



TIGERFLOW®
Engineered Systems to the World

PACKAGED FIRE PUMPING SYSTEMS



**PREFABRICATED
& FACTORY
TESTED**



**3rd PARTY
CERTIFIED - UL/
C-UL LISTED
SYSTEMS**



**ASME SECTION 9
WELDING**



**SINGLE SOURCE
RESPONSIBILITY**



**UL/FM APPROVED
COMPONENTS**



**NFPA PAMPHLET
20 FULL
COMPLIANCE**



**NFPA 70 (NEC)
NAT'L ELECT.
CODE
COMPLIANCE**



**ENVIRONMENTAL
ENCLOSURE or
SKID MOUNTED**



Cost-effective engineered fire protection systems for commercial, institutional, municipal and industrial applications.

Packaged Fire Protection Systems You Can Count On....

Standard Features

- 3rd Party UL/C-UL Labeled Systems
- ASME Section 9 Certified Welding
- UL Listed/FM Approved Components
- NFPA 20 & NEC 70 Compliance

Drivers

- Electric Motors
- Diesel Engine
- Steam Turbine

Pumps

- End Suction
- In-line
- Horizontal Split Case
- Vertical Turbine



- Prefabricated Skid Mounted Units
- Prefabricated Units with Environmental Enclosures

- Factory Tested
- Single Source Responsibility
- Start-up & Field Training



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TIGERFLOW, Your expert source for engineered fire protection systems...

TIGERFLOW FIRE PROTECTION SYSTEMS provide critical advantages for system owners, designers and contractors. The complete **TIGERFLOW** system is factory built, tested and UL/C-UL third-party certified before shipment. That means the unit arrives on site meeting and/or exceeding all relevant industry standards, including NEC and NFPA guidelines. Liability and performance risks are eliminated. System designers appreciate the time savings and **TIGERFLOW** expertise built into each project. Coordinated deliveries of third party certified systems make contractor performance penalties and delays inherent in site-built/site-certified systems a thing of the past.

Our promise to you...

Your **TIGERFLOW** factory engineered system will arrive ready to go and operate reliably to the required specifications, with the simplest of site installation.

REPRESENTED BY:



DATE:

PROJECT:

ENGINEER:

REP:

SPECIFICATION FOR ELECTRIC DRIVEN HORIZONTAL SPLIT CASE FIRE PUMP SYSTEM

Furnish and install a **TIGERFLOW** Series FPS-7000, ETL/C-ETL listed engineered packaged pump system. The system shall be rated for a flow of ___ GPM at a system pressure of ___ PSIG including a suction pressure of ___ PSIG minimum, ___ PSIG maximum.

FIRE PUMP

The pump shall be a Model ____, Size ____, (Underwriters Laboratories Listed) (Underwriters Laboratories of Canada Listed) (Factory Mutual Approved) horizontal split case fire pump(s). Each unit shall include a pump, base, coupling, coupling guard, electric motor, necessary fittings and automatic motor controller. The pump(s) shall be rated for ___ GPM at ___ PSI. Units shall be designed to deliver not less than 150% of rated capacity and 65% of rated head. Maximum permissible pump speed shall not exceed ___ RPM.

PUMP CONSTRUCTION

Pump(s) shall be of the double suction horizontal split case design, with class 30 cast iron casing, bronze casing wearing rings, bronze impeller, high quality steel shaft with renewable bronze shaft sleeves through the packing boxes and grease lubricated cartridge type anti-friction bearings. The packing box glands shall be of the bronze split type. Pump(s) shall be hydrostatically tested to 1 _ times the maximum working pressure but in no case less than 250 PSI. Pump accessories shall include 3 _" diameter suction and discharge gauges, automatic air release valve, and circulation relief valve.

MOTOR

Electric motor(s) shall be ___ HP of the ODP type with 1.15 service factor and wound for ___ phase, ___ hertz, ___ volts. Motor(s) shall be of the (across-the-line) (part-winding) (WYE-Delta) type starting and sized as not to exceed the permissible loading limits of NFPA #20 (or factory mutual loss prevention data sheet 3-7N) at any point on the pump performance curve.

CONTROLLER

The electric motor controller shall be ETL/C-ETL/FM labeled and arranged to start with (automatic stop) (manual stop). (For sprinkler or standpipe systems where an automatically controller pumping unit constitutes the sole supply, the controller shall be wired for manual shutdown. Manual shutdown shall also be provided where required by the authority having jurisdiction). It shall be supplied with a circuit breaker rated not less than _____ AIC at ____ phase, ____ hertz, ____ volts. [Automatic transfer switch (stand-by generator service)(secondary utility service)]

The magnetic starting contractor shall be of the (choose one):

1. Across-the-line type.
2. Reduced voltage primary resistor type.
3. Reduced voltage primary reactor type.
4. Part winding start type.
5. Wye-Delta start type.
6. Autotransformer type.
7. Solid state soft start type.

JOCKEY PUMP

The jockey pump shall be cast iron, stainless steel fitted, mechanical seal, vertical multi-stage centrifugal pump rigid-coupled to a ____ HP, ____ RPM, ____ Volts, ____ Phase, ____ Hertz motor. Condition point: ____ GPM @ ____' TDH.

JOCKEY CONTROLLER

The jockey controller shall be a Nema 2, controller complete with a fusible disconnect, H-O-A selector switch, overload relay, mercoid pressure switch and minimum run timer.

VALVES

PROVIDE:

- (1) ____ “ UL/FM OS&Y suction flanged gate valve with tamper switch.
- (1) ____ “ UL/FM Discharge wafer butterfly valve with tamper switch.
- (1) ____ “ UL/FM Discharge wafer style check valve.

ACCESSORIES (CHOOSE OPTIONS REQUIRED)

- (1) ____ “ hose valve header with ____ (qty) 1 _” NPT thread hose valves, caps and chains complete piping, drain valve, and (1) UL/FM isolation wafer, butterfly valve (Note: Hose valve header, supplied for remote installation).

ACCESSORIES – cont.

- (1) UL/FM flowmeter with piping from discharge back to suction complete with (2) UL/FM isolation wafer style butterfly valves with tamper switches.
- (1) Line size city bypass including: piping, (1) UL/FM wafer check valve and (2) UL/FM wafer style butterfly isolation valves with tamper switches.

FACTORY FABRICATION

- (1) Ten-inch (10") open rectangular perimeter open floor design skid base, complete with all necessary sensing lines, pipe supports, wiring for complete package system. All welding to be done by ASME Code Section 9 certified welders. System shall have seismic calculations with California P.E. stamp for zone and requirements.

THIRD PARTY REQUIREMENTS

- All equipment supplied and complete installation in accordance with NFPA #20 and/or (UL443) (ULC443) (Factory Mutual Approval Standard #1311).
- The package shall be ETL/C-ETL listed as a system for its intended use, so meeting OSHA Federal Regulations 29CFR1910.303 and .399 as well as NFPA Pamphlet #70 (National Electric Code) Article 90.7, City of Los Angeles Approval Code, CMR248 Massachusetts State Plumbing Code Approval.

FACTORY TEST

The package shall be electrically and hydrostatically tested per NFPA requirements before shipment.

STARTUP

The factory authorized local representative shall provide startup and acceptance testing in accordance with NFPA requirements.

WARRANTY

Each **Tigerflow** system is warranty-protected from failure due to defects in material and workmanship for a period of eighteen (18) months from date of shipment or twelve (12) months from date of startup, whichever occurs first.

SUBMITTALS & INSURANCE CERTIFICATIONS

Submittals shall be in accordance with requirements of general specifications. Submit 6 copies to the engineer for approval. All submittals must include the following:

- Complete shop drawings & complete wiring diagrams. All drawings must be AutoCAD release 2000 complete with full mechanical desktop 3-D drawings in both hardcopy and disk format. Complete operating and maintenance instructions.

SUBMITTALS & INSURANCE CERTIFICATIONS – Continued

- Furnish written certification of the manufacturer's listing with Underwriters Laboratories as an approved manufacturer of control panels.
- Furnish written certification that the manufacturer is listed by E0TL/C-ETL as an approved manufacturer of factory assembled pumping systems.
- A complete, easily readable functional description of the proposed equipment.
- Upon completion of the installation, the results of the field and acceptance tests as specified under this section of the specification shall be submitted to the engineer.
- Furnish written certification from the manufacturer's representative of the proper installation of station.
- Provide written certification that the pump system is manufactured by a nationally recognized manufacturer of packaged pump systems and signed by a corporate officer.
- Operation and Maintenance manuals – submit complete operations and maintenance information for this specific equipment. These manuals shall be reviewed by the engineer for completeness. They shall include complete parts list including manufacturer's reference and ordering numbers. Manuals shall include manufacturer's name, address and phone number, the local representative's name, address and phone number, the model number and serial number of system.
- The manufacturer shall submit a certificate of product liability insurance for no less than one million dollars (\$1,000,000).

QUALITY ASSURANCE

- All equipment under this section shall be furnished by a single supplier and shall be products that the manufacturer regularly engages in. The supplier shall have sole responsibility for proper functioning of the system and equipment supplied.
- Equipment shall be manufacturer's standard products presently in commercial production.
- The manufacturer shall have in place a quality assurance program to assure the quality of material furnished.

QUALIFICATIONS

- The manufacturer shall have a minimum of ten years manufacturing and application experience.
- Upon request from the engineer, the pump station manufacturer shall demonstrate proof of financial responsibility with respect to performance and delivery date.
- Upon request from the engineer, the pump station manufacturer shall provide proof or evidence of facilities, equipment and skills required to produce the equipment specified herein.



DATE:

PROJECT:

ENGINEER:

REP:

**SPECIFICATION FOR ENGINE DRIVEN
HORIZONTAL SPLIT CASE FIRE PUMP SYSTEM**

Furnish and install a **TIGERFLOW** Series FPS-7000, ETL/C-ETL listed engineered packaged pump system. The system shall be rated for a flow of ____GPM at a system pressure of ____PSIG including a suction pressure of ____PSIG minimum, ____ PSIG maximum.

FIRE PUMP

The pump shall be a Model ____, Size ____, (Underwriters Laboratories Listed) (Underwriters Laboratories of Canada Listed) (Factory Mutual Approved) horizontal split case fire pump(s). Each unit shall include a pump, base, coupling, coupling guard, electric motor, necessary fittings and automatic motor controller. The pump(s) shall be rated for ____GPM at ____PSI. Units shall be designed to deliver not less than 150% of rated capacity and 65% of rated head. Maximum permissible pump speed shall not exceed ____RPM.

PUMP CONSTRUCTION

Pump(s) shall be of the double suction horizontal split case design, with class 30 cast iron casing, bronze casing wearing rings, bronze impeller, high quality steel shaft with renewable bronze shaft sleeves through the packing boxes and grease lubricated cartridge type anti-friction bearings. The packing box glands shall be of the bronze split type. Pump(s) shall be hydrostatically tested to 1 _ times the maximum working pressure but in no case less than 250 PSI. Pump accessories shall include 3 _" diameter suction and discharge gauges, automatic air release valve, and circulation relief valve.

ENGINE

Diesel Engine(s) shall be equal to ____ Model ____ rated ____HP at RPM at 300 feet above sea level and 77 degrees F and shall be (Underwriters Laboratories Listed) (Factory Mutual Approved). Each engine shall be provided with electric starting equipment, a charging alternator and a factory installed heat exchanger cooling system with required strainers, a pressure gauge, a pressure reducing valve, a solenoid valve and bypass line with the inlet piped to the pump discharge. Each engine shall be furnished with lead-acid heavy duty starting batteries, battery rack and cables, a flexible exhaust connector and residential type silencer. Furnish each engine with a jacket water heater.

CONTROLLER

The diesel engine controller shall be arranged to start the fire pump engine automatically on loss of system pressure with (Automatic stop) (Manual stop). (For sprinkler or standpipe systems where an automatically controlled pumping unit constitutes the sole supply, the controller shall be wired for manual shutdown. Manual shutdown shall also be provided where required by the authority having jurisdiction). An automatic weekly test timer shall also be standard. The controller shall be furnished with a built-in battery charger capable of restoring the batteries from a fully discharged condition to a fully charged condition within twenty-four (24) hours.

FUEL SYSTEM

Furnish an above ground fuel tank with a ____ gallon capacity, equal to one gallon per horsepower plus 5% volume for expansion and 5% volume for sump. Furnish the tank with an indicating fuel level gauge. Provide full capacity spill basin and fuel line piping.

JOCKEY PUMP

The jockey pump shall be cast iron, stainless steel fitted, mechanical seal, vertical multi-stage centrifugal pump rigid-coupled to a ____ HP, ____ RPM, ____ Volts, ____ Phase, ____ Hertz motor. Condition point: ____GPM @ ____' TDH.

JOCKEY CONTROLLER

The jockey controller shall be a NEMA 2, controller complete with a fusible disconnect, H-O-A selector switch, overload relay, mercoid pressure switch and minimum run timer.

VALVES

PROVIDE:

- (1) ____ “ UL/FM OS&Y suction flanged gate valve with tamper switch.
- (1) ____ “ UL/FM Discharge wafer butterfly valve with tamper switch.
- (1) ____ “ UL/FM Discharge wafer style check valve.
- (1) ____ “ Main relief valve with ____” x ____” waste cone.

ACCESSORIES (CHOOSE OPTIONS REQUIRED)

- (1) ____ “ hose valve header with ____ (qty) 2 _” NPT thread hose valves, caps and chains complete piping, drain valve, and (1) UL/FM isolation wafer, butterfly valve (Note: Hose valve header, supplied for remote installation).
- (1) UL/FM flowmeter with piping from discharge back to suction complete with (2) UL/FM isolation wafer style butterfly valves with tamper switches.
- (1) Line size city bypass including: piping, (1) UL/FM wafer check valve and (2) UL/FM wafer style butterfly isolation valves with tamper switches.

FACTORY PREFABRICATION

Provide each system as a complete package system on a structural steel mounting frame complete with all necessary pipe supports, wiring and hard copper sensing lines for complete package. Unit shall be factory primed and painted with a machine grade finish coat. All welding shall be performed by ASME Section 9 Certified Welders.

THIRD PARTY REQUIREMENTS

- All equipment supplied and complete installation in accordance with NFPA #20 and/or (UL443) (ULC443) (Factory Mutual Approval Standard #1311).
- The package shall be ETL/C-ETL listed as a system for its intended use, so meeting OSHA Federal Regulations 29CFR1910.303 and .399 as well as NFPA Pamphlet #70 (National Electric Code) Article 90.7, City of Los Angeles Approval Code, CMR248 Massachusetts State Plumbing Code Approval.

FACTORY TEST

The package shall be electrically and hydrostatically tested per NFPA requirements before shipment.

STARTUP

The factory authorized local representative shall provide startup and acceptance testing in accordance with NFPA requirements.

WARRANTY

Each Tigerflow system is warranty-protected from failure due to defects in material and workmanship for a period of eighteen (18) months from date of shipment or twelve (12) months from date of startup, whichever occurs first.

