

Installation Guide

Fuel Installation

General Considerations

External fuel tank installation options

- External fuel tank with electrical fuel transfer pump
 - External fuel tank with 3-way valve
 - Intermediate tank between the genset and the main tank installation
-

Fuel storage

Fuel lines. Topics to have in consideration

Fuel installation

Generator sets include a fuel tank as standard which is installed inside the bedplate, and is supplied directly, with it only being necessary to control the fuel level according to the use given to the genset.

In some cases, for reasons of autonomy because of the use given to the genset or to minimize refuelling operations, **the installation is provided with a separate larger reservoir with an electric pump, which maintains the fuel level in the tank of the genset or supply it directly.**



The location, materials, dimensions, components, installation, ventilation and inspection will be performed by the customer, who must comply with current regulations governing oil installations for own use in the country where the installation is to be carried out.



With fuel installations for standard static gensets, the same instructions should be followed, connecting the fuel system directly to the appropriate components (transfer pump, internal tank, etc.).



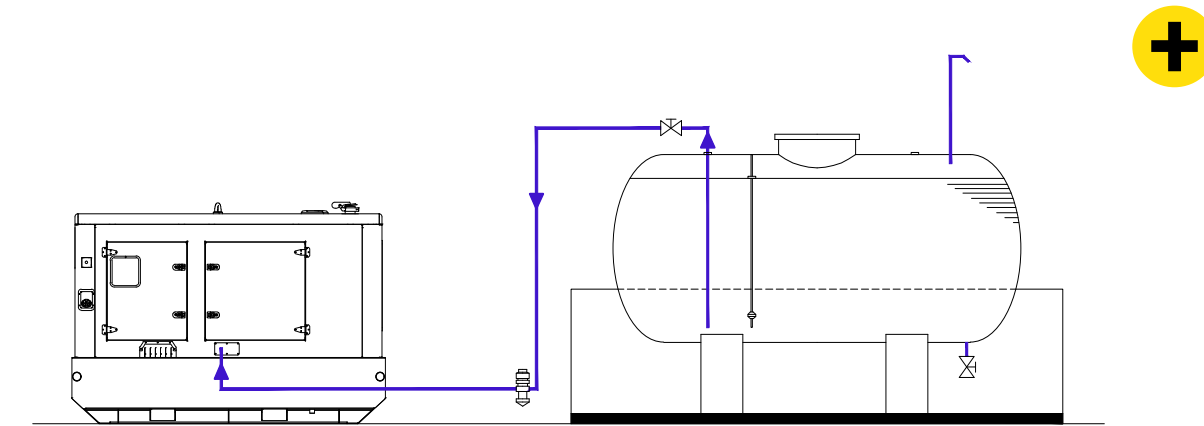
It is important to consult, and follow, with particular attention the provisions set out in regulations related to the installation of fuel systems, given that in some countries fuel is classified as a "dangerous product". Also, it is important to consult the technical specifications of the installation components included in the genset, following its assumptions.

External fuel tank installation options

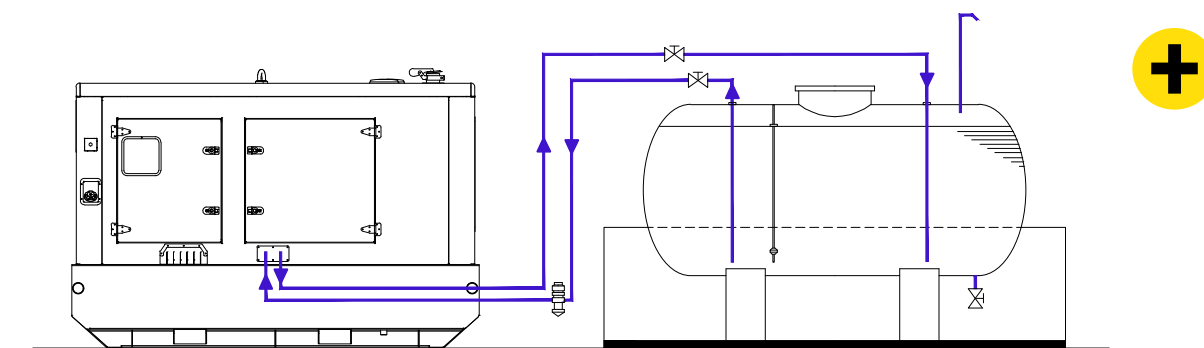
For higher autonomies, and for satisfying special demands, it is a need to install an external fuel tank.

