipment has been de-energized. All relevant local guidelines and procedures must be applied. The person who locked out the device, should be the only person to remove the lockout.

When equipment is to be locked out, employers, supervisors and workers should follow accepted lockout principles, including:

- Pre-planning for the lockout by identifying all energy sources, switches, etc.
- Where lockout is complex, a written sequence in checklist form should be prepared for equipment access, lockout/tagout, clearance, release and start-up.
- All workers affected by the lockout should be notified.
- Equipment should be shut down by normal means by turning of switches and closing valves etc.
- Equipment should be isolated from energy sources by disconnecting or blocking the sources of energy.
- Lockout and tag the energy isolating devices by padlock or some other locking device that the worker has control over as well as a tag indicating that the equipment has been shut down.
- Verify that all energy sources have been isolated by attempting to cycle the equipment prior to working on it.
- When work is completed, release equipment from lockout.
- Test equipment

5.0 Confined Spaces

“**confined space**” means a fully or partially enclosed space:

- that is not both designed and constructed for continuous human occupancy, and
- in which atmospheric hazards may occur because of its construction, location or contents or because of work that is done in it.

If you have a space that is fully or partially enclosed, the two conditions – (a) and (b) above – must both apply before the space can be considered a "confined space".

"**atmospheric hazards**" means:

- the accumulation of flammable, combustible or explosive agents,
- an oxygen content in the atmosphere that is less than 19.5 per cent or more than 23 per cent by volume, or
- the accumulation of atmospheric contaminants, including gases, vapours, fumes, dusts or mists, that could,

- result in acute health effects that pose an immediate threat to life, or
- interfere with a person's ability to escape unaided from a confined space.

Follow local laws and regulations with respect to entering a confined space.

If a workplace includes a confined space that workers may enter to perform work, it is highly recommended that written program for the confined space is developed and maintained in accordance with this local regulations and policies before a worker enters the confined space.

A confined space program is a written document that would include: a method for recognizing each confined space to which the program applies; a method for assessing the hazards to which workers may be exposed; a method for the development of confined space entry plans; a method for training workers; and, an entry permit system.

Most newterra systems do not have confined spaces; however, you must consult your local Health and Safety Coordinator for clarification.

6.0 Fire Safety

Exposed hot surfaces can create potential burn/ignition hazards. Blowers and air compressors compress ambient air, causing heat to be generated. This heat can bring the temperature of the air compressor head and blower piping to a level that can cause burns to exposed flesh.

Follow local laws and regulations with respect to Fire Safety and regulations.

6.0 Responsibility for Safety

6.1 Management/Supervisors

Management is responsible for providing a safe working environment. This is accomplished partly by:

- Ensuring that all facilities and equipment are built and maintained in accordance with the appropriate safety standards
- Providing adequate funds for equipment, system maintenance and establish a safety training program (if applicable)
- Supplying easy accessible eyewash, fire extinguishers, first-aid stations and proper personal protective equipment (PPE) for personnel servicing the newterra system (if not provided as part of the system).

6.2 Worker

- To develop a positive and professional attitude towards safety.
- To avoid mistakes caused by indifference to safety, poor work habits, lack of attentiveness, rushing the job, failure to observe established safety procedures and poor physical condition.

Remember the "ABC" of accident prevention:

ALWAYS BE CAREFUL!!!

In addition to ***"being careful"*****,** it is the responsibility of all workers to:

- Work in accordance with established safety procedures
- Follow the established safety rules
- Wear appropriate personal protective equipment (PPE)
- Report all accidents, no matter how minor
- Report potential safety hazards
- Participate in safety programs

6.3 Plant Safety – Simple Rules to Follow

Common sense plays a very important part in the safe operation of any type of plant!

- Wear the appropriate personal protective equipment at all times.
- Keep walkways clear of snow and ice, and loose objects such as pails, shovels, tools, etc.
- Clean up spills of oil, grease, chemicals, or other substances immediately.
- Keep all tools and similar equipment clean, in good condition, and properly stored when not in use.
- Replace all manhole covers, access trap doors, etc. as soon as possible. Erect a safety barrier if it is necessary to leave the opening uncovered.

- Use the proper tools when removing or replacing a manhole cover.
- Wear a safety belt whenever there is the possibility of falling even a short distance, or when working over water.
- Lock out and tag electrical equipment before working on it or the associated equipment.
- Ensure that moving machinery is properly guarded. Wear ear protection in noisy environments.
- Ensure that fire-fighting equipment is in good working condition.

6.4 Hazard Warning Signs/Symbols

Below is a sample of possible hazard warning signs/symbols that may be provided with the newterra system. It is recommended that the operator become familiar with the warning signs in the system.

7.0 First aid

First aid is emergency care given immediately to an injured person. The purpose of first aid is to minimize injury and future disability. In serious cases, first aid may be necessary to keep the victim alive.

It often consists of a one-time, short-term treatment and requires little technology or training to administer. First aid can include cleaning minor cuts, scrapes, or scratches; treating a minor burn; applying bandages and dressings; drinking fluids to relieve heat stress, etc.

Operators must know the location of emergency telephone number(s), First Aid Kits, emergency eye wash stations and first aid attendant(s).

In over 98% of locations in the United States and Canada, dialing "9-1-1" from any telephone will link the caller to an emergency dispatch office—called a Public-Safety Answering Point (PSAP) by the telecom industry—which can send emergency responders to the caller's location in an emergency. In approximately 96 percent of the U.S., the Enhanced 9-1-1 system automatically pairs caller numbers with a physical address.

Follow local laws and regulations with respect to First Aid procedures and reporting.

7.2 CPR Poster

CPR for an Adult or Child

1

- Check the scene to ensure it is safe. If it is safe to do so, check the person and the person's ABCs (Airway, Breathing, Circulation).
- Call EMS/9-1-1 and get an AED or have someone else do this.

2

- Place the heel of one hand on the middle of the chest. Place the other hand on top.
- Do 30 compressions. Push hard, push fast.

3

- Open the airway by tilting the head back and lifting the chin. Pinch the nostrils closed and give 2 breaths.
- Repeat the cycle of 30 compressions and 2 breaths.
- Continue CPR until an AED arrives or more advanced care takes over.

The information on this poster does not replace formal First Aid & CPR training.

To find a Red Cross First Aid course in your area scan the QR code, or:
redcross.ca/firstaid |1.877.356.3226

CANADIAN RED CROSS

10/10

MECHANICAL TEST RECORD								
Device Name:	**H-7901A**			Manufacturer:	**MARKEL**			
Device Model #:	**HLA1224036007.024**			Device Serial #:				
Motor Manufacturer:				Area Classification Tag Checked:				
Motor Model #:				Motor Serial #:				
WATTAGE	**7.5K**	Voltage:	**240**	Frame:		RPM:		
Phase:	**3**	Current:	**18.00**	SF:		ENCL.:		
Factory Test:				Field Test:				
L1	L2	L3		L1	L2	L3		
16.0	**16.2**	**16.2**	Amps				Amps	
L1/L2	L2/L3	L3/L1		L1/L2	L2/L3	L3/L1		
229	**230**	**229**	Vac				Vac	

Device Name:	**H-7902A**			Manufacturer:	**MARKEL**			
Device Model #:	**HLA1624036010.024**			Device Serial #:				
Motor Manufacturer:				Area Classification Tag Checked:				
Motor Model #:				Motor Serial #:				
WATTAGE	**10K**	Voltage:	**240**	Frame:		RPM:		
Phase:	**3**	Current:	**21.40**	SF:		ENCL.:		
Factory Test:				Field Test:				
L1	L2	L3		L1	L2	L3		
22.0	**22.0**	**22.3**	Amps				Amps	
L1/L2	L2/L3	L3/L1		L1/L2	L2/L3	L3/L1		
229	**230**	**229**	Vac				Vac	

Device Name:	**H-7901B**			Manufacturer:	**MARKEL**			
Device Model #:	**HLA1224036007.024**			Device Serial #:				
Motor Manufacturer:				Area Classification Tag Checked:				
Motor Model #:				Motor Serial #:				
WATTAGE	**7.5K**	Voltage:	**240**	Frame:		RPM:		
Phase:	**3**	Current:	**18.00**	SF:		ENCL.:		
Factory Test:				Field Test:				
L1	L2	L3		L1	L2	L3		
16.2	**16.0**	**16.5**	Amps				Amps	
L1/L2	L2/L3	L3/L1		L1/L2	L2/L3	L3/L1		
229	**230**	**229**	Vac				Vac	

Device Name:	**H-7902B**			Manufacturer:	**MARKEL**			
Device Model #:	**HLA1624036010.024**			Device Serial #:				
Motor Manufacturer:				Area Classification Tag Checked:				
Motor Model #:				Motor Serial #:				
WATTAGE	**10K**	Voltage:	**240**	Frame:		RPM:		
Phase:	**3**	Current:	**21.40**	SF:		ENCL.:		
Factory Test:				Field Test:				
L1	L2	L3		L1	L2	L3		
22.3	**22.5**	**22.5**	Amps				Amps	
L1/L2	L2/L3	L3/L1		L1/L2	L2/L3	L3/L1		
229	**230**	**229**	Vac				Vac	

4428 Manila Road SE
Calgary, AB T2G 4B7
showard@newterra.com | www.newterra.com

September 1st, 2017

Patrice Demers |Manager, Purchasing
Horizon North Logistics Inc., Camps & Catering

5637 67th Avenue, Edmonton AB T6B 2R8
(Office) 780-395-7305
(Cell) 780-446-5614
(Toll Free) 866-305-6565
www.horizonnorth.ca

Re: **Quote for Wastewater storage tank / Quote # 1704962R0**

Dear Patrice Demers,

We are pleased to provide you with a firm price quote for a **newterra** WW storage system for the storage of sewage. The **newterra** WW system is designed specifically for decentralized remote camp applications.

As your preferred vendor and global water technology partner we will endeavor to engineer the best solutions for your customers incorporating the **newterra** technology. We trust that, as you review this proposal, you will find the information provided to be helpful in your decision making process. Should you require further information, please do not hesitate to contact us.

Yours truly,

Steve Howard
Vice President Western Operations
403.651.8094 | showard@newterra.com

4428 Manila Road SE
Calgary, AB T2G 4B7
showard@newterra.com | www.newterra.com

SCOPE OF SUPPLY:

Storage System

- Four (4) storage tanks
  - HDPE construction
  - Inlet and outlet isolation valves
  - Total approximate volume of 6,400 gal
  - Each tank Sealed and vented to exterior

System Enclosures – Modified Shipping Containers

cMET certified, built to NEC standards with all wiring complete and all equipment pre-piped factory tested and mounted in enclosure.

One (1) used 40’ high-cube modified shipping containers with the following standard features:

- Exterior paint
- Class 1 Div. 2 Heaters
- Lifting eyes on upper corners
- Insulated walls and ceiling
- Insulated floor
- Barn-style rear double doors

Control System Module:

- Branch circuit protection with circuit breakers for heaters
- Wired and installed
- Factory tested prior to shipping

4428 Manila Road SE
Calgary, AB T2G 4B7
showard@newterra.com | www.newterra.com

PRICE BREAKDOWN:

Equipment Purchase Cost:	$ 65,000.00 each
Estimated Equipment Freight to Montreal:	$ 2000.00 each
Sales Tax on Equipment:	Not Included
Total System Purchase Cost:	**$ 67,000.00 each**

DELIVERY: The system would be ready for shipment from Brockville Ontario by September 11, 2017

CURRENCY: All prices are quoted in CAN dollars.

PAYMENT TERMS:

- 50% due immediately on purchase order
- 50% due 15 days from ready shipment

CLIENT'S SCOPE OF SUPPLY AND WORK:

- Delivery of raw sewage to the **newterra** WWR system;
- Permitting;
- Grease trap to control entry of oil and greasy material to the **newterra** WWR system. Fat, oil and grease levels entering the newterra MBR system must be less than 30 mg/L to ensure the system functions as designed and to prevent overflow clogging;
- Firm, level base for the containers;
- Piping hookups to and from the **newterra** WWR system;
- Electrical power supply to our electrical distribution panel @ 3Ph 20KW
- Lightning, grounding, etc. ;
- Potable water supply to the plant site for plant hydraulic test during startup;
- Wastewater testing;
- Anything not mentioned in "Scope of Supply" above.

Project Packing List

PMProjNum **1704962**

Horizon North Wastewater Storage Tanks

Shipping Notes:

Tag	Part Number	Part Description	Req	EngMemo
			Rec	
			PO #	Line
7900	24612	Container, 40' x 8' x 9'6", Once Use, High Cu	2	---
-	ea	30,480kg rated, Forklift Pockets, CSC Plate,	0	
	Type: I	ABS/BV/LR Certs. Steel Checkerplate ---	1704962-0003	1
8900	11328	Disconnect, 3ph, CH362RB	2	---
DISC	ea	60A,CSA,600V,Nema 3R,fusible disconnect	2	
	Type: P	---	1704962-0010	1
8900	38783	Disconnect, Square D, CH361RB	2	---
DISC	ea	30A, CSA, 600V, Nema 3R,fusible disconne	2	
	Type: P	---	1704962-0010	2
8900	E1200	Fuse, GLD TRS30R	18	---
DISC	ea	30A 600V Time Delay	18	
	Type: P	Class R ---	1704962-0010	3
8900	E1202	Fuse, GLD TRS40R	18	---
DISC	ea	40A 600V Time Delay	18	
	Type: P	Class R ---	1704962-0010	4

newterra Return Material Authorization (RMA)

For in warranty issues there are two possible RMA procedures.
1. System will be down during warranty assessment. Raise an RMA through **newterra™** and we will have the equipment sent for warranty assessment. Depending on the outcome of the warranty assessment you will either receive refurbished or replacement equipment, or, if it is deemed not covered by warranty, you will have to purchase new equipment.
2. System will be running during warranty assessment. Raise an RMA through **newterra** and we will have the equipment sent for warranty assessment. Purchase new equipment. Depending on the outcome of the warranty assessment you will either receive a credit for the purchase amount, or, if it is deemed not covered by warranty, no further action will be taken.

Return Policy and Instructions

Please note only goods that have been authorized by newterra for return will be accepted. Returned goods that do not follow this procedure will not be accepted.

Contact newterra requesting a return of the product.
Include a brief description of the problem and what action is required, ie repair, warranty, incorrect item etc.

Get RMA form and RMA number from newterra.
Upon receiving authorization from **newterra** to return goods, **newterra** will provide you a RMA number, and fax/email you an RMA form that must be completed and signed.

Complete and sign the RMA form and include form with items being returned.
The RMA form (completed and signed by customer) must accompany the goods being returned.

Ship returned items prepaid on your courier account.
Shipment from customer to **newterra** shall be prepaid at customer's expense. Collect shipments will not be accepted. Replaced or repaired items will be shipped back to customer at customer's expense.

Restocking Policy

Only unused items, in 'like new' condition in original packing (if applicable) can be returned for credit.
All credits are subject to our satisfactory examination of the returned items. All items returned must be clean and free of product. Restocking charges are applicable and will be reviewed on a case by case basis.

Exchange Policy

In cases where an incorrect item was shipped, or an item was damaged in transit please notify **newterra** immediately for instructions for return and /or exchange.