SUBMITTALS & INSURANCE CERTIFICATIONS

Submittals shall be in accordance with requirements of general specifications. Submit 6 copies to the engineer for approval. All submittals must include the following:

- Complete shop drawings & complete wiring diagrams. All drawings must be AutoCAD release 2000 complete with full mechanical desktop 3-D drawings in both hardcopy and disk format. Complete operating and maintenance instructions.

SUBMITTALS & INSURANCE CERTIFICATIONS – Continued

- Furnish written certification of the manufacturer's listing with Underwriters Laboratories as an approved manufacturer of control panels.
- Furnish written certification that the manufacturer is listed by EOTL/C-ETL as an approved manufacturer of factory assembled pumping systems.
- A complete, easily readable functional description of the proposed equipment.
- Upon completion of the installation, the results of the field and acceptance tests as specified under this section of the specification shall be submitted to the engineer.
- Furnish written certification from the manufacturer's representative of the proper installation of station.
- Provide written certification that the pump system is manufactured by a nationally recognized manufacturer of packaged pump systems and signed by a corporate officer.
- Operation and Maintenance manuals – submit complete operations and maintenance information for this specific equipment. These manuals shall be reviewed by the engineer for completeness. They shall include complete parts list including manufacturer's reference and ordering numbers. Manuals shall include manufacturer's name, address and phone number, the local representative's name, address and phone number, the model number and serial number of system.
- The manufacturer shall submit a certificate of product liability insurance for no less than one million dollars (\$1,000,000).

QUALITY ASSURANCE

- All equipment under this section shall be furnished by a single supplier and shall be products that the manufacturer regularly engages in. The supplier shall have sole responsibility for proper functioning of the system and equipment supplied.
- Equipment shall be manufacturer's standard products presently in commercial production.
- The manufacturer shall have in place a quality assurance program to assure the quality of material furnished.

QUALIFICATIONS

- The manufacturer shall have a minimum of ten years manufacturing and application experience.
- Upon request from the engineer, the pump station manufacturer shall demonstrate proof of financial responsibility with respect to performance and delivery date.
- Upon request from the engineer, the pump station manufacturer shall provide proof or evidence of facilities, equipment and skills required to produce the equipment specified herein.



DATE:

PROJECT:

ENGINEER:

REP:

**SPECIFICATION FOR ELECTRIC DRIVEN
HORIZONTAL SPLIT CASE FIRE PUMP SYSTEM with
PRE-FABRICATED ENVIRONMENTAL ENCLOSURE**

Furnish and install a **TIGERFLOW** Series FPS-7000, ETL/C-ETL listed engineered packaged pump system. The system shall be rated for a flow of ____GPM at a system pressure of ____PSIG including a suction pressure of ____PSIG minimum, ____PSIG maximum.

FIRE PUMP

The pump shall be a Model ____, Size ____, (Underwriters Laboratories Listed) (Underwriters Laboratories of Canada Listed) (Factory Mutual Approved) horizontal split case fire pump(s). Each unit shall include a pump, base, coupling, coupling guard, electric motor, necessary fittings and automatic motor controller. The pump(s) shall be rated for ____GPM at ____PSI. Units shall be designed to deliver not less than 150% of rated capacity and 65% of rated head. Maximum permissible pump speed shall not exceed ____RPM.

PUMP CONSTRUCTION

Pump(s) shall be of the double suction horizontal split case design, with class 30 cast iron casing, bronze casing wearing rings, bronze impeller, high quality steel shaft with renewable bronze shaft sleeves through the packing boxes and grease lubricated cartridge type anti-friction bearings. The packing box glands shall be of the bronze split type. Pump(s) shall be hydrostatically tested to 1 _ times the maximum working pressure but in no case less than 250 PSI. Pump accessories shall include 3 _" diameter suction and discharge gauges, automatic air release valve, and circulation relief valve.

MOTOR

Electric motor(s) shall be ____ HP of the ODP type with 1.15 service factor and wound for ____ phase, ____ hertz, ____ volts. Motor(s) shall be of the (across-the-line) (part-winding) (WYE-Delta) type starting and sized as not to exceed the permissible loading limits of NFPA #20 (or factory mutual loss prevention data sheet 3-7N) at any point on the pump performance curve.

CONTROLLER

The electric motor controller shall be ETL/C-ETL/FM labeled and arranged to start with (automatic stop) (manual stop). (For sprinkler or standpipe systems where an automatically controller pumping unit constitutes the sole supply, the controller shall be wired for manual shutdown. Manual shutdown shall also be provided where required by the authority having jurisdiction). It shall be supplied with a circuit breaker rated not less than _____ AIC at ____ phase, ____ hertz, ____ volts. [Automatic transfer switch (stand-by generator service)(secondary utility service)]

The magnetic starting contractor shall be of the (choose one):

1. Across-the-line type.
2. Reduced voltage primary resistor type.
3. Reduced voltage primary reactor type.
4. Part winding start type.
5. Wye-Delta start type.
6. Autotransformer type.
7. Solid state soft start type.

JOCKEY PUMP

The jockey pump shall be cast iron, stainless steel fitted, mechanical seal, vertical multi-stage centrifugal pump rigid-coupled to a ____ HP, ____ RPM, ____ Volts, ____ Phase, ____ Hertz motor. Condition point: ____ GPM @ ____' TDH.

JOCKEY CONTROLLER

The jockey controller shall be a Nema 2, controller complete with a fusible disconnect, H-O-A selector switch, overload relay, mercoid pressure switch and minimum run timer.

VALVES

PROVIDE:

- (1) ____ " UL/FM OS&Y suction flanged gate valve with tamper switch.
- (1) ____ " UL/FM Discharge wafer butterfly valve with tamper switch.
- (1) ____ " UL/FM Discharge wafer style check valve.

ACCESSORIES (CHOOSE OPTIONS REQUIRED)

- (1) ____ “ hose valve header with ____ (qty) 1 _” NPT thread hose valves, caps and chains complete piping, drain valve, and (1) UL/FM isolation wafer, butterfly valve (Note: Hose valve header, supplied for remote installation).
- (1) UL/FM flowmeter with piping from discharge back to suction complete with (2) UL/FM isolation wafer style butterfly valves with tamper switches.
- (1) Line size city bypass including: piping, (1) UL/FM wafer check valve and (2) UL/FM wafer style butterfly isolation valves with tamper switches.

PRE-FABRICATED ENVIRONMENTAL ENCLOSURES**GENERAL**

Provide as part of the packaged system, a completely pre-fabricated environmental enclosure, including, but not limited to: size: 10'-8" W x ____ 'L x 11'-3" H +/-.

Buildings of smaller size will not be considered

PANEL CONSTRUCTION

Insulated panels shall be fabricated with metal pans adhered securely to interior and exterior of panel to compose tough resilient, shock-resisting surface. All panels shall exhibit 100% urethane poured-in-place, exclusive of metal pans, perimeter bracing and metal fasteners. Perimeter bracing shall be #2 grade, SPF specie wood, tongue-and-grooved for proper alignment and positive sealing. Overall coefficient of heat transfer (“U” factor) shall not exceed 0.029, R30 for 3-1/2” thick panels and R-42 for 5” thick panels. Nominal panel dimensions shall be fabricated as required. Standard panel width shall be R-foot (nominal). All perimeter bracketing shall be chemically pressure treated.

FINISH

Metal finishes shall provide optimum protection plus superior resistance to chemical corrosion and ultraviolet (UV) radiation. Finishes shall maintain complete adhesion to foam insulation. Finishes for both interior and exterior shall be one or combination of following:

- Galvanized steel
- White (polyester) stucco embossed 24 gauge
- Sand tan (polyester) stucco embossed 24 gauge (standard)

PANEL FASTENERS

Provide factory installed cam-lock fasteners. Each cam-lock fastener shall provide a tight and positive seal. Fastener material shall be steel housing, hook and pin with high pressure die-cast zinc cam. Hardened steel hexagonal wrench is used to tighten panel fasteners. The hook of the fastener shall engage over the pin when rotating the wrench and with cam-action, draw the panels tightly together. Opaque white, gray or tank polyethylene snap-in caps cover the wrench hole borings.

PANEL GASKETS

Each joint shall exhibit a polyvinylchloride (PVC) serrated bulb type, double lined, compression gasket to eliminate water vapor permeability. All gaskets are factory installed and require no additional handling. Gaskets shall be resistant to chemical corrosion and ultraviolet radiation. Gasket operating temperature shall be -34° C to 71° C (-30° F to 160° F).

INSULATION

Insulation shall be thermosetting type polyurethane polymer rigid foam and produced by the reaction of polyisocyanurates with polyether-based resins. Insulation shall be 3 1/2 " or 5" thick form, 2.0 lbs. per cubic foot. Density (poured-in-place, not frothed) according to ASTM C303. The thermal conductivity initial "K" factor shall be 0.118 BTU per house (square foot) (degrees Fahrenheit per inch) according to ASTM C518. Insulation shall remain stable within operating temperature -68° to 121° C (-90° to 250°F).

METAL COMMERCIAL DOORS

Door shall be seamless, constructed of two face sheets of 18 gauge cold rolled steel, stretcher-leveled quality or flatness. Vertical edges of doors shall have neat hemmed edge. Seam mechanically interlocked for maximum structural integrity. All hinge reinforcements shall be of 8 gauge steel projection welded to door.

Standard frames shall be 16-gauge cold rolled steel. Frames shall be mitered, face welded and ground smooth. All hinge reinforcements shall be of 8 gauge steel projection welded to frames. Reinforcements for strike and surface shall be furnished with factory installed rubber mutes, three per strike jamb. All frames shall be factory installed into the wall panels (door section).

Doors and frames shall be painted as specified. Door hardware including pinned butt hinges with individual latch set and various accessories, if required, for both interior and exterior doors as follows:

- (1) 6' x 7' double leaf metal commercial door
- (2) Hinges: 1 _ pair (per door), 4 _" x 4 _", brush chrome finish (U.S. 26D)
- (3) Passage latch set: Cylindrical, brushed chrome finish (U.S. 26D)
- (4) Head bolt: 6" long with 24" chain, cadmium finish
- (5) Foot bolt: 6" long with cadmium finish
- (6) Weather-stripping: vinyl in an aluminum frame
- (7) Threshold: aluminum

U. L. LISTED

Classified insulated panels by Underwriter's Laboratories, standard testing for surface burning characteristics of building materials (UL-723).

CAULKING & SEALANTS

Insulated panels shall be set on galvanized "Z" base trim with non-drying butyl caulking. All openings and penetrations through insulated panels shall be sealed with silicone sealant, clean and degrease applicable surfaces.

ROOF SYSTEM

A prefabricated roof system shall be provided for the enclosure to provide a waterproof and ultraviolet-proof covering for insulated ceiling panels. Roof system shall be galvanized standing seam, 22 gauge, 16 inches wide, sheet metal over ceiling panels with a slope of _" per foot. Fasteners shall be corrosion resistant rubber washered TEK screws with length and strength required for metal to be fastened.

INSTALLED ACCESSORIES

- (1 set) 6' x 7' double doors
- (1) _____/3/60 load center
- (1) Mini-power zone with 7 _ KVA transformer and circuit breakers
- (1) Unit heater with thermostat: 5KW, 480/3/60
- (1) Exhaust fan with thermostat 120/1/60
- (2) Powered louvers (powered close/spring open)
- (1) Exterior mounted light with photo cell
- (3) 40 watt fluorescent light fixtures and bulbs
- (2) GFCI convenience outlets 120/1/60
- (1) Battery powered emergency light

INSTALLED ACCESSORIES - cont

- (*) Muffler piping and bracket (shipped loose for contractor install)
- (*) Wall penetration sleeves as required
- (1) Pump house sprinkler system
- (1) 4" Diameter floor drain piped to skid edge
- (*) Cooling loop piping to drain
- (*) Gland pockets piped to drain

FACTORY FABRICATION

- (1) 10" open rectangular perimeter open floor design skid base, complete with all necessary sensing lines, pipe supports, wiring for complete package system. All welding to be done by ASME Code Section 9 certified welders.

FACTORY FABRICATION

- (1) Ten-inch (10") open rectangular perimeter open floor design skid base, complete with all necessary sensing lines, pipe supports, wiring for complete package system. All welding to be done by ASME Code Section 9 certified welders.

System shall have seismic calculations with California P.E. stamp for zone and requirements.

THIRD PARTY REQUIREMENTS

- All equipment supplied and complete installation in accordance with NFPA #20 and/or (UL443) (ULC443) (Factory Mutual Approval Standard #1311).
- The package shall be ETL/C-ETL listed as a system for its intended use, so meeting OSHA Federal Regulations 29CFR1910.303 and .399 as well as NFPA Pamphlet #70 (National Electric Code) Article 90.7, City of Los Angeles Approval Code, CMR248 Massachusetts State Plumbing Code Approval.

FACTORY TEST

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STARTUP

The factory authorized local representative shall provide startup and acceptance testing in accordance with NFPA requirements.

WARRANTY

Each Tigerflow system is warranty-protected from failure due to defects in material and workmanship for a period of eighteen (18) months from date of shipment or twelve (12) months from date of startup, whichever occurs first.

SUBMITTALS & INSURANCE CERTIFICATIONS

Submittals shall be in accordance with requirements of general specifications. Submit 6 copies to the engineer for approval. All submittals must include the following:

- Complete shop drawings & complete wiring diagrams. All drawings must be AutoCAD release 2000 complete with full mechanical desktop 3-D drawings in both hardcopy and disk format. Complete operating and maintenance instructions.
- Furnish written certification of the manufacturer's listing with Underwriters Laboratories as an approved manufacturer of control panels.
- Furnish written certification that the manufacturer is listed by E0TL/C-ETL as an approved manufacturer of factory assembled pumping systems.
- A complete, easily readable functional description of the proposed equipment.
- Upon completion of the installation, the results of the field and acceptance tests as specified under this section of the specification shall be submitted to the engineer.
- Furnish written certification from the manufacturer's representative of the proper installation of station.
- Provide written certification that the pump system is manufactured by a nationally recognized manufacturer of packaged pump systems and signed by a corporate officer.
- Operation and Maintenance manuals – submit complete operations and maintenance information for this specific equipment. These manuals shall be

reviewed by the engineer for completeness. They shall include complete parts list including manufacturer's reference and ordering numbers. Manuals shall include manufacturer's name, address and phone number, the local representative's name, address and phone number, the model number and serial number of system.

- The manufacturer shall submit a certificate of product liability insurance for no less than one million dollars (\$1,000,000).

QUALITY ASSURANCE

- All equipment under this section shall be furnished by a single supplier and shall be products that the manufacturer regularly engages in. The supplier shall have sole responsibility for proper functioning of the system and equipment supplied.
- Equipment shall be manufacturer's standard products presently in commercial production.
- The manufacturer shall have in place a quality assurance program to assure the quality of material furnished.

QUALIFICATIONS

- The manufacturer shall have a minimum of ten years manufacturing and application experience.
- Upon request from the engineer, the pump station manufacturer shall demonstrate proof of financial responsibility with respect to performance and delivery date.
- Upon request from the engineer, the pump station manufacturer shall provide proof or evidence of facilities, equipment and skills required to produce the equipment specified herein.

