

In addition to the renowned product range of quality rubber hoses, Elaflex also offers Type FWS composite hoses for petroleum based products and chemicals.

Composite hoses consist of electrically non conductive wrapped layers of thermoplastic films, joined together in circular shape by an outer and inner helix. Often, the inner helix is coated with a non-conductive plastic, e.g. our Type FWS-PP, see catalogue page 181.

Due to their design and construction, the use of composite hoses are subject to special requirements with regards to electrical conductivity which are explained below in detail.

Use with Flammable Liquids in Ex-Zones

When using composite hoses for flammable liquids, not only the chemical and physical suitability but also all requirements regarding the safe dissipation of electrostatic energy have to be considered. These are defined in the EN 13765 and in the International "electrostatics" standard IEC 60069-32-1.

According IEC, a use in potentially explosive filling areas 'Ex-Zones' (Zone 0, Zone 1, Zone 2) shall be permitted only when **both metal helixes are non-isolated (not plastic coated) and bonded electrically safe with the metal couplings**, to allow a safe dissipation of electrostatic energy via the inner/outer helix and the couplings.

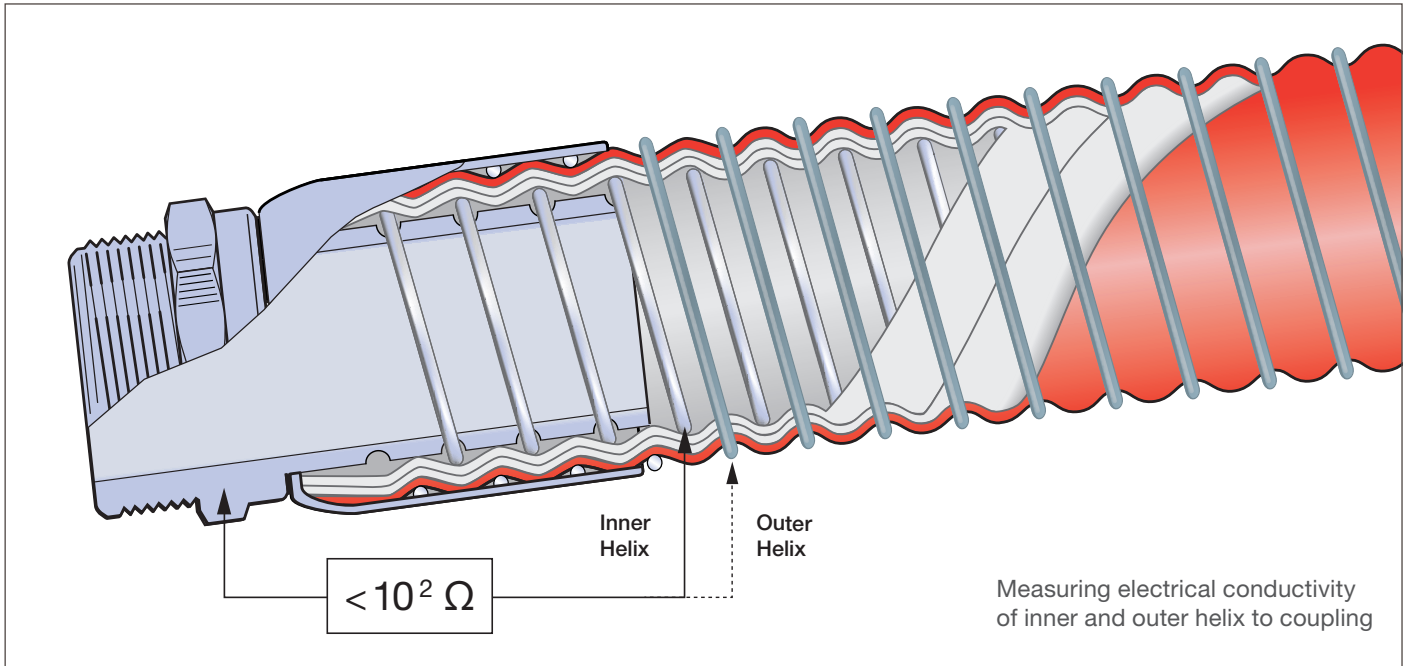
In other words: If composite hose assemblies for the transfer of flammable liquids (whose gases can form explosive mixtures) are used in Ex-Zones:

- a) the hose shall be constructed with a non-isolating (i. e. non-coated) inner *and* outer helix, and
- b) both inner and outer helixes must be bonded electrically safe with the metal couplings.

Re (a): For the application mentioned above, only use composite hoses with non-coated inner and outer helix – we recommend Type **FWS PTFE** (both helixes stainless steel) or Type **FWS PP St/St** (both helixes zinc plated steel).

Re (b): With the common conductivity measurement (externally, between metal hose ends) it is not possible to note a non-bonded helix of a composite hose. A thorough check is only possible by measuring both the inner and outer helix against the coupling – on both sides. On request, Elaflex will suggest a suitable method.





General remark: Composite hoses shall not be used when so-called stray currents can be expected in the environment of the hose, see also Information 7.11 E.

Use with Electronic Cross-Over Prevention Systems

The loading and offloading of road tankers at petrol stations is often electronically monitored by cross-over prevention systems (COP).

With composite hoses, data signals have to be transmitted via the metal helices of the hose, from one end of the hose to the other. However, they may be more susceptible to outside interference i.e. ground moisture, overlapping of hose etc. A possible remedial action is to increase the electrical resistance of the

outer helix by an additional installation. Elaflex therefore offers a coupling solution with integrated and operational safe function for FWS hoses. If required, please contact the Elaflex sales team.

When using COP systems the Elaflex standard solution is to use rubber hose assemblies i.e. hose type LTW which is of a robust and durable construction, or the lightweight gravity discharge type LG.

With these hose types the helix is embedded in the rubber, insulating it from outside interferences. This system does not require any additional special equipment as it is operationally safe. During assembly the helix can be attached to the coupling in a standard procedure.

