GENERAL

This guideline is intended to provide basic guidelines to be followed when an Engine Generator set is installed on campus. *Note: This guideline does not include emergency generators for MUHC. See MUHC Design Guidelines.*

DESIGN GUIDELINES

1. General

1.1. Generator and prime mover shall be direct coupled.

1.2. Generators shall not be used for peak shaving unless approved by University.

1.3. Ratings

1.3.1. Installation shall be capable of a minimum of 8 running hours at rated full load. Maximum run time may be extended based on requirements of facility.

1.3.2. Generator kW power rating shall be selected according to the following.

kW Power Rating	Operating Hours	
Emergency Standby	Average Power (kW) output over 24 hours limited to < 70% of power rating	<200 hours per year
Limited Time Running		<500 hours per year
Prime Running	Average Power (kW) output over 24 hours limited to < 70% of power rating	Unlimited hours per year
Continuous Operating		Unlimited hours per year

1.3.3. Allowable vibration and noise levels shall be investigated and considered for the installation location.

1.4. Alarms

1.4.1. Local Enunciation

1.4.1.1.Battery charger
1.4.1.2.Engine run
1.4.1.3.Engine trouble
1.4.1.4.Low fuel
1.4.1.5.Engine shutdown

1.4.2. Building Automation System Enunciation

1.4.2.1.Engine Running
1.4.2.2.Generator Trouble

1.5. Building requirements

1.5.1. Generator and room shall be provided with adequate ventilation and combustion air including controlled louvers where needed.

1.6. Generators shall be readily accessible for maintenance, testing and fueling without the use of a ladder.

1.7. Generators serving fire pumps shall be provided with an input contact that disables all generator safety shutdowns, except over speed per NFPA 20. The input shall only be energized when the fire ump is running while on emergency power.

2. Engine

2.1. Generators inside buildings shall be provided with a crankcase breather / ventilation manager to reduce engine blow by.

2.2. Provide radiator coolant level sight glass or other means to visually assess the coolant level without opening the radiator cap.

3. Fuel

3.1. Typical fuel will be diesel or natural gas.

3.2. Storage tank shall be sized for rated hours of operation and full load.

3.3. Fuel spill containment shall be provided.

3.4. Fuel level indication shall be provided.

3.5. Isolation valves must be installed on the fuel transfer system to allow for pump maintenance without having to drain the system.

4. Emissions

4.1. Generator shall meet all applicable local, state and federal emissions regulations.

4.2. Where applicable, generator shall be included in the campus inventory of emissions generating equipment.

4.3. All generator exhausts shall be located to disperse fumes and noise without affecting the normal functions of the building or surrounding site. Ensure exhaust will not be re-entraining by nearby air intakes including other buildings.

5. Electrical

5.1. Generator shall be four wire 277/480 or 120/208 volts.

5.2. Voltage and frequency steady state regulation, electronic speed regulation and transient performance shall be specified for all classes of load and load rejection.

5.3. Provide Docking Station for connection of an owner furnished, portable load bank and temporary portable generator for testing and maintenance.

5.3.1. Provide one Cam-Lok mechanical lug per maximum of 400A of capacity.

5.4. If generator "**connections only**" is installed for a temporary portable generator;

5.4.1. Location shall be on the exterior of building accessible for a portable generator.

5.4.2. Connection cabinet shall be pad-lockable.

5.4.3. Provide one Cam-Lok mechanical lug per maximum of 400A of capacity.

5.4.4. Where automated, provide generator starting contact connection point to allow transfer switches to start a portable generator.

5.4.5. Provide single 20A, 120V receptacle and single 30A, 208V, 3 wire receptacle next to connection point.

COMMISSIONING

1. System will be placed in service only after verification of meeting all design/installation guidelines.

2. Full load testing is required upon initial installation of the engine generator set. Specify full startup and commissioning by the generator vendor including a full load test for the specified run time. This test shall be performed only after the entire installation is complete including the room ventilation and louvers.