Evaluation Policy

Items returned for repair which are no longer under warranty may be subject to a $200 evaluation fee.

newterra Return Material Authorization (RMA)

1325 California Avenue
P.O. Box 1517
Brockville, Ontario
Canada, K6V 5Y6

Ph. 1-800-420-4056
Fax 613-345-7633

Date Issued: _____

RMA Number: _____ Project Number: _____

newterra Contact: _____

Customer Name: _____

Customer Contact: _____

Customer Ph.: _____

Customer Fax: _____

Parts free of 'product': _____

newterra Part Number/s, Description/s and quantity to be returned:

Part #	Description	Quantity

Reason for return: _____

Print name: _____

Signature: _____

Title: _____

Date: _____

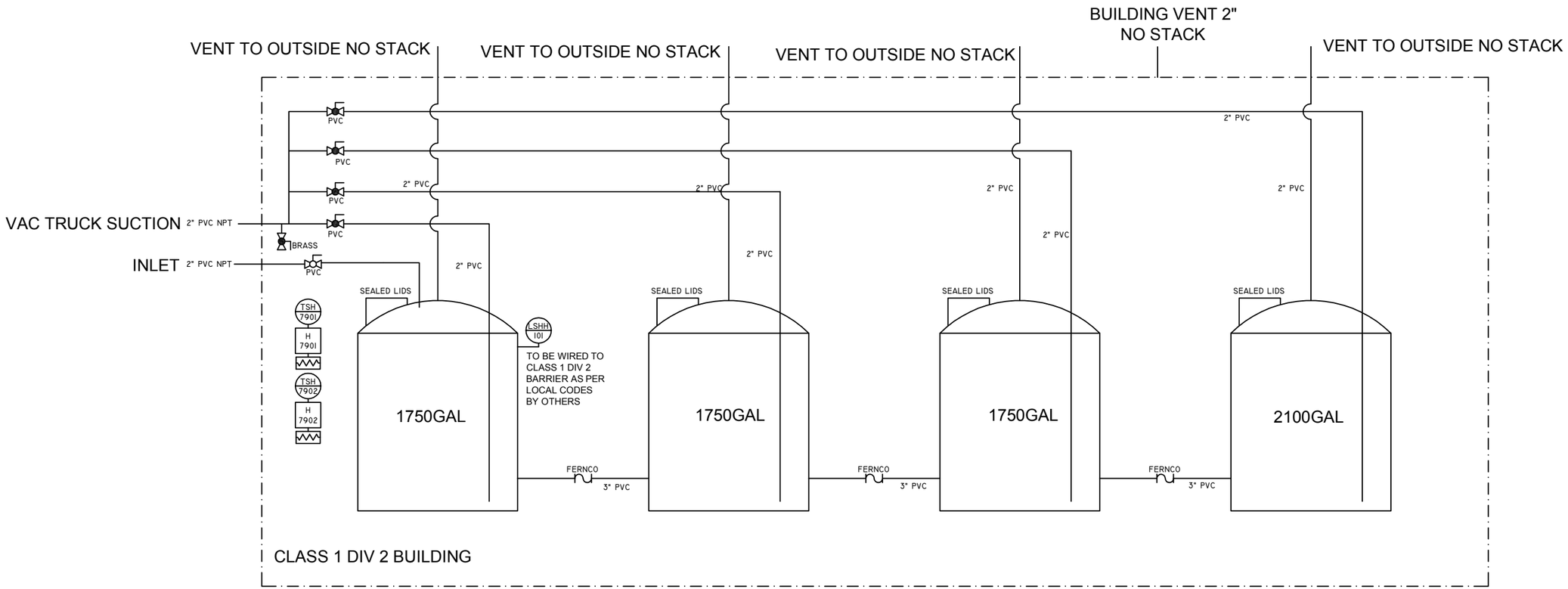
Sheet to be filled out by customer and returned with returned items.

Section 2

Mechanical Drawings

HEATER 7901
1799K25
McMaster Carr
240v 3p 7.5KW

HEATER 7902
1799K27
McMaster Carr
240v 3p 10KW



WIRING AND SPECIAL PROJECT NOTES
IS INPUT WIRING TO BE WIRED FOR INDOORS, ACCORDING NEC FOR HAZARDOUS LOCATIONS.
WIRING TO BE CLASS 1 DIVISION 2, AS PER THE NEC.

NOTES
- MATERIALS OF VALVES AND FITTINGS TO BE THE SAME AS THE DESCRIPTION AT THE LINE. IF THERE IS A TRANSITION FROM PVC TO STEEL, THE VALVE SHOULD BE BRASS.
- THERE ARE NO SPECIAL PIPING REQUIREMENTS OTHER THAN WHAT IS EXPLAINED ON THE DIAGRAM.
- - PVC PIPE MAY BE SUBSTITUTED WITH EQUAL-SIZED PVC HOSE WHERE A FLEXIBLE CONNECTION IS PREFERRED.
- DO NOT DRILL AND TAP HOLES IN PIPE WHEN PRESSURES ARE OVER 15 PSIG.

newterra

PHONE:
(800) 420-4056

www.newterra.com

LEVEL	REVISION	DATE (mm/dd/yy)	BY
C	AS BUILT	08/09/17	JJK
B	PRODUCTION	06/09/17	JJK
A	FOR SUBMITTAL	05/09/17	JJK

PROJECT NUMBER 1704962

TITLE AND LOCATION WASTEWATER STORAGE

CUSTOMER HORIZON NORTH

DRAWN BY | DATE | SHEET 1 | SHEETS 1

VALVES AND PIPING

NO NC

BALL VALVE -

GATE VALVE -

GLOBE VALVE -

NEEDLE VALVE -

SLIDE VALVE -

SOLENOID VALVE -

BUTTERFLY VALVE -

SWING CHECK VALVE -

WAFER CHECK VALVE -

SPRING CHECK VALVE -

WYE STRAINER -

SAMPLE PORT -

PRESSURE RELIEF VALVE -

VACUUM RELIEF VALVE -

CAMLOCK CONNECTION -

FLEXIBLE COUPLING - FLEX

FLEXIBLE CONNECTION -

FLANGED CONNECTION -

REDUCER -

UNION -

ADSORBENT FILTER - A (TWIST DRAIN) A (AUTO DRAIN)

COALESCING FILTER - (TWIST DRAIN) (AUTO DRAIN)

PARTICULATE FILTER - (TWIST DRAIN) (AUTO DRAIN)

FILTER, SILENCER -

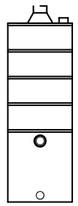
PRESSURE REGULATOR -

REGULATOR W/ FILTER -

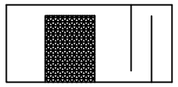
BANDED TRANSITION FITTING - BTF

NEWTERRA / CLIENT SCOPE CHANGE - NC

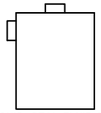
EQUIPMENT



AIR STRIPPER

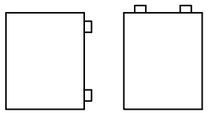


OIL/WATER SEPARATOR



VAPOR/LIQUID, SEAL FLUID SEPARATOR

BAG FILTER

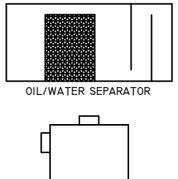


CARBON VESSEL

PRODUCT STORAGE DRUM, TANK

OXIDIZER

CHEMICAL DRUM



STANDARD, CONICAL-BOTTOM TANK

VIBRATION ISOLATOR

EQUIPMENT

CENTRIFUGAL PUMP -

PROGRESSIVE-CAVITY PUMP -

CHEMICAL-INJECTION PUMP -

CENTRIFUGAL, REGENERATIVE BLOWER -

POSITIVE-DISPLACEMENT BLOWER -

ROTARY-CLAW BLOWER -

LIQUID-RING PUMP -

ROTARY-VANE COMPRESSOR -

RECIPROCATING COMPRESSOR -

HEAT EXCHANGER -

PASSIVE COOLING FINS -

MOTOR DRIVEN FAN - F

EQUIPMENT

AS - AIR STRIPPER
BLD - BUILDING, TRAILER OR SKID
FLT - FILTER VESSEL
LPC - LIQUID-PHASE CARBON VESSEL
MFD - MANIFOLD
OWS - OIL/WATER SEPARATOR
OX - OXIDIZER
PST - PRODUCT STORAGE TANK
SOS - SEAL OIL SEPARATOR
SWS - SEAL WATER SEPARATOR
TNK - TANK
VLS - VAPOR/LIQUID SEPARATOR
VPC - VAPOR-PHASE CARBON VESSEL

FLOW MEASUREMENT

AVERAGING PITOT TUBE - RANGE PDI 101 H L

VENTURI - RANGE PDI 101 H L

ROTOMETER - RANGE FI 101

WATER FLOW METER - FQI 101

INSTRUMENT DESIGNATION

	INPUT	1ST MODIFIER	2ND MODIFIER	3RD MODIFIER	OUTPUT	1ST MODIFIER	
A			ALARM				A
B						BLOWER	B
C	CYCLE					COMPRESSOR	C
D		DIFFERENTIAL				AIR DRYER	D
E							E
F	FLOW					FAN	F
G	GAS (LEL)		GAUGE				G
H				HIGH	HAND	HEATER	H
I	CURRENT		INDICATOR				I
J							J
K							K
L	LEVEL			LOW			L
M					MOTORIZED		M
N							N
O							O
P	PRESSURE				PNEUMATIC	PUMP	P
Q		QUANTITY					Q
R							R
S	SPEED		SWITCH		SOLENOID		S
T	TEMPERATURE		TRANSMITTER				T
U							U
V						VALVE	V
W							W
X							X
Y							Y
Z	POSITION						Z

INSTRUMENT IDENTIFICATION

- INDICATING INSTRUMENT

- DIGITAL INPUT TO CONTROL PANEL

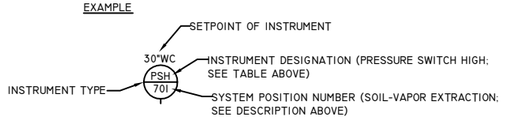
- DIGITAL INPUT CAUSING ALARM

** - DIGITAL INPUT CAUSING SYSTEM SHUTDOWN ALARM

- ANALOG INPUT TO CONTROL PANEL

- ANALOG OUTPUT FROM CONTROL PANEL

EXAMPLE



SYSTEM POSITION DESIGNATION

100 - VACUUM INLET MANIFOLD
300 - INLET HEAT EXCHANGER
400 - VAPOR/LIQUID SEPARATOR
500 - VAPOR/LIQUID SEPARATOR - 2
700 - SOIL-VAPOR EXTRACTION
1000 - LIQUID-RING PUMP
1300 - SVE HEAT EXCHANGER
1600 - VAPOR-PHASE CARBON
1900 - OXIDIZER
2200 - AIR SPARGE
2500 - SPARGE HEAT EXCHANGER
2800 - SPARGE OUTLET MANIFOLD
3100 - AIR COMPRESSOR
3400 - COMPRESSED-AIR OUTLET MANIFOLD
3700 - PNEUMATIC WELL PUMPS
4000 - SUBMERSIBLE WELL PUMPS
4300 - SURFACE-MOUNT WELL PUMPS
4600 - GROUNDWATER INLET MANIFOLD
4900 - OIL/WATER SEPARATOR
5200 - PRODUCT STORAGE TANK
5500 - INLET TANK
5800 - UPSTREAM BAG FILTER
6100 - CHEMICAL INJECTION
6400 - AIR STRIPPER
6700 - PRE-CARBON BAG FILTER
7000 - LIQUID-PHASE CARBON
7100 - PRE-MEDIA BAG FILTER
7200 - ACTIVATED ALUMINA
7300 - DISCHARGE TANK
7400 - POST-TREATMENT BAG FILTER
7600 - REINJECTION
7900 - BUILDING,TRAILER OR SKID
8200 - CONTROL PANEL
8500 - ELECTRICAL PARTS
9900 - EXTRAS

NOTES
- WATER FLOW METERS: PROVIDE 10 DIA. OF STRAIGHT PIPE BEFORE AND 5 DIA. OF STRAIGHT PIPE AFTER METERS. ENSURE THAT THROTTLING VALVES ARE NOT DIRECTLY IN LINE WITH METERS.
- AIR FLOW METERS: PROVIDE 8 DIA. OF STRAIGHT PIPE BEFORE AND 3 DIA. OF STRAIGHT PIPE AFTER METERS, AVOID TEES AND ELBOWS BEFORE AND AFTER METERS.
- MATERIALS OF VALVES AND FITTINGS TO BE THE SAME AS THE DESCRIPTION AT THE LINE. IF THERE IS A TRANSITION FROM PVC TO STEEL, THE VALVE SHOULD BE BRASS.
- THERE ARE NO SPECIAL PIPING REQUIREMENTS OTHER THAN WHAT IS EXPLAINED ON THE DIAGRAM.
- WHEN PVC HOSE IS SPECIFIED, ALWAYS USE VACUUM HOSE; USE GREEN HOSE FOR PRESSURES LESS THAN 60PSI; USE TANK TRUCK HOSE FOR PRESSURES BETWEEN 60PSI AND 150PSI.
- PVC PIPE MAY BE SUBSTITUTED WITH EQUAL-SIZED PVC HOSE WHERE A FLEXIBLE CONNECTION IS PREFERRED.
- DO NOT DRILL AND TAP HOLES IN PIPE WHEN PRESSURES ARE OVER 15 PSIG.
- DO NOT USE PVC PIPE ON AIR LINES OVER 5 PSIG.