**DATE:****PROJECT:****ENGINEER:****REP:**

**SPECIFICATION FOR ENGINE DRIVEN HORIZONTAL
SPLITCASE FIRE PUMP SYSTEM WITH PREFABRICATED
ENVIRONMENTAL ENCLOSURE**

FURNISH AND INSTALL A **TIGERFLOW SERIES FPS-7000-PEC, ETL/C-ETL**, LISTED ENGINEERED **PACKAGED PUMP SYSTEM** COMPLETE WITH PRE-FABRICATED ENVIRONMENTAL ENCLOSURE. THE SYSTEM SHALL BE RATED FOR A FLOW OF ____ GPM AT A SYSTEM PRESSURE OF ____ PSIG INCLUDING A SUCTION PRESSURE OF ____ PSIG MINIMUM, ____ PSIG MAXIMUM

FIRE PUMP

The pump shall be a model _____, size _____ (Underwriters Laboratories Listed) (Underwriters Laboratories of Canada Listed) (Factory Mutual Approved) horizontal split case fire pump. Unit shall include a pump, base, coupling, coupling guard, engine drive, necessary fittings and automatic engine controller. The pump(s) shall be rated for ____ GPM at ____ PSI. Units shall be designed to deliver not less than 150% of rated capacity and 65% of rated head. Maximum permissible pump speed shall not exceed ____ RPM.

PUMP CONSTRUCTION

Pump shall be of the double suction horizontal split case design, with class 30 cast iron casing, bronze casing wearing rings, bronze impeller, high quality steel shaft with renewable bronze shaft sleeves through the packing boxes and grease lubricated cartridge type anti-friction bearings. The packing box glands shall be of the bronze split type. Pump shall be hydrostatically tested to 1 _ times the maximum working pressure but in no case less than 250 PSI. Pump accessories shall include 3 _" diameter suction and discharge gauges, and automatic air release valve.

ENGINE

Diesel engine shall be equal to model _____ rated at 300 feet above sea level and 77 degrees F and shall be (Underwriters Laboratories Listed) (Factory mutual approved). Each engine shall be provided with electric starting equipment, a charging alternator and a factory installed heat exchanger cooling system with required strainers, a pressure gauge, a pressure reducing valve, a solenoid valve and bypass line with the inlet piped to the pump discharge. Each engine shall be furnished with lead-acid heavy duty starting batteries, battery rack and cables, a flexible exhaust connector and residential type silencer. Furnish each engine with a jacket water heater.

CONTROLLER

The diesel engine controller shall be arranged to start the fire pump engine automatically on loss of system pressure with (Automatic stop) (Manual stop). (For sprinkler or standpipe systems where an automatically controlled pumping unit constitutes the sole supply, the controller shall be wired for manual shutdown. Manual shutdown shall also be provided where required by the authority having jurisdiction). An automatic weekly test timer shall also be standard. The controller shall be furnished with a built-in batter charger capable of restoring the batteries from a fully discharged condition to a fully charged condition within twenty-four (24) hours.

FUEL SYSTEM

Furnish an above ground dual wall fuel tank with a ____ gallon capacity, equal to one gallon per horsepower plus 5% volume for expansion and 5% volume for sump. Furnish the tank with an indicating fuel level gauge.

JOCKEY PUMP

The jockey pump shall be cast iron, stainless steel fitted, mechanical seal, vertical multi-stage centrifugal pump rigid-coupled to a ____ HP, ____ RPM, ____ Volts, 3 Phase, 60 Hertz motor. Condition point: ____ GPM @ ____" TDH.

JOCKEY CONTROLLER

The jockey controller shall be a NEMA 2, controller complete with a fusible disconnect, H-O-A selector switch, overload relay, Mercoild pressure switch and minimum run timer.

VALVES**PROVIDE:**

- (1) ____" UL/FM OS&Y Suction flanged gate valve with tamper switch.
- (1) ____" UL/FM Discharge wafer butterfly valve with tamper switch.
- (1) ____" UL/FM Discharge wafer style check valve.
- (1) ____" UL/FM Main relief valve, ____ waste cone and piping thru wall

ACCESSORIES

- (1) ____" hose valve header with ____ (qty) 2 ____" NPT thread hose valves, caps and chains complete piping, drain valve, and (1) UL/FM Isolation wafer, butterfly valve (Note: hose valve header, supplied for remote installation).
- (1) ____" UL/FM flowmeter with piping from discharge back to suction complete with (2) UL/FM isolation wafer style butterfly valves with tamper switches.
- (1) ____" Line size city bypass including: piping, (1) UL/FM wafer check valve and (2) UL/FM wafer style butterfly isolation valves with tamper switches.
- (1) 4" Fire department connection with 4" UL/FM wafer style check valve, 4" FDC and piping.
- (1) Suction side mounted ____" Watts 774DCDA UL/FM backflow preventer with (2) UL/FM OS&Y valves, tamper switches, GPM meter.
- ____" Globe pattern UL/FM suction control valve, discharge mounted sensing line back to suction.

PRE-FABRICATED ENVIRONMENTAL ENCLOSURES**GENERAL**

Provide as part of the packaged system, a completely pre-fabricated environmental enclosure, including, but not limited to: size: 10'-8" W x ____' L x 11'-3" H +/- **Buildings of smaller size will not be considered**

PANEL CONSTRUCTION

Insulated panels shall be fabricated with metal pans adhered securely to interior and exterior of panel to compose tough resilient, shock-resisting surface. All panels shall exhibit 100% urethane poured-in-place, exclusive of metal pans, perimeter bracing and metal fasteners. Perimeter bracing shall be #2 grade, SPF specie wood, tongue-and-grooved for proper alignment and positive sealing. Overall coefficient of heat transfer ("U" factor) shall not exceed 0.029, R30 for 3-1/2" thick panels and R-42 for 5" thick panels. Nominal panel dimensions

shall be fabricated as required. Standard panel width shall be R-foot (nominal). All perimeter bracketing shall be chemically pressure treated.

FINISH

Metal finishes shall provide optimum protection plus superior resistance to chemical corrosion and ultraviolet (UV) radiation. Finishes shall maintain complete adhesion to foam insulation. Finishes for both interior and exterior shall be one or combination of following:

- Galvanized steel
- White (polyester) stucco embossed 24 gauge
- Sand tan (polyester) stucco embossed 24 gauge (standard)

PANEL FASTENERS

Provide factory installed cam-lock fasteners. Each cam-lock fastener shall provide a tight and positive seal. Fastener material shall be steel housing, hook and pin with high pressure die-cast zinc cam. Hardened steel hexagonal wrench is used to tighten panel fasteners. The hook of the fastener shall engage over the pin when rotating the wrench and with cam-action, draw the panels tightly together. Opaque white, gray or tank polyethylene snap-in caps cover the wrench hole borings.

PANEL GASKETS

Each joint shall exhibit a polyvinylchloride (PVC) serrated bulb type, double lined, compression gasket to eliminate water vapor permeability. All gaskets are factory installed and require no additional handling. Gaskets shall be resistant to chemical corrosion and ultraviolet radiation. Gasket operating temperature shall be -34° C to 71° C (-30° F to 160° F).

INSULATION

Insulation shall be thermosetting type polyurethane polymer rigid foam and produced by the reaction of polyisocyanurates with polyether-based resins. Insulation shall be 3 1/2" or 5" thick form, 2.0 lbs. per cubic foot. Density (poured-in-place, not frothed) according to ASTM C303. The thermal conductivity initial "K" factor shall be 0.118 BTU per house (square foot) (degrees Fahrenheit per inch) according to ASTM C518. Insulation shall remain stable within operating temperature -68° to 121° C (-90° to 250°F).

METAL COMMERCIAL DOORS

Door shall be seamless, constructed of two face sheets of 18 gauge cold rolled steel, stretcher-leveled quality or flatness. Vertical edges of doors shall have neat hemmed edge. Seam mechanically interlocked for maximum structural integrity. All hinge reinforcements shall be of 8 gauge steel projection welded to door.

Standard frames shall be 16-gauge cold rolled steel. Frames shall be mitered, face welded and ground smooth. All hinge reinforcements shall be of 8 gauge steel projection welded to frames. Reinforcements for strike and surface shall be furnished with factory installed rubber mutes, three per strike jamb. All frames shall be factory installed into the wall panels (door section).

Doors and frames shall be painted as specified. Door hardware including pinned butt hinges with individual latch set and various accessories, if required, for both interior and exterior doors as follows:

- (1) 6' x 7' double leaf metal commercial door
- (2) Hinges: 1 _ pair (per door), 4 _" x 4 _", brush chrome finish (U.S. 26D)
- (3) Passage latch set: Cylindrical, brushed chrome finish (U.S. 26D)
- (4) Head bolt: 6" long with 24" chain, cadmium finish
- (5) Foot bolt: 6" long with cadmium finish
- (6) Weather-stripping: vinyl in an aluminum frame
- (7) Threshold: aluminum

U. L. LISTED

Classified insulated panels by Underwriter's Laboratories, standard testing for surface burning characteristics of building materials (UL-723).

CAULKING & SEALANTS

Insulated panels shall be set on galvanized "Z" base trim with non-drying butyl caulking. All openings and penetrations through insulated panels shall be sealed with silicone sealant, clean and degrease applicable surfaces.

ROOF SYSTEM

A prefabricated roof system shall be provided for the enclosure to provide a waterproof and ultraviolet-proof covering for insulated ceiling panels. Roof system shall be galvanized standing seam, 22 gauge, 16 inches wide, sheet metal over ceiling panels with a slope of _" per foot. Fasteners shall be corrosion resistant rubber washered TEK screws with length and strength required for metal to be fastened.

INSTALLED ACCESSORIES

- (1 set) 6' x 7' double doors
- (1) _____/3/60 load center
- (1) Mini-power zone with 7 _ KVA transformer and circuit breakers
- (1) Unit heater with thermostat: 5KW, 480/3/60
- (1) Exhaust fan with thermostat 120/1/60
- (2) Powered louvers (powered close/spring open)
- (1) Exterior mounted light with photo cell
- (3) 40 watt fluorescent light fixtures and bulbs
- (2) GFCI convenience outlets 120/1/60

- (1) Battery powered emergency light (option)
- (* Muffler piping and bracket (shipped loose for contractor install)
- (* Wall penetration sleeves as required)
- (1) Pump house sprinkler system
- (1) 4" Diameter floor drain piped to skid edge (option)
- (* Cooling loop piping to drain)
- (* Gland pockets piped to drain)

FACTORY FABRICATION

- (1) 10" open rectangular perimeter open floor design skid base, complete with all necessary sensing lines, pipe supports, wiring for complete package system. All welding to be done by ASME Code Section 9 certified welders.

THIRD PARTY REQUIREMENTS

- All equipment supplied and complete installation in accordance with NFPA #20 and/or (UL443) (ULC443) (Factory Mutual Approved Standard #1311).
- The package shall be UL/C-UL listed as a system for its intended use, so meeting OSHA Federal Regulations 29CFR1910.303 and .399 as well as NFPA Pamphlet #70 (National Electric Code) Article 90.7, City of Los Angeles Approved Code, CMR248 Massachusetts State Plumbing Code Approved.
- Seismic Zone 4 calculations with State of Washington P.E. Stamp
- State of Washington P.E. Stamp on enclosures and system
- State of Washington Industrial Building Inspection, approval and state label. NOTE: Must be inspected, approved and label applied before system may ship into the State of Washington.

FACTORY TEST

The package shall be electrically and hydrostatically tested per NFPA requirements before shipment.

STARTUP

The factory authorized local representative shall provide startup and acceptance testing in accordance with NFPA requirements.

WARRANTY

Each Tigerflow system is warranty-protected from failure due to defects in material and workmanship for a period of eighteen (18) months from date of shipment or twelve (12) months from date of startup, whichever occurs first.

SUBMITTALS & INSURANCE CERTIFICATIONS

Submittals shall be in accordance with requirements of general specifications. Submit 6 copies to the engineer for approval. All submittals must include the following:

- Complete shop drawings and complete wiring diagrams. All drawings must be AUTOCADD Release 2000; complete with full mechanical Desk Top 3-D drawings in both hardcopy and disk format. Complete operating and maintenance instructions.
- Furnish written certification of the manufacturers listing with Underwriters Laboratories as an approved manufacturer of control panels.
- Furnish written certification that the manufacturer is listed by UL/C-UL as an approved manufacturer of factory assembled pumping systems.
- A complete, easily readable functional description of the proposed equipment.
- Upon completion of the installation, the results of the field and acceptance tests as specified under this section of the specification shall be submitted to the engineer.
- Furnished written certification from the manufacturer's representative of the proper installation of the station.
- Provide written certification that, a nationally recognized manufacturer of package pump systems, manufactures the pump system. A corporate officer must sign this certification.
- Operation and maintenance manuals:
Submit complete operations and maintenance information for this specific equipment. The engineer shall review these manuals for completeness. They shall include complete parts list including manufacturer's reference and ordering number, the local representative name, address and phone number, the model and serial number of the system.
- The manufacturers shall submit a certificate of product liability insurance for no less than one million dollars (\$1,000,000)

QUALITY ASSURANCE

- All equipment under this section shall be furnished by a single supplier and shall be products that the manufacturer regularly engages in. The supplier shall have sole responsibility for proper functioning of the system and equipment supplied.
- Equipment shall be a manufacturer's standard product presently in commercial production.
- The manufacturer shall have in place a quality assurance program to assure the quality of the material furnished.

QUALIFICATIONS

- The manufacturer shall have a minimum of ten years manufacturing and application experience.
- Upon request from the engineer, the pump station manufacturer shall demonstrate proof of financial responsibility with respect to performance and delivery date.
- Upon request from the engineer, the pump station manufacturer shall provide proof or evidence of facilities, equipment and skills required to produce the equipment specified herein.



DATE:

PROJECT:

ENGINEER:

REP:

**SPECIFICATION FOR ELECTRIC DRIVEN
VERTICAL TURBINE FIRE PUMP SYSTEM with
PRE-FABRICATED ENVIRONMENTAL ENCLOSURE**

Furnish and install a **TIGERFLOW** Series FPS-7000-VTP-PEC, ETL/C-ETL listed engineered packaged pump system complete with pre-fabricated environmental enclosure. The system shall be rated for a flow of ____GPM at a system pressure of ____PSIG.

FIRE PUMP

The pump shall be a ____ Model_____, _____ Stage, Underwriters Laboratories Listed water lubricated vertical turbine fire pump. Each unit shall include a bowl, assembly, strainer, column and shaft, surface discharge head, vertical hollow shaft electrical motor, automatic air release valve, discharge pressure gauge, and automatic motor controller.

CONDITIONS OF SERVICE

The pump shall be rated for ____GPM @ ____ PSI at the discharge head centerline. The maximum lift below distance from the discharge head centerline to the minimum low water level will not exceed ____ feet. The distance from the top of the pump mounting pad to the bottom of the pump or reservoir shall be ____ feet. The unit will be installed at ____ feet elevation about sea level with a maximum ambient temperature of ____ degrees F.