For storage, in order to keep always full daily fuel tank, or feeding directly genset from external fuel tank. These optionals are the best solution to improve genset autonomy

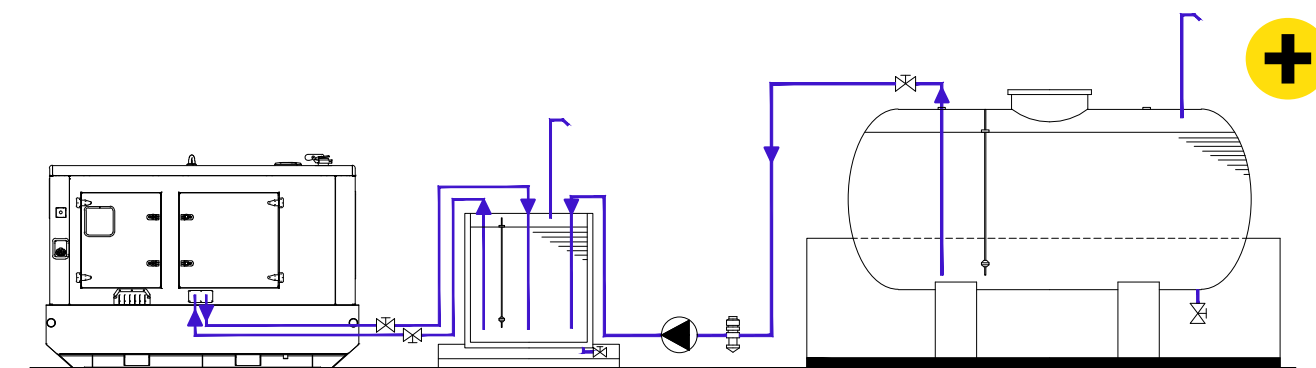
External fuel tank with electrical fuel transfer pump