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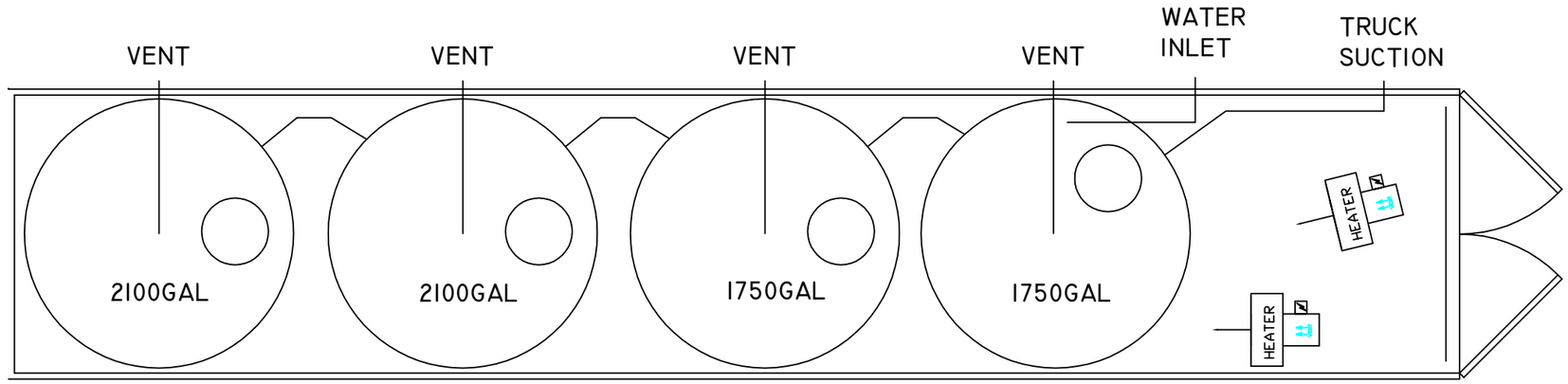
LEVEL	REVISION	DATE (mm/dd/yy)	BY

PROJECT NUMBER	CUSTOMER
TITLE AND LOCATION	
DRAWN BY	DATE / SHEET / SHEETS



40' SHIPPING CONTAINER

WALLS
- 2" SPRAY FOAM INSULATION
- NO PLYWOOD WALLS OR FRAMING

FLOOR
- 4" SPRAY FOAM INSULATION

CEILING
- 3" SPRAY FOAM INSULATION

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C	AS BUILT	08/09/17	JJK
B	PRODUCTION	07/09/17	JJK
A	SUBMITTAL	05/09/17	JJK

PROJECT NUMBER: 1704962

TITLE AND LOCATION: WASTEWATER TANKS

CUSTOMER: HORIZON NORTH

DRAWN BY | DATE | SHEET: 1 | SHEETS: 1

Section 3

Electrical Drawings

1704962

WASTE WATER STORAGE
HORIZON NORTH

newterra®

ELECTRICAL DRAWING PACKAGE

ELEC-All Electrical Drawings

Page #	Location	Description 1	Description 2
1	BLD-7901	ELECTRICAL TITLE PAGE	
2	BLD-7901	DRAWING LIST	
3	BLD-7901	SPECIFICATIONS	
4	BLD-7901	ELECTRICAL LEGEND	
5	MCP	SINGLE LINE DIAGRAM	
6	MCP	POWER DISTRIBUTION	
7	MCP	BILL OF MATERIAL -	PAGE 1/1
8	MCP	BILL OF MATERIAL -	PAGE 1/1
9	MCP	BILL OF MATERIAL -	PAGE 1/1

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A	FOR REVIEW	07/09/2017	ccliffe

PROJ. NO: 1704962

TITLE AND LOCATION: DRAWING LIST

CUSTOMER: HORIZON NORTH WASTE WATER STORAGE

SCALE	SHEET	SHEETS
NTS	2	9

ELECTRICAL SPECIFICATIONS

VOLTAGE	240V
PHASE	3
FREQUENCY	60Hz
FULL LOAD AMPS	45A
MAIN DISCONNECT SIZE	NONE - BY CUSTOMER
MAIN OVERCURRENT PROTECTION RATING	NONE - BY CUSTOMER
SCCR SYMMETRICAL (kAMPS)	10
SYSTEM APPROVAL AND CLASSIFICATION	cMETus CL1 DIV 2
PANEL APPROVAL AND CLASSIFICATION	cMET TO UL698A
ELECTRICAL INSTALL SPECIFICATIONS	CLASS 1 DIV 2 STANDARD

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PROJ. NO: 1704962
TITLE AND LOCATION: SPECIFICATIONS
CUSTOMER: HORIZON NORTH WASTE WATER STORAGE
SCALE: NTS | SHEET: 3 | SHEETS: 9

FLOW SWITCH, NORMALLY CLOSED

FLOW SWITCH, NORMALLY OPEN

FLOAT SWITCH, NORMALLY CLOSED

FLOAT SWITCH, NORMALLY OPEN

LIMIT SWITCH, NORMALLY CLOSED

LIMIT SWITCH, NORMALLY OPEN

PRESSURE SWITCH, CHANGE OVER CONTACTS

PRESSURE SWITCH, NORMALLY CLOSED OPENS ON PRESSURE INCREASE

PRESSURE SWITCH, NORMALLY OPEN CLOSES ON PRESSURE INCREASE

TEMPERATURE SWITCH, CHANGE OVER CONTACTS

TEMPERATURE SWITCH, NORMALLY CLOSED OPENS ON TEMPERATURE INCREASE

TEMPERATURE SWITCH, NORMALLY OPEN CLOSES ON TEMPERATURE INCREASE

METAL OXIDE VARISTOR
MOV

DIODE

TANDEM TERMINAL BLOCK

PANEL TERMINAL BLOCK

JUNCTION BOX TERMINAL BLOCK

CUSTOMER TERMINAL BLOCK

FUSED TERMINAL BLOCK

TERMINALS THAT ARE JUMPERED TOGETHER HAVE THEIR JUMPERS SHOWN ON THE TERMINAL STRIP LAYOUTS

TOGGLE SWITCH, NORMALLY OPEN

TEMPERATURE SWITCH, NORMALLY OPEN CLOSES ON TEMPERATURE INCREASE

PUSH BUTTON, NORMALLY CLOSED

PUSH BUTTON, NORMALLY OPEN

TEMPERATURE SWITCH, NORMALLY OPEN CLOSES ON TEMPERATURE INCREASE

SELECTOR SWITCH, 2 POSITION
2 NORMALLY OPEN

H A

SELECTOR SWITCH, 3 POSITION
2 NORMALLY OPEN

PILOT LIGHT, PUSH-TO-TEST
X=COLOUR

X

PILOT LIGHT, X=COLOUR

A - AMBER
B - BLUE
G - GREEN
R - RED
W - WHITE

BEACON LIGHT
X=COLOR

CONTACT, NORMALLY CLOSED

CONTACT, NORMALLY OPEN

TIME DELAY CONTACT, INSTANTANEOUS OPEN
TIMED CLOSED ON DE-ENERGIZE

TIME DELAY CONTACT, INSTANTANEOUS CLOSE
TIMED OPEN ON DE-ENERGIZE

TIME DELAY CONTACT, INSTANTANEOUS OPEN
TIMED CLOSE ON ENERGIZE

TIME DELAY CONTACT, INSTANTANEOUS CLOSE
TIMED OPEN ON ENERGIZE

COIL - RELAY, CONTACTOR
TIMER, MOTOR STARTER

ANNUNCIATOR, HORN

ANNUNCIATOR, BUZZER

BATTERY

TRANSMITTER, 2 WIRE
LOOP POWERED

INTRINSICALLY SAFE BARRIERS
(NOT TO SCALE)

4 CHANNEL DISCRETE

IN1
IN2
IN3
IN4

2 CHANNEL ANALOG

IN1
IN2

PANEL METER
AM=AMMETER
VM=VOLT METER

AM

ETM

ELAPSED TIME METER

CURRENT TRANSFORMER

GROUND

INSTRUMENTATION GROUND

SOLENOID

CURRENT SWITCH

FUSED DISCONNECT
X=AMP RATING

FUSE, X=AMP RATING

CIRCUIT BREAKER
X=AMP RATING

COMBINATION STARTER
X-X AMP=CURRENT RANGE

CONTACTOR

DISTRIBUTION BLOCK

M

3 PHASE MOTOR

HTR

3 PHASE HEATER

RECEPTACLE, SINGLE OUTLET

RECEPTACLE, DUPLEX

HV
LV

TRANSFORMER
CONTROL POWER
(NOT REPRESENTATIVE OF ALL TYPES)

HV
LV

TRANSFORMER
DISTRIBUTION/LIGHTING
(NOT REPRESENTATIVE OF ALL TYPES)

24V
72Watt

DC POWER SUPPLY
(NOT REPRESENTATIVE OF ALL TYPES)
(NOT TO SCALE)

REACTOR

CR0917C

0704B		0917F	
0926B		0919E	
0913F		0919F	
0913E		0925E	

CROSS REFERENCE TABLE

R/L1
S/L2
T/L3
Line Voltage
U/T1
V/T2
W/T3
Motor
GND
GND

VARIABLE FREQUENCY DRIVE
(NOT REPRESENTATIVE
OF ALL TYPES)
(NOT TO SCALE)

CONNECTION MADE BY JUMPER BAR

GENERAL PUROSE WIRING EXTERNAL TO PANEL

CL1DIV2 WIRING EXTERNAL TO PANEL

WIRING BY OTHERS EXTERNAL TO PANEL

USA 3 PHASE
POWER WIRING COLOR CODE

480V	208/230V (HIGH LEG)
PHASE A - BROWN	PHASE A - BLACK
PHASE B - ORANGE	PHASE B - RED(ORG)
PHASE C - YELLOW	PHASE C - BLUE

CANADIAN 3 PHASE
POWER WIRING COLOUR CODE

PHASE A - RED
PHASE B - BLACK
PHASE C - BLUE

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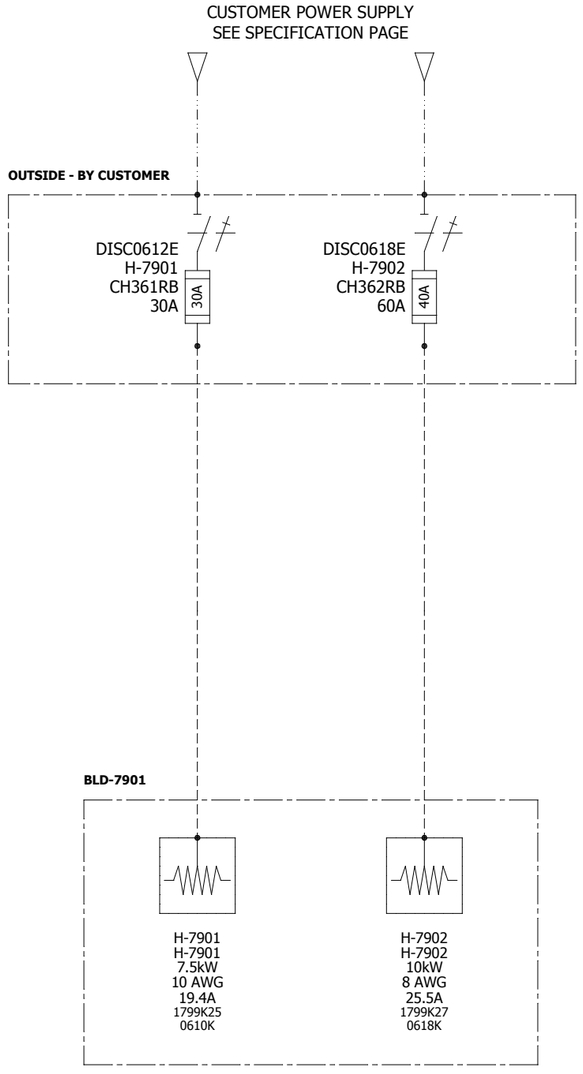
PROJ. NO: 1704962

TITLE AND LOCATION: ELECTRICAL LEGEND

CUSTOMER: HORIZON NORTH WASTE WATER STORAGE

SCALE	SHEET	SHEETS
NTS	4	9



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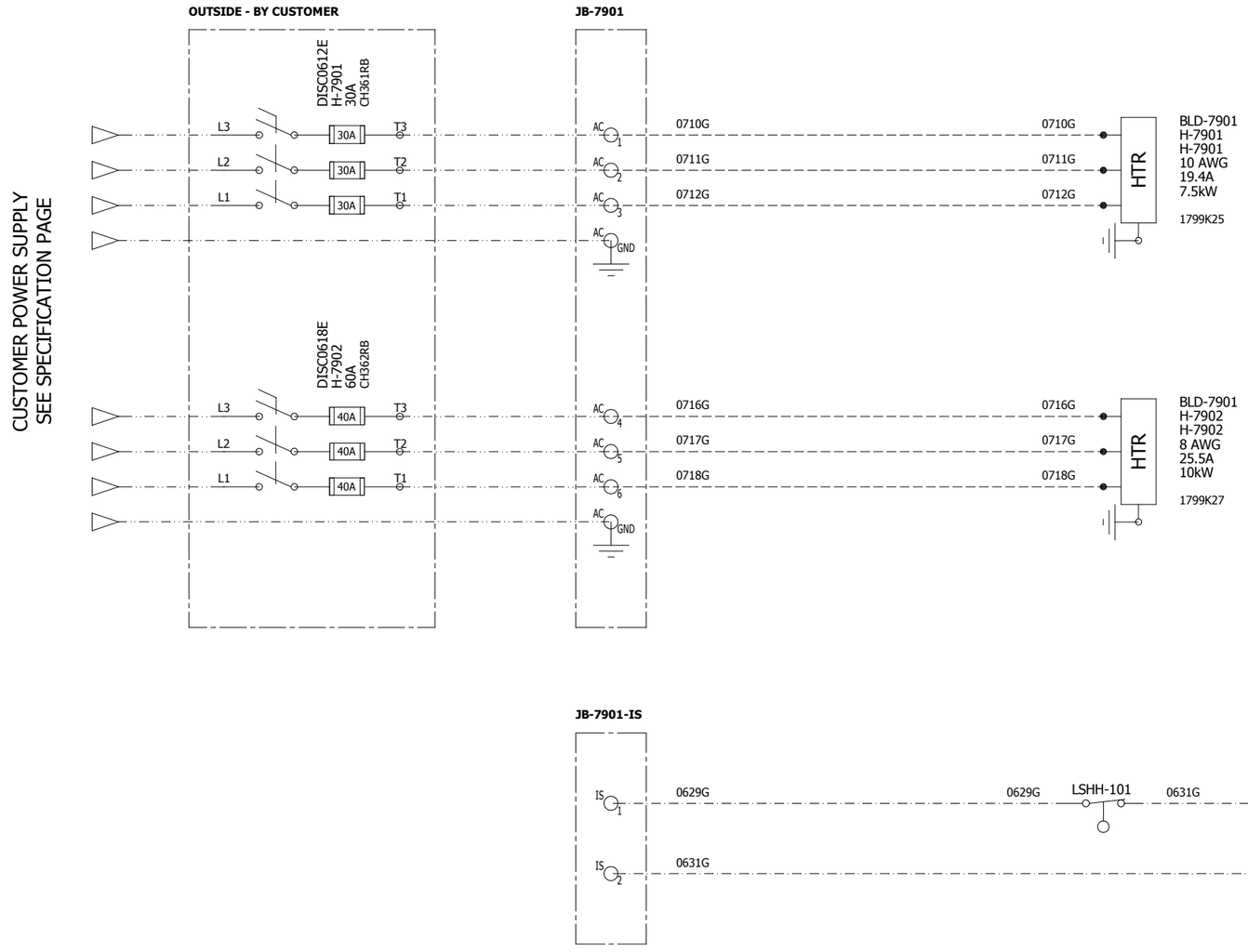
TITLE AND LOCATION: SINGLE LINE DIAGRAM

MCP

CUSTOMER: HORIZON NORTH WASTE WATER STORAGE

SCALE	SHEET	SHEETS
NTS	5	9



CONTROL WIRING LEGEND

BLACK:	POWER
RED:	120VAC CONTROL
WHITE:	NEUTRAL
BLUE:	+24VDC & IS WIRING
BLU/WHT:	0VDC
YELLOW:	INTERLOCKS

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PROJ. NO: 1704962

TITLE AND LOCATION: POWER DISTRIBUTION

MCP

CUSTOMER: HORIZON NORTH WASTE WATER STORAGE

SCALE	SHEET	SHEETS
NTS	6	9

JB-7901

Quantity	APES Number	Manufacturer	Part Number	Description	TAG
1	19168	Phoenix Contact	801733	Steel mounting rail; 35x7,5 mm, 1 mm thick; perforated	JB-7901
2	23745	Phoenix Contact	800886	End Bracket - DIN Rail	JB-7901
6	28365	Phoenix Contact	3036110	Terminal, PHX 3036110, ST 10, Grey, Spring Cage, 24 - 8 AWG	AC-1 , AC-2 , AC-3 , AC-4 , AC-5 , AC-6
2	28366	Phoenix Contact	3036644	Terminal, PHX 3036644, D-ST 10, End cover for ST 10 terminal	JB-7901
2	28446	Phoenix Contact	3030433	Terminal, PHX 3030433, D-ST 6, End cover for ST 6 terminal	JB-7901
2	28447	Phoenix Contact	3031500	TERMINAL, GROUND, 24-10AWG, ST6-PE	AC-GND
1	38220	Hammond Mfg	EJ1084	Junction Box, 10" x 8" x 4", Hammond EJ1084 with Back Panel and Hinged ...	JB-7901

