ULTIMATE SERVICE ASSOCIATES

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Concrete Platforms and Mounting Arrangements for Generator Systems

1.0 Introduction

This information sheet is a guide to the location and mounting of engine driven generator set systems. In an ideal situation the generator set should be mounted on a concrete pad on firm ground, however the designer of a system is frequently challenged with less than ideal mounting situations, as such this information covers the critical criteria that must be followed for any arrangement.

Correctly mounted stationary generator systems will give years of dependable service. This information sheet gives suitable guidelines and details the applicable codes governing generator set installations.

2.0 Location considerations

If the generator set cannot be located on the ground the building engineer has to confirm if the structure is able to support the weight of the generator set. In locating the generator set the following have to be considered:

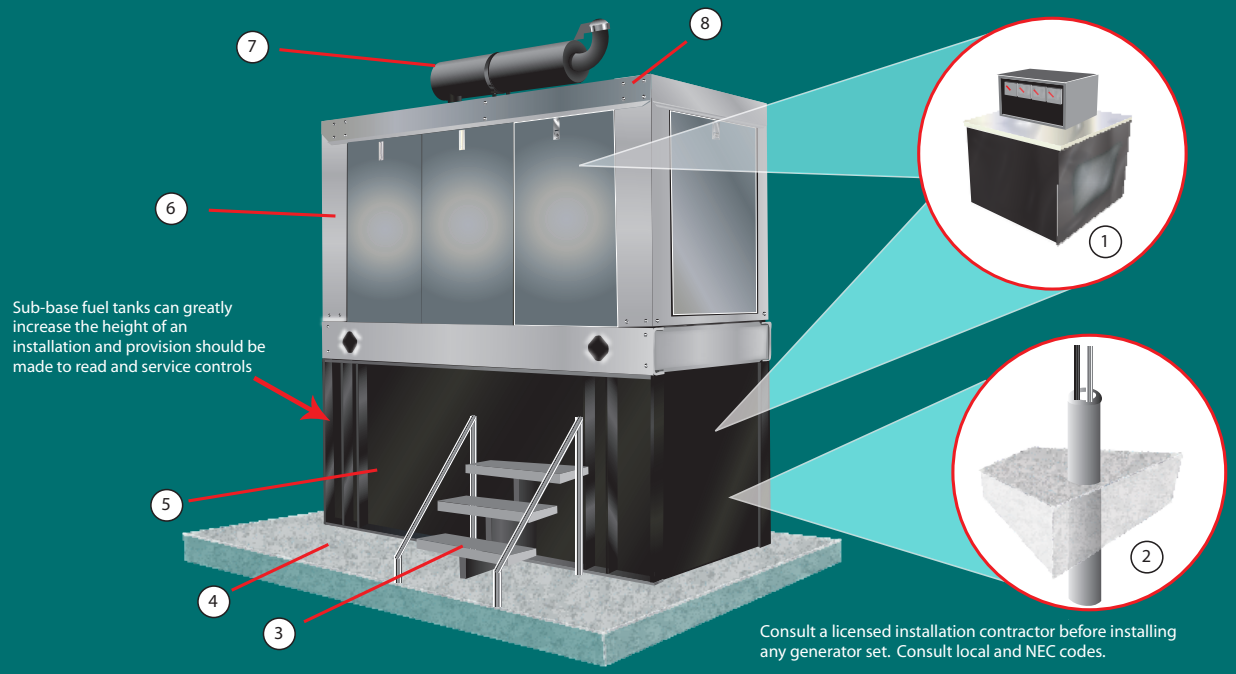
Load bearing requirements: In addition to the generator set the weight of accessories such as fuel tanks, batteries, radiators, mounting pads and any other equipment has to be known and calculated. An outside installation will likely have all the accessories already mounted but the all up weight should be known. (See diagram one)

Fire codes: Local authorities have strict codes controlling the standard of generator set installation with applicable fire codes.

