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**GUIDE SPECIFICATIONS  
for Fuel Day Tank  
with Supply Pump and Motor**

**1.0 GENERAL**

**1.1 SUMMARY**

These specifications describe requirements for a fuel day tank System consisting of one or more fuel tanks, an Electronic Control Module (ECM) and fuel supply pumps sized to support the generator set. The Fuel Day Tank System shall automatically maintain fuel levels specified within.

The manufacturer shall design and furnish all materials and equipment to be fully compatible with electrical, environmental and space conditions of the site. It shall include all equipment to safely support the full demands of the generator set and be designed for unattended operation.

**1.2 CODES AND STANDARDS**

1.2.1 The fuel day tank and all associated equipment and components shall be manufactured in accordance with the following applicable standards:

The Day Tank and all associated equipment and components shall be manufactured in accordance with the following applicable standards:

- UL-142 Above Ground Flammable Liquid Tanks
- CAN/ULC-S601-07 Steel Above Ground Tanks for Flammable and Combustible Liquids
- UL-508 Industrial Control Equipment (ECM)
- American Welding Society (AWS) - Welders certified AWS standards D 1.1 / D 1.1 M
- Office of Statewide Health Planning and Development (OSHPD) California Health Care facility - Preapproval OSP-0254-10 (10 through 350 Gallon)
- IBC Seismic Certification - Design in accordance with ASCE 7-05 Chapter 13 (10-350 gallons; also available for other capacities)

1.2.2 The installing contractor shall be an experienced firm regularly engaged in the installation of fuel day tanks and fuel piping systems, and be responsible to conform to the requirements of the codes and standards, as applicable. The fuel day tank shall be manufactured to allow the necessary features to meet the requirements of these standards.

- NFPA 30 - Flammable and Combustible Liquids
- NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines
- NFPA 70 - National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
- NFPA 99 - Essential Electrical Systems for Health Care Facilities
- NFPA 110 - Emergency and Standby Power Systems.

**1.3 ACCEPTABLE MANUFACTURERS**

Only approved bidders shall supply equipment provided under this contract. Equipment specifications for this project are based on microprocessor-based fuel day tanks manufactured by Tramont Manufacturing LLC. Equipment by other suppliers that meets the requirement of this specification is acceptable, if approved not less than 2 weeks before scheduled bid date. Proposals must include a line by line compliance statement based on this specification.

**1.4 SUBMITTALS**

**A. Shop drawings:**

1. Outline drawings of assembly.
2. One line diagrams and wiring diagrams for assembly and components.

**B. Product data:**

1. Technical data on all major components.
2. Seismic certification, as required.

**C. Project information:**

1. Test reports and certifications.
2. Factory test procedures.

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### 1.5 QUALIFICATIONS

- The fuel day tank manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation and service, in accordance with ISO 9001.
- The manufacturer of this equipment shall have produced similar equipment for a minimum period of ten years. When requested by the engineer, an acceptable list of installations with similar equipment shall be provided, demonstrating compliance with this requirement.
- Production pressure test shall be performed by the manufacturer on each tank prior to shipping in accordance with prevailing standards of UL-142 and CAN/ULC-S601-07. These tests are intended to verify compliance with production requirements of the standard for leakage. The test is to be conducted before painting the tank by applying an internal air pressure and using soap suds, or equivalent material, for the detection of leaks. For a horizontal or rectangular tank, the test gauge pressure is to be not less than 3 psi (21 kPa). If a leak should be detected during production testing, the leak shall be repaired. Tanks shall be retested until zero leaks are apparent during two (2) successive test periods. A record of the manufacturer's testing shall be permanently maintained and available to the end user or customer.
- The installing contractor must have a minimum of five (5) years' experience in the design, installation and testing of fuel day tank systems. A list of systems of a similar nature and scope shall be provided on request.
- The installing contractor shall test the system during start-up to assure the overflow line transfers an overflow through continuous piping, without valves or traps, back to the source tank or to a collection system.
- The installing contractor shall test the system during start-up to assure the return pump system will move fuel overflow back to the source tank or to a collection system.

### 1.6 WARRANTY

- The manufacturer shall warrant the material and workmanship of the fuel day tank for a minimum of one (1) year from date of shipment.
- The manufacture of the fuel day tank(s) shall offer an extended coverage (years 2 - 5)<sup>1</sup>.
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<sup>1</sup> System designer should consult with facility owner to determine equipment warranty requirements. Consideration should be given to extended warranty period when an owner expects to occupy the facility indefinitely and needs long term support for the system design.