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PROJ. NO: 1704962

TITLE AND LOCATION: BILL OF MATERIAL - ELECTRICAL
PAGE 1/3

CUSTOMER: HORIZON NORTH
WASTE WATER STORAGE

SCALE	SHEET	SHEETS
NTS	7	9

JB-7901-IS

Quantity	APES Number	Manufacturer	Part Number	Description	TAG
1	19168	Phoenix Contact	801733	Steel mounting rail; 35x7,5 mm, 1 mm thick; perforated	JB-7901-IS
2	23738	Phoenix Contact	3031377	Terminal, Blue, 28-12AWG, 30A, 600V	IS-1 , IS-2
1	23742	Phoenix Contact	3030420	End Plate - 30A Feed Thru	JB-7901-IS
2	23745	Phoenix Contact	800886	End Bracket - DIN Rail	JB-7901-IS
1	37975	Hammond Mfg	EJ664	Junction Box, 6" x 6" x 4", Hammond EJ664 with Back Panel and Hinged Li...	JB-7901-IS

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PROJ. NO: 1704962

TITLE AND LOCATION:
BILL OF MATERIAL - ELECTRICAL
PAGE 2/3

CUSTOMER:
HORIZON NORTH
WASTE WATER STORAGE

SCALE	SHEET	SHEETS
NTS	8	9

OUTSIDE - BY CUSTOMER

Quantity	APES Number	Manufacturer	Part Number	Description	TAG
1	11328	Schneider Electric	CH362RB	Disconnect,3ph, CH362RB60A,CSA,600V,Nema 3R,fusible disconnect	DISC0618E
1	38783	Schneider Electric	CH361RB	Disconnect,3ph, CH361RB 30A,CSA,600V,Nema 3R,fusible disconnect	DISC0612E
9	E1200	Ferraz Shawmut	TRS30R	Fuse, GLD TRS30R 30A 600V Time Delay	DISC0612E
9	E1202	Ferraz Shawmut	TRS40R	Fuse, GLD TRS40R 40A 600V Time Delay	DISC0618E

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PROJ. NO: 1704962

TITLE AND LOCATION: BILL OF MATERIAL - ELECTRICAL PAGE 3/3

CUSTOMER: HORIZON NORTH WASTE WATER STORAGE

SCALE	SHEET	SHEETS
NTS	9	9

Section 4

Mechanical Components

Project As-Built Document

08-Sep-17

1704962 Horizon North Wastewater Sto

Customer: Patrice Demers Horizon North Camps & Catering

System SIte Specifications

Elevation: 0 ft
Max Temp 0 deg F
Min Temp: 0 deg F
Noise Target:
Gas Required:
Water Required:
Telephone Reqd:
Building:

System Electrical Specifications

Voltage:
Main Disconnect
Panel Approval: Class
System Approval: Class
Panel Type:
Telemetry:
Autodialer:
EMonitor: Server:

System SVE (First Blower)

0 @ 0
Blower Disch Temp: 0 deg F
Inlet Legs: 0
Disch Press: 0 in wc
Water Flowrate: 0 gpm
Heat xchg Disch: 0 deg F

System SVE (Second Blower)

0 @ 0
Blower Disch Temp: 0 deg F
Inlet Legs: 0
Disch Press: 0 in wc
Water Flowrate: 0 gpm
Heat xchg Disch: 0 deg F

Air Sparge

0 @ 0 psi
Sparge Disch Temp: 0 deg F
Disch Legs: 0
Heat xchg Disch: 0 deg F

Other Specifications

Other Inlet Liquid Flow: 0 gpm
Disch Flow: 0 gpm @ 0 psi
AirTreatment:
Water_Treatment:
Stripper Airflow: 0 cfm
Stripper Dsn Flow: 0 gpm
OWS_Dsn_Flow: 0 gpm

Contaminants

Other Information May be Presented Below

Connection Info:

Shipping Information

Valport Maritime Services Inc
950 Boulevard Gérard-Cadieux

Salaberry-de-Valle Quebec
Canada J6T 6L4

Reducer, Bushing, Galv, 3" x 2" Hex Reducer, Bushing, Galv, 3" x 2"	Part: Qty: Mfg: Mfg Part:	10019 1
Valve, Ball, Brass, 3/4", 150# NPT, Teflon seats, 600 PSI WOG Valve, Ball, Brass, 3/4", 150#	Part: Qty: Mfg: Mfg Part:	10095 1 Kitz
Tee, Galv, 2" 1 Tee, Galv, 2"	Part: Qty: Mfg: Mfg Part:	10136 2
Plug, Galv, 2", Square Drive Plug, Galv, 2", Square Drive	Part: Qty: Mfg: Mfg Part:	10137 1
Plug, Galv, 2", Square Drive Plug, Galv, 2", Square Drive	Part: Qty: Mfg: Mfg Part:	10137 1
Pipe, PVC 40, 2" 10ft Length, 40-020G Pipe, PVC 40, 2"	Part: Qty: Mfg: Mfg Part:	10154 20
Pipe, PVC 40, 2" 10ft Length, 40-020G Pipe, PVC 40, 2"	Part: Qty: Mfg: Mfg Part:	10154 30
Pipe, PVC 40, 2" 10ft Length, 40-020G Pipe, PVC 40, 2"	Part: Qty: Mfg: Mfg Part:	10154 10
Pipe, PVC 40, 2" 10ft Length, 40-020G Pipe, PVC 40, 2"	Part: Qty: Mfg: Mfg Part:	10154 10
Pipe, PVC 40, 2" 10ft Length, 40-020G Pipe, PVC 40, 2"	Part: Qty: Mfg: Mfg Part:	10154 20
Nipple, PVC 80, 2" x 8" Nipple, PVC 80, 2" x 8"	Part: Qty: Mfg: Mfg Part:	10366 6

Cement Solvent, PVC, 711, quart	Part:	10384
	Qty:	1
	Mfg:	
Cement Solvent, PVC, 711, quart	Mfg Part:	
Valve, Ball, Brass, 1/2", 150#	Part:	10538
NPT, Teflon seats, 600 PSI WOG	Qty:	2
	Mfg:	
Valve, Ball, Brass, 1/2", 150#	Mfg Part:	
Nipple, Galv, 1/2" x Close	Part:	10619
	Qty:	2
	Mfg:	
Nipple, Galv, 1/2" x Close	Mfg Part:	
Coupling, PVC 80, 3", SxS, 829-030G	Part:	10729
	Qty:	2
	Mfg:	
Coupling, PVC 80, 3", SxS, 829-030G	Mfg Part:	
Plug, Galv, 1-1/2", Square Drive	Part:	10804
	Qty:	2
	Mfg:	
Plug, Galv, 1-1/2", Square Drive	Mfg Part:	
Reducer, Bushing, Galv, 4" x 3"	Part:	10811
Hex	Qty:	1
	Mfg:	
Reducer, Bushing, Galv, 4" x 3"	Mfg Part:	
Nipple, KC, Plated, 3/4"	Part:	12235
	Qty:	1
	Mfg:	
Nipple, KC, Plated, 3/4"	Mfg Part:	
Paint, Roller, 3106.081 (6) sleeve	Part:	12925
10mm	Qty:	1
	Mfg:	
Paint, Roller, 3106.081 (6) sleeve	Mfg Part:	
Washer, Master seal 3/8", 685-004, (100 per box)	Part:	13368
	Qty:	100
	Mfg:	
Washer, Master seal 3/8", 685-004, (100 per box)	Mfg Part:	
Strut, Slotted, 1-5/8" x 1-5/8"	Part:	15297
TB A1200HS10PGC	Qty:	20
	Mfg:	
Strut, Slotted, 1-5/8" x 1-5/8"	Mfg Part:	
Strut, Slotted, 1-5/8" x 1-5/8"	Part:	15297
TB A1200HS10PGC	Qty:	20
	Mfg:	
Strut, Slotted, 1-5/8" x 1-5/8"	Mfg Part:	
Strut, Slotted, 1-5/8" x 1-5/8"	Part:	15297
TB A1200HS10PGC	Qty:	20
	Mfg:	
Strut, Slotted, 1-5/8" x 1-5/8"	Mfg Part:	

Strut, Slotted, 1-5/8" x 1-5/8" TB A1200HS10PGC Strut, Slotted, 1-5/8" x 1-5/8"	Part: Qty: Mfg: Mfg Part:	15297 20
Strut, Slotted, 1-5/8" x 1-5/8" TB A1200HS10PGC Strut, Slotted, 1-5/8" x 1-5/8"	Part: Qty: Mfg: Mfg Part:	15297 20
Strut, Vinyl End Covers, 1-5/8" TB A804NEOPWH Strut, Vinyl End Covers, 1-5/8"	Part: Qty: Mfg: Mfg Part:	15318 25
Strut, Twirl Nuts, 3/8" TN228 ZN Strut, Twirl Nuts, 3/8"	Part: Qty: Mfg: Mfg Part:	15323 100
Strut, Angle, 5 Hole 90 deg Fitting - Gusset 3-1/2" x 4-1/8" Strut, Angle, 5 Hole 90 deg Fitting - Gusset	Part: Qty: Mfg: Mfg Part:	15324 6
Strut, Angle, 4 Hole 90 deg Corner 3-1/2" x 4-1/8" Strut, Angle, 4 Hole 90 deg Corner	Part: Qty: Mfg: Mfg Part:	15391 25
Plug, PVC 40, 2", MPT 450-020G Plug, PVC 40, 2", MPT	Part: Qty: Mfg: Mfg Part:	15500 1
Hole Saw, 3-1/2" Hole Saw, 3-1/2"	Part: Qty: Mfg: Mfg Part:	15935 1
Reducer, Bushing, Black, 2" x 1-1/2" Hex Reducer, Bushing, Black, 2" x 1-1/2"	Part: Qty: Mfg: Mfg Part:	16450 2
Plug, Galv, 1/2", Square Drive Plug, Galv, 1/2", Square Drive	Part: Qty: Mfg: Mfg Part:	17440 10
Hose Barb, Brass, 1/4" x 1/4", NPT x Hose, 125-4B 1 Hose Barb, Brass, 1/4" x 1/4", NPT x Hose, 125-4B	Part: Qty: Mfg: Mfg Part:	18070 1
Reinforced, Adapter, PVC 80, Female, 2", Spig x T Steel Reinforced, 878-020SR Reinforced, Adapter, PVC 80, Female, 2", Spig x T	Part: Qty: Mfg: Mfg Part:	19282 2

Plug, Black, 1-1/2"	Part:	21375
	Qty:	2
	Mfg:	
Plug, Black, 1-1/2"	Mfg Part:	
Gloves, Polyethelene Knit, Large Polyurethane dipped palm, Cut Level 3	Part:	21913
	Qty:	2
	Mfg:	
Gloves, Polyethelene Knit, Large	Mfg Part:	
Gloves, Polyethelene Knit, Large Polyurethane dipped palm, Cut Level 3	Part:	21913
	Qty:	1
	Mfg:	
Gloves, Polyethelene Knit, Large	Mfg Part:	
Gloves, Polyethelene Knit, X-Large Polyurethane dipped palm, Cut Level 3	Part:	21914
	Qty:	1
	Mfg:	
Gloves, Polyethelene Knit, X-Large	Mfg Part:	
Coupling, PVC 40, 2", SxS, 429-020G	Part:	22488
	Qty:	2
	Mfg:	
Coupling, PVC 40, 2", SxS, 429-020G	Mfg Part:	
Elbow, 90deg, PVC 40, 2", SxS, 406-020G	Part:	22489
	Qty:	8
	Mfg:	
Elbow, 90deg, PVC 40, 2", SxS, 406-020G	Mfg Part:	
Plug, PVC 40, 3", MPT 450-030G	Part:	23421
	Qty:	1
	Mfg:	
Plug, PVC 40, 3", MPT	Mfg Part:	
Nut, hex, 3/8"-16, zinc plated	Part:	23676
	Qty:	50
	Mfg:	
Nut, hex, 3/8"-16, zinc plated	Mfg Part:	
Washer, BS, Flat, 3/8", Plated	Part:	23678
	Qty:	100
	Mfg:	
Washer, BS, Flat, 3/8", Plated	Mfg Part:	
Washer, BS, Flat, 3/8", Plated	Part:	23678
	Qty:	100
	Mfg:	
Washer, BS, Flat, 3/8", Plated	Mfg Part:	
Washer, BS, Lock, Spring, 3/8", Plated	Part:	23679
	Qty:	50
	Mfg:	
Washer, BS, Lock, Spring, 3/8", Plated	Mfg Part:	
Washer, BS, Lock, Spring, 3/8", Plated	Part:	23679
	Qty:	20
	Mfg:	
Washer, BS, Lock, Spring, 3/8", Plated	Mfg Part:	

Lubricant, Super Lube, Cartridge, 14.5 oz PTFE	Part:	23726
	Qty:	1
	Mfg:	
Lubricant, Super Lube, Cartridge, 14.5 oz PTFE	Mfg Part:	
Tape, Silver Duct, 2" (2"x60yrd) 3M 3939	Part:	23771
	Qty:	1
	Mfg:	
Tape, Silver Duct, 2" (2"x60yrd) 3M 3939	Mfg Part:	
Cleaner, Citris, Llyods 51120, 20oz	Part:	23781
	Qty:	1
	Mfg:	
Cleaner, Citris, Llyods 51120, 20oz	Mfg Part:	
Blade, Sawzall, "THE TORCH", 14T, 9", 5PK	Part:	23785
	Qty:	1
	Mfg:	
Blade, Sawzall, "THE TORCH", 14T, 9", 5PK	Mfg Part:	
Respirator, Mask, Disposable, N95	Part:	23829
M1-5-8210	Qty:	2
RESPIRATOR: N95 PARTICULATE DUST MASK	Mfg:	
Respirator, Mask, Disposable, N95	Mfg Part:	
Screw, Hex Head Cap, NC, GR5, Plated, 5/16-18x1-1/4"	Part:	23837
	Qty:	8
	Mfg:	
Screw, Hex Head Cap, NC, GR5, Plated, 5/16-18x1-1/4"	Mfg Part:	
Screw, Hex Head Cap, NC, GR5, Plated, 3/8-16x3"	Part:	23861
	Qty:	2
	Mfg:	
Screw, Hex Head Cap, NC, GR5, Plated, 3/8-16x3"	Mfg Part:	
Screw, Hex Head Cap, NC, GR5, Plated, 3/8-16x3"	Part:	23861
	Qty:	50
	Mfg:	
Screw, Hex Head Cap, NC, GR5, Plated, 3/8-16x3"	Mfg Part:	
Cement, PVC, Electrical	Part:	25399
250 ML	Qty:	1
	Mfg:	
Cement, PVC, Electrical	Mfg Part:	
Screw, Hex Head Cap, NC, GR5, Plated, 5/16-18x1"	Part:	25594
	Qty:	8
	Mfg:	
Screw, Hex Head Cap, NC, GR5, Plated, 5/16-18x1"	Mfg Part:	
Washer, SS, Flat, 1/4"	Part:	25670
	Qty:	16
	Mfg:	
Washer, SS, Flat, 1/4"	Mfg Part:	
Junction Box, 10" x 8" x 4",	Part:	27232
box only requires backplate to be ordered	Qty:	1
	Mfg:	
Junction Box, 10" x 8" x 4",	Mfg Part:	

