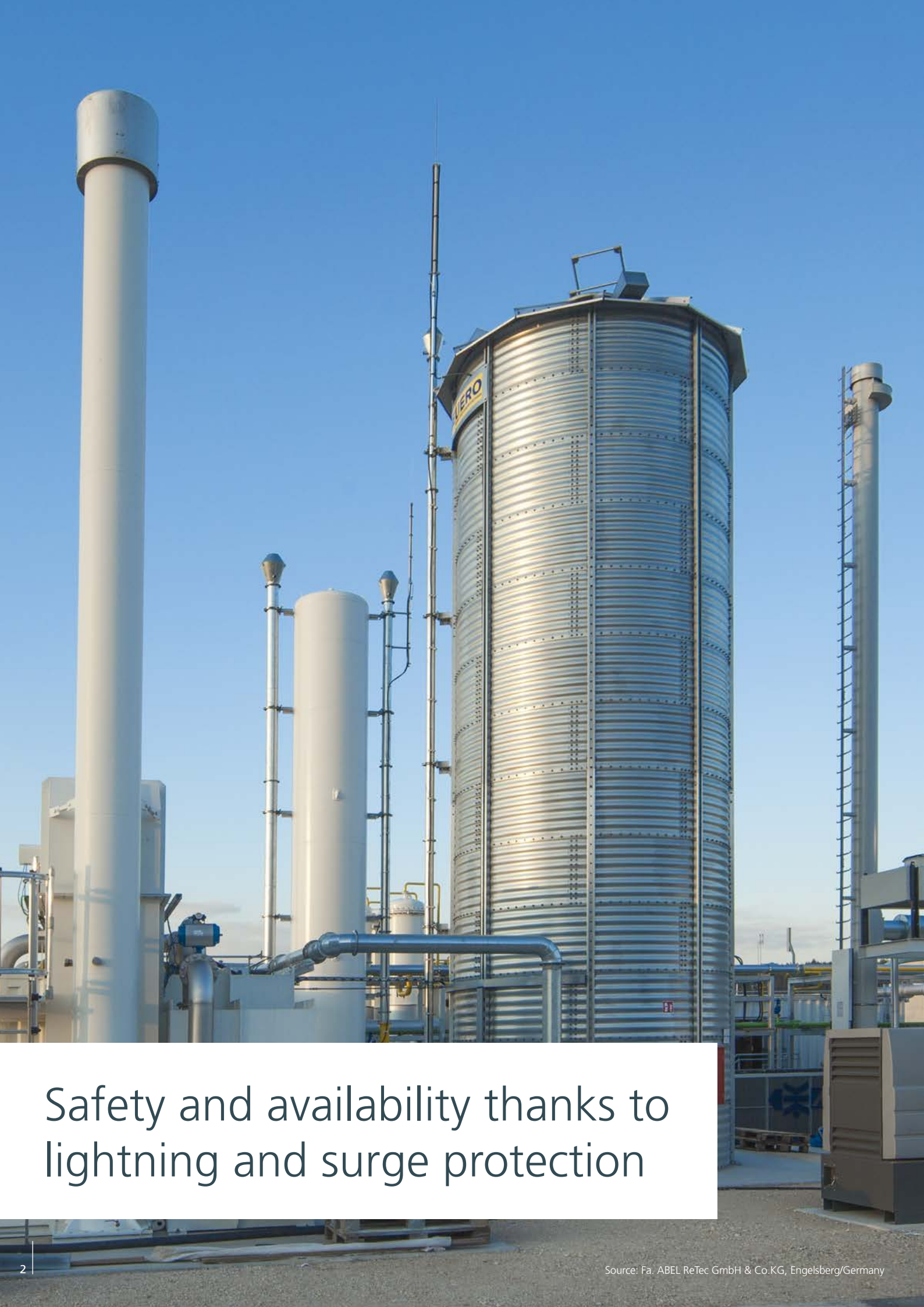


DEHN protects Biogas Plants





ABELO

Safety and availability thanks to lightning and surge protection

## Protection solutions for biogas plants

Complex and cost-intensive plants with fully automated processes are required to generate useable final products from biomass. Since an explosive mixture of gas and air is formed in the vicinity of fermentation and gas tanks, these parts are classified as potentially explosive atmospheres. Consequently, reliable protection concepts are required to ensure permanent availability and safe operation.