Depósito externo de almacenamiento con válvula de 3 vías



Instalacion de depósito intermedio entre el grupo y el depósito principal

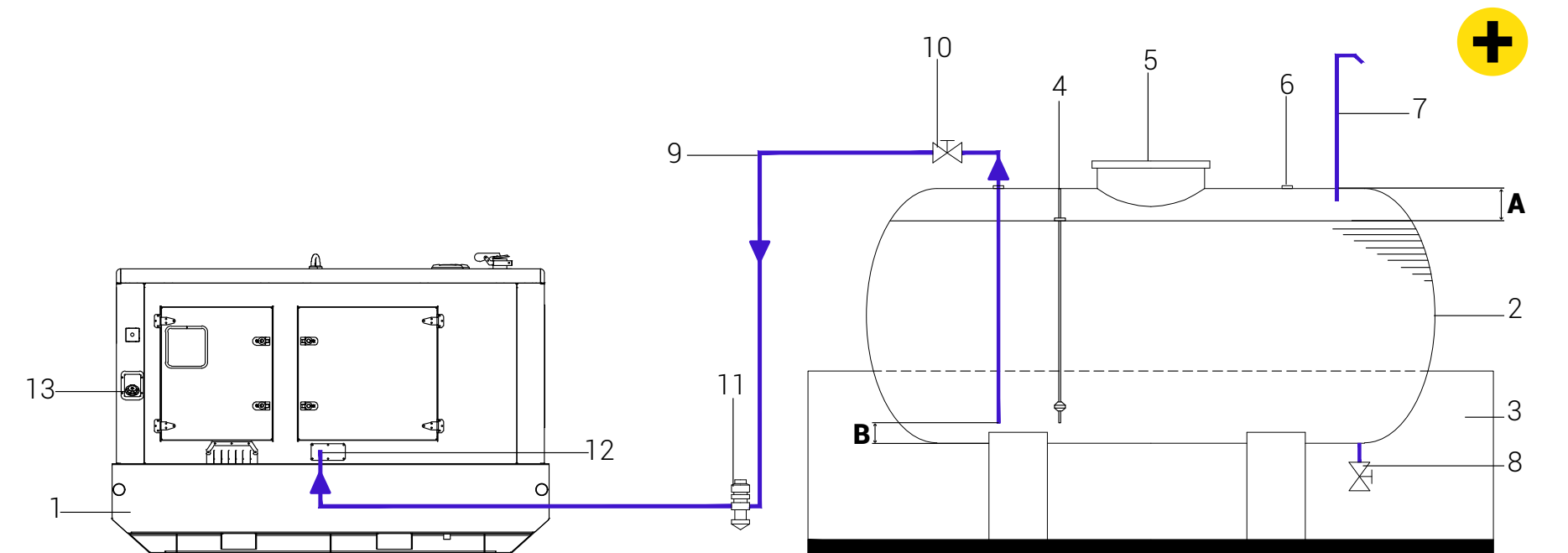


External fuel tank with electrical fuel transfer pump

It may be interesting to install an outside fuel storage tank, which always keeps the daily tank at necessary level for proper operation.

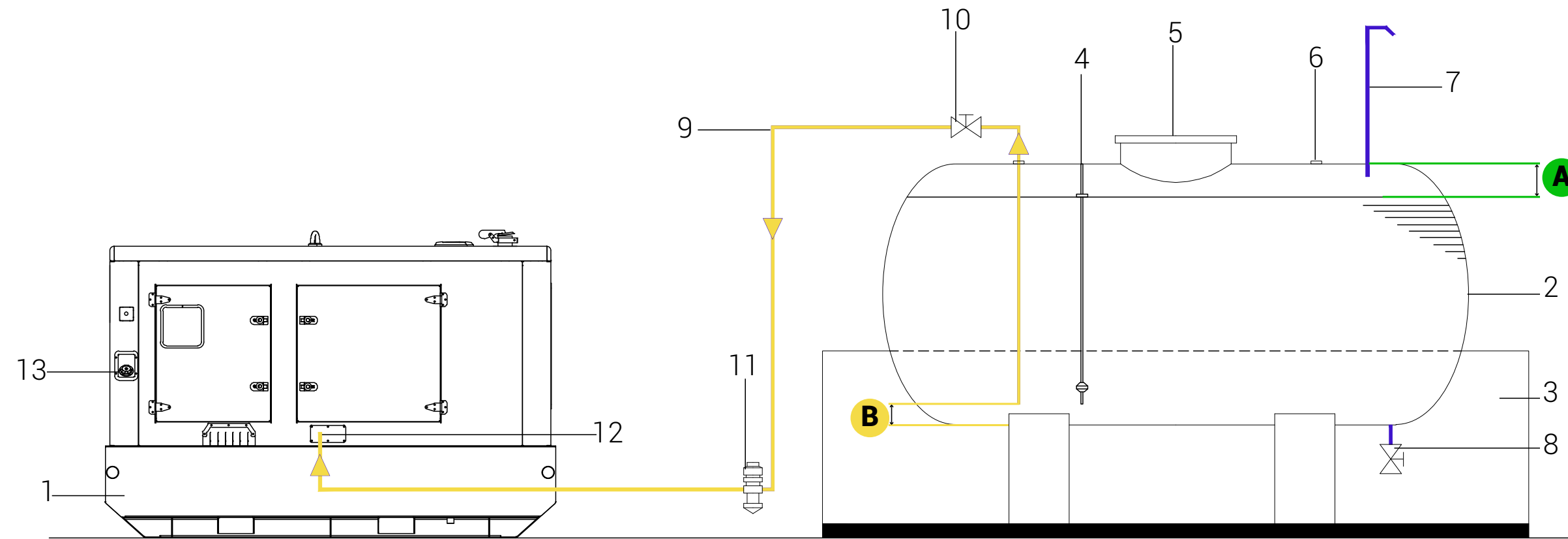
To do this, upon request, the generator set incorporates a fuel transfer pump, being necessary to connect the fuel supply line from the storage tank to the connection point of the genset.

As optional, it is possible to install a non-return valve at the genset inlet, in order to avoid fuel overflows in case where genset and external fuel tank heights are different.