PUMP CONSTRUCTION

DISCHARGE HEAD

The discharge head shall be class 30 cast iron with a separate cast iron foundation plate, and shall be furnished with a grease lubricated packing box and ANSI (125#) (250#) standard discharge flange. To prevent damage to the shaft when installing or removing

the motor, a separate motor shaft shall be furnished and shall be connected to the head shaft at a point above the packing box with a threaded coupling. The head shaft shall be furnished with a stainless steel sleeve where it passes through the packing box. The discharge head shall be provided with a _____” NPT tap for packing box drainage. The discharge head shall be hydrostatically tested 1 _ times the maximum working pressure but in no case less than 240 PSI.

COLUMN PIPE

Pump column pipe shall be furnished in section not exceeding 10 feet length with straight threads and sleeve type couplings. Pipe weights shall be not less than specified in NFPA #20.

LINESHAFT

Open, water lubricated construction shall be used where the distance from the discharge head to the static water level does not exceed 50 feet. Line shaft shall be furnished in sections not exceeding 10 feet in length. Line shaft shall be SAE 1045 steel of adequate size to transmit the horsepower and thrust required and shall have renewable shaft sleeves. The line shaft shall run in neoprene bearings housed in bronze bearing retainers.

BOWL ASSEMBLY

The pump bowls shall be class 30 cast iron with bronze bowl wearing rings, bronze enclosed impellers and steel impeller lock collects. The pump shaft shall be 416 stainless steel supported by bronze bowl bearings. The bowl assembly shall be hydrostatically tested to 1-PSI. The bowl assembly shall be performance tested and certified performance curves supplied.

STRAINER

A bronze basket strainer with a free area of at least 4 times the suction area and with openings to restrict the passage of a _” sphere shall also be supplied

ELECTRIC MOTOR

Electric motor(s) shall be of the weather protected type 1, Vertical hollow shaft design with non-reverse ratchet and 1.15 service factor, and wound for ____ Phase, _____ Hertz, _____ Volts. Motor(s) shall be of the (across-the-line) (Part-winding) (Wye-Delta) type starting and sized so as not to exceed the permissible loading limits of NFPA #20 (or factory mutual loss prevention data sheet 3-7N) at any point on the pump performance curve motor(s) shall be provided with thrust bearings having an average life of 5 years

continuous operation and capable of sustaining the maximum pump down thrust.
Maximum motor horsepower shall not exceed _____ HP

ACCESSORIES

Furnish each pump with the following fittings or accessories:

1. 3 _” Dial discharge pressure gauge
2. Minimum 1 _” automatic air and vacuum release valve
3. Pressure recorder as required by factory mutual and NFPA #20, common to all pumps.
4. Water level testing device common to all pumps.

CONTROLLER

The electric motor controller shall be ETL/C-ETL/FM labeled and arranged to start with (automatic stop) (manual stop). (For sprinkler or standpipe systems where an automatically controller pumping unit constitutes the sole supply, the controller shall be wired for manual shutdown. Manual shutdown shall also be provided where required by the authority having jurisdiction). It shall be supplied with a circuit breaker rated not less than _____ AIC at ___ phase, ___ hertz, ___ volts.(automatic transfer) (stand-by generator service) (secondary utility service).

The magnetic starting contractor shall be of the (choose one):

1. Across-the-line type.
2. Reduced voltage primary resistor type.
3. Reduced voltage primary reactor type.
4. Part winding start type.
5. Wye-Delta start type.
6. Autotransformer type.
7. Solid state soft start type.

JOCKEY PUMP

The jockey pump shall be cast iron, stainless steel fitted, mechanical seal, vertical multi-stage centrifugal pump rigid-coupled to a _____ HP, _____ RPM, _____ Volts, _____Phase, _____ Hertz motor. Condition point: _____ GPM @ _____’ TDH. (Suction from city water source)

JOCKEY CONTROLLER

The jockey controller shall be a NEMA 2, controller complete with a fusible disconnect, H-O-A selector switch, overload relay, mercoid pressure switch and minimum run timer.

VALVES

PROVIDE:

- (1) ____ “ UL/FM Discharge wafer butterfly valve with tamper switch.
- (1) ____ “ UL/FM Discharge wafer style check valve.

ACCESSORIES (CHOOSE OPTIONS REQUIRED)

- (1) ____ “ hose valve header with ____ (qty) 2 _” NPT thread hose valves, caps and chains complete piping, drain valve, and (1) UL/FM isolation wafer, butterfly valve (Note: Hose valve header, supplied for remote installation).
- (1) UL/FM flowmeter with piping from discharge back to suction (well) complete with (2) UL/FM isolation wafer style butterfly valves with tamper switches.

GENERAL

Provide as part of the packaged system, a completely pre-fabricated environmental enclosure including but not limited to: Size: _____ wide x _____ long x _____ high.

PANEL CONSTRUCTION

Insulated panels shall be fabricated with metal pans adhered securely to interior and exterior of panel to compose tough resilient, shock-resisting surface. All panels shall exhibit 100% urethane poured-in-place, exclusive of metal pans, perimeter bracing and metal fasteners. Perimeter bracing shall be #2 grade, SPF specie wood, tongue-and-grooved for proper alignment and positive sealing. Overall coefficient of heat transfer (“U” factor) shall not exceed 0.029, R30 for 3-1/2” thick panels and R-42 for 5” thick panels. Nominal panel dimensions shall be fabricated as required. Standard panel width shall be R-foot (nominal). All perimeter bracketing shall be chemically pressure treated.

FINISH

Metal finishes shall provide optimum protection plus superior resistance to chemical corrosion and ultraviolet (UV) radiation. Finishes shall maintain complete adhesion to foam insulation. Finishes for both interior and exterior shall be one or combination of following:

- Galvanized steel
- White (polyester) stucco embossed 24 gauge
- Sand tan (polyester) stucco embossed 24 gauge (standard)

PANEL FASTENERS

Provide factory installed cam-lock fasteners. Each cam-lock fastener shall provide a tight and positive seal. Fastener material shall be steel housing, hook and pin with high pressure die-cast zinc cam. Hardened steel hexagonal wrench is used to tighten panel fasteners. The hook of the fastener shall engage over the pin when rotating the wrench and with cam-action, draw the panels tightly together. Opaque white, gray or tank polyethylene snap-in caps cover the wrench hole borings.

PANEL GASKETS

Each joint shall exhibit a polyvinylchloride (PVC) serrated bulb type, double lined, compression gasket to eliminate water vapor permeability. All gaskets are factory installed and require no additional handling. Gaskets shall be resistant to chemical corrosion and ultraviolet radiation. Gasket operating temperature shall be -34° C to 71° C (-30° F to 160° F).

INSULATION

Insulation shall be thermosetting type polyurethane polymer rigid foam and produced by the reaction of polyisocyanurates with polyether-based resins. Insulation shall be 3 1/2 " or 5" thick form, 2.0 lbs. per cubic foot. Density (poured-in-place, not frothed) according to ASTM C303. The thermal conductivity initial "K" factor shall be 0.118 BTU per house (square foot) (degrees Fahrenheit per inch) according to ASTM C518. Insulation shall remain stable within operating temperature -68° to 121° C (-90° to 250°F).

METAL COMMERCIAL DOORS

Door shall be seamless, constructed of two face sheets of 18 gauge cold rolled steel, stretcher-leveled quality or flatness. Vertical edges of doors shall have neat hemmed edge. Seam mechanically interlocked for maximum structural integrity. All hinge reinforcements shall be of 8 gauge steel projection welded to door.

Standard frames shall be 16-gauge cold rolled steel. Frames shall be mitered, face welded and ground smooth. All hinge reinforcements shall be of 8 gauge steel projection welded to frames. Reinforcements for strike and surface shall be furnished with factory installed rubber mutes, three per strike jamb. All frames shall be factory installed into the wall panels (door section).

Doors and frames shall be painted as specified. Door hardware including pinned butt hinges with individual latch set and various accessories, if required, for both interior and exterior doors as follows:

- (1) 6' x 7' double leaf metal commercial door
- (2) Hinges: 1 _ pair (per door), 4 _ " x 4 _ ", brush chrome finish (U.S. 26D)

- (3) Passage latch set: Cylindrical, brushed chrome finish (U.S. 26D)
- (4) Head bolt: 6" long with 24" chain, cadmium finish
- (5) Foot bolt: 6" long with cadmium finish
- (6) Weather-stripping: vinyl in an aluminum frame
- (7) Threshold: aluminum

U. L. LISTED

Classified insulated panels by Underwriter's Laboratories, standard testing for surface burning characteristics of building materials (UL-723).

CAULKING & SEALANTS

Insulated panels shall be set on galvanized "Z" base trim with non-drying butyl caulking. All openings and penetrations through insulated panels shall be sealed with silicone sealant, clean and degrease applicable surfaces.

ROOF SYSTEM

A prefabricated roof system shall be provided for the enclosure to provide a waterproof and ultraviolet-proof covering for insulated ceiling panels. Roof system shall be galvanized standing seam, 22 gauge, 16 inches wide, sheet metal over ceiling panels with a slope of _" per foot. Fasteners shall be corrosion resistant rubber washered TEK screws with length and strength required for metal to be fastened.

INSTALLED ACCESSORIES

- (1 set) Gutters and down spouts
- (1) 3 phase load center (panel board)
- (1) Mini-power zone with _____KVA transformer and circuit breakers
- (1) Unit heater with thermostat: ____KW unit
- (1) Exhaust fan with damper and thermostat
- (2) Louvers
- (1) Exterior mounted light with photo cell
- (3) Fluorescent light fixtures and bulbs
- (2) GFCI convenience outlets 120/1/60
- (*) Wall penetration sleeves as required
- (1) Pump house sprinkler system
- (1) Roof hatch

FACTORY FABRICATION

- (1) Provide each system as a complete package system on a 10" I-Beam structural steel mounting frame complete with all necessary sensing lines, pipe supports, wiring and hard copper sensing lines for complete package system. Unit shall be

factory primed and painted with a machine grade finish coat. All welding to be done by ASME Code Section 9 certified welders.

THIRD PARTY REQUIREMENTS

- All equipment supplied and complete installation in accordance with NFPA #20 and/or (UL443) (ULC443) (Factory Mutual Approval Standard #1311).
- The package shall be UL/C-UL listed as a system for its intended use, so meeting OSHA Federal Regulations 29CFR1910.303 and .399 as well as NFPA Pamphlet #70 (National Electric Code) Article 90.7, City of Los Angeles Approval Code, CMR248 Massachusetts State Plumbing Code Approval.

FACTORY TEST

The package shall be electrically and hydrostatically tested per NFPA requirements before shipment.

STARTUP

The factory authorized local representative shall provide startup and acceptance testing in accordance with NFPA requirements.

WARRANTY

Each Tigerflow system is warranty-protected from failure due to defects in material and workmanship for a period of eighteen (18) months from date of shipment or twelve (12) months from date of startup, whichever occurs first.

SUBMITTALS & INSURANCE CERTIFICATIONS

Submittals shall be in accordance with requirements of general specifications. Submit 6 copies to the engineer for approval. All submittals must include the following:

- Complete shop drawings & complete wiring diagrams. All drawings must be AutoCAD release 2000 complete with full mechanical desktop 3-D drawings in both hardcopy and disk format. Complete operating and maintenance instructions.
- Furnish written certification of the manufacturer's listing with Underwriters Laboratories as an approved manufacturer of control panels.
- Furnish written certification that the manufacturer is listed by E0TL/C-ETL as an approved manufacturer of factory assembled pumping systems.
- A complete, easily readable functional description of the proposed equipment.

- Upon completion of the installation, the results of the field and acceptance tests as specified under this section of the specification shall be submitted to the engineer.
- Furnish written certification from the manufacturer's representative of the proper installation of station.
- Provide written certification that the pump system is manufactured by a nationally recognized manufacturer of packaged pump systems and signed by a corporate officer.
- Operation and Maintenance manuals – submit complete operations and maintenance information for this specific equipment. These manuals shall be reviewed by the engineer for completeness. They shall include complete parts list including manufacturer's reference and ordering numbers. Manuals shall include manufacturer's name, address and phone number, the local representative's name, address and phone number, the model number and serial number of system.
- The manufacturer shall submit a certificate of product liability insurance for no less than one million dollars (\$1,000,000).

QUALITY ASSURANCE

- All equipment under this section shall be furnished by a single supplier and shall be products that the manufacturer regularly engages in. The supplier shall have sole responsibility for proper functioning of the system and equipment supplied.
- Equipment shall be manufacturer's standard products presently in commercial production.
- The manufacturer shall have in place a quality assurance program to assure the quality of material furnished.

QUALIFICATIONS

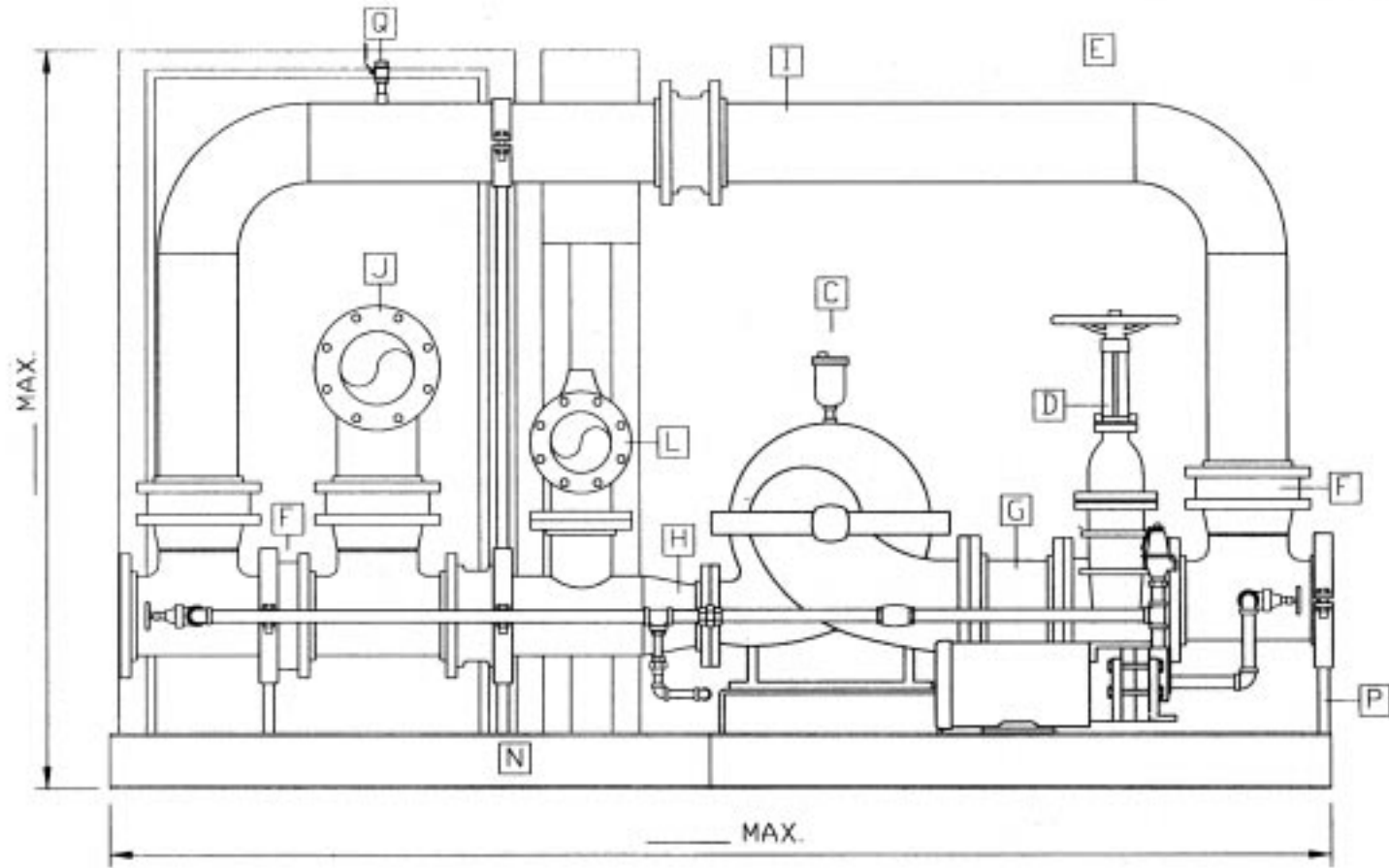
- The manufacturer shall have a minimum of ten years manufacturing and application experience.
- Upon request from the engineer, the pump station manufacturer shall demonstrate proof of financial responsibility with respect to performance and delivery date.
- Upon request from the engineer, the pump station manufacturer shall provide proof or evidence of facilities, equipment and skills required to produce the equipment specified herein.