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## 2.0 PRODUCTS

### 2.1 CAPACITY

Fuel Day Tank capacity shall be based on NEC 2011, NFPA 70, Article 701.12 (B) (2) where internal combustion engines are used as the prime mover, an on-site fuel supply shall be provided with an on premise fuel supply sufficient for not less than two (2) hours of full-demand operation of the system. The day tank shall be sized in accordance with these standards and the capacity shall not be less than \_\_\_\_<sup>2</sup> gallons.

### 2.2 CONSTRUCTION

Fuel Day Tank shall be made of heavy gauge steel construction. Tank shall include removable, welded steel top cover (applicable, not applicable) for indoor applications, or weatherproof cover (applicable, not applicable) for outdoor applications. Tank shall be coated with rust inhibitor within inner tank, primed and finish painted on external tank. The installing contractor shall provide schedule 40, ASTM A 53, black iron pipe connections to the day tank fittings. All connections to be made with pipe unions to facilitate tank service/removal. The tank shall include at a minimum the following fittings:

- 1" NPT engine supply.
- 1" NPT engine return.
- NPT fitting for emergency vent, sized per the requirements of NFPA 30 and UL-142/ULC-S601
- 1" NPT overflow.
- 2" NPT normal vent.
- 4-1/2" square inspection port below electrical controls.
- The tank shall be provided with atmospheric (normal) vent cap with screen and emergency pressure relief vent as shown on drawing sized per the requirements of NFPA 30 and UL 142/ ULC S601. Emergency vent cap shall be spring-pressure operated. Opening Pressure shall be 0.5 psig; full opening pressure 2.5 psig. Flow rate shall be marked on top of each vent.

### 2.3 DESIGN REQUIREMENTS

#### 2.3.1 Fuel Day Tank Control, Alarm and Status Display.

The microprocessor-based electronic control module (ECM) shall be specified for control of non-redundant (applicable, not applicable) or redundant (applicable, not applicable) pump operation. Where power is needed for the operation of the fuel transfer pumps to deliver fuel to a generator set day tank, the pumps shall be connected to the legally required standby power system. The ECM shall receive a signal from a single electrical analog float sensor. The ECM shall be provided with the following indications: fuel level, alarm, function, and existing warning and shutdown conditions and be located within a Type 1 zinc-plated enclosure for indoor use. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. All warnings shall be provided with normally open and normally closed, dry contacts for remote annunciation (3 amps @ 120 VAC).

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Genset kW Range	Typical tank capacity US gallons (Liters). Supporting kW range referenced.
20 - 50	10 (38)
51 -80	15 (57)
81 - 150	25 (95)
151 - 300	50 (189)
301 - 500	75 (284)
501 - 650	100 (378)
651 - 1000	150 (568)
1001 - 1250	200 (757)
1251 - 1750	275 (1041)
1751 - 2000	300 (1136)
2001 - 2800	400 (1514)
2801 - 3100	450 (1703)
3100 - 3250	500 (1893)

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The following alarm, shutdown and status conditions are required as a minimum:

#### 2.3.2 Fuel Level Display

- Full- 100% Green LED Indicator
- 95% - Green LED Indicator
- 85% - Green LED Indicator
- 75% - Yellow LED Indicator
- 50% - Yellow LED Indicator
- 25% - Yellow LED Indicator
- 10% - Yellow LED Indicator
- Empty - 6% - Red LED Indicator

#### 2.3.3 Alarm Display

- High Fuel-106% or greater of Capacity
- Low Fuel - 62% of Capacity
- Critical Low Fuel - 6% of Capacity
- Fuel within Containment
- ECM Functional - Tank Fault

#### 2.3.4 Function Display

- Power on - This button activates the ECM after the Off button has been depressed. On any initial power up condition, after a power outage, the ECM shall be in an on condition.
- Pump running - For redundant pump operation fuel pump control panel shall indicate Pump A or Pump B running. Pump running relay shall provide local contacts for remote monitoring, indicating pump is running.

#### 2.3.5 Remote Contact Connections

- Tank Fault (ECM Functional)/Fuel in Containment (Shared)/Loss of Power
- Critical High Fuel - 106% or greater of capacity
- Pump Running Option - Indicating supply pump is in operation
- High Fuel - 106% of capacity
- Low Fuel - 62% of capacity
- Critical Low Fuel - 6% of capacity

#### 2.3.6 Mode

- On - Power available to ECM
- Off - Turns off power within ECM
- Test - Shall force supply pump(s) to operate at time of start-up to verify overflow return line has been piped correctly and that there are no leaks within the system.

