

# Cold Climate Considerations for Generator Sets

A Winter Weather Readiness Program should be developed to establish an operational framework to ensure that Generators are ready for service in the event of a cold weather emergency. The results of freezing weather and winter storms can have catastrophic consequences. Broken pipes may be the least of your problems.

## **Have a Plan**

Cold lowers the ability of a battery to produce energy. By keeping the battery warm with a battery warmer, the battery is able to produce more energy and thus provide more reliable engine starting.

**Block heaters** are considered a normal accessory for standby generators. The size is dependent on the ambient conditions for the specific installation site. A rule of thumb is that typical block heater will require 1 to 2 hours to bring the engine up to temperature for rapid starting. Most block heaters are connected to a constant electrical supply or have a thermostat included to maintain and regulate coolant temperature. It is important to automatically disconnect the heater when the engine start sequence is initiated.

**Fuel system** - Incorrect fueling will impact starting and the ability of the generator set to continue in operation. Diesel fuels are susceptible to gelling (waxing) in below freezing conditions. Running sets will shut down if the ambient conditions worsen after start.

The following actions should be taken to ensure continued fuel supply to the system in cold ambients:

**Winter grade diesel fuel** - It is important to use winter grade diesel fuel (often called No. 1), in lieu of the summer fuel (No. 2), where temperatures dictate. This winter grade fuel is lighter, less oily and has less lubricating qualities than No. 2 fuel.

**Fuel conditioners** - A number of manufacturers can supply anti-gelling additives for use on site to treat the fuel and prevent crystals forming at low temperatures, where conditions are extreme. Paraffin crystals or molecules precipitate from the fuel and form a waxy substance. This can block the fuel filter (s) which will restrict the fuel flow to the fuel pump and injectors, and need to be dispersed.

**Ventilation** - A major factor associated with operation in cold climates, is precipitation in the form of ice and snow. Generator sets require adequate ventilation for combustion and cooling. Where accumulation of ice and snow are expected, the set should be installed in a suitable enclosure or building

with adequate apertures for inlet and exhaust air ventilation or snow accumulation should be removed from around the generator

**Air Cleaner Icing** - To avoid ice building up in the air cleaner, the air requires only enough heat to be above the dew point. In cold conditions, ensure the inlet air location of the air cleaner is located in an area that receives recirculated warm engine room air.

**A good Winter Weather Readiness Program/Plan for your Standby Generator should have three separate parts.**

- Pre Winter Weather Preparation
- During Severe Winter Weather Events
- Post Winter Weather Event

#### ✳️ **Pre Winter Weather Preparation**

**Pre Winter Weather Preparation can consist of the following:**

**Training** - Review Generator's operating instructions.

**Inspections** - Generators covered by the plan must be inspected prior to each winter weather season and again prior to each winter weather event. A weekly inspection is required but you might want to increase the inspection rate. Keep an Eye on Your Generator sets.

**Maintenance** - All scheduled maintenance should be completed prior to any Winter Weather Event. For diesel generators the most important parts are keeping the fuel from gelling, the coolant heaters/block heaters running, oil heaters maintained, and making sure the batteries are still good and they are fully charged. To prevent gelling and ensure optimal performance the fuel tank can be cleaned, polished and treated.

**Operations and Testing** - Run Generators immediately prior to winter weather events to help ensure availability and also to review fuel quantity and quality.

**Supplies** - Ensure inventory of fuel, fuel stabilizers, lubricants, batteries, coolant and spare parts are available. A battery warmer and coolant heater is also a great idea in extreme climates. Also, a snow hood may be an option for outdoor installations. If your Generator requires a starting fluid, keep it at room temperature.

**Have a Backup Plan** - What will you do if your Generator does not start?

## **During Severe Winter Weather**

### **✳️During Winter Weather Events:**

**Access** - For an outdoor installation, make sure to keep a pathway open to your generator.

**Documentation** - Keep a record of starts and run durations of Generators when they are started. Document any problems that occur; or repairs that have to be made.

**Generator Operation** - Use the following options to keep the machine warm:

- Safely use portable heaters for enclosures and compartments.
- To assist in warm-up, temporarily block the radiator. Blocking the radiator will restrict air from the fan.
- Running the engine at idle will keep the engine compartment warm.

Only use starting fluid while the engine is cranking. Check the air cleaner daily before starting the machine. If you operate the machine in heavy snow, consider attaching a burlap sack loosely to the air intake. By moving freely, the sack will prevent the snow from accumulating around the inlet filter. **Keep the burlap sack away from heated parts. The hot exhaust piping may ignite the burlap sack so use extreme caution. Also, make sure that the burlap sack does not touch any moving parts.** Usually the manufacturer of the Generator offers a useful PDF file with additional tips for operating commercial engines in cold weather.

### **✳️Post Winter Weather Season**

**Post Winter Weather Preparation can consist of the following:**

**Review Documentation** - After the last freeze of the winter season is the time to gather your information and see what worked and what didn't work with your Winter Weather Readiness Plan. Update your plan with any changes you feel need to be made.

**Maintenance** – Continue to perform scheduled maintenance. This includes an oil change, coolant change out, filter replacements and so on. Be ready for the summer weather before it arrives with its own challenges.