FOR PRE-FABRICATED
ENVIRONMENTAL
ENCLOSURE
SPECIFICATION

SEE CUSTOM SECTION

SPECIFICATION NO. 12000.1

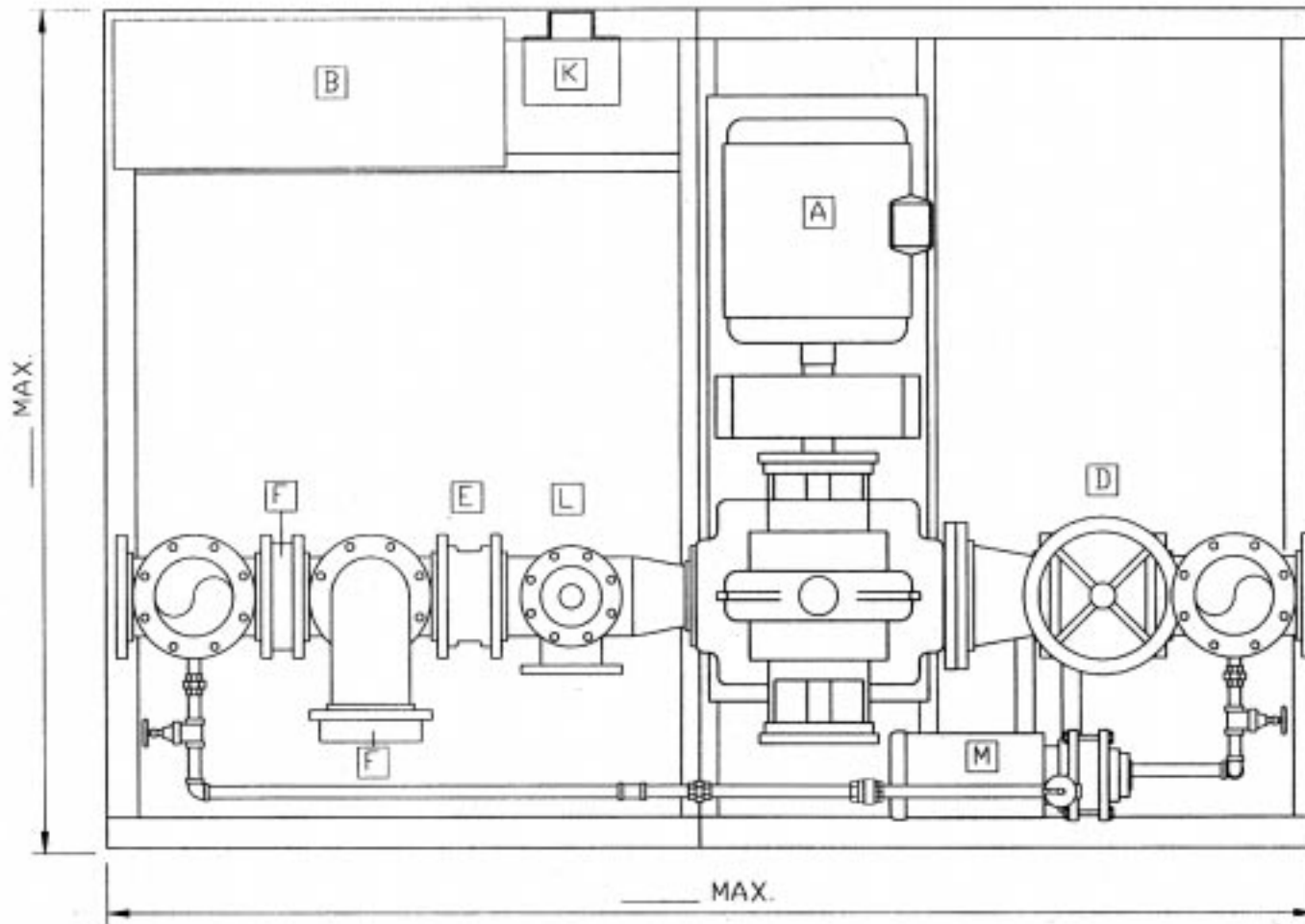


FRONT VIEW
NTS

MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____



DATE: _____
 SCALE: _____
 APPROVED: _____
 DRAWN BY: _____
 REVISION NO: _____



PLAN VIEW
NTS

MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____



DATE: _____
 SCALE: _____
 APPROVED: _____
 DRAWN BY: _____
 REVISION NO: _____

KEY

A	1	HSC FIRE PUMP	J	1	HOSE VALVE CONNECTION W/ HOSE VALVES
B	1	FIRE PUMP CONTROLLER	K	1	JOCKEY PUMP CONTROLLER
C	1	AUTOMATIC AIR RELEASE VALVE	L	1	RELIEF VALVE
D	1	OS&Y FLANGED GATE WITH TAMPER SWITCH	M	1	JOCKEY PUMP W/2 GATE VALES, 1 CHECK VALVE, PIPING & RELIEF VALVE
E	2	WAFER STYLE CHECK VALVE	N	1	I BEAM PERIMETER SKID
F	4	WAFER STYLE BUTTERFLY VALVES W/ TAMPER	O	1	C CHANNEL INTERIOR SKID MEMBERS
G	1	ECCENTRIC WELD REDUCER	P	3	PIPE SUPPORTS
H	1	CONCENTRIC WELD REDUCER	Q	1	AIR VENT
I	1	CITY WATER BYPASS			

Notes:

1. Dimensions are not for constructions purposes unless certified.
2. All dimensions are $\pm 1/2"$.
3. All dimensions are subject to change without notice.
4. Pipe supports not shown for clarity.
5. All welding done by ASME code section 9 certified welders.

TIGERFLOW Packaged Systems are third party U.L. labeled/C.U.L. labeled as a system to comply with OSHA federal regulations 29CFR1910.303, .399 and NEC #70 Article 90-7

MODEL #: _____

SYSTEM TYPE: _____

PROJECT NAME: _____

DESIGN FLOW: _____

DESIGN PRESSURE: _____



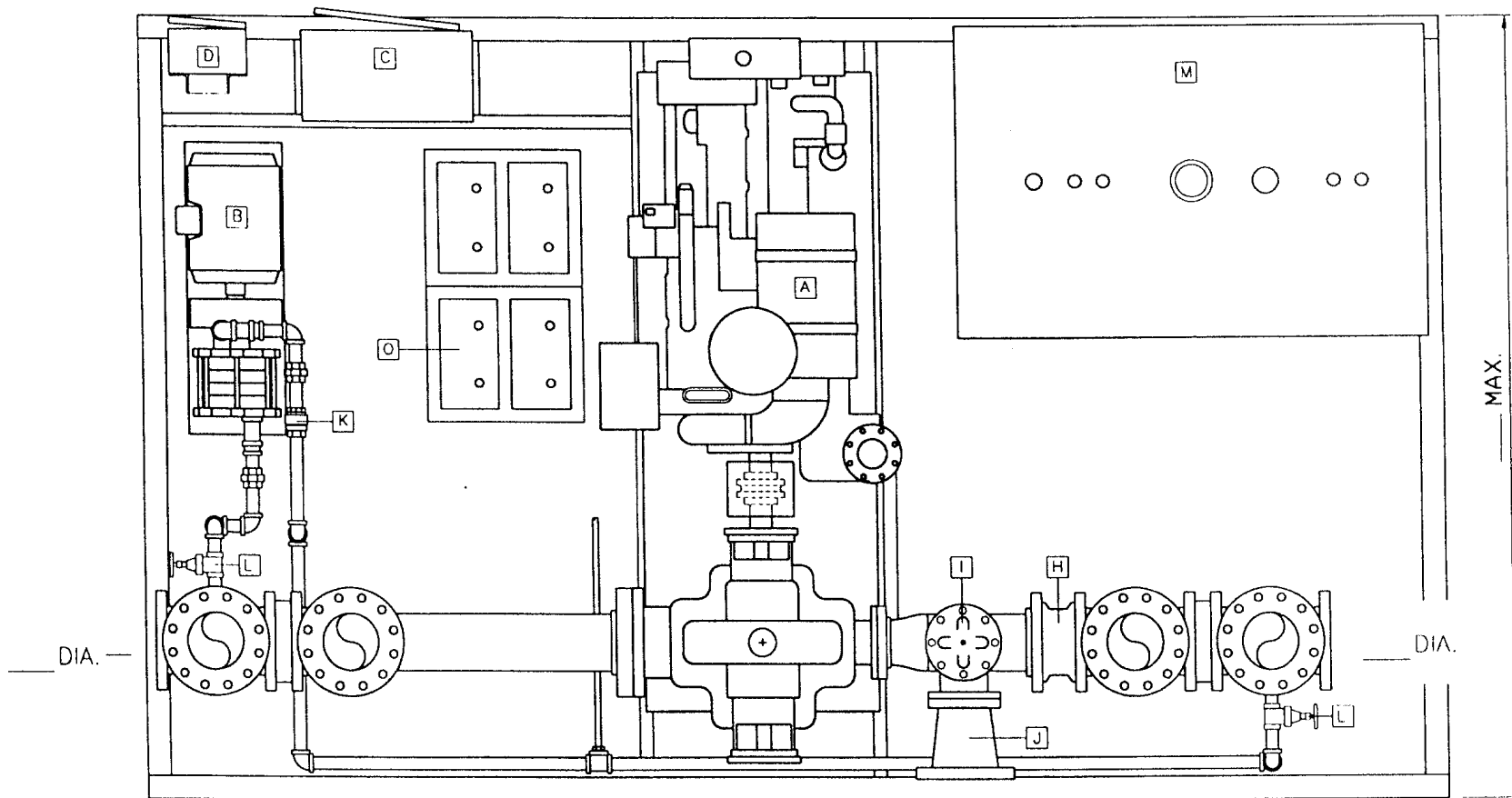
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SCALE: _____

APPROVED: _____

DRAWN BY: _____

REVISION NO: _____



PLAN VIEW

NOTES:

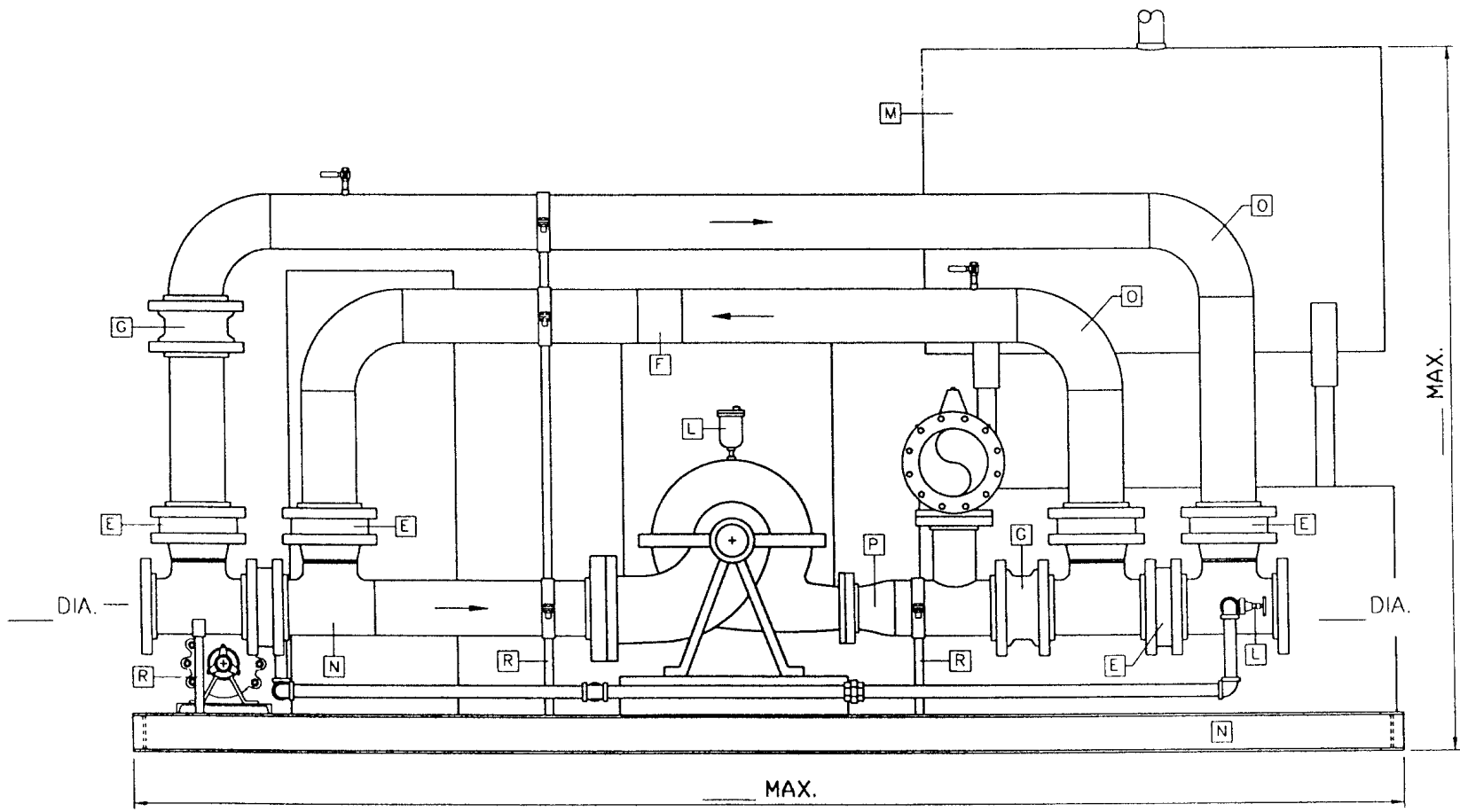
1. DIMENSIONS ARE NOT FOR CONSTRUCTION PURPOSES UNLESS CERTIFIED.
2. ALL DIMENSIONS ARE $\pm 1/2"$.
3. ALL DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.
4. PIPE SUPPORTS NOT SHOWN FOR CLARITY.
5. ALL WELDING DONE BY ASME CODE SECTION 9 CERTIFIED WELDERS.

