

# Freeze protection

IECEX certifies trace-heating cables

**Pipelines, tanks and vessels that store or transport potentially explosive substances are frequently subjected to extreme climatic conditions and huge temperature variations. Confronted with the problem of protecting equipment from freezing or ensuring that products were stored at the correct temperature, engineers were quick to find a solution: electric trace-heating cables.**

## Prevent heat loss

Pipe and vessels are subject to heat loss when their temperature is above ambient temperature. Thermal insulation reduces the rate of heat loss but does not eliminate it. Trace heating is used to replace the heat that is lost to the atmosphere. If the heat replaced matches the heat lost, temperature will be maintained.

Trace heating consists of an electrical heating element run in physical contact along the length of a pipe, tank or vessel. Heat generated by the element maintains the temperature. The object must be covered with thermal insulation to minimize heat losses.

## Historical background

Electric trace heating began in the 1930s. While at the time there was no dedicated equipment available – mineral insulated cables were run at high current densities to produce heat – the technology evolved rapidly. Mineral-insulated resistance heating cables and parallel-type heating cables that could be cut to length were introduced in the 1950s. The 1970s saw the introduction of proper control systems while networked computerized controls were developed in the 1990s.

## A wide range of applications

Trace heating is widely used both in hazardous and non-hazardous environments. Applications can be found in many industrial sectors: oil and gas,

chemical, petrochemical, pharmaceutical, food processing, refineries, pulp and paper. Nuclear power plants also make use of the technology. Trace heating is most commonly used as protection against freezing and maintenance of temperature.

## IEC International Standards...

As part of its IEC 60079 series of International Standards on explosive atmospheres, IEC TC (Technical Committee) 31: Equipment for explosive atmospheres, has developed two standards that cover general and testing



Trace heating cables are used in pipelines, here the Trans-Alaskan pipeline...

## CONFORMITY ASSESSMENT

requirements and provide guidance for the design, installation and maintenance of electrical resistance trace heating in potentially hazardous areas.

### ...and Conformity Assessment for trace heating in Ex areas

Trace-heating cables, as specified in IEC 60079-30-1 and IEC 60079-30-2, are the only type of cables tested and certified by IECEx, the IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres.

Any other type of electrical cable used in Ex areas is not considered a part of the Ex equipment and is not covered by the IECEx Certified Equipment Schemes. This is why it is all the more important to entrust electrical installations in hazardous locations to highly skilled and trained staff who are aware of the specific aspects linked to explosion protection.

### Highly skilled staff

To assess and certify individuals working in potentially hazardous areas, IECEx has developed the IECEx Certification of Personnel Competence Scheme.

The IECEx CoPC (Certificate of Personnel Competence) provides companies with independent proof that the certificate holder has the required qualifications and experience necessary to work on electrical equipment located in hazardous areas and can implement IEC International Standards covering explosive atmospheres. This can be especially important for contracting staff.

For the CoPC, competence is defined as “the ability to apply knowledge” rather than simply assessing knowledge. In this sense the assessment of persons includes assessing their ability to perform certain Ex-related tasks.

To obtain a CoPC, a person submits an application to an approved



...offshore oil platforms... (Troll A platform, Statoil / Photo Øyvind Hagen).



...or storage tanks (Photo: Statoil).

IECEx Certification Body. Regular re-assessment also ensures that the certified person maintains these competencies. The certificate is personal, non-transferable and is valid across international borders.

All IECEx Certificates are issued via the IECEx “On-Line” certificate System. Full public view is available on the IECEx website at [www.iecex.com](http://www.iecex.com)