Generator set fuel supply: when and how should we use an external tank?

Generator sets have an internal fuel tank that feeds them directly. To make sure the generator set works properly, all you have to do is control the fuel level. In certain cases, perhaps due to increased fuel consumption or to increase the genset’s running time or to keep the number of refuelling operations to a minimum, a larger external tank is added to maintain the level of fuel in the genset’s internal tank or to feed it directly.

The client must choose the location, materials, dimensions, components of the tank and ensure that it is installed, ventilated and inspected in compliance with the regulations governing oil installations for own use that are in force in the country where the installation is carried out. Particular attention should be paid to the regulations concerning the installation of fuel systems, as in certain countries fuel is classified as a ‘hazardous product’.

THREE EXTERNAL FUEL INSTALLATION OPTIONS:

To increase the running time and to satisfy special demands, an external fuel tank should be installed. Either for storage purposes, to make sure the internal tank always stays at the necessary level, or to supply the generator set directly from the tank. These options are the perfect solution to improve the unit’s running time.

1. EXTERNAL FUEL TANK WITH AN ELECTRIC TRANSFER PUMP

To make sure the genset works properly and to make sure its internal tank always stays at the required level, it may be advisable to install an external fuel storage tank. To do this, the generator set should be fitted with a fuel transfer pump and the fuel supply line from the storage tank should be connected to the genset’s connection point.

As an option, you can also install a non-return valve at the genset’s fuel inlet to prevent the fuel from overflowing should there be a difference in level between the genset and the external tank.

Recommendations:
- To prevent air from getting in when the fuel level in the tank drops, we recommend that you install the storage tank supply line as deep as possible and at least at a distance of no less than 5 cm from the bottom of the tank.
- When filling the tank, we recommend that you maintain a free space of at least 5% to prevent possible spillage due to the fuel expanding when it gets hot, always making sure not to let any impurity and/or humidity into the system.

OPTION 1: EXTERNAL FUEL TANK WITH AN ELECTRIC TRANSFER PUMP
• We recommended that you locate the fuel storage tank as close as possible to the engine, at a maximum distance of 20 metres from the engine, and that both should be on the same level.

2. EXTERNAL FUEL TANK WITH A THREE-WAY VALVE.

Another possibility is to feed the generator set directly from an external storage and supply tank. For this you will have to install a supply line and a return line. The generator set can be equipped with a double-body 3-way valve that allows the engine to be supplied with fuel, either from an external tank or from the genset's own internal tank. To connect the external installation to the generator set, you need to use quick connectors.

Recommendations:
• You are best advised to maintain a clearance between the supply line and the return line inside the tank to prevent the fuel from heating up and to stop any impurities from getting in, which could be harmful to the operation of the engine. The distance between the two lines should be as wide as possible, with a minimum of 50 cm, where possible. The distance between the fuel lines and the bottom of the tank should be as short as possible and not less than 5 cm.
• At the same time, when filling the tank, we recommend that you leave at least 5% of the total tank capacity free and that you place the fuel storage tank as close to the engine as possible, at a maximum distance of 20 metres from the engine, and that they should both be on the same level.

3. INSTALLATION OF AN INTERMEDIATE TANK BETWEEN THE GENSET AND THE MAIN TANK.

If the clearance is greater than that specified in the pump documentation, if the installation is on a different level than that of the generator set, or if so required by the regulations governing the installation of fuel tanks, you may need to install an intermediate tank between the genset and the main tank. The fuel transfer pump and the placement of the intermediate supply tank must both be appropriate to the location chosen for the fuel storage tank. The latter must be in accordance with the specifications of the fuel pump inside the generator set.

Recommendations:
• We recommend that the supply and return lines be installed as far apart as possible inside the intermediate tank, leaving a minimum of 50 cm between them whenever possible. The distance between the fuel lines and the tank bottom should be as little as possible and no less than 5 cm. A clearance of at least 5% of the total tank capacity should be maintained.
• We recommended that you locate the fuel storage tank as close as possible to the engine, at a maximum distance of 20 metres from the engine, and that they should both be on the same level.

Finally, and this applies to all three options shown, it may be useful to install the tank at a slight inclination (between 2° and 5°), placing the fuel supply line, the drainage and the level meter at the lowest point. The design of the fuel system shall be specific to the characteristics of the installed generator set and its components; taking into account the quality, temperature, pressure and necessary volume of the fuel to be supplied, as well as preventing any air, water, impurity or humidity from getting into the system.

OPTION 2: EXTERNAL FUEL TANK WITH A THREE-WAY VALVE

OPTION 3: INSTALLATION OF AN INTERMEDIATE TANK BETWEEN THE GENSET AND THE MAIN TANK
FUEL STORAGE. WHAT IS RECOMMENDED?

Fuel storage is essential if the generator set is to function properly. It is therefore advisable to use clean tanks for fuel storage and transfer, periodically emptying the tank to drain decanted water and any sediment from the bottom, avoiding long storage periods and controlling the temperature of the fuel, as excessive temperature increases can reduce the density and lubricity of the fuel, decreasing the maximum power output.

Don’t forget that the average life span of good quality diesel oil is 1.5 to 2 years, with proper storage.

FUEL LINES. WHAT YOU NEED TO KNOW.

Fuel lines, both supply and return, should prevent overheating, which could be harmful due to the formation of vapour bubbles that can affect the ignition of the engine. Pipelines should be black iron with no welding. Avoid galvanized steel, copper, cast iron and aluminium pipelines as they can cause problems for fuel storage and/or supply.

In addition, flexible connections to the combustion engine must be installed to isolate the fixed parts of the plant from any induced vibrations. Depending on the characteristics of the combustion engine, these flexible lines can be made in different ways.

WARNING! WHATEVER YOU DO, DON’T FORGET...

- Avoid pipeline joints, and if they are unavoidable, make sure they are hermetically sealed.
- Low level suction pipelines should be located not less than 5 cm from the bottom and at a certain distance from the fuel return pipelines.
- Use wide radius pipeline elbows.
- Avoid transit areas near exhaust system components, heating pipes or electrical wiring.
- Add shut-off valves to make it easier to replace parts or maintain pipelines.
- Always avoid running the engine with the supply or return line closed, as this can cause serious damage to the engine.

CONCLUSIONS

The way we install the fuel supply lines, the way we establish the connections between the tank and the generator set and the different characteristics and eventualities of each model are crucial when implementing a project with this type of machinery. An installation error can ruin the investment made and it can pose a potential hazard due to fuel spillage or leakage. That is why we must take all these considerations into account so that we can get the most out of our installation.

In HIMOINSA, a team of technical professionals provides advice in each project regarding the best fuel installation system in accordance with the customer’s needs and the peculiarities of each installation.