TIGERFLOW PACKAGED SYSTEMS ARE THIRD PARTY UL LABELED/C.U.L. LABELED AS A SYSTEM TO COMPLY WITH OSHA FEDERAL REGULATIONS 29CFR1910.303, 399 AND NEC #70 ARTICLE 90-7.

MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____



DATE: _____
 SCALE: _____
 APPROVED: _____
 DRAWN BY: _____
 REVISION NO.: _____



ELEVATION

NOTES

- 1 DIMENSIONS ARE NOT FOR CONSTRUCTION PURPOSES UNLESS CERTIFIED.
- 2 ALL DIMENSIONS ARE $\pm 1/2'$.
- 3 ALL DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.
- 4 PIPE SUPPORTS NOT SHOWN FOR CLARITY.
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 DESIGN PRESSURE: _____



DATE: _____
 SCALE: _____
 APPROVED: _____
 DRAWN BY: _____
 REVISION NO.: _____

KEY

A 1 DIESEL DRIVEN FIRE PUMP
B 1 JOCKEY PUMP
C 1 FIRE PUMP CONTROLLER
D 1 JOCKEY PUMP CONTROLLER
E 6 BUTTERFLY VALVES
F 1 FLOW METER (BUTT WELD)

G 2 WAFER STYLE CHECK VALVES
H 1 MAIN RELIEF VALVE
I 1 WASTE CONE
J 1 CHECK VALVE
K 2 GATE VALVES
L 1 AIR RELEASE VALVE

M 1 FUEL TANK W/ SPILL BASIN
N 1 I BEAM STEEL SKID BASE
O 1 DUAL SET OF BATTERIES W/ RACK
P 1 CONC. WELD REDUCER
Q 4 WELD ELBOWS
R 4 PIPE SUPPORTS

NOTES:

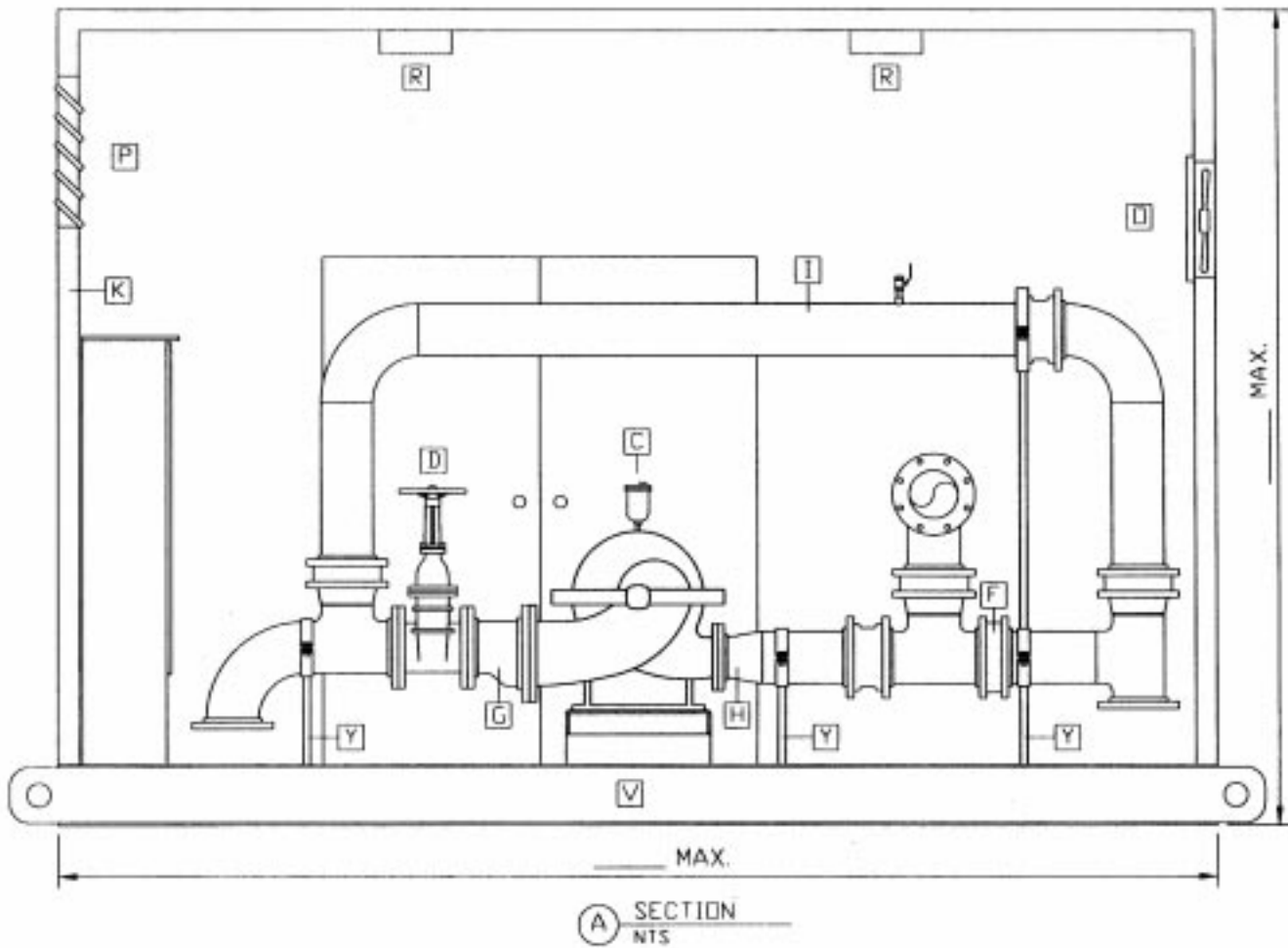
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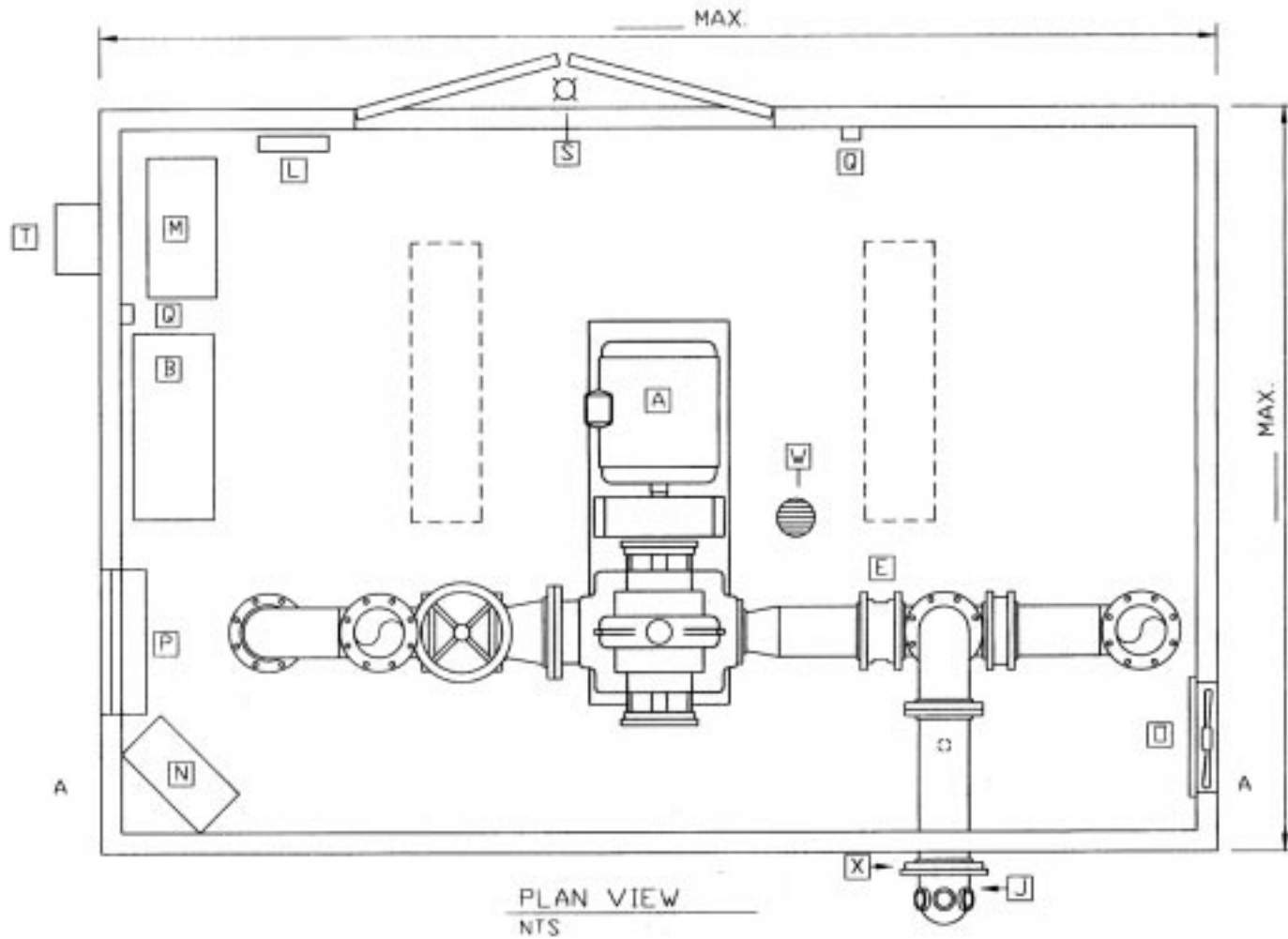
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APPROVED: _____
DRAWN BY: _____
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MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
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DATE: _____
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MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____



DATE: _____
 SCALE: _____
 APPROVED: _____
 DRAWN BY: _____
 REVISION NO: _____

KEY

A	1 HSC FIRE PUMP	M	1 MINI POWER-ZONE
B	1 FIRE PUMP CONTROLLER	N	1 UNIT HEATER
C	1 AUTOMATIC AIR RELEASE VALVE	O	1 EXHAUST FAN WITH DAMPER AND THERMOSTAT
D	1 OS&Y FLANGED GATE WITH TAMPER SWITCH	P	1 INTAKE LOUVER
E	2 WAFER STYLE CHECK VALVE	Q	2 COMMERCIAL GFCI RECEPTACLES
F	3 LUG STYLE BUTTERFLY VALVES W/ TAMPER SWITCHES	R	2 FLUORESCENT LIGHT FIXTURES
G	1 ECCENTRIC WELD REDUCER	S	1 EXTERIOR LIGHT WITH PHOTO CELL
H	1 CONCENTRIC WELD REDUCER	T	1 EXTERIOR MOUNTED POWER JUNCTION BOX
I	1 CITY WATER BYPASS	U	1 SPRINKLER SYSTEM
J	1 HOSE VALVE CONNECTION W/ HOSE VALVES	V	1 I-BEAM PERIMETER SKID
K	1 ENVIRONMENTAL ENCLOSURE	W	1 FLOOR DRAIN
L	1 PANEL BOARD	X	1 GROOVED FLANGE
		Y	4 PIPE SUPPORTS

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SYSTEM TYPE: _____

PROJECT NAME: _____

DESIGN FLOW: _____

DESIGN PRESSURE: _____



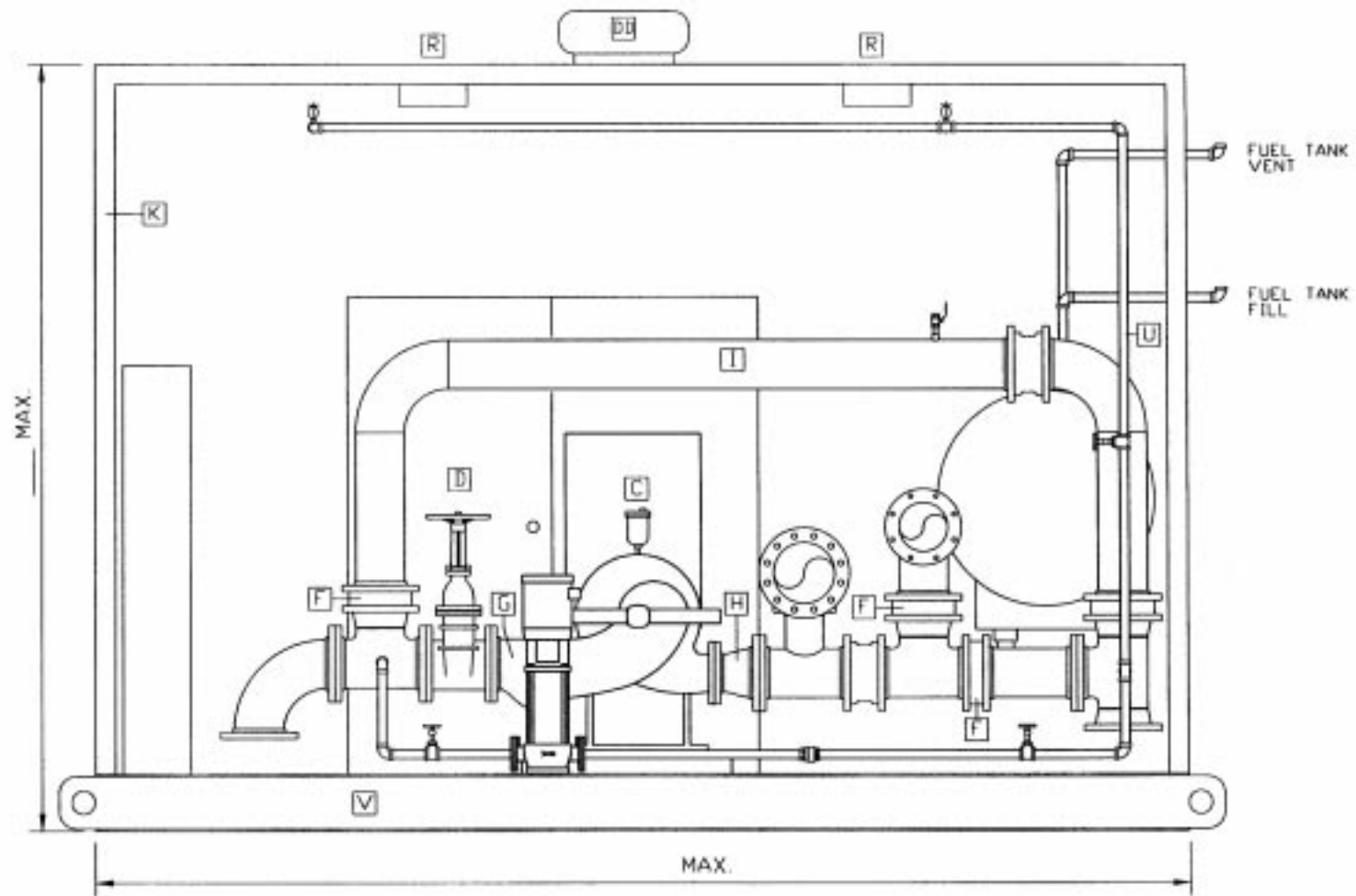
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DRAWN BY: _____