Bit, Power Drive, #2 x Square	Part:	29383
	Qty:	1
	Mfg:	
Bit, Power Drive, #2 x Square	Mfg Part:	
Screw, Hex Head Cap, NC, GR5, Plated, 3/8-16x2-1/2"	Part:	29747
	Qty:	2
	Mfg:	
Screw, Hex Head Cap, NC, GR5, Plated, 3/8-16x2-1/2"	Mfg Part:	
Screw, Hex Head Cap, 1/4-20 x 3", SS **XFR**	Part:	35629
	Qty:	8
	Mfg:	
Screw, Hex Head Cap, 1/4-20 x 3", SS **XFR**	Mfg Part:	
Washer, SS, Lock, 1/4" **XFR**	Part:	35892
	Qty:	8
	Mfg:	
Washer, SS, Lock, 1/4" **XFR**	Mfg Part:	
Junction Box, 6" x 6" x 4", Hammond EJ664 with Back Panel and Hinged Lid, NEMA 4	Part:	37975
	Qty:	1
	Mfg:	
Junction Box, 6" x 6" x 4", Hammond EJ664	Mfg Part:	
Coupling, Galv, 2"	Part:	P1016
	Qty:	2
	Mfg:	
Coupling, Galv, 2"	Mfg Part:	
Reducer, Bushing, Galv, 1/2" x 1/4" Hex	Part:	P1018
	Qty:	1
	Mfg:	
Reducer, Bushing, Galv, 1/2" x 1/4"	Mfg Part:	
Reducer, Bushing, Galv, 2" x 1/2" Hex	Part:	P1021
	Qty:	2
	Mfg:	
Reducer, Bushing, Galv, 2" x 1/2"	Mfg Part:	
Reducer, Bushing, Galv, 3" x 1-1/2" Hex	Part:	P1022
	Qty:	1
	Mfg:	
Reducer, Bushing, Galv, 3" x 1-1/2"	Mfg Part:	
Adapter, Tank, PVC, 2", Threaded, 871-020 Bulkhead Fitting	Part:	P1040
	Qty:	1
	Mfg:	
Adapter, Tank, PVC, 2", Threaded, 871-020	Mfg Part:	
Reducer, Bushing, Galv, 2" x 1-1/2" Hex	Part:	P1053
	Qty:	1
	Mfg:	
Reducer, Bushing, Galv, 2" x 1-1/2"	Mfg Part:	
Pipe, PVC 80, 3" 10 ft. 80-030	Part:	P1101
	Qty:	10
	Mfg:	
Pipe, PVC 80, 3" 10 ft.	Mfg Part:	

Plug, ABS, 4", 21-4APG	Part:	P1109
	Qty:	4
	Mfg:	
Plug, ABS, 4", 21-4APG	Mfg Part:	
Nipple, Galv, 2" x 6"	Part:	P1141
	Qty:	4
	Mfg:	
Nipple, Galv, 2" x 6"	Mfg Part:	
Elbow, 90deg, PVC 80, 2", SxS, 806-020G	Part:	P1144
	Qty:	16
	Mfg:	
Elbow, 90deg, PVC 80, 2", SxS, 806-020G	Mfg Part:	
Coupling, PVC 80, 2", SxS, 829-020G	Part:	P1145
	Qty:	4
	Mfg:	
Coupling, PVC 80, 2", SxS, 829-020G	Mfg Part:	
Coupling, PVC 80, 2", SxS, 829-020G	Part:	P1145
	Qty:	2
	Mfg:	
Coupling, PVC 80, 2", SxS, 829-020G	Mfg Part:	
Coupling, PVC 80, 2", SxS, 829-020G	Part:	P1145
	Qty:	4
	Mfg:	
Coupling, PVC 80, 2", SxS, 829-020G	Mfg Part:	
Tee, PVC 80, 2", SxSxS, 801-020G	Part:	P1156
	Qty:	8
	Mfg:	
Tee, PVC 80, 2", SxSxS, 801-020G	Mfg Part:	
Adapter, Tank, PVC, 3", Threaded, 871-030	Part:	P1167
Bulkhead Fitting	Qty:	6
	Mfg:	
Adapter, Tank, PVC, 3", Threaded, 871-030	Mfg Part:	
Nipple, PVC 80, 3" x 8"	Part:	P1168
	Qty:	8
	Mfg:	
Nipple, PVC 80, 3" x 8"	Mfg Part:	
Pipe, PVC 80, 2"	Part:	P1190
80-020	Qty:	20
	Mfg:	
Pipe, PVC 80, 2"	Mfg Part:	
Pipe, PVC 80, 2"	Part:	P1190
80-020	Qty:	10
	Mfg:	
Pipe, PVC 80, 2"	Mfg Part:	
Pipe, PVC 80, 2"	Part:	P1190
80-020	Qty:	20
	Mfg:	
Pipe, PVC 80, 2"	Mfg Part:	

Pipe, PVC 80, 2" 80-020 Pipe, PVC 80, 2"	Part: Qty: Mfg: Mfg Part:	P1190 30
Pipe, PVC 80, 2" 80-020 Pipe, PVC 80, 2"	Part: Qty: Mfg: Mfg Part:	P1190 40
Reducer, Bushing, Black, 4" x 2" Hex Reducer, Bushing, Black, 4" x 2"	Part: Qty: Mfg: Mfg Part:	P1198 2

-

Nipple, PVC 80, 2" x 8" ---	Part: Qty: Mfg: Mfg Part:	10366 10 887-080
Flexible Coupling, 3" x 3" ---	Part: Qty: Mfg: Mfg Part:	10383 6 5633
Elbow, 45deg, PVC 80, 3", SxS, 817-030G ---	Part: Qty: Mfg: Mfg Part:	10767 12 817-030
Reinforced, Adapter, PVC 80, Female, 2", FNPTxS Fitting, transition, socket x Fipt SS ---	Part: Qty: Mfg: Mfg Part:	17054 4 835-020SR
Tank, Lid, Non Vented 16" replacement lid ---	Part: Qty: Mfg: Mfg Part:	23430 8 norwesco 60365
Tank, Gasket, For 16" Lid Ethafoam ---	Part: Qty: Mfg: Mfg Part:	24326 10 norwesco 62941
Tank, Closed Top, Cylindrical, 2100 gal, Norwesco - no drain 87dia 89 tall, 1.9sg, Heavy Walled, blue 40241 ---	Part: Qty: Mfg: Mfg Part:	26009 4 40241
Tank, Closed Top, Cylindrical, HDPE, 1700 gal, Norwesco 89 dia 72" tall Heavy Wall , 1.9sg - No Drain, bl 40012 ---	Part: Qty: Mfg: Mfg Part:	26010 4 40012 - No Botto
Valve, Ball, PVC, 2", True-Union, FPM O-rings SOC ends included ---	Part: Qty: Mfg: Mfg Part:	37662 10 K15-020VS

Adapter, Tank, PVC, 2", Threaded, 871-020 Bulkhead Fitting ---	Part: Qty: Mfg: Mfg Part:	P1040 20 8172E-020
Adapter, Tank, PVC, 3", Threaded, 871-030 Bulkhead Fitting ---	Part: Qty: Mfg: Mfg Part:	P1167 12 8172E-030

ls

Strain Relief, Connector, PVC, 1/2" TSRC10 None	Part: Qty: Mfg: Mfg Part:	16884 2 TSRC10
Switch, Level, Mech Float, Narrow Angle, N.C., YEL N/C, Yellow float None	Part: Qty: Mfg: Mfg Part:	19279 2 PY2CW4000
Switch, Level, Tether Weight Cast Iron fits PB20W4000 None	Part: Qty: Mfg: Mfg Part:	21552 2
Level Switch Assembly -	Part: Qty: Mfg: Mfg Part:	38185 2 -
Adapter, Tank, PVC, 1/2", Threaded, 871-005 Bulkhead Fitting None	Part: Qty: Mfg: Mfg Part:	P1166 2 8172E-005

Building

Module Code: 7900

Strut, Clamp, 2" EMT/RIGID ERC SK325I Strut, Clamp, 2" EMT/RIGID	Part: Qty: Mfg: Mfg Part:	15304 50

-

Container, 40' x 8' x 9'6", Once Use, High Cube, Steel Floor 30,480kg rated, Forklift Pockets, CSC Plate, ISO ABS/BV/LR Certs. Steel Checkerplate ---	Part: Qty: Mfg: Mfg Part:	24612 2
Insulation, Container, Complete interior insulation, Blown Spray Foam 40ft Containers 3in ceiling	Part: Qty: Mfg: Mfg Part:	25403 2
Paint, Hempatex Hi Build 46410, Black Hempel Colour Code 19990 priced per Gallon - sold in 5 gallon pails ---	Part: Qty: Mfg: Mfg Part:	28979 5

bld

Junction Box, 6" x 6" x 4", Hammond EJ664 with Back Panel and Hinged Lid, NEMA 4 ---	Part: Qty: Mfg: Mfg Part:	37975 2 HAM EJ664

Decal

Label, Misc. As per detailed specification below. Decals per document: 1704962 Port Shipping Label - Newterra.pdf 4 decals. 2 decals of each page.	Part: Qty: Mfg: Mfg Part:	35332 4

Freight

Estimated Freight to jobsite - address as provided Outbound ---	Part: Qty: Mfg: Mfg Part:	25793 2 x

H-7901

Misc Part, McMaster-Carr 1799K27 Hazardous Location Wall-Mount Large-Space Heater, 240V AC, 34100 Btu/hr.	Part: Qty: Mfg: Mfg Part:	21362 2 1799K27

H-7902

McMaster-Carr, Misc, Catalog Part	Part:	22858
See Description	Qty:	2
	Mfg:	
1799K25 Hazardous Location Wall-Mount Large-Space Heater, 240V AC, 25600 Btu/hr	Mfg Part:	1799K25

JB

Module Code: 8200

JB

Terminal, PHX 3031487, ST 6	Part:	28445
Grey, Spring Cage, 24-10 AWG	Qty:	12
	Mfg:	
---	Mfg Part:	3031487
Terminal, PHX 3031500, ST 6-PE	Part:	28447
Ground, Spring Cage, 24-10 AWG	Qty:	4
	Mfg:	
---	Mfg Part:	PHX 3031500
Junction Box, 10" x 8" x 4", Hammond EJ1084	Part:	38220
with Back Panel and Hinged Lid, NEMA 4	Qty:	2
	Mfg:	
---	Mfg Part:	HAM EJ1084

MPP

Breaker, Techna, JTEC4893C30	Part:	17715
480/277V 30 AMP 3P C Trip Curve	Qty:	1
10k SCCR	Mfg:	Fusetek
---	Mfg Part:	JTEC4893C30
Breaker, Techna, JTEC4893C40	Part:	17717
240V 40 AMP 3P C Trip Cuve	Qty:	1
10k SCCR	Mfg:	Fusetek
---	Mfg Part:	JTEC4893C40

Disconnects

Module Code: 8900

DISC

Disconnect, 3ph, CH362RB	Part:	11328
60A,CSA,600V,Nema 3R,fusible disconnect	Qty:	2
	Mfg:	Square D
---	Mfg Part:	SQD CH362RB
Disconnect, Square D, CH361RB	Part:	38783
30A, CSA, 600V, Nema 3R,fusible disconnect	Qty:	2
	Mfg:	
---	Mfg Part:	SQD CH361RB
Fuse, GLD TRS30R	Part:	E1200
30A 600V Time Delay	Qty:	18
Class R	Mfg:	Ferraz Shawmut
---	Mfg Part:	GLD TRS30R
Fuse, GLD TRS40R	Part:	E1202
40A 600V Time Delay	Qty:	18
Class R	Mfg:	Ferraz Shawmut
---	Mfg Part:	GLD TRS40R

Section 5

System Manuals

Manual Document List

PMProjNum **1704962**

Horizon North Wastewater Storage Tanks

Part Number	Part Description	
Tag		
Module:	*100*	
19279	Switch, Level, Mech Float, Narrow Angle, N.C., YEL	Manucturer:
ls		ManDoc: \\mlee-nas\DATA\Library\Gems\Manuals\Series M Float Switch Manual.pdf
Module:	*7900*	
21362	Misc Part, McMaster-Carr	Manucturer:
Merkel HLA12		
22858	McMaster-Carr, Misc, Catalog Part	Manucturer:
H-7902		ManDoc:
Merkel HLA16		

Warrick®
Series M Mechanical Tilt Float Switch
Installation and Operation Bulletin

Specifications

Cord	16 gauge, 2 or 3 conductor SJOW, Oil Resistant CPE
Contact Rating	13 amp @ 120/240 VAC, 1/2hp
Contact Design	SPST, Normally Open or Normally Closed, Common with N.O. & N.C. (Form C)
Temperature Rating	32°F (0°C) to 194°F (90°C) Dry and 140°F (60°C) Water Resistant
Overall Weight	1.0 lbs. (not including weight)
Tether Method	Tie-wrap nylon, weight: 2.5 lbs.
Approvals	U.L. Recognized, CSA Certified

Installation

Tether Tie-Wrap (Fig 1)
Attach cord, using a tie-wrap, to a stationary structure. This is known as the tether point, it will determine the pumping range. The farther the float is placed from the tether point, the greater the pumping range. The minimum distance that the float should be placed from the tether point is 3 inches.

Tether-Weight (Fig 2)
Place tension-brand over the cord before installation. Place the weight at the desired position and secure with the tension-band. This position will determine the pumping range. The farther the float is placed from the tether point, the greater the pumping range. The minimum distance that the float should be placed from the tether point is 3 inches.

Determine tether point using charts below as a reference

Notes:
1. To Prevent Motor Burnout - In a pumpdown application make sure the turn-off level is at least 2 inches above the intake of the submersible pump.

2. Securing Tether Points - Make sure levels are correct and that floats are free from any obstructions before securing tether points.