Water protection: Ensure the location is not prone to ground water flooding or water from any other source such as the rain. An indoor installation should be a structure not susceptible to flooding from ground water or problems with water ingress due to the weather. Equipment has to be protected from corrosion and for safety no electrical components should be allowed to get wet or be adjacent to wet surfaces. Any out door installation should be fitted with the appropriate weather protective enclosure and on a platform that sits above known flood levels. Check the local code requirements. *(continued over)*

Diagram 1 Key issues to note with outside installations

1) When mounted on a sub-base tank, access should be provided to operate and service controls. Consult local codes for platform and stairs access.
2) Stub-up for electrical conduits has to be provided and access allowed through sub-base tank. See manufacturer drawings for location.
3) Access steps to controls for operation and service are required due to sub base tank height.
4) Concrete pad should meet local codes and allow full service access around the generator set.
5) Sub-base tank has to meet required UL and any local codes and be rated to carry the generator set weight.
6) Housing should provide adequate weather protection to generator equipment plus ventilation for cooling.
7) Exhaust muffler should meet local sound ordinance codes and safely vent to atmosphere.
8) The location of the mounting pad and generator set should provide proper maintenance, testing, flow of exhaust gases and cooling air flows. Particular attention must be made to radiator placement for obstructions to air flow and prevailing wind considerations (dirt, debris and snow contamination).



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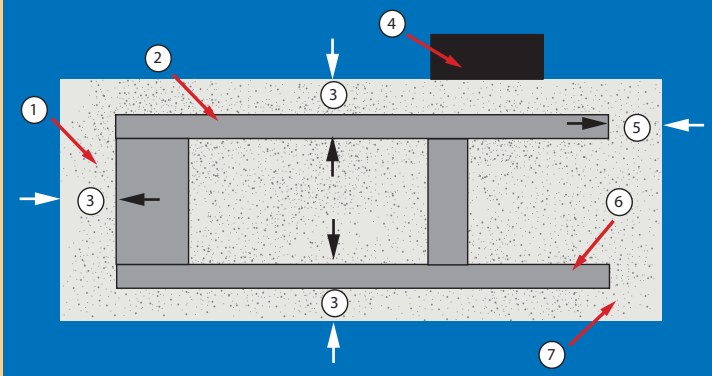
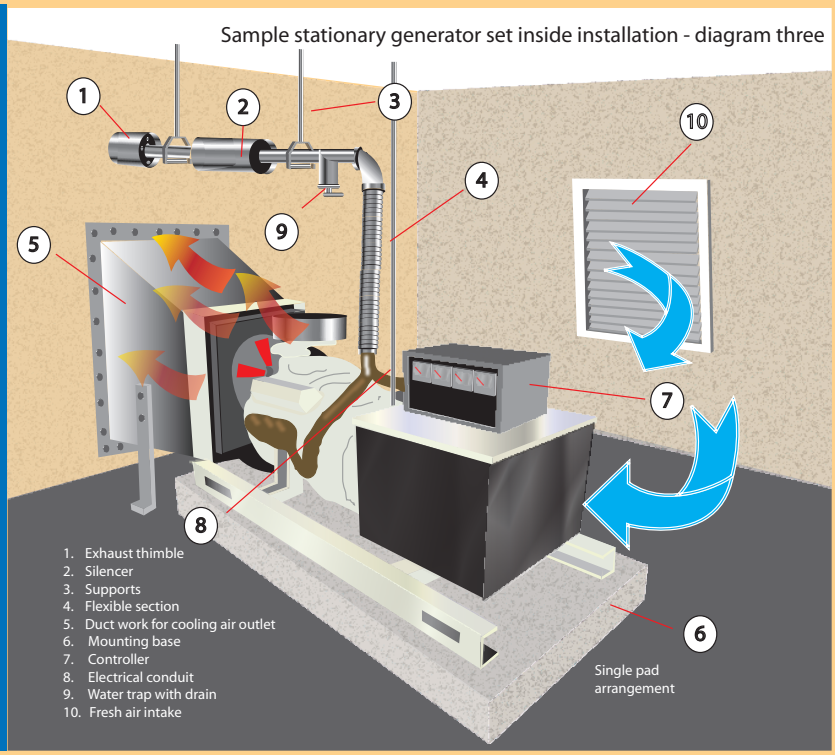
Mounting surface - diagram two