2.3.7 Start-up test switch shall test contacts for high, low, critical low, ECM functional and containment switch to assure wiring of remote contacts is correct.

2.3.8 Critical high-level automatic discrete shutoff switch shall stop supply pump delivery to the fuel day tank at the tank critical high liquid level. The critical high-level fuel switch shall be hard-wired to override any other alarms or signals received by the ECM.



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## 2.4 PUMP OPERATION

2.4.1 For non-redundant pump operation (applicable, not applicable), a single supply pump shall provide a minimum of 17 feet of vertical lift at sea level and shall activate when fuel level decreases to 87% of capacity and shall stop at 100% tank full. The single pump shall be sized to accommodate the Emergency/Standby Power System Generator Set and be supplied as a

- 2 GPM pump with 1/3 HP, 115 VAC, 1 phase 60 Hz, thermally protected motor.
- 4 GPM pump with 1/3 HP, 115 VAC, 1 phase, 60 Hz, thermally protected motor.
- 7 GPM pump with 1/2 HP, 115 VAC, 1 phase, 60 Hz, thermally protected motor.
- 10 GPM pump with 3/4 HP, 115 VAC, 1 phase, 60 Hz motor and motor starter.
- 19 GPM pump with 1 HP, 115 VAC, 1 phase, 60 Hz motor and motor starter.

2.4.2 For redundant pump operation (applicable, not applicable), two supply pumps and motors are supplied and the pumps shall alternate as the lead when refueling day tank. The lead pump shall activate when fuel level decreases to 87% of capacity; the lag pump shall activate in tandem with the lead pump if the fuel level decreases to 75% of capacity. The supply pump operation shall stop at 100% of tank capacity. The pumps shall provide a minimum of 17 feet of vertical lift at sea level. Appropriately sized check valves with fuel strainers shall be provided on the pump fuel inlets. The lead pump shall be sized to accommodate the Emergency/Standby Power System Generator Set<sup>3</sup> and be supplied as

- Two (2) quantity - 2 GPM pumps with 1/3 HP, 115 VAC, 1 phase 60 Hz, thermally protected motors.
- Two (2) quantity - 4 GPM pumps with 1/3 HP, 115 VAC, 1 phase, 60 Hz, thermally protected motors
- Two (2) quantity - 7 GPM pumps with 1/2 HP, 115 VAC, 1 phase, 60 Hz, thermally protected motors.
- Two (2) quantity - 10 GPM pumps with 3/4 HP, 115 VAC, 1 phase, 60 Hz motors and motor starters.
- Two (2) quantity - 19 GPM pump with 1 HP, 115 VAC, 1 phase, 60 Hz motor and motor starters.

2.4.3 Return pump system shall be supplied when the Main Fuel Tank has a fuel pick up point that is higher than the fuel day tank overflow. The return pump operation shall be designed for automatic unattended operation when the day tank level exceeds 110% of its normal capacity. The return pump shall be activated by a separate, critical high level switch. The return pump shall exceed the delivery capacity of the fuel supply to the fuel day tank. The ECM is hard-wired to override any other indications given by the controller.

## 2.5 FUEL CONTAINMENT

The fuel day tank shall include a welded steel containment basin to prevent escape of fuel in the event of a tank rupture, sized at a minimum of 150% of the tank capacity. The basin shall be primed and finish painted.

2.5.1 Indoor containment basin (applicable, not applicable): The basin shall consist of an open-top, welded heavy gauge steel structure. Leak detection switch shall be wired into the electronic control module (ECM). This will shut down the supply pump and motor in case of a fuel leak into the containment basin.

<sup>3</sup> Refer to generator set manufacturer's data for information on Fuel Consumption at 100% full load demand to determine supply pump capacity. Typical supply pump capacity for 60 Hz generator set are as follows when the engine return is piped back to the day tank based on consumption:

kW Rating	Supply pump based on fuel consumption
20 - 650	2 GPM
651 - 1000	4 GPM
1001 - 3250	7 GPM



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2.5.2 Containment basin (applicable, not applicable) (indoor or outdoor): The containment tank shall consist of a welded heavy gauge steel structure. The containment tank shall feature a welded steel top, with an emergency pressure relief vent as shown on drawing and sized per the requirements of NFPA 30 and UL 142/ ULC S601. Emergency vent cap shall be spring-pressure operated. Opening pressure shall be 0.5 psig; full opening pressure shall be 2.5 psig. Limits shall be marked on top of each vent. Leak detection switch shall be wired into the electronic control module (ECM). This will shut down the supply pump and motor in case of a fuel leak into the containment basin.