

Increased safety

BGR-compliant transportation hoses for hazardous areas

When solids or liquids are conveyed through hoses, electrostatic charging occurs. The potential hazards from discharges are considerable. Electrically conducting and conductive hose designs from Norres comply with statutory regulations and guidelines relating to the elimination of danger sources, thus contributing to trouble-free operation of the overall plant.

Electrostatic charging occurs due to the friction of the material against the hose wall and within the medium. The degree of charging is determined by the conductivity of the medium, the flow velocity and the actual substance mixtures. The primary hazards are:

- Discharges that can ignite the explosive mixtures of gas, vapour, mist and dust
- Dangerous or unpredictable behaviour caused by shock when this discharge takes place via the human body
- Process disruptions caused by the medium sticking to the hose wall
- Malfunction of measuring devices and controllers

The first of these points is governed by various national and international regulations. Two of the most important are BRG 132 (German Employers' Liability Insurance Association guideline) and Atex Directive 94/9/EC. The other hazards are left largely to the discretion of the user. Once again, the quality requirements specified for equipment installed in hazardous areas are increasingly strict. Transportation hoses are subjected to high dynamic stresses during the course of the process and therefore need to be particularly reliable. The Norres range is suitable for a broad spectrum of applications. Several types in the Protape, Airduc

and clamp profile hose series have been adapted to take account of the most diverse requirements and safety regulations.

Hoses with PTB approval

According to BGR 132, conducting substances must have a surface resistance $<10^4 \Omega$. Conductive substances have a resistance of between 10^4 and $10^9 \Omega$, while insulating substances are neither conducting nor conductive. When it comes to hoses, however, separate values and design rules apply according to the PTB definition and with reference to the standards laid down for liquid hoses. Conducting hoses have a resistance of $<10^3 \Omega/m$. The Airduc PUR 355 EL meets this requirement. The wall is made of electrically conductive ester-polyurethane. The electrical and surface resistance of this hose are $<10^3 \Omega/m$. Being extremely robust and abrasion-proof, it is ideal for conveying abrasive substances such as powders, chips or granulates in hazardous areas.

Airduc hoses are designed with a spring steel wire firmly embedded in the wall and are welded from spiral material. Providing the spiral is earthed, the hose is conductive according to BGR 132. Airduc features a very smooth interior and high axial stiff-

ness, yet without losing its flexibility. The outstanding advantage of the Airduc PUR 355 EL is the defined, macroscopic rippling of its inside wall, which permits a higher delivery rate compared to hoses characterised by a completely smooth interior. The problem of medium settling on the hose surface is practically eliminated, with the result that other potential hazards are likewise reduced. The optimised flow properties of the profile mean pressure losses are minimised. The blower power requirements and therefore the operating costs are consequently also lower. Media with sharp edges can be conveyed without any problems thanks to the selective reinforcement at the primary points of wear. The increased pressure and vacuum resistance and the good resistance to chemicals, UV and ozone enable the hoses to be used for industrial vacuum cleaners, granulate conveying systems, blowers and compressors in hazardous areas.

For aggressive media

The Protape PE 322 EL film hose is an attractive alternative whenever aggressive gaseous media such as vapours and smoke or light dust need to be exhausted in haz-



Non-interchangeable connection technology



The CP Viton 459 EL clamp profile hose can convey aggressive solids or gaseous media

For high temperatures

According to the PTB definition, hoses with a resistance of between $>10^3 \Omega/m$ and $<10^6 \Omega/m$ are conductive (capable of discharge). This category also includes hoses made of insulating materials featuring conducting inserts that comply with certain design values and have a leakage resistance of $<10^6 \Omega/m$. The CP Viton 459 EL has an electrical and surface resistance of $<10^4 \Omega/m$. According to BGR 132 and the PTB guideline, it is conductive providing the spiral is earthed. It is designed with a patented clamp profile. A double spiral layer of Viton-coated polyester fabric is clamped in this profile. An embedded wire guarantees firm clamping of the wall in the profile and prevents slippage. The external clamp profile protects the CP Viton 459 EL against abrasion. Its good resistance to alkalis, acids and chemicals recommend it for use in hazardous areas in the chemical industry. Unlike the Airduc and Protape hose types, which can be used at temperatures from -40 to $+90^\circ\text{C}$ or from -35 to $+80^\circ\text{C}$, the CP Viton 459 EL is capable of withstanding up to 210°C . The clamp profile is perfect for

conveying aggressive solids or gaseous media such as vapours and smoke as well as for bellows and expansion joints or dust removal and suction plants.

Non-interchangeable

Conducting hoses must always be fitted with suitable coupling systems to prevent the possibility of confusion with insulating hoses (resistance $>10^6 \Omega/m$). In the majority of cases, for example, all-plastics hoses with a stranded earthing wire are only insulating because the maximum wall thickness specified in the regulation between the inner core of the hose and the outer earthing wire is too large and/or because the arrangement and/or coverage of the stranded earthing wire on the hose surface fails to meet the requirements of BGR 132. Norres implements the hose connecting elements and connectors as non-interchangeable couplings. Once the hose and the connecting element have been earthed, standardised or customised coupling systems can be joined together inseparably.

ardous areas. It has a spring steel wire embedded in the wall and is welded from spiral tape material. Owing to the use of electrically conductive polyethylene as the wall material, the Protape PE 322 EL has an electrical and surface resistance of $<10^3 \Omega/m$. It is not only extremely flexible and compressible thanks to its even folds but also lightweight yet kink-proof. The extruded film tape facilitates selective reinforcement. The patented welding procedure assures coherent, secure bonding. Providing the spiral spring steel wire is earthed, the hose is conductive according to BGR 132.

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