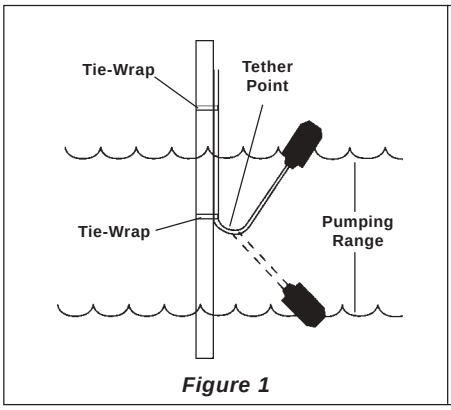


Figure 1

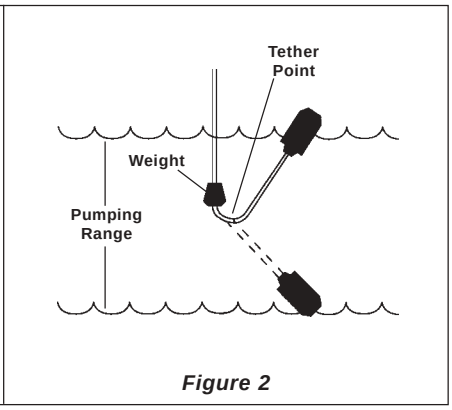
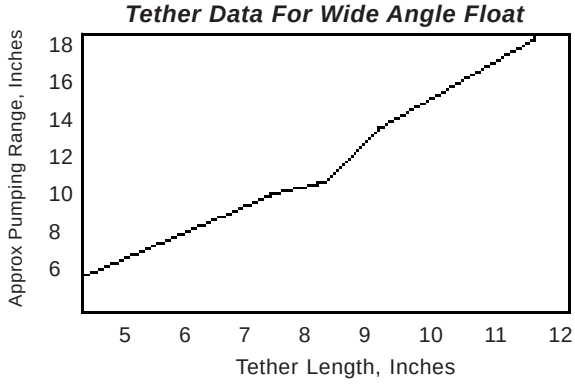
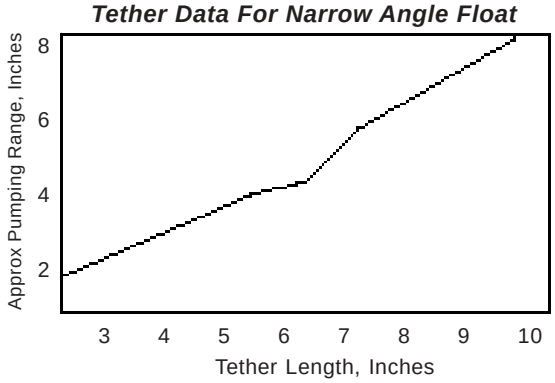


Figure 2

Tether Data For Wide Angle Float

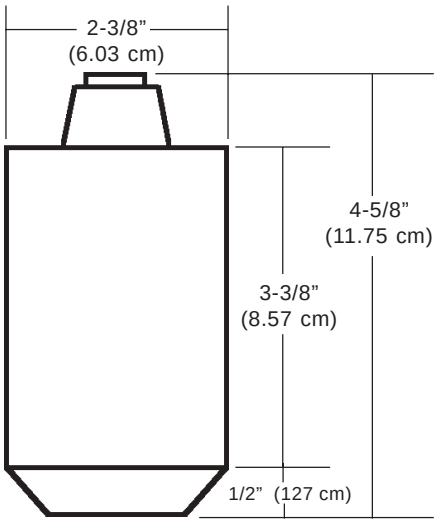


Tether Data For Narrow Angle Float

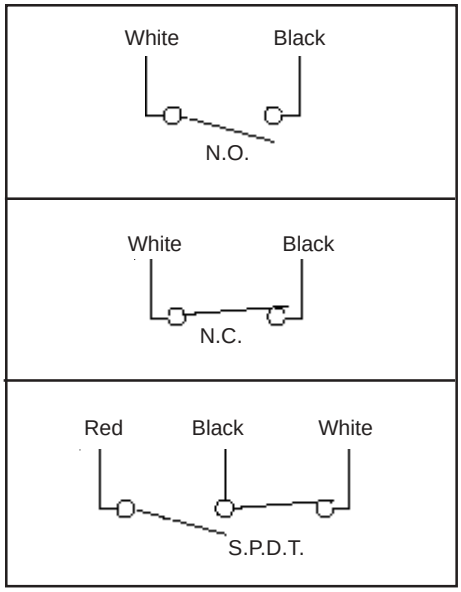


Notes:
1. Narrow angle pumping range is approximately 2 In. to 8 In.
2. Wide angle pumping range is approximately 5 In. to 18 In.

Dimensions



Contact Configurations



Important Points:

- Gems products must be maintained and installed in strict accordance with the National Electrical Code and the applicable Gems Product Instruction Bulletin that covers installation, operation and proper maintenance. Failure to observe this information may result in serious injury or damages.
- For hazardous area applications involving such things as, but not limited to, ignitable mixtures, combustible dust and flammable materials, use an appropriate explosionproof enclosure or intrinsically safe interface device.
- Please adhere to the pressure and temperature limitations shown throughout this catalog for our level and flow sensors. These limitations must not be exceeded. These pressures and temperatures take into consideration possible system surge pressures/temperatures and their frequencies.
- Selection of materials for compatibility with the media is critical to the life and operation of Gems products. Take care in the proper selection of materials of construction, testing is required.
- NSF-approved sensors are made of materials approved for potable water applica tions according to Standard 61.
- Stainless steel is generally regarded as safe by NSF and FDA.
- Life expectancy of switch contacts varies with application. Contact Gems if life cycle testing is required.
- Ambient temperature changes do affect switch set points, since the gravity of a liquid can vary with temperature.
- Our sensors have been designed to resist shock and vibration. However, shock and vibration should be minimized.
- Filter liquid media containing particulate and/or debris to ensure the proper operation of our products.
- Electrical entries and mounting points in an enclosed tank may require liquid/vapor sealing.
- Our sensors must not be field-repaired.
- Physical damage sustained by product may render it unserviceable.

Return Policy

Returns are accepted on stock items up to 30 days from date of order. You must contact our Returns Department for a Return Authorization (RA) number. Return the goods - freight prepaid - in the original container and include original packing slip. C. O. D. returns are not accepted. Gems reserves the right to apply restocking charges.

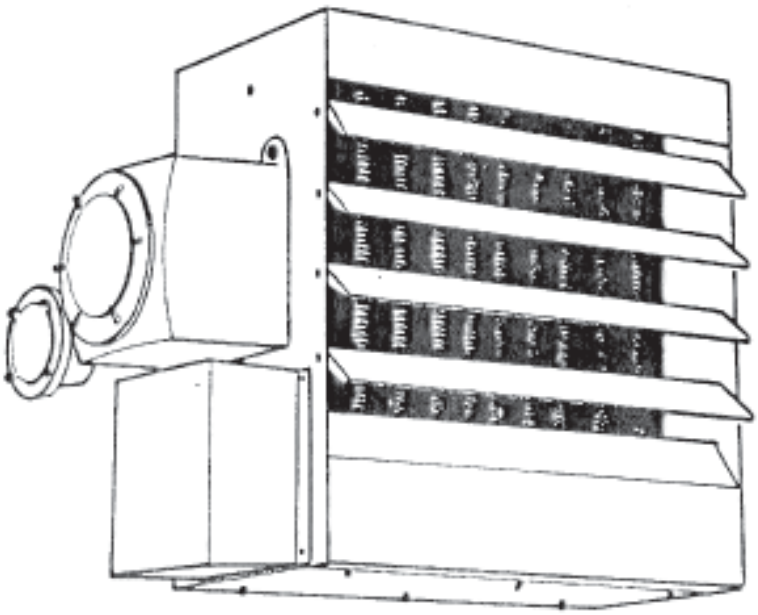
Tel: 860-793-4357
Fax: 860-793-4563

Gems Sensors Inc.
One Cowles Road
Plainville, CT 06062-1198
Tel: 860-793-4579
Fax: 860-793-4580

INSTALLATION, PARTS, SERVICE & MAINTENANCE MANUAL FOR HLA SERIES HEATER

Electric Air Heaters for Hazardous Locations

Divisions 1 & 2
Class I Group C, D - Class II, Groups E, F & G



Models covered by this manual:

HLA12 - 3, 5 AND 7.5 KW
HLA16 - 10 KW
HLA20 - 15, 20 AND 25 KW

WARNING!

READ ALL WARNINGS AND NOTICES.

FORM: 9627 - D

WARNING

To prevent ignition of hazardous atmospheres adhere to the following:

1. Read and follow the instructions in this manual.

2. The HLA Series electric unit heaters have been listed by the Underwriters Laboratories and have a maximum operating temperature of 165°C. DO NOT install heaters where the marked operating tempera ture exceeds the ignition temperature of the hazardous atmosphere.

3. Before opening any enclosure, first disconnect the heater from the power supply.

4. It is absolutely essential that the high-limit thermostat provided in the heater be left in operation. Never bypass the high-limit from the contactor coil circuit. When installing an external control thermostat, con nect it to the terminal block provided in the control box. Refer to “INSTALLATION - ELECTRICAL” for more details.

5. Operate heater only while permanently mounted in an upright position. See “INSTALLATION - MECHANI CAL” for tilt limits.

6. To operate correctly, the heater must be kept clean. When operating in a dirty environment, requlary clean the finned tubes, fan and fan guard, and motor cooling fan, if provided.

7. If any fluid leakage occurs, withdraw the heater from service and have it repaired. See “REPAIR AND REPLACEMENT PROCEDURES - HEAT EXCHANGER CORE” for details.

8. Never operate the heater with all or any louvers fully closed. Set all louvers to similar angles to obtain required air flow direction. Stops have been provided in the cabinet side walls to limit the amount to which the louvers may be closed. DO NOT OVERRIDE THESE STOPS.

9. Do not operate in atmosphere corrosive to steel and aluminum.

10. During installation, ensure that the 1” plastic protector cap in the control box is discarded and replaced with either an incoming conduit or the remaining 1” explosion-proof plug not being used. Do not operate the heater without proper explosion-proof plugs installed in all unused threaded openings.

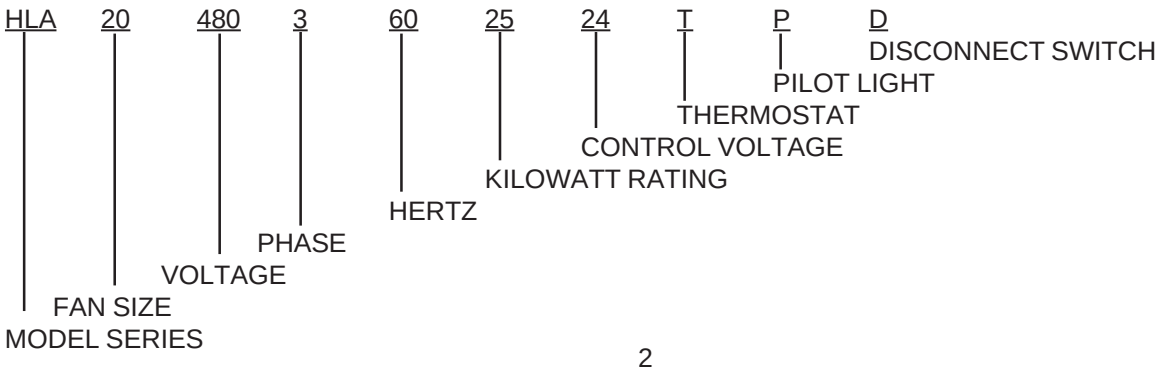
WARRANTY WILL BE VOIDED IF THESE WARNINGS ARE NOT ADHERED TO.

INTRODUCTION

APPROVED SERVICE USES

HLA Series Electric Air Heaters for Hazardous Locations are U.L. listed for use in hazardous locations Divi- sions 1 and 2, Class 1, Group C, D and Class II, Groups E, F and G. For details of the particular hazardous environments having the potential for explosion, refer to articles 500 through 516 of the National Electrical Code.

MODEL CODING



DESCRIPTION

The HLA Series heaters use a permanently sealed, liquid-to-air finned tube heat exchanger core. This consists of a bottom tank containing three immersion type heating elements and two rows of finned heat exchanger tubes welded between the bottom tank and a top header tank. A specific mixture of ethylene glycol to water mixture is placed in the heater core to act as the heat transfer fluid. Heat is transferred to the fluid mixture by the heating elements causing vigorous convective vapor circulation and condensation within the heater core, ensuring even heat distribution. The ethylene glycol provides freeze damage protection to -49°F (-45°C). An electric motor driven fan blows air over the finned tubes to transfer heat to the air flow, thus heating the area.

Over temperature protection is effected by a manual reset capillary type high-limit rated for 6,000 cycles of reliable service, which is housed in a thermowell tube next to the heating elements. Overpressure arising from excessive external temperature is relieved by a pressure relief valve provided in the top heater tank.

The heater core assembly is contained in a sturdy steel cabinet which also carries the controls, motor and fan assembly. A narrow gap safety fan guard is provided to shield all moving parts. Adjustable louvers are provided to allow directional control of the airflow.

All electrical power is carried by copper conductor wires enclosed in rigid metal conduits. Only within the enclosures are wires exposed to permit connection to terminals.

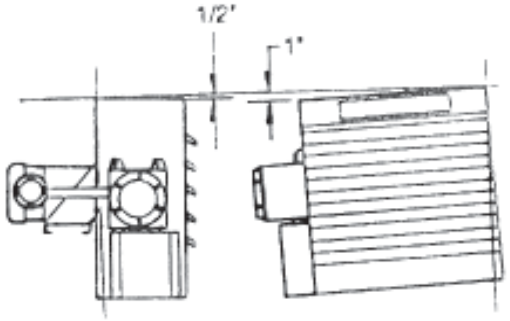
NOTE - In order to provide the highest possible outlet air temperatures, yet operate safely in hazardous atmospheres, these heaters operate in a narrow temperature band between normal operating temperature and that temperature at which the high-limit control shuts off to limit maximum temperature. It is probable therefore, that the heater will not operate continuously should ambient temperatures exceed 104°F (40°C).

INSTALLATION

MECHANICAL

The HLA series heaters are designed for use only while permanently mounted in an upright position. The supporting assembly must ensure that the heater is installed such that it operates in an upright attitude. The maximum out of plane attitude shall not exceed the values indicated in the following sketch.

To insure proper heating of floor surfaces, observe the following recommended maximum mounting heights (to



Maximum tilt allowed during operation (applicable front to back and side to side in either direction). Heater must be permanently mounted.

Max Mtg. Height from Floor:	HLA12	HLA16	HLA20
	8 ft.	10 ft.	13 ft.

The heater should be installed to allow clearances for services access and air circulation as follows:

Back	-	2” from motor
Front	-	84” HLA20, 72” HLA12 & HLA16
Right Side	-	1”
Left Side	-	30” from control box
Top	-	0”
Bottom	-	Cabinet height plus 6” (Optional - for easier core removal)

To permit removal of the heater core assembly from a suspended heater, leave space beneath the heater at least equal the cabinet height plus 6". Installations with less than specified clearances from the heater bottom make it necessary to dismount the entire unit should core removal be required.

It is essential that the supporting assembly be of adequate strength to suspend the heaters. See "Specifications" for heater weights. Adequate stiffness should be provided to ensure that unwanted vibrations or movements of the complete system do not occur. Such vibrations or movement could be induced by electric motor start-up, or be transmitted to the heater from the structure to which it is mounted, as in mobile installations. Where heaters are installed in applications that are of a relocatable or transportable nature (such as drilling rigs) design the mounting structure to withstand all probable load conditions. Such load conditions should recognize abuse situations such as truck off-loading impacts. The heaters should be suspended from the supporting assembly by two 5/8 NC bolts fitted with lock washers.

ELECTRICAL

The HLA heaters have been designed for explosion proof service, with single and three-phase inputs of 208, 240, 480 or 600 volts. They meet stringent U.L. requirements. However, it is essential that correct installation procedures be followed to eliminate all potential hazards ariging from faulty installation.

Follow these instructions:

1. Should it be deemed desirable to install a room temperature control thermostat, refer to the appropriate electrical wiring diagram and follow these steps:

   Remove the jumper wire from the small terminal block marked C1-C2 located in control enclosure. Connect the external thermostat to these terminals. The external thermostat will then be connected in series with the heater high limit and correct operation of the heater will result.

   Any room thermostat used with these heaters must be of an explosion-proof type, open on temperature rise, suitable with control voltage selected.

WARNING

   It is imperative that the high-limit (in the heater core junction box enclosure) remain connected in series with the room thermostat, the secondary output of the control transformer and the contactor coil. Under no circumstances are the heaters to be operated with the high-limit disabled or disconnected.

