Generator Foundation Mountings

Considerations for Generator Set Foundations

Foundations supporting generator sets must meet flotation, alignment and vibration parameters for successful operation.

Specifications that consider the following criteria will help ensure trouble-free installation and operation.

Foundations must be able to withstand the installation's weight and prevent deflection. To determine the pressure exerted by a generator set, use the following equation:
P = W/A
Where:
P = pressure in PSI (kPa)
W = generator set wet weight in lbs (kg)
A = Area in sq. in. (m2) of the rails, pads or vibration mounts.
Note: This pressure must be less than the load-carrying capability of the soil foundation pad. General load bearing capabilities of underfoot are listed in Table 1.

Table 1 - Bearing Load Capacities

Material	psi	kPa
Rock, hardpan	70	482
Hard clay, gravel and coarse sand	56	386
Loose medium sand and medium clay	28	193
Loose fine sand	14	96.4
Soft clay	0-14	0-96.4

Note: The foundation should weigh at least as much as the generator set's wet weight.

Use this equation to calculate the necessary foundation depth:
Foundation depth = W/DxBxL
Where:
W = Total wet weight of genset (lb or kg)
D = Density of concrete (150.b/cu.ft3 or 2,400 kg/m3)
B = Foundation width (ft or m)
L = Foundation length (ft or m)

Note: This equation assumes a concrete mixture ratio of 1:2:3 (cement:sand:aggregate) with maximum 4 inch (101.6mm) slump and 29-day compressive strength of 3,000 psi (20.67MPa).

If no vibration isolators are used, the floor must support 125% of the generator set weight. If gensets are paralleled, possible out-of-phase paralleling could cause torque reactions. Here, foundations must be designed to withstand twice the generator set wet weight.

The foundation should be reinforced with No. 8 gauge steel wire fabric of No. 6 reinforcing bars on 12" (304.8mm) centers horizontally. Bars should be imbedded in the concrete at least 3" (76.2mm) from foundation surface.

NOTE: All above are suggestions only. Neither Caterpillar nor Cashman publish certified pad requirements. Local seismic and structural codes should be reviewed and the final pad design should be done by a properly certified structural engineer.

Maintaining Alignment

Modern multi-cylinder medium-speed generators sets do not require massive concrete foundations to maintain engine/generator alignment. In most applications, a single-bearing generator set can be installed and operated on the base it was shipped on.

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Two-bearing generators, generators driven from either end of one engine, tandem generators or generators with tandem engines require a much heavier boxed base that resists bending forces exerted by the generator sets. The base also must prevent resonant vibration during operation.

Flexible Connections

Any supply line or hose connected to the generator set–including exhaust coupling and exhaust pipe hangers, jacket water connections, heat recovery systems and fuel lines–must be fitted with a flexible section that can withstand vibrations incurred by the operating generator set. These flexible connections should be installed as close to the generator set as possible and be designed to prevent line leaks or breaks.

Service Considerations

Convenience and serviceability can be designed into a generator set foundation. Consider specifying conduit for electric starting systems, generator leads and fuel and water connections.