1. Engine end
2. Generator set skid
3. Concrete should extend 6" outside skid
4. Battery rack (Outside installation will have set inside base frame)
5. Allow at least 18" access around the set to assist service
6. Alternator end
7. Mounting pad (concrete surface)

Sample stationary generator set inside installation - diagram three



1. Exhaust thimble
2. Silencer
3. Supports
4. Flexible section
5. Duct work for cooling air outlet
6. Mounting base
7. Controller
8. Electrical conduit
9. Water trap with drain
10. Fresh air intake

(continued from page-one)

Positioning: Before deciding on the position ensure the generator is not located near combustible material, a porous surface susceptible to fuel, coolant, battery acid and oil. (If so containment should be designed into the system to meet local codes)

Access: Ensure there is easy access to the generator set to carry out checks, routine service and overhaul.

Access for fuel tank mounted installation: When the generator set is mounted on a sub-base fuel tanks that significantly increases the overall height of the unit, the system designer has the responsibility to ensure controls and other equipment can be easily accessed for operation and service. If access can only be achieved by means of a ladder or access platform the designer has to ensure the design of the installation meets local codes.

Ventilation: The unit should have sufficient ventilation for combustion and coolant air. If the natural ambient airflow is not sufficient then the designer will have to design ducts for adequately ventilating inlet and exhaust air flow.

Exhaust: Ensure there is adequate expulsion of the exhaust to prevent the build up of dangerous exhaust gases.

Fuel systems: The location of the fuel tank should allow for the vertical lift specification of the fuel pump and any auxiliary pumps within the system. Frequently even with a remote bulk storage of fuel a day tank will be adjacent to the generator set.

Security: For safety and protection of vital standby power the installation should minimize public/ unauthorized access

Outside installations: In addition to providing all round access for operation and service the design should specify in accordance with codes an installation that is not hindered in access or operation by vegetation or other structures.

3.0 Mounting Surface:

All mounting surfaces should be level and firm enough to bear the load of the generator set and accessories.
There are various mounting configurations as follows. (Diagram two details typical arrangement points)

Single-pad mounting: This is the most common mounting arrangement. A single level concrete pad (diagram three) provides for a firm level surface that supports the weight of the generator set and prevents any distortion of the base. With this method it may be necessary to provide an oil drain pump or raise the generator set above the pad to allow clearance for draining.

Mounting pad weight: Recommendations are that the single mounting pad or combined weight of two and four mounting pads should be at least the total weight of the generator set and its mounted accessories.

Guide to determining pad weight: The volume of the pad(s) in cubic feet (length x width x height) multiplied by 150 lbs gives weight of the pad. The designer should determine if this weight comes within the load bearing limits of the location.

Mounting pad specifications: The composition of the mounting pad should follow standard practice for required loadings. The specification with 2500-3000 psi is for concrete reinforced with eight-gauge wire mesh of #6 reinforcing bars on 12" centers.

Concrete mixture: The recommended mixture by volume is given as 1:2:3 parts of cement, sand and aggregate, respectively. The generator set should be anchored to the pad using bolts set in the concrete. (Expansion anchors should not be used)

4.0 Conduit entry:

When the generator set is mounted on the concrete pad provision should be made to receive the electrical conduit. The area where the cables come up through the pad is called the "stub-up." The system designer has to ensure the stub-up location is optimally placed to the generator set's load and control terminal connections. Also, when the generator set is mounted on a sub-base fuel tank the designer has to ensure the electrical conduit entry of the sub tank is optimally located to the generator set terminals.
(See diagram one for details of an outdoor installation, sub-base fuel tank and stub-up location)

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