2. Proper installation of the heater requires that an adequate grounding conductor be connected to the ground terminal. This terminal is marked and is located in the control enclosure.

3. Avoid placing conduit runs directly beneath the heater in a way that would prevent removal of the heater core assembly.

4. On all 3-phase heaters, it is necessary to verify that the fan is rotating in the proper direction. If air delivery is not from the front of the heater, exhange any 2 input wires at the contactor. Do not needlessly remove the electric motor conduit box cover. In the event that the motor cover is removed, ensure that it is securely tightened when replaced.

5. Use only an approved explosion-proof means of wiring such as mineral insulated cable or copper conduc tors in rigid conduit to make connections to the heater.

6. External electric circuit breaker protection is required. See "TECHNICAL DATA" table and follow code recommendations. Check nameplate for voltage and amperage.

7. Follow all applicable electrical and building codes related to the intended use of the heater. Similarly, any National, State or Local codes must be observed and adhered to.

8. When doing any work on a heater, including the initial electrical connection, disconnect the electrical current at the main switch. Where possible lock the switch in the off (open) position and/or tag WARNING to prevent shock hazards.

9. Refer to the appropriate wiring diagram to ensure that all connections are as required and securely fastened.

10. Ensure conductions are of appropriate gauge size. Size all input conductors according to accepted standards consistent with the temperature rating of the wire being used. Use minimum 90°C rated wire. Minimum size for the thermostat circuit is 16 - AWG (90oC). Use copper conductors.

11. Ensure that input conductors and conduit have adequate strain relief at installation.

12. Confirm that the electrical power supply is compatible with the nameplate rating of the heater to be connected.

13. Before application of electrical power, recheck all connections to ensure compliance with the wiring diagram and any code requirements. Remove any foreign objects from the control box and reinstall cover lid tightly. Make certain that all three conduit box covers are securely in place.

MAINTENANCE RECOMMENDATIONS

CAUTION - Before undertaking any maintenance, disconnect the heater from the electrical power source. If possible, lock the main power switch in the off (open) position and/or tag to prevent shock hazards.

ELECTRICAL

Annually inspect all terminal connections, contactor and visible insulation for damage, looseness, fraying, etc. as applicable. Retighten any loose terminals and replace or repair damaged or deteriorated insulation. If contactor contacts are badly pitted, welded together or burned, replace the contactor. Check all explosion -proof conduit for visible damage and tightness. Contact TPI for replacement parts.

If reduced heat output is suspected, verify the condition of the heating elements by using an amperage meter to check the current draw of each input line. All input lines should draw approximately equal current which should agree with nameplate rating. If they do not, one or more of the heating elements could be burned out. See "REPAIR AND REPLACEMENT PROCEDURES".

The electric motor is permanently lubricated and thermally protected. Check for smooth and quiet running at all inspections. Check shaft for bearing play. Replace motor if excessive bearing play is detected. Contact TPI for replacement parts.

MECHANICAL

Explosion-proof conduit boxes are designed with threaded joints and metal-to-metal contact at lid and cover joints to prevent an explosion. Do not attempt to install gasket materials of any type at these joints. A light coating of anti-seize compound is applied to the threads to prevent seizing.

Annually check the tightness of all visible bolts or nuts, in particular the support structure bolts and nuts. Similarly check the electric motor mounting bolts and nuts.

Periodically, depending on environmental service condition, check the cleanliness of motor, fan and heater core fins. Clean if required by air jet. Check louvers for tightness and equal angle settings. Check motor and fan for smooth running. Any unusual noise or vibration must be investigated and rectified.

REPAIR AND REPLACE PROCEDURES

CAUTION - Before undertaking any maintenance, disconnect the heater from the electrical power source. If possible, lock the main power switch in the off (open) position and/or tag to prevent shock hazards.

Should problems arise requiring repair or replacement of any major component, the following procedures should be followed where applicable:

HEAT EXCHANGER CORE

(Including HEAT TRANSFER FLUID, HEATING ELEMENTS and PRESSURE RELIEF VALVE)

The HLA Series heater core assemblies have been deliberately designed to permit only limited field service. Repair and overhaul is intended to only be by complete replacement of the core assembly with either a new or factory reconditioned core assembly. Such new ore reconditioned core assemblies will be supplied with heating elements, pressure relief valve, the correct amount of fluid and a new high-limit. Each core assembly will have been factory assembled, inspected and electrically tested for correct heat output and proper operation of the high-limit. Because of the equipment and test procedures required to test core assemblies, it is not practical for cores to be field serviced. Incorrect field service procedures may render a heater potentially hazardous.

The only core assembly field service work sanctioned by the manufacturer is replacement of the capillary high-limit and cleaning.

To remove the heater core from the heater cabinet proceed as follows:

1. First remove all threaded and screw-attached sheet metal covers from the control box side of the heater. Then remove the bottom cover.

2. Remove all 5 wires from within the conduit between the upper and lower boxes.

3. The heater core assembly is secured by three 5/16 diameter x 1/2 capscrews; two on one side and one above the aluminum control box enclosure. Before removing these screws assistance will be required to support the weight of the core.

4. With a second person to support the weight of the core assembly, remove the three 5/16 diameter x 1/2 capscrews and have the helper carefully lower the heater core assembly from the cabinet.

HEAT TRANSFER FLUID

The heater cores are partially filled with an ethylene glycol/water solution similar to that used in automotive applications. Oral ingestion of this solution could prove fatal since ETHYLENE GLYCOL IS POISONOUS. Should ingestion occur, seek medical attention immediately.

Field service of the core assembly with respect to refilling it with fluid is not permissible. A new or factory reconditioned core assembly must be used and shall be provided by the manufacturer or one of its agents.

HEATING ELEMENTS

In the event of failure of the heating elements it will be necessary to replace the core assembly with a new or reconditioned unit.

PRESSURE RELIEF VALVE

The pressure relief valve is factory installed and pressure tested. Contact the manufacturer or authorized service agent should suspected problems occur.

ELECTRIC MOTOR

Remove the cover lid on the motor junction box and disconnect all the wires. Carefully loosen the union between the motor and control box enclosures. Loosen and remove the motor mounting bolts and fan guard bolts, being careful not to damage the fan blades. Note the relative axial position of the fan hub on the motor shaft and remove the motor mounting bolts and fan guard bolts, being careful not to damage the fan blades. Note the relative axial position of the fan blades. Note the relative axial position of the fan hub on the motor shaft and remove the fan.

To replace the motor, fan guard and fan assembly, reverse the above procedure. Position the fan on the shaft to the previously noted position. It is helpful to leave the motor bolts loose while connecting the union. The back of each fan blade should be about 3/4" from the inside of the fan guard. When everything is in place, make certain all fasteners are secure and that the conduits have at least 5 threads engaged. Manually spin the fan blade with a screwdriver before application of power to make certain it does not foul the cabinet or fan guard.

HIGH-LIMIT

The high-limit is rated for operation of 6,000 cycles. Experience indicates that nuisance tripping is generally not the fault of the high-limit but is usually caused by excessive input voltage, high ambient temperatures, or an excessively dirty heater core. The high-limit is unlikely to cause any difficulty, but if it should, follow these procedures:

Gain access to the high-limit by removing the sheet metal cover from the cabinet and the threaded aluminum cover from the core junction box. Once inside, pull off the two wires attached to the high-limit. Remove the two screws that retain the capillary high-limit and withdraw it by pulling.

To replace the high-limit, reverse the above procedure. Reconnect the thermostat wires on terminals. DO NOT OMIT THIS OPERATION AND DO NOT BYPASS.

Never use any replacement high-limit other than one supplied by the manufacturer as the heaters may be rendered potentially hazardous.

CONTROL TRANSFORMER

HLA heaters are provided with multi-tap primary transformers on 208, 240 and 480 volt models. If replacement is necessary, select the voltage tap compatible with the line voltage of the unit and cap off all unused taps. All 600 volt units are furnished with non selectable dedicated primaries.

NOTE: Transformers secondaries should not be sparked or shorted as they may be provided with embedded over current protection.

CONTACTOR

A contactor should be replaced if excessive pitting or burning of the contact points is found, or if the coil has burned out. (Note-the contactor is rated for 100,000 cycles of operation at it full rated capacity).

REPLACEMENT PROCEDURES - CONTROLS

BEFORE OPENING ANY ENCLOSURE, DISCONNECT HEATER FROM POWER SUPPLY.

Remove top plate located in control enclosure, by removing three (3) No. 8 screws. One of the screws also retains the grounding lug. Associated wiring must be removed from control block, fuse block, and contactor. Remove three (3) screws that retain the contactor mounting plate. Remove contactor mounting plate, which will have two standoff posts and contactor assembled as a unit. The contactor can be replaced if necessary, at this time.

If transformer or thermostat is to be replaced, remove three (3) screws retaining the plate on which they are mounted. Both parts will be removed together. If a thermostat is provided, the operating shaft must be withdrawn through its clearance hole or shaft hub screw loosened to free assembly. Transformer can now be replaced.

To replace thermostat, loosen bulb retaining clamps, and remove capillary plug retaining ring located on outside of enclosure. Withdraw thermostat and its capillary bulb through enclosure opening. Thermostat may be replaced at this time. When reassembling thermostat, retaining rings should be firmly seated in capillary plug seal grooves on both sides of enclosure wall. Inside retaining ring should be placed on seal plug before passing capillary bulb through enclosure opening provided. To prevent any possible shorting of terminals, route thermostat capillary close to lower enclosure wall. Refer to wiring diagram covering your model. For reassembly reverse the order to above procedure.

RATINGS

MODEL	VOLTS	PHASE	MOTOR KW	MOTOR HP	A MOTOR	A HEATER	A LINE	MINIMUM CIRCUIT A	MAXIMUM FUSE A	SUPPLY CONNECTIONS WIRE SIZE NO. AWG.
			3	1/4	1.9	14.4	16.3	20.4	25	10
HLA 12	208	1	5	1/4	1.9	24.0	26.0	32.5	35	8
			7 1/2	1/4	1.9	36.1	38.0	47.5	50	8
			3	1/4	2.3	12.5	14.8	18.5	20	12
HLA12	240	1	5	1/4	2.3	20.8	23.1	28.9	30	10
			7 1/2	1/4	2.3	31.3	33.6	42.0	45	8
			3	1/4	1.5	8.3	9.8	12.3	15	14
HLA12	208	3	5	1/4	1.5	13.9	15.4	19.2	20	12
			7 1/2	1/4	1.5	20.8	22.3	27.9	30	10
			3	1/4	1.4	7.2	8.6	10.8	15	14
HLA12	240	3	5	1/4	1.4	12.0	13.4	16.8	20	12
			7 1/2	1/4	1.4	18.0	19.4	24.3	25	10
			3	1/4	0.7	3.6	4.3	5.4	15	14
HLA12	480	3	5	1/4	0.7	6.0	6.7	8.4	15	14
			7 1/2	1/4	0.7	9.0	9.7	12.1	15	14
			3	1/4	0.6	2.9	3.5	4.4	15	14
HLA12			5	1/4	0.6	4.8	5.4	6.8	15	14
	600	3	7 1/2	1/4	0.6	7.2	7.8	9.8	15	14
HLA16	208	3	10	1/4	1.5	27.8	29.3	36.6	40	8
HLA16	240	3	10	1/4	1.4	24.1	25.5	31.8	35	8
HLA16	480	3	10	1/4	0.7	12	12.7	15.9	20	12
HLA16	600	3	10	1/4	0.6	9.6	10.2	12.8	15	14
HLA16	240	1	10	1/4	2.3	41.7	44	55	60	6
HLA16	208	3	15	1/2	1.9	41.6	43.3	54.4	60	6
HLA20	240	3	15	1/2	2.0	36.1	38.1	47.6	50	8
			15	1/2	1.0	18.0	19.0	23.3	25	10
HLA20	480	3	20	1/2	1.0	24.1	25.1	31.3	35	8
			25	1/2	1.0	30.1	31.1	38.8	40	8
			15	1/2	0.8	14.4	15.2	19.0	20	12
HLA20	600	3	20	1/2	0.8	19.2	20.1	25.1	30	10
			25	1/2	0.8	24.1	24.9	31.1	35	8

REPLACEMENT PARTS LIST HLA

ITEM	QTY	3, 5, 7.5 KW	10 KW	15, 20, 25 KW	DESCRIPTION
1	1	70667-001	70667-002	70667-003	CABINET WELDMENT
2	3	62022-001			LOUVER
2			62022-002		LOUVER
2				62022-003	LOUVER
3	4	62023-001	62023-002	62023-003	MOTOR SUPPORT
4	5	51634-001	51634-002	51634-003	BOTTOM COVER
5	1	70671-001	70671-002	70671-003	FAN GUARD
6	1	62003-001	62003-002	62003-003	FAN GUARD
7	1	51510-004	51510-005	51510-006	HIGH LIMIT CONTROL
8	1	52823-001	52823-002	52823-003	CONDUIT MOTOR 3/4
9	1	52823-001	52823-002	52823-004	CONDUIT JUNCTION BOX 3/4
10	1	PROVIDE MODEL NUMBER			

Heat Exchanger Complete with relief valve, elements, fluid charge, slip-joint and element enclosure cover.

COMMON TO ALL SIZES PARTS LIST		
ITEM	PART NUMBER	DESCRIPTION
11	58027-036	CONTACTOR, 50 AMP 3 POLE 24 VOLT COIL
11	58027-037	CONTACTOR, 50 AMP 3 POLE 120 VOLT COIL
11	58027-038	CONTACTOR, 50 AMP 3 POLE 208/240 VOLT COIL
12	51704-001	TRANSFORMER 208/240/480 VOLT PRIMARY 24 VOLT SECONDARY
12	51512-001	TRANSFORMER 208/240/480 VOLT PRIMARY 120 VOLT SECONDARY
12	51704-002	TRANSFORMER 600 VOLT PRIMARY 24 VOLT SECONDARY
13	51511-002	FUSE BLOCK 2 POLE
14	43810-003	FUSE 3.0 AMP TIME DELAY
14	43810-002	FUSE 4/10 AMP TIME DELAY
14	43810-001	FUSE 2/10 AMP TIME DELAY
15 (3.5, 7.5, 10KW)	62034-001	MOTOR, 1/4 HP 208/240/480 VOLT SINGLE PHASE
16 (3.5, 7.5, 10KW)	62034-002	MOTOR, 1/4 HP 208/240/480 VOLT SINGLE PHASE
17 (3.5, 7.5, 10KW)	62034-003	MOTOR, 1/4 HP 600 VOLT THREE PHASE
15 (15, 20, 25KW)	62034-004	MOTOR, 1/2 HP 208/240/480 VOLT THREE PHASE
16 (15, 20, 25KW)	62034-005	MOTOR, 1/2 HP 600 VOLT THREE PHASE
16	62024-001	ELEMENT ENCLOSURE COVER
17	62032-001	ELEMENT ENCLOSURE (EXPLOSION PROOF) THREADED COVER
18	41352-001	CAUTION PLATE
19	70672-003	CONTROL BOX EXPLOSION PROOF (PROVISIONS FOR THERMOSTAT OPTION)
20	62031-002	CONTROL BOX EXPLOSION PROOF COVER
21	51637-001	THERMOSTAT (STAINLESS STEEL CAPILLARY)
22	43633-001	THERMOSTAT RETAINING RING (2 REQUIRED)
23	41341-001	THERMOSTAT SHAFT ASSEMBLY
24	43758-001	3/4" CONDUIT UNION FEMALE (MOTOR)
25	43755-001	3/4" CONDUIT UNION MALE (JUNCTION BOX)
26	51638-001	3/4" SLIP-JOINT FITTING (JUNCTION BOX TO ELEMENT ENCLOSURE)
27	43672-001	DRIVE SCREW #6 X 3/16"
28	62034-000	MOTOR JUNCTION BOX (EXPLOSION PROOF)

TERMS AND WARRANTY

RETURNED MERCHANDISE

Goods may not be returned without the company's written permission. All transportation costs for returned goods must be paid by the customer:

FREIGHT DAMAGE CLAIMS

Title to goods shipped passes to the consignee upon delivery by the company to the carrier. All claims for shortages or damage must be made to the carrier by the consignee. In case of concealed damage it is important that such damage be reported to the delivering carrier within one week.