1. Internal supply tank	8. Drainage line
2. Storage tank	9. Supply line
3. Collection vat	10. Shutoff valve
4. Fuel level indicator	11. Fuel filter
5. Maintenance hatch	12. Fuel pump connection
6. Storage tank supply	13. Punto de alimentación directa
7. Vent line	

External fuel tank with electrical fuel transfer pump



It is advisable to install the storage tank supply line as deep as possible, at a distance **B** not less than 5 cm from the bottom of the tank, thus avoiding the supply of air when the fuel level in the tank is low.

In turn, when filling the tank it is recommended that a clearance **A** of at least 5% is maintained to prevent spills due to fuel expansion caused by warming, always avoiding the penetration of dirt and/or moisture into the system.

It is recommended that the fuel storage tank is placed as close to the engine as possible, with a maximum of 20 metres of separation from the engine, with both at the same level. Consult the documentation of the fuel transfer pump for more detailed information on other possible configurations.

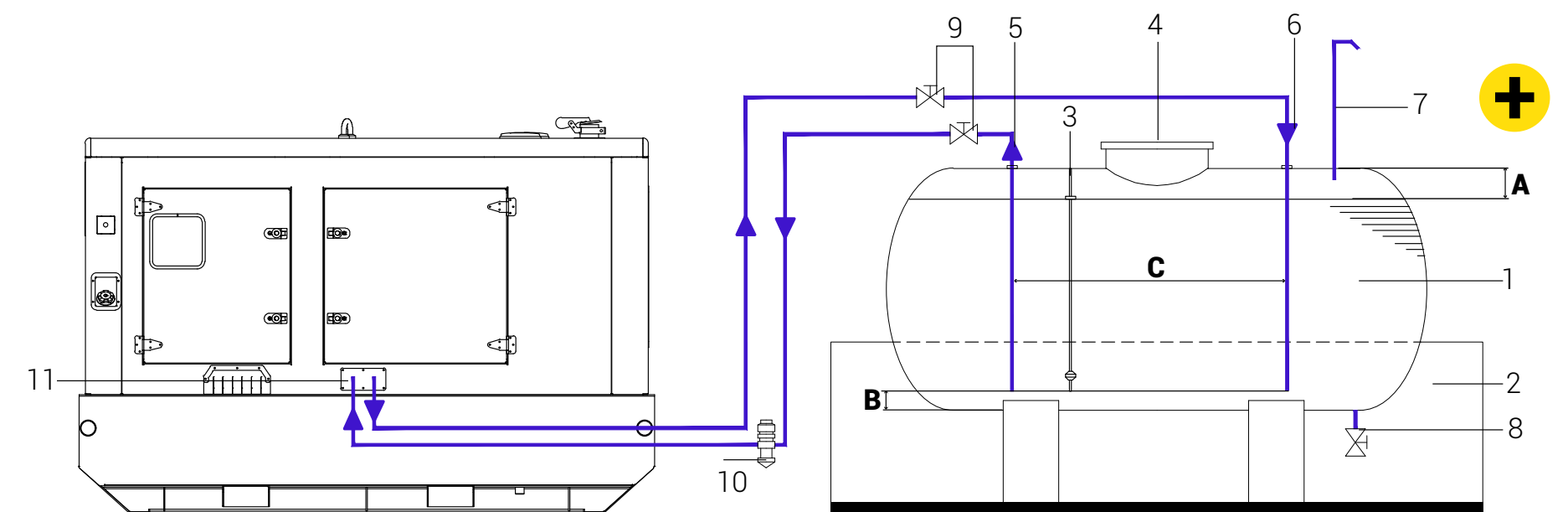
Back

External fuel tank with 3-way valve

Another possibility may be to feed the generator set directly from an external storage and supply tank.

