



Chemical hoses will in future show their conductivity rating so users know what they are dealing with

# Safe conduct

**HOSES** Changes to the current CEN standard for chemical hoses aim to improve safety in flammable areas by ensuring hoses are sufficiently conductive to dissipate any electrostatic charge

The CEN standard EN 12115 presents specifications for the construction and performance of rubber and thermoplastics hoses and hose assemblies for use with liquid or gaseous chemicals. It was published in 1999; at that time Germany varied from its requirements, including in its national standards a provision that hoses marked 'Ω' should offer electrical conductivity through the hose wall, with a maximum electrical resistance of  $10^9 \Omega$ . It is that variation that has now been adopted by CEN in the revision to the standard, published as EN 12115:2011.

Under the old standard there were two types of hose: 'Ω' hoses, termed 'dissipative' in the standard, with a maximum resistance, measured between the hose end fittings, of  $10^6 \Omega$ ; and 'M' hoses, termed 'conductive', with a maximum resistance of  $10^2 \Omega$ .

The main change introduced in the new version is that hoses for use in explosive environments much offer conductivity through the hose wall, with a maximum resistance of  $10^9 \Omega$ . These are distinguished from standard hoses by the marking Ω/T or M/T, as appropriate.

Another minor change is that Ω and Ω/T hoses are now termed 'conductive' and M and M/T hoses are termed 'electrically bonded'.

## The risks explained

The reason for the standard is that hose assemblies can easily build up an electrostatic charge. This can be caused by the movement of the medium

passing through them or the movement of the hose over the ground. If not dissipated, this charge runs the risk of dissipating in the form of a spark when the hose is coupled or uncoupled, which could cause any explosive mixture to ignite.

The revised standard recognises two separate hazards. Hoses used to transfer potentially flammable liquids and gases are likely to generate an explosive atmosphere in the area around the coupling. On the other hand, if the hose assembly is used "entirely or to a major part" within an explosive environment (Ex zone) then an electrical charge on the inner surface of the hose wall must be able to dissipate safely through the hose wall, in accordance with the International Electrotechnical Commission standard IEC 60079-32-1:2011.

German hose manufacturer Elaflex explains some guidelines for selecting the appropriate hose according to EN 12115:2011.

Ω hoses are suitable for normal use and offer high security due to the use of conductive rubber mixtures in the hose itself. They are suitable for use with liquids of explosion group IIA (acetone, benzene, etc) if the hose is only partially used in a hazardous area.

Ω/T hoses offer the highest level of safety, being suitable for use within hazardous areas and for the transfer of media of a higher explosion group, such as ethylene oxide, acetylene, hydrogen, etc.

M/T hoses also offer high levels of safety. The main difference compared to Ω/T hoses is that the electrical conductivity of M/T and M hoses is

achieved by metallic conductors; this connection is likely to be subjected to high loads when the hose is being used and, in the worse case, can be broken. Regular monitoring of conductivity is recommended. Use of M/T and M hoses should also be avoided when 'stray' currents are expected in the vicinity of the hose. These may be produced by electrical generators or electrically powered vehicles working nearby.

## Care with products

Elaflex also warns that Ω and M hoses with a non-conductive inner lining but with a conductive hose cover or reinforcements may suffer damage to the lining through electrostatic discharge. This is a risk when the hoses are used to transfer some non-conductive products, such as toluene and heptane. The energy released in the discharge will not be passed to the couplings and, at high levels, can break through the hose lining, puncturing the hose itself. This can be avoided by using a Ω/T hose offering higher electrical resistance.

Elaflex has been marking its hoses with the new indicators since September. Most of its hoses for chemical applications fall under the Ω/T notation, although it also has some Ω hoses and one M hose in its range.

More information on the revised standard, as well as Elaflex's hose range, can be found on the company's website at [http://www.elaflex.de/dokumente/download/ELAFLEX\\_Information\\_7.11E.pdf](http://www.elaflex.de/dokumente/download/ELAFLEX_Information_7.11E.pdf).

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