WARRANTY
LIMITED WARRANTY TO OWNER
TPI CORPORATION
EFFECTIVE MAY 1, 1977

The warranty herein set forth is in lieu of all other warranties expressed or implied, and shall not apply to any accessory not part of the product.

TPI Corporation, hereafter referred to as the company of Johnson City, Tennessee 37602, warrants its products to the owner against defects in material and workmanship for a (12) month period under normal use and services following date of manufacture or installation when proof of such is provided to seller.

This warranty requires that the owner, or his agent install the equipment in accordance with the National Electrical Code, any other applicable heating or electrical codes and the manufacturer's installation instructions. It further requires that he perform reasonable and necessary maintenance on the unit. The company is not liable for abuse or misuse of product as may be finally determined by inspection by the company.

The obligation of the manufacturer, under the terms of this warranty, shall be to supply a new part, or the repair of defective part at the company's option with no costs to owener for the new or repaired part. Such parts are to be returned to the factory, or such other location as the company may desinate at the ovner's expense. This warranty does not obligate the manufacturer to bear the cost of labor in replacing any assembly, unit or component part therof, nor does the company assume any liability for secondary charges, expenses for installing or removal, or any other consequential losses, freight or damages. The company's maximum liability shall not in any case exceed the list price for the product claimed to be defective.

IN CASE OF PRODUCT FAILURE

It shall be the obligation of the owner to furnish to the company within the designated warranty period, the following information:

1. Model number and date of manufacture of product involved.

2. Complete description of the problem encountered with product.

Upon receipt of the above, the company will reply to the owner within a period not to exceed fifteen (15) working days, the action to be taken by owner.

When requested, it shall be the obligation of the owner to return the defective part to the company within thirty (30) days after its removal, or otherwise to follow instructions from the company.

HAZARDOUS LOCATIONS DEFINITIONS

HAZARDOUS LOCATIONS - Areas where the possibility of explosion or fire exists because of the presence of flammable gases, vapors, or dust etc.

DIVISION 1 - Locations where the hazard is expected to be present during normal production operations, or during frequent maintenance and repair activities.

DIVISION II - Locations where the hazards would only exist as a result of an accident or other abnormal event such as a rupture or spillage.

CLASS I - Areas wheresufficient quantities of flammable gases or vaports exist in the air to be explosive or ignitable.

- Offshore and land based drilling rigs, petroleum exploration and testing facilities.
- Petroleum refineries, gasoline storage and dispensing areas.
- Industrial firms that use flammable liguids in dip tanks for parts cleaning or other operations.
- Petrochemical companies that manufacture chemicals from gas and oil.
- Dry cleaning plants where vapors from cleaning fluids can be present.
- Artcraft hangars and fuel servicing areas.
- Utility gas plants and operations involving storage and handling of liquefied petroleum gas or natural gas.

GROUP D - Gases or vapors with specific explosive characteristics grouped together including:

Acetone	Cyclohexane	Iso Butyl Alcohol	Propane
Acrylonitrile	Decane	Isooctane	Propylene
Ammonia	Ethano	Isoprene	Propyl Acetate
Amyl Acetate	Ethylene Dicholoride	Methane	Styrene
Amyl Alcohol	Ethyl Acetate	Methanol	Toluene
Benzene	Ethyl Alcohol	Methyl Acetate	Vinyl Acetate
Blast Furnace Gas	Ethyl Methyl Keytone	Methyl Alcohol	Vinyl Chloride
Buta - 1:3 Diene	Ethyl Nitrite	Naphtha	Xylene
Butane	Heptane	Natural Gas	
Butyl Acetate	Hexane	N-Butyl Alcohol	
Carbon Monazite		Pentane	

CLASS II - Areas which are made hazardous by the existence of combustible dusts.

- Coal preparation plants and other carbon handling or processing areas
- Grain elevators, flour and feed mills.
- Plants that manufacture, use or store magnesium or aluminum powders.
- Plants that have chemical or metallurgical processes, producers of plastics, medicines and fireworks, etc.
- Producers of starch or candies.
- Spice grinding plants, surgar plants and cocoa plants.

GROUP E - Powdered metals such as aluminum and magnesium, and other metal dusts with similar characteristics.

GROUP F - Dusts such as carbon black, coke, and coal dust.

GROUP G -Dusts, including flour, starch, spices and grain dust.

BASIC MOUNTING KIT/WALL MOUNTING KIT
INSTRUCTION SHEET

NOTE: Check that your heater model number corresponds to the model number shown on the mounting kit carton.

WARNING: IF INSTALLED ON A STRUCTURE THAT IS TO BE TRANSPORTED, PROVIDE ADDITIONAL TEMPORARY SUPPORT FOR THE HEATER DURING TRANSIT.

THE SUSPENDED WEIGHT ON THE ARM ASSEMBLY SHOULD NOT EXCEED 250 LB (114KG.)

REFER TO HEATER INSTALLATION MANUAL FOR MOUNTING SPECIFICATIONS AND CONDITIONS.

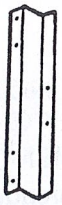
INSTALLER REQUIRED TO SUPPLY:

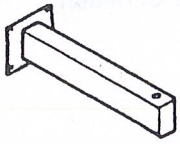
A method to fasten the two Z Sections ① to the supporting wall. This kit required at least four (4) 3/8" diameter, grade 5 bolts. However, any method providing the same or greater strength may be used.

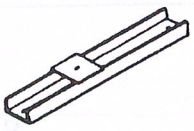
A method to fasten the ARM ASSEMBLY ② to the supporting structure. Four (4) 3/8" diameter, grade 5 bolts are suggested, however, any method providing the same or greater strength may be used.

CONTENTS:

Item	Part No.	Quantity	Description
①	51666-001	2	Z SECTION, SUPPORT
②	62036-002	1	ARM ASSEMBLY, MOUNTING
③	62037-001 HLA 12 62037-002 HLA 16 62037-003 HLA 20	1	ATTACHMENT, ASSEMBLY
④	93480-004	4	3/8 UNC Nut
⑤	1766	4	3/8 UNC x 1 Bolt
⑥	43567-001	4	3/8 Lock Washer
⑦	43566-002	2	5/8 UNC x 1 1/4 Bolt
⑧	43567-002	2	5/8 Lock Washer
⑨	43566-001	1	5/8 UNC x 4 1/2 Bolt
⑩	43625-003	1	5/8 Flat Washer





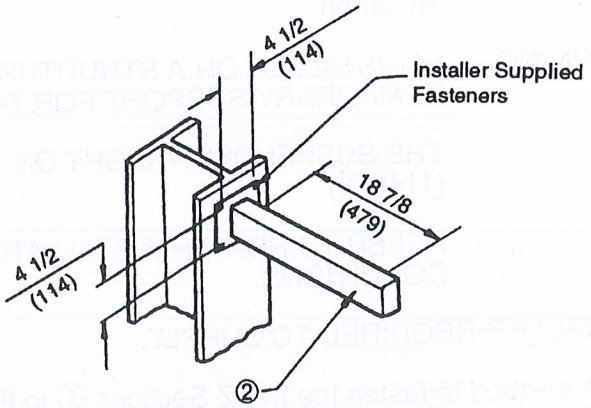


BASIC MOUNTING KIT INSTALLATION

Note: Dimensions are in inches (mm)

STEP 1

Fasten the ARM ASSEMBLY②to a surface or structure that will support the heater's weight using the installer supplied fastening method.

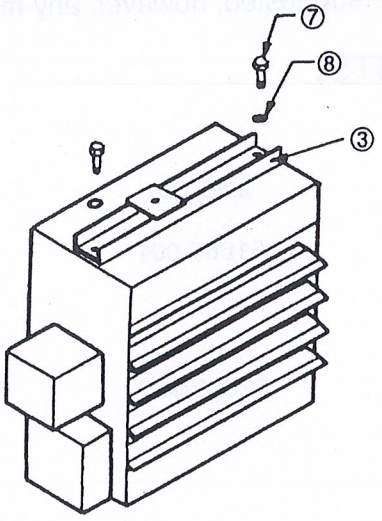


STEP 2

Bolt ATTACHMENT ASSEMBLY ③ to the heater using 5/8 UNC x 1 1/4 bolts and lock washers.

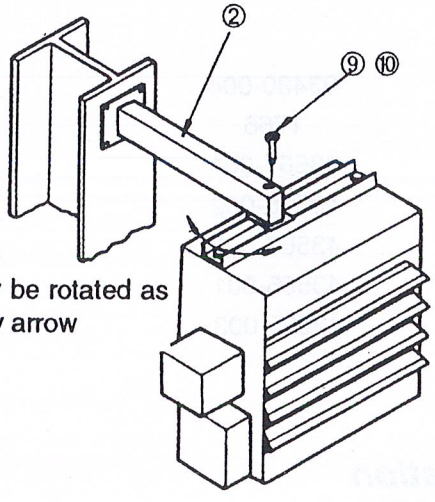
NOTES:

1) HL Series electric heaters use an ATTACHMENT ASSEMBLY ③ with an offset threaded hole. The ATTACHMENT ASSEMBLY ③ must be placed with the threaded hole closest to the control box side of heater.



STEP 3

Lift heater into place and fasten it to the ARM ASSEMBLY ② using a 5/8 UNC x 4 1/2 bolt. This step will require more than one person due to the weight of the heater. Refer to the heater installation manual for weight.



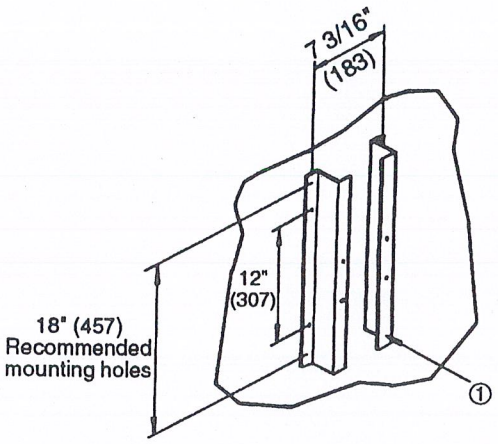
Heater may be rotated as indicated by arrow

WALL MOUNTING KIT INSTALLATION

NOTE: Dimensions are in inches (mm)

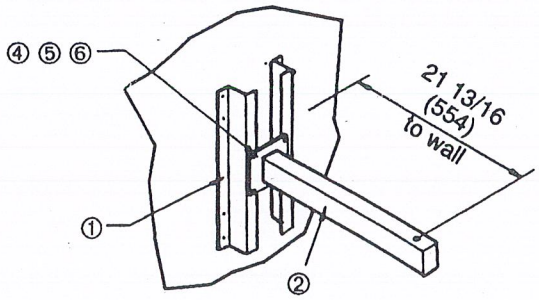
STEP 1

Fasten the Z SECTIONS ① to a wall that will support the heater's weight using installer supplied fasteners.



STEP 2

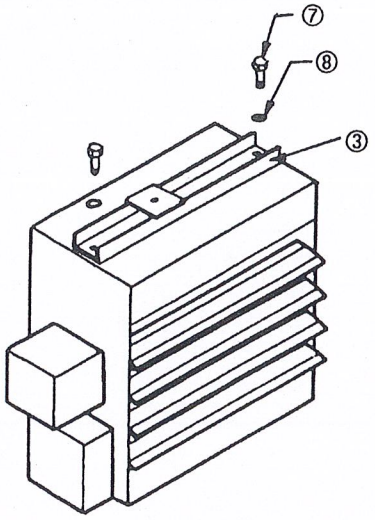
Bolt the ARM ASSEMBLY ② to the Z SECTIONS ① using 3/8 UNC x 1 bolts, lockwashers and nuts.



STEP 3

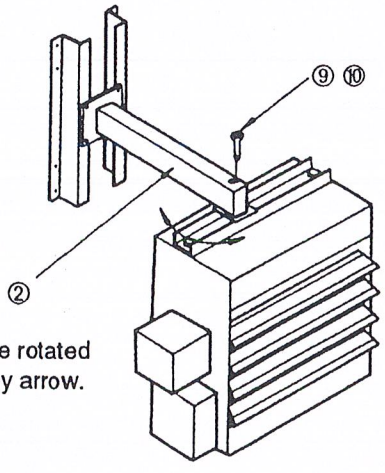
Bolt ATTACHMENT ASSEMBLY ③ to the heater using 3/8 UNC x 1 1/4 bolts and lock washers.

1) HL Series electric heaters use an ATTACHMENT ASSEMBLY ③ with an offset threaded hole. The ATTACHMENT ASSEMBLY ③ must be placed with the threaded hole closest tot he control box side of heater.



STEP 4

Lift heater into place and fasten it to the ARM ASSEMBLY ② using a 5/8 UNC x 4 1/2 bolt. This step will require more than one person due to the weight of the heater. Refer to the heater installation manual for weight.



Heater may be rotated as indicated by arrow.

Section 6

Warranty

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WARRANTY AND PERFORMANCE GUARANTEE

General Warranty Statement

1. **newterra** warrants and guarantees products of its manufacture against defective workmanship or material for a period of one year from the date of successful commissioning or eighteen months from the date of shipment from the factory, whichever comes earlier.
2. This warranty is expressly and strictly limited to replacing, without charge, any part or parts which prove to **newterra**'s satisfaction upon examination, to have been defective in design, material, and workmanship, and which have not been neglected, abused or misapplied, and provided that the buyer gives **newterra** immediate written notice upon discovery of any claimed defect.
3. During the warranty period, parts will be shipped with the instructions to replace, which can be further elaborated over the telephone; visit of our technician can be covered under the service agreement; otherwise, actual charges will be quoted to the owner at that time, if required.
4. All components are designed in accordance with the local/national governing building code(s).
5. All wastewater components meet the specified guideline and standards.

Warranty Exclusions

1. Warranty coverage does not include:
   - Freight, labour, travel, and living expenses associated with parts replacement
   - Normal wear & tear for items such as lubrication, fan belts, and cleaning of the equipment
2. In the event that the customer, or any contractor employed by the customer, contracts an outside company other than **newterra** for modification of plant equipment, without knowledge of **newterra**, the warranty in that case may become null & void.

Conditions of Warranty

1. **newterra** highly recommends that the system be started up by a **newterra** factory trained technician to ensure the correct installation and trouble-free startup. The start-up checklist provided in the manual must be completed and returned to the Product Support Department at **newterra** to validate your equipment warranty, which begins on the date of shipment from the factory.