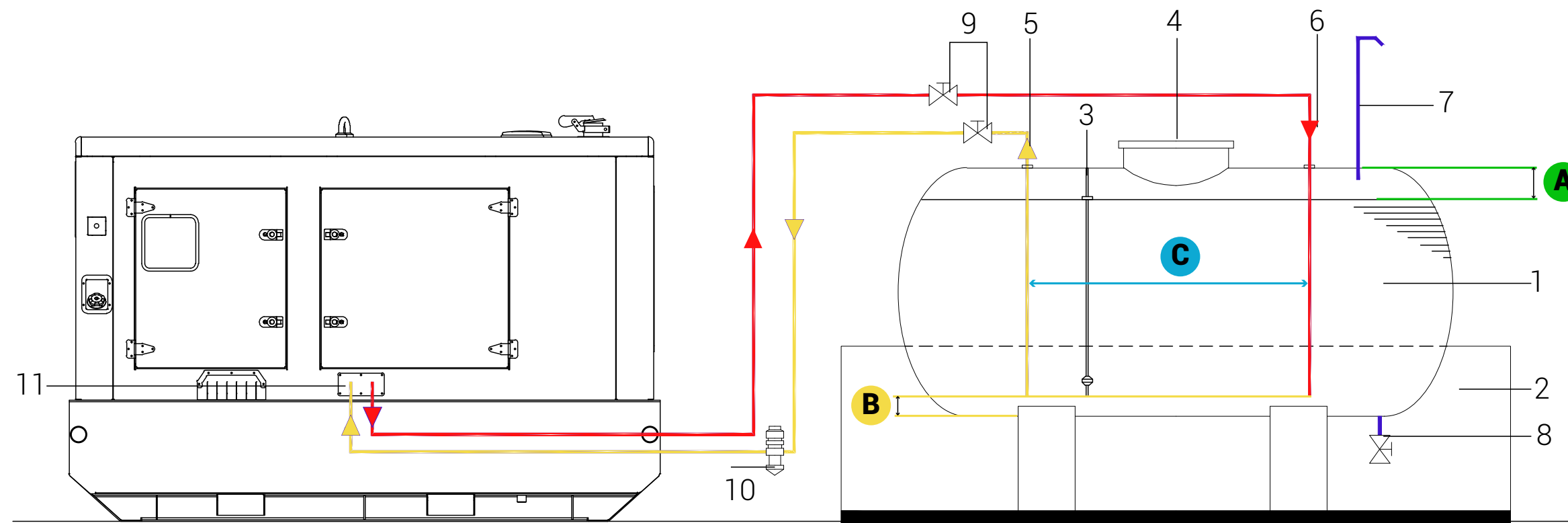
It will be necessary to install a supply line and a return line.

Upon request, gensets may have a double 3-way valve which allows to feed fuel to engine, from a external fuel tank or from daily tank. For conection we will fit quick connectors.



1. Storage and supply tank	7. Vent line
2. Collection vat	8. Drainage line
3. Fuel level indicator	9. Shutoff valves
4. Maintenance hatch	10. Fuel filter
5. Supply line	11. Fuel connection point
6. Return line	