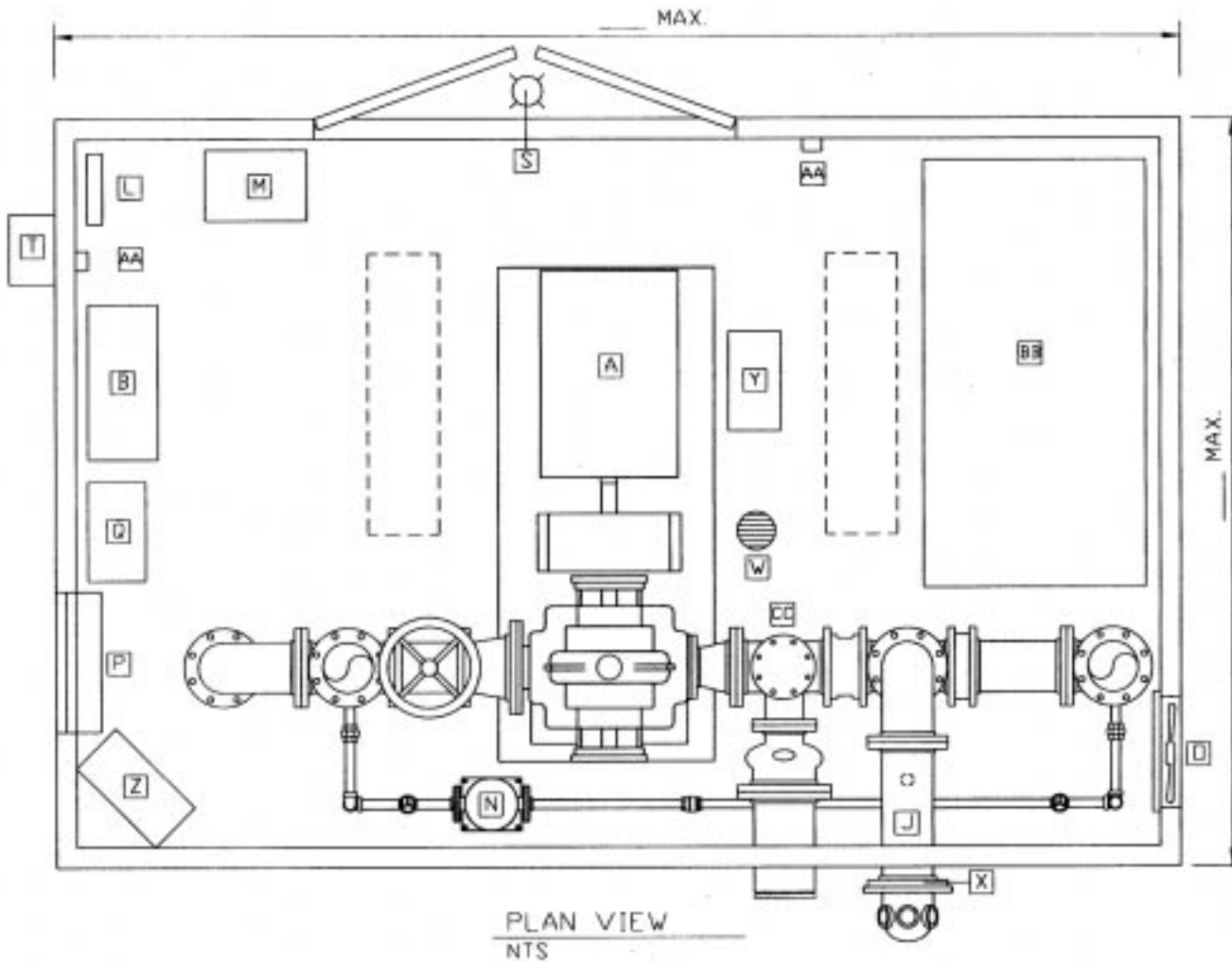
REVISION NO: _____



SIDE VIEW
NTS

MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____





MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____



DATE: _____
 SCALE: _____
 APPROVED: _____
 DRAWN BY: _____
 REVISION NO: _____

KEY

A	1 HSC FIRE PUMP W/ ENGINE	P	1 INTAKE LOUVER
B	1 ENGINE DRIVE FIRE PUMP CONTROLLER	Q	1 JOCKEY PUMP CONTROLLER
C	1 AUTOMATIC AIR RELEASE VALVE	R	2 FLUORESCENT LIGHT FIXTURES
D	1 DS&Y FLANGED GATE WITH TAMPER SWITCH	S	1 EXTERIOR LIGHT WITH PHOTO CELL
E	2 WAFER STYLE CHECK VALVE	T	1 EXTERIOR MOUNTED POWER JUNCTION BOX
F	3 LUG STYLE BUTTERFLY VALVES W/ TAMPER SWITCHES	U	1 SPRINKLER SYSTEM
G	1 ECCENTRIC WELD REDUCER	V	1 I-BEAM PERIMETER SKID
H	1 CONCENTRIC WELD REDUCER	W	1 FLOOR DRAIN
I	1 CITY WATER BYPASS	X	1 GROOVED FLANGE
J	1 HOSE VALVE CONNECTION W/ HOSE VALVES	Y	1 BATTERY RACK
K	1 ENVIRONMENTAL ENCLOSURE	Z	1 UNIT HEATER
L	1 PANEL BOARD	AA	2 COMMERCIAL GFCI RECEPTACLES
M	1 MINI POWER-ZONE	BB	1 DAY TANK W/ SPIL BASIN
N	1 JOCKEY PUMP	CC	1 MAIN RELIEF VALVE W/ WASTE CONE
O	1 EXHAUST FAN WITH DAMPER AND THERMOSTAT	DD	1 FLEX EXHAUST MUFFLER

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MODEL #: _____

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PROJECT NAME: _____

DESIGN FLOW: _____

DESIGN PRESSURE: _____



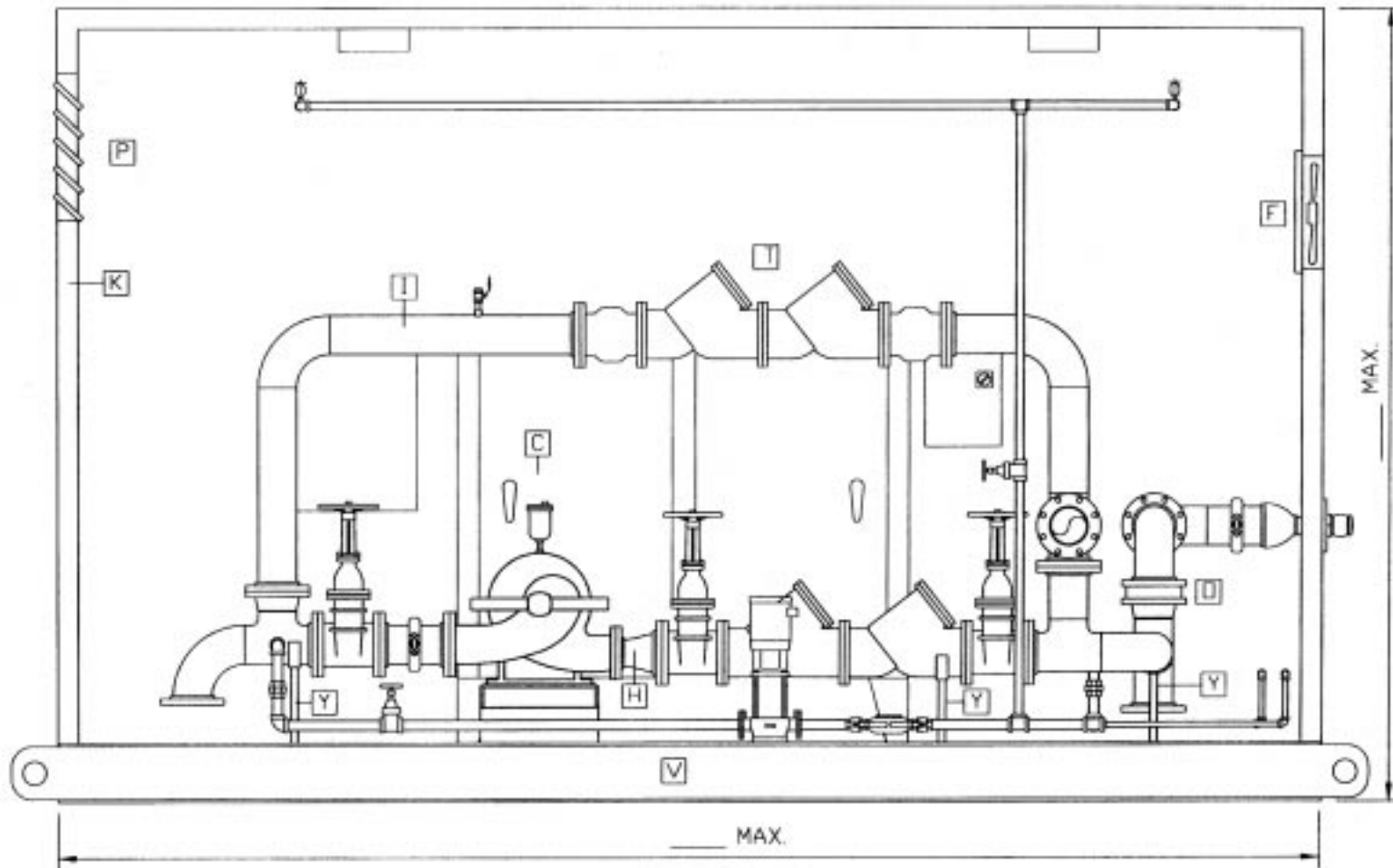
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SCALE: _____

