TECHNICAL NEWS

CORTEM GROUP
To be sure to be safe.

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Prevention during the phases of fuels loading and unloading in petrol filling stations

As often happens, people's sensitivity to certain issues and events increases when accidents occur, even fatal, in proportion to the severity of the accident.

Recent news events lead us to a more than necessary reflection on the activities of loading and unloading fuels at petrol refuelling stations.

Everyone will have witnessed, during the refuelling operations of his car, the loading of tanks buried by self-propelled vehicles without paying attention to the procedures put in place during these operations nor to the clearly written instructions on each pump such as switch off the engine, do not smoke and last but not least, switch off the mobile phone.

1. What could be the causes that trigger explosions in gas stations?

In the case of an explosion generated by the combustible exhaust means (tanker), it can be assumed that this event may be caused by incorrect use of the tanker's earth connection, which, as is known, traveling on rubber, is electrostatically charged during the journey and is isolated from the ground.

This condition means that the means of transport is electrostatically "loaded" and therefore in a condition of potential difference to earth.

The basic condition is to ensure that the means of transport is connected to the ground system of the loading/unloading bay and that the transfer systems are not activated unless after having received a consent from the specific device for measuring the equipotential grounding of the metal mass of the transport vehicle has occurred.

A grounding system, such as the Cortem GRD-4200 series certified for the "SIL 2" level (TUV Italia certificate No. C-IS-252099-01), must comply with all safety regulations and carry out the standard procedure:

1. Activation of the "earthing system", with the verification of its functionality (red light on)
2. Connect the device to the grounding system of the installation (if not already connected)
3. Connect the grounding clamp of the device to the ground point of the tanker
4. Turn the selector on the device in the "Start" position keeping it in position for not less than two seconds
5. Verify that the green light has turned on and consequently the red light has turned off, and if the green light is on, release the selector referred to pos. 4
6. The device is properly inserted, and the tanker is equipotential with the main plant ground system

7. The device, via a signalling contact of functional status, send to the control room or to the loading/unloading bay management system, the signal "Ready to dispense", in order to enable the loading system to operate with the opening of the inlet valve and activate the loading pump.

8. During the entire loading/unloading phase, the device monitors the status of equipotentiality of the grounding system and, if the value, between 0 and 40 ohm, should be exceeded, provides to remove the consent of operation of the upload pump and close the inlet valve.

9. In the latter case, the operator must verify that the ground connection has not been tampered and control the functionality of the system, with the restoration of the initial conditions.

10. At the end of the loading/unloading operations, must be removed the connection hose to the tanker and unplug the grounding system between tanker and earthing system, by turning off the device and then disconnecting the ground wire from the tanker.

This condition implies that each filling station has at its disposal a grounding system for the tanker used to load fuels.

2. Can not the grounding system be systematically installed on fuels transport vehicles?

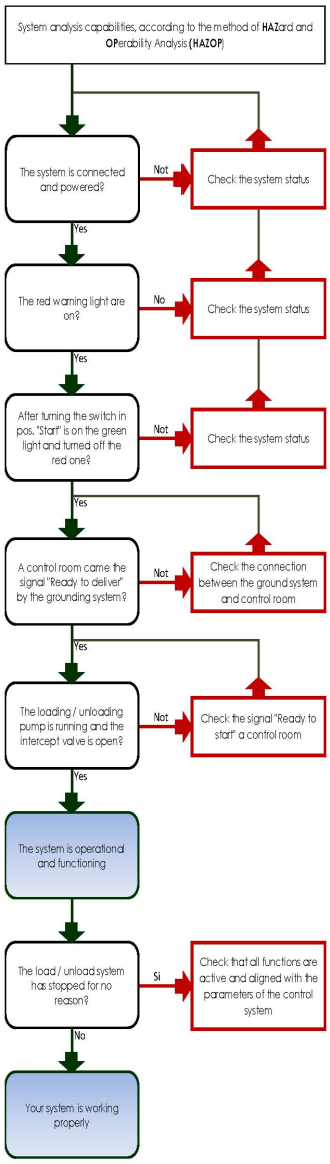
Certainly, if such a device were installed on all fuel transport vehicles, the possibility of accidents would be reduced to a minimum.

But how can a fixed system coexist with a mobile system?

In principle, both systems must interact with the loading system (load pump) which cannot be activated if the tanker has not been placed in equipotentiality with the load bay grounding system. This interaction comes only from a system of logical process that must be designed in full compliance with the precautions to be taken to protect people and t things but that both situations must coexist for a total guarantee.

Already in a previous newsletter we had addressed this problem and, in order to better understand it, we report the flow of the risk analysis that must be considered for the safety of these high-risk operations.

This flow indicates that the means of transport has been correctly placed in equipotential conditions and that therefore there are no possible causes of explosive initiation resulting from electrostatic charges.



3. The non-observance of the prescriptions on the spilling columns

Another problem is the failure to comply with what is prescribed on the warning plates placed on all the supply columns.

Often it happens to witness unpleasant situations, also taken by the security cameras placed on the filling stations, which show how much is the superficiality of those who are preparing to refuel.

Have we ever wondered why smoking or keeping the engine running or talking on a cell phone is forbidden in service stations? According to the main oil companies, smoking or keeping the engine running in the presence of petrol vapours can be the source of an explosion caused by the heat source of the cigarette or the engine exhaust that has a high temperature. Similarly, the same problem can occur when we keep the cell phone on and converse during the fuel withdrawal phase.

However, it should be noted that it is not the mobile phone that is the real cause of the explosion, but rather the electrostatic charges that are generated as a result of our behaviour. If we stay away once we leave the car until the end of the refuelling, there will be no consequences. On the other hand, if we go back into the car during the refuelling, the rubbing between our clothes and the seat fabric can electrostatically charge us, especially when the weather conditions are low in humidity (particularly calm and windy days). Our body will become the driving element of the accumulations of energy (condenser effect) that are generated and, in contact with metal masses unlike potential, such as the fuel distributor, generates an electrostatic discharge source of the explosive start for the flammable substances.

4. Conclusions

With this brief analysis we wanted to emphasize that greater attention and a greater number of protective systems can significantly reduce the possible causes of accidents during the loading/unloading phases of tanks containing liquids or potentially flammable gases trusting in the common sense of the public.

We also point out that the same problem arises even when substances in the dusty state are moved, which can also be a cause of fire, so they must have the same attention in handling, storage and handling.