External fuel tank with 3-way valve



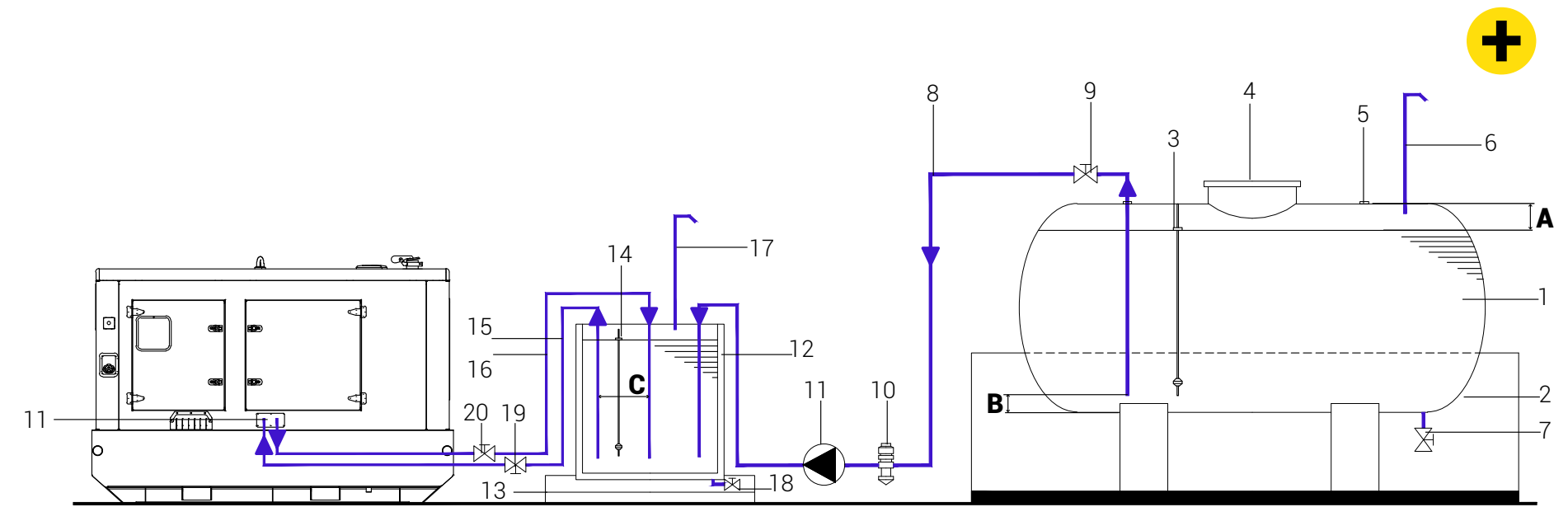
It is advisable to maintain a separation between the supply line and the return line inside the tank to avoid overheating the fuel or allowing impurities to enter which may be detrimental to engine operation. The separation between the two lines **C** should be at the maximum possible, with a minimum of 50 cm, provided this is possible. The distance **B** between the fuel lines and tank bottom should be at low as possible, although not less than 5 cm. Similarly, when filling the tank it is recommended to keep a clearance **A** of at least 5% of the total capacity of the tank and position the fuel storage tank as close to the engine as possible, with a maximum of 20 metres of separation from the engine, with both at the same level. Ensure that the maximum level of fuel in the supply tank is below the height of the injectors. Consult the documentation of the fuel supply pump for more detailed information on other possible configurations.

Back

Intermediate tank between the genset and the main tank installation

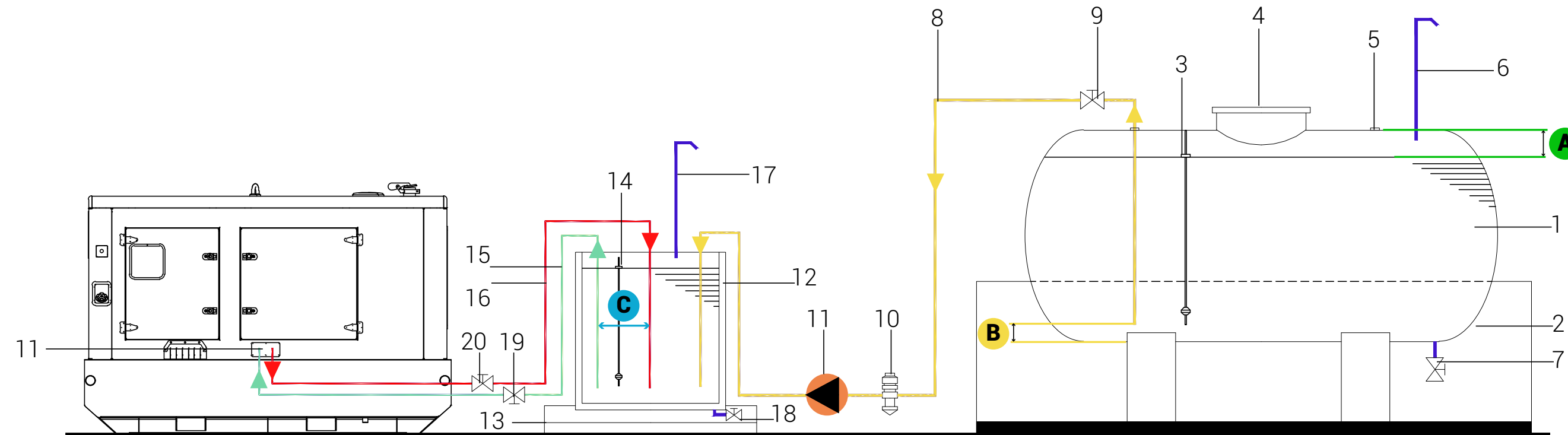
In the case of separation which is greater than that specified in the documentation of the pump, installations at a different level to the generator set or due to the requirements of the regulations related to the installation of fuel tanks, the use of an intermediate tank between the genset and the main tank may be needed.