APPROVED: _____

DRAWN BY: _____

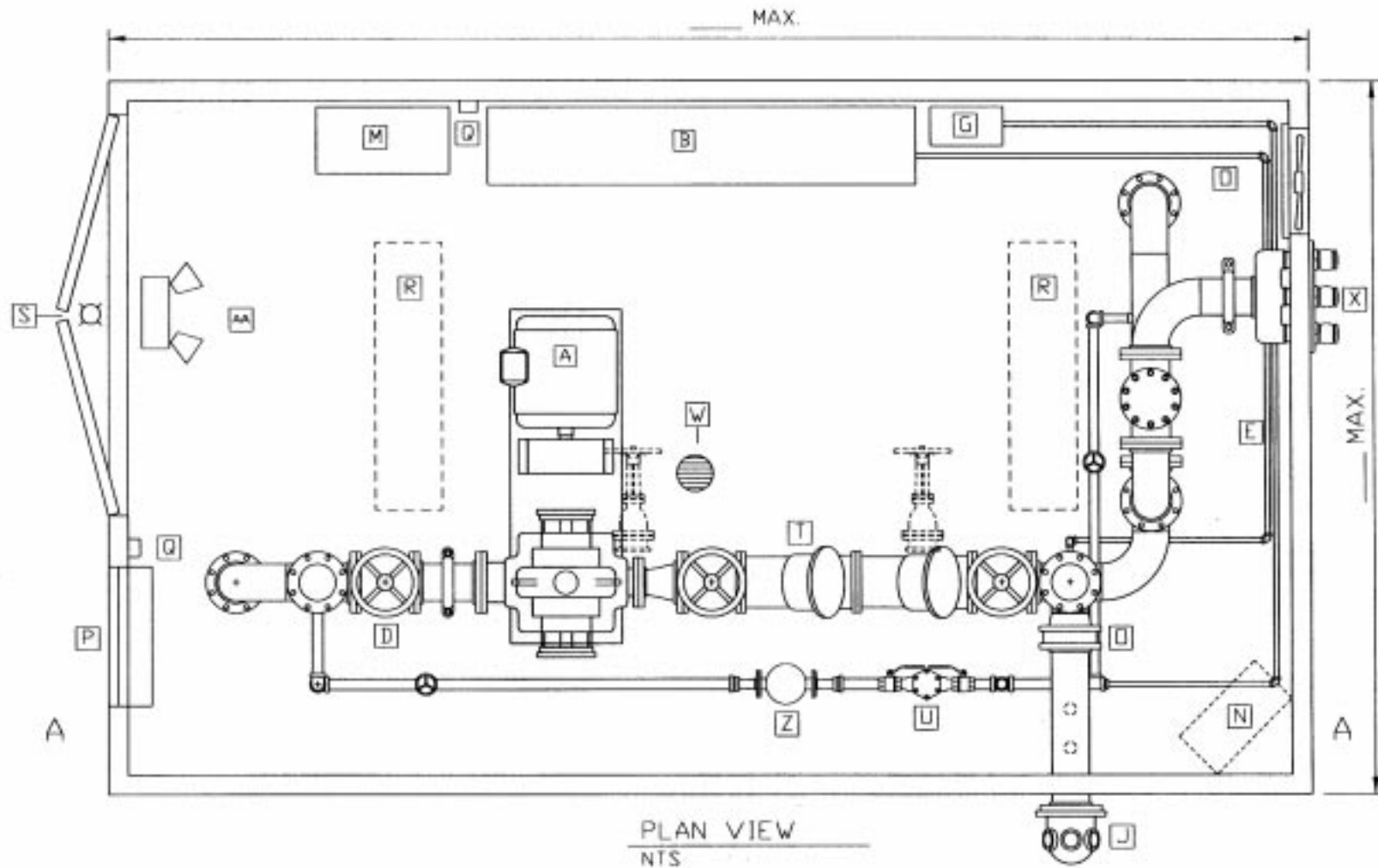
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MODEL #: _____
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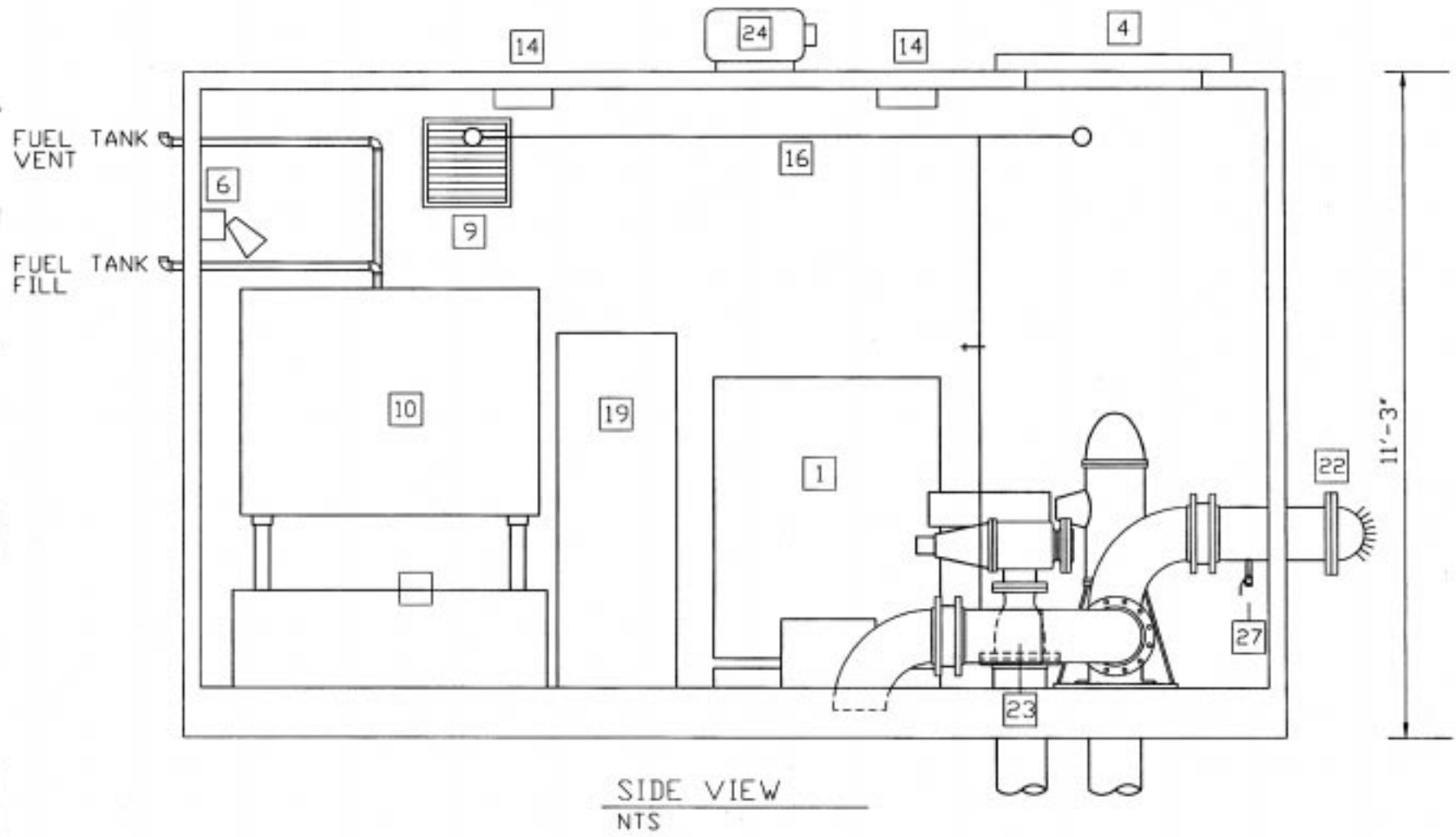
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MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
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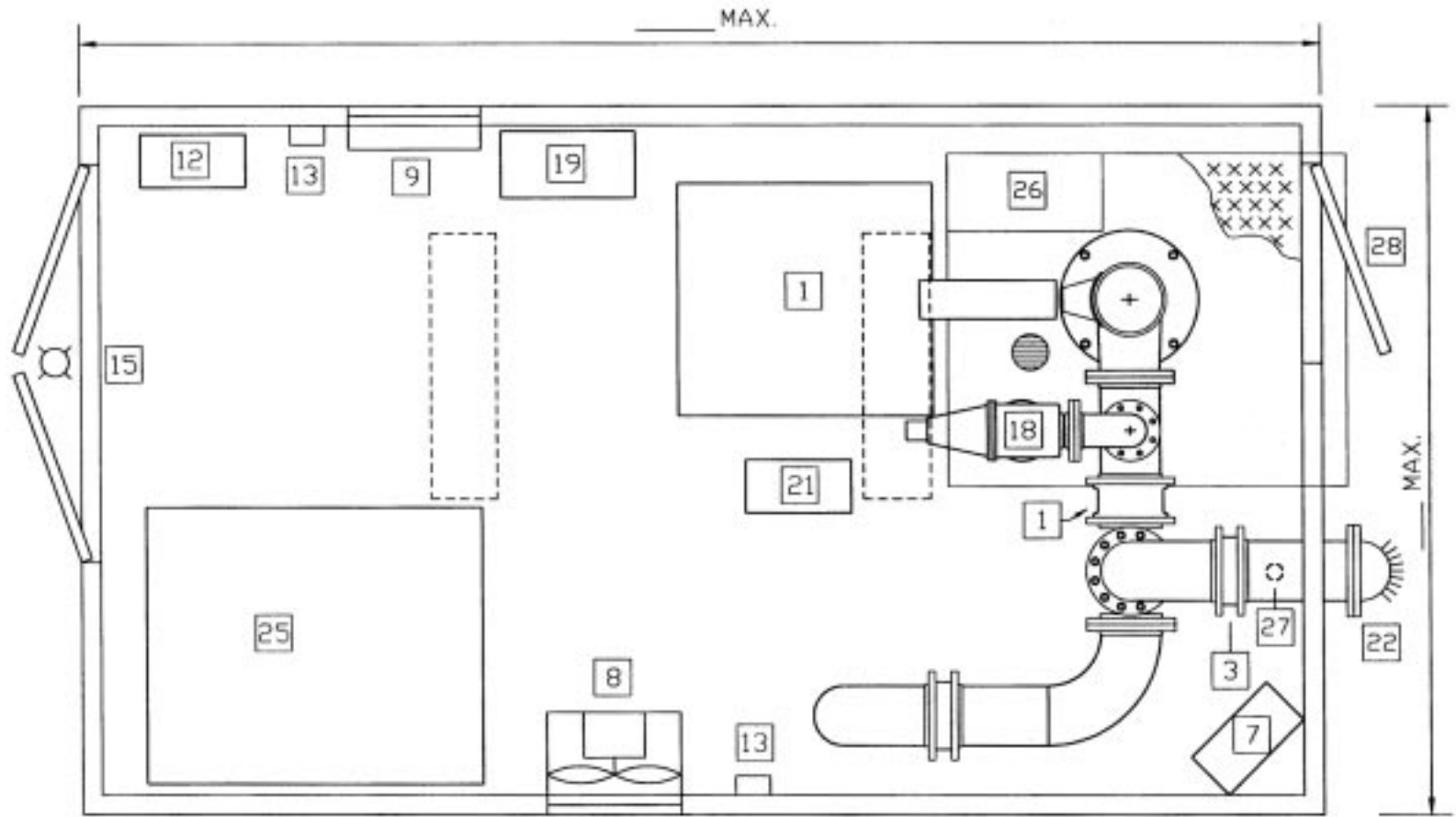
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MODEL #: _____
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 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____



DATE: _____
 SCALE: _____
 APPROVED: _____
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 REVISION NO: _____



PLAN VIEW
NTS

MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____



DATE: _____
 SCALE: _____
 APPROVED: _____
 DRAWN BY: _____
 REVISION NO: _____

KEY

- | | | | |
|----|--|----|------------------------------|
| 1 | FIRE PUMP W/ENGINE | 15 | EXTERIOR LIGHT W/ PHOTO CELL |
| 2 | WAFER STYLE U.L./F.M. CHECK VALVE | 16 | SPRINKLER SYSTEM |
| 3 | WAFER STYLE U.L./F.M. BUTTERFLY VALVE W/ TAMPER | 17 | I-BEAM SKID |
| 4 | ROOF HATCH | 18 | SPRING TYPE RELIEF VALVE |
| 5 | 6'x7' DOUBLE DOOR W/ PASSAGE LATCH | 19 | FIRE PUMP CONTROLLER |
| 6 | 2 HEAD EMERGENCY LIGHTING UNIT W/ BATTERY BACKUP | 20 | FLOOR DRAIN |
| 7 | UNIT HEATER W/ THERMOSTAT | 21 | BATTERY RACK |
| 8 | EXHAUST FAN W/ THERMOSTAT | 22 | HOSE VALVE HEADER |
| 9 | COMBUSTION AIR INTAKE LOUVER W/ MOTORIZED DAMPER | 23 | WASTE CONE |
| 10 | DAY TANK W/ SPILL BASIN | 24 | ENGINE EXHAUST MUFFLER |
| 11 | FIXED DAMPER | 25 | DIAMOND PLATE WET WELL COVER |
| 12 | MINI POWER ZONE W/ TRANSFORMER AND CIRCUIT BREAKER | 26 | INSPECTION COVER |
| 13 | GFCI CONVENIENCE OUTLET | 27 | MANUAL DRAIN VALVE |
| 14 | FLUORESCENT LIGHT FIXTURE | 28 | 3'-0" DOOR |

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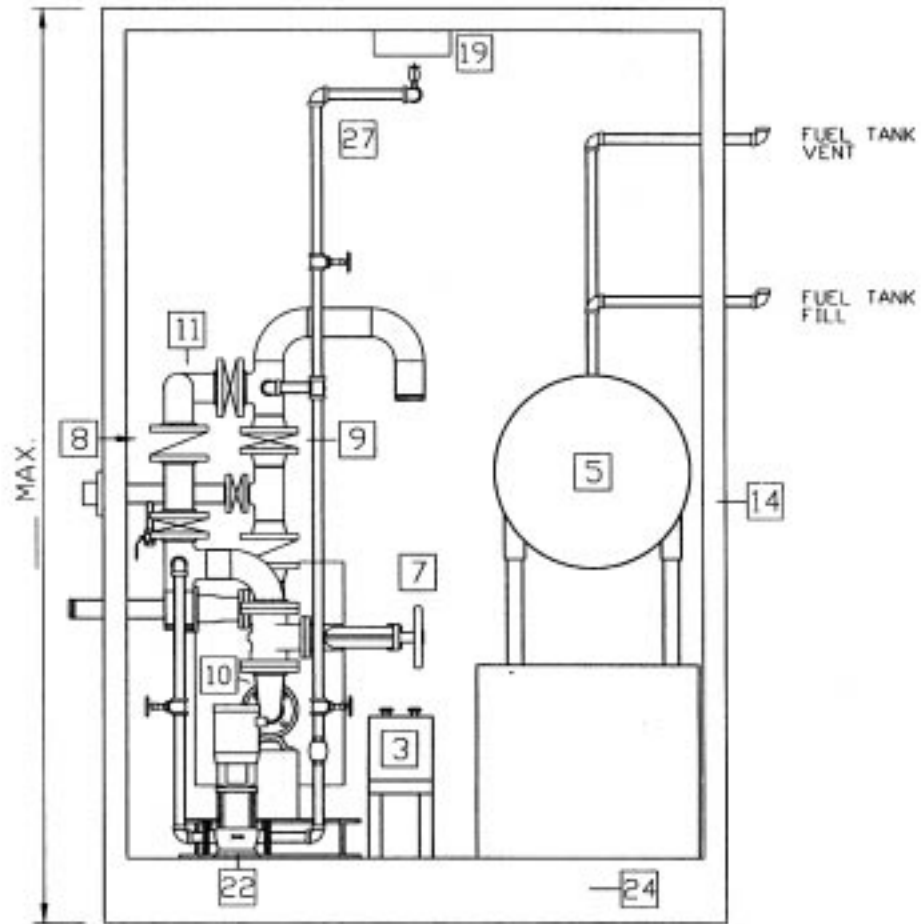
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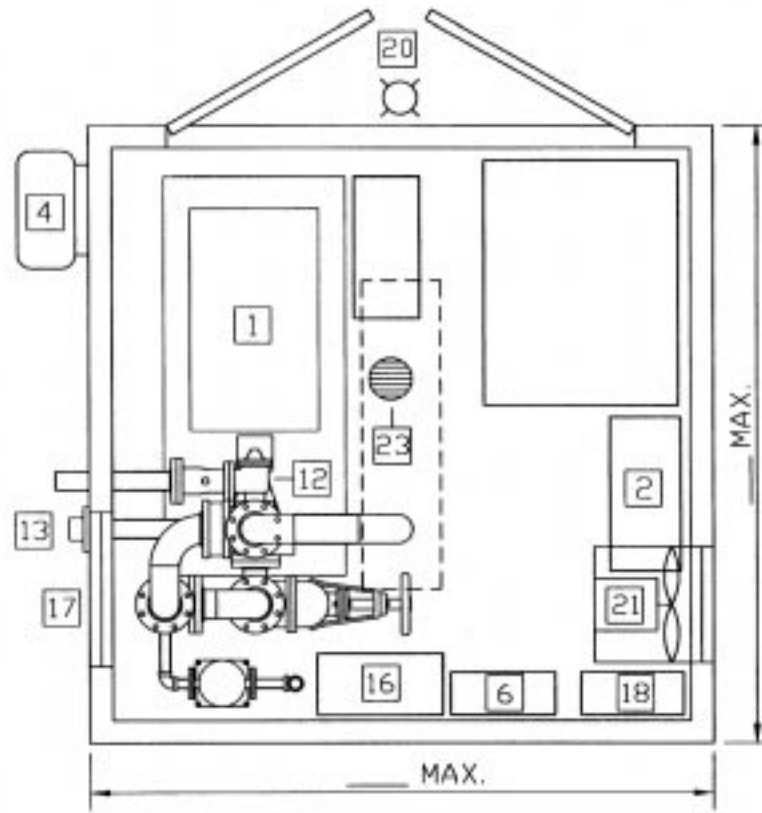
REVISION NO: _____



SIDE VIEW
NTS

MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____





PLAN VIEW
NTS

MODEL #: _____
 SYSTEM TYPE: _____
 PROJECT NAME: _____
 DESIGN FLOW: _____
 DESIGN PRESSURE: _____



DATE: _____
 SCALE: _____
 APPROVED: _____
 DRAWN BY: _____
 REVISION NO: _____

KEY

1	END SUCTION FIRE PUMP WITH ENGINE	1	HOSE VALVE HEADER CONNECTION
2	ENGINE DRIVE FIRE PUMP CONTROLLER	2	ENVIRONMENTAL ENCLOSURE
3	BATTERY RACK	3	PANEL BOARD AND MINI-POWER ZONE
4	FLEX-EXHAUST MUFFLER	4	UNIT HEATER
5	DAY TANK WITH SPILL BASIN	5	INTAKE LOUVER
6	JOCKEY PUMP CONTROLLER	6	GFCI (NOT SHOWN FOR CLARITY)
7	OS&Y FLANGED GATE WITH TAMPER SWITCH	7	FLUORESCENT LIGHT FIXTURE
8	WAFER CHECK VALVE	8	EXTERIOR LIGHT FIXTURE WITH PHOTO CELL
9	LUG STYLE BUTTERFLY VALVE WITH TAMPER SWITCH	9	EXHAUST FAN WITH DAMPER AND THERMOSTAT
10	REDUCING WELD ELBOW	10	JOCKEY PUMP WITH PIPING AND VALVES
11	CITY WATER BYPASS	11	FLOOR DRAIN
11	MAIN RELIEF VALVE WITH 2-1/2"x2" WASTE CONE	11	I-BEAM SKID

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