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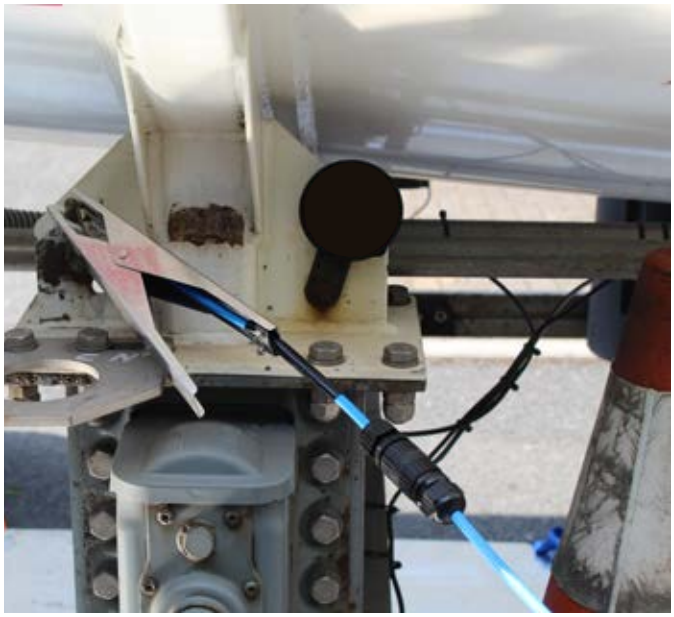
Technical Article

Grounding Road Tankers (Tank Trucks) Resistance Vs Impedance Vs Capacitance, Ground Resistance & Continuous Ground Loop Monitoring

Grounding road tankers during hazardous gas, liquid & powder transfers can be a difficult business due to lack of training of the driver (e.g. lowering the trailer legs and connecting hoses before the grounding system has a GREEN LED flashing), lack of routine maintenance of the system, weather and ground conditions (snow, ice, rain and salt).

An Ideal Road Tanker Grounding installation:

1. Must have a verified ground connection that is checked by a responsible electrical engineer on a routine basis.
2. Must have a designated ground point on the truck with a metal to metal connection to the chassis and tank of less than 10 Ohms. Designated grounding points are usually brass pins or stainless-steel tabs and must be clearly identified.
3. Must have a grounding system that complies with Industry Standards, Guidance and Recommended Practices (IEC TS 60079-32-1, NFPA77 and API RP 2003).
4. Must have a grounding system installed to Ex/manufacturers specifications and has routine maintenance carried out by a responsible electrical engineer.



Resistance Based Road Tanker Grounding Systems

Resistance based road tanker grounding systems have visual indication and interlock capabilities. However, their ability to measure low levels of resistance are massively different.

The Newson Gale Earth-Rite® II PLUS system is able to monitor the loop from the teeth of the clamp to the verified ground connection to less than 10 Ohms and fully complies with the above Industry Standards, Guidance and Recommended Practices.

Other competitive systems range from a few hundred Ohms to 35 K Ohms exhibited by the worst example, and they do not comply with any of the above Industry Standards, Guidance and Recommended Practices.

All resistance based grounding systems can be “tricked” by users into thinking they are connected to a Road Tanker if they are attached to other metallic objects i.e. spanner, railings, etc. The “whys and wherefores” of this type of action are very questionable but unfortunately it does happen regularly.

Impedance Based Road Tanker Grounding Systems

Impedance based road tanker grounding systems have visual indication and interlock capabilities. Electrical Impedance is the total opposition to alternating current by an electric circuit, equal to the square root of the sum of the squares of the resistance and reactance of the circuit and usually expressed in ohms. Symbol: Z.

Impedance is a complex mixture of resistance, capacitive and inductive reactance. The grounding systems that are impedance based are usually set up at the site because they are affected by cable length/capacitance and environmental conditions. Impedance based grounding systems do not comply with the relevant International Standards, Guidance and Recommended Practices. The impedance based systems may be able to detect the presence of a road tanker and infer the resistance of the verified earth however it cannot monitor the less than 10 Ohm loop between the teeth of the clamp on the truck back to verified earth point as required in the standards etc.

Capacitance Based Road Tanker Grounding Systems

Capacitance based road tanker grounding systems have visual indication and interlock capabilities. Capacitance based grounding systems fully comply with the relevant International Standards, Guidance and Recommended Practices.

They can detect the typical capacitance footprint of a road tanker, can check that the connection to true earth is less than 1000 Ohms and therefore good enough to dissipate static easily and then they switch into continuous ground loop monitoring to ensure that the resistance between the teeth of the clamp and the verified earth point is less than 10 Ohms.

Please remember to always put the grounding clamp on the road tanker first and get GREEN permissive flashing LED before any other actions are started i.e. attaching hoses, lowering the trailer legs, moving a loading arm into place over the road tanker etc.

Please also always use a capacitance based grounding system for full compliance with the relevant International Standards (IEC 60079-32-1), Guidance (NFPA 77) and Recommended Practices (API RP 2003). They just work out of the box without on-site calibration or setup whatever the conditions.

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