The fuel transfer pump should be appropriate for the chosen location of the fuel storage tank; as well as the placement of the intermediate supply tank, the latter being in line with the specifications of the fuel pump inside the generator set.



1. Storage tank	11. Fuel transfer pump
2. Fuel storage collection vat	12. Intermediate tank
3. Fuel level indicator	13. Intermediate tank collection vat
4. Maintenance hatch	14. Fuel level indicator
5. Storage tank supply	15. Generator set supply line
6. Storage tank vent line	16. Generator set return line
7. Storage tank drainage line	17. Intermediate tank vent line
8. Intermediate tank supply line	18. Intermediate tank drainage line
9. Intermediate tank supply shutoff valve	19. Generator set supply shutoff valve
	20. Generator set shutoff valve
10. Fuel filter	21. Generator set connection point

Intermediate tank between the genset and the main tank installation



The fuel transfer pump  should be appropriate for the chosen location of the fuel storage tank; as well as the placement of the intermediate supply tank, the latter being in line with the specifications of the fuel pump inside the generator set.

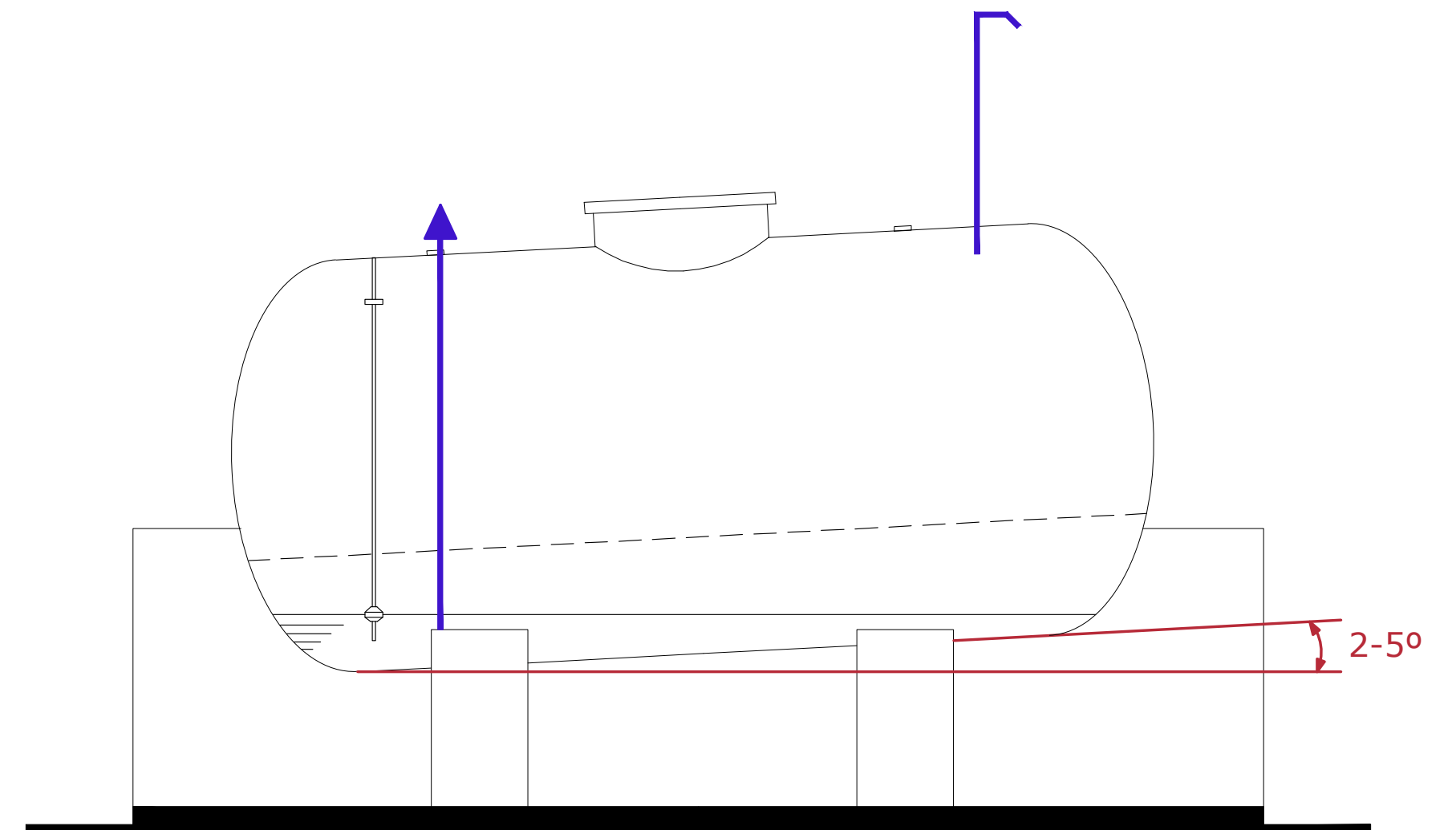
As above, it is recommended that the supply and return lines inside the intermediate tank **C** be installed with greater separation, with a minimum of 50 cm, if possible. The distance **B** between the fuel lines and tank bottom shall not be less than 5 cm and a clearance **A** must be kept of at least 5% of the total tank capacity.

It is recommended that the fuel storage tank is placed as close to the engine as possible, with a maximum of 20 metres of separation from the engine, with both at the same level; ensuring that the maximum level of fuel in the supply tank is below the injectors. Consult the documentation of the fuel supply pump for more detailed information on other possible configurations.

Back

It may be useful to install the tank at a slight angle (between 2° and 5°), placing the fuel supply line, drainage line and level meter at the lowest point.

The design of the fuel system will be specific to the characteristics of the generator set installed and its components; having considered the quality, temperature, pressure and volume required of the fuel to be supplied as well as preventing the entry of air, water, dirt and moisture into the system.



Fuel storage

Fuel storage is essential for the proper functioning of the generator set. **It is therefore advisable to use clean tanks for the storage and transfer of fuel, periodically emptying the tank to drain the decanted water and sediments on the bottom, avoiding long periods of storage and controlling the fuel temperature as excessive temperature increases may reduce fuel density and lubricity, reducing the maximum power output.**



The average service life of good quality diesel is 1.5 to 2 years, provided proper storage is always carried out.



Fuel lines. Topics to have in consideration

Avoid excessive heating of the fuel lines, both supply and return, as this could be harmful due to the formation of vapour bubbles that will affect engine ignition.

The pipes shall be made of seamless black iron, avoiding galvanized steel, copper, cast iron and aluminium, as these materials can be problematic for fuel storage and/or supply.

Flexible connections have to be used with the combustion engine to isolate the fixed parts of the installation from any possible induced vibrations. Depending on the characteristics of the combustion engine, these flexible lines can be carried out by:

- Sections, of suitable length, of reinforced rubber pipes with flexible inserts which are resistant to diesel oil using tubing connections with edges and closed with screw clamps for connections to the terminal.
- Low pressure type flexible pipes, suitable for diesel oil, protected by wire mesh and screw terminals for sealing.

In addition, the design of the fuel line must take into account:

- The piping must be fixed by means of brackets at regular intervals so that the vibrations and inflections caused by the weight of piping are avoided. Consider positioning the installation in low conduits in the vicinity of the genset.
- Avoid, as far as possible, creating pipeline connections. In the event they need to be carried out, they must be sealable, especially in parts which are subject to depression (fuel suction inlet), to prevent air infiltration which can make it more difficult to start.
- The suction pipelines under the fuel level should be at least 5 cm from the bottom, and suitably distanced from the fuel return pipeline to avoid the possible suction of impurities in the diesel oil at the bottom of the tank; guaranteeing an air-free fuel supply at all times.
- Avoid sharp changes in the direction of the piping using elbows with large curvature radii.
- Avoid having transit areas close to the components of the exhaust system, heating pipes or electrical wiring.
- It is recommended to have shut-off valves at appropriate points to allow thorough cleaning, repair or replacement of pipes without the need to empty the entire system. Keep in mind that operating the engine with the supply or return line closed may cause serious damage.



Keep in mind that operating the engine with the supply or return line closed may cause serious damage.