European directives as well as their translation into national standards and regulations describe explosion protection as well as health and safety measures\*. According to the EN 1127 standard, lightning strikes and their effects must be considered as potential source of ignition of explosive gas mixtures. Therefore, measures are required to reduce the effects of lightning strikes and to prevent ignition of potentially explosive atmospheres\*\*.

The IEC/EN 62305 standard series is an overall lightning protection concept and provides information on the assessment of risks and the planning and implementation of protection measures\*\*\*.

DEHN has long-standing know-how in lightning and surge protection for biogas plants. We offer internal and external lightning protection products and customer-specific solutions. For this reason, many biogas plant installers and operators rely on our protection solutions.

\* Directive 2014/34/EU of the European Parliament and the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres

Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres

\*\* EN 1127 Explosive atmospheres – Explosion prevention and protection

\*\*\* IEC/EN 62305 Protection against lightning

TRGS 529 Activities regarding the production of biogas



## External lightning protection for fermenters

It is crucial that the separation distance is maintained in plants with a risk of explosion to prevent dangerous sparking and flashover to conductive plant parts. The HVI®Conductor from DEHN meets this requirement since this high-voltage-resistant insulated down conductor provides an extended equivalent separation distance.

### Air-termination mast with HVI®Conductor

Air-termination masts with HVI®Conductor for a maximum total length of 12.5 m (in case of LPL II) and a maximum free length of 8.5 m.

Type	Part No.
Air-termination mast with HVI®Conductor	819 730



### Accessories

Variable holder for air-termination masts, adjustment range from 250 to 350 mm.



Type	Part No.
Variable holder for air-termination masts	105 345

Earthing busbar for connecting HVI®Conductors to the earth-termination system, 2 x 2 terminals.



Type	Part No.
Earthing busbar	472 109



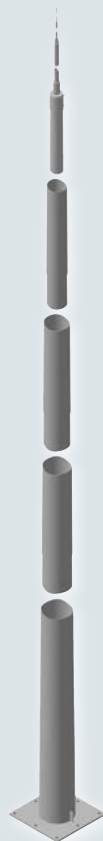
To prevent direct lightning strikes particularly in case of fermenters with large diameters, telescopic lightning protection masts have proven their worth. This system ensures that large parts are situated within the protected zone without requiring additional spanned cables.

The masts with a height up to 25 metres are installed on foundation baskets in the in-situ concrete foundation or on precast foundations.

### Air-termination masts for bucket or in-situ concrete foundations

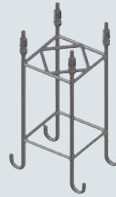
When installing air-termination masts, it is advisable to perform static calculations based on the relevant calculation data available for every type.

Type	Part No.
Air-termination mast with a height of 13.35 m	103 013
Air-termination mast with a height of 24.85 m	103 025



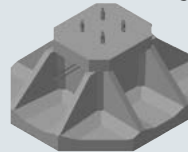
### Accessories

Foundation basket to be embedded in concrete; for mast heights up to 19.35 m or 25.85 m.



Type	Part No.
Foundation basket up to a mast height of 19.35 m.	103 040
Foundation basket up to a mast height of 24.85 m.	103 041

Bucket foundation for installing air-termination masts; for mast heights up to 19.35 m or 24.85 m.



Type	Part No.
Bucket foundation up to a mast height of 19.35 m.	103 030
Bucket foundation up to a mast height of 24.85 m.	103 031



Source: Fa. ABEL ReTec GmbH & Co.KG, Engelsberg

## Protection of gas processing plants

For the protection of gas processing plants the same applies: Lightning-related sparks, which may ignite a gas mixture or destroy electrical installations of the plant have to be avoided. In this case it is also advisable to use an isolated lightning protection system with HVI®Conductor for the external lightning protection system.

Lightning equipotential bonding for incoming metal pipelines is implemented by connection to the earth-termination / equipotential bonding system. In hazardous zones, it must be particularly ensured that these connections are secured against working loose. They are also to be tested for absence of ignition sparks.

### HVI®Conductor in supporting tube with air-termination rod

With interior sealing end and air-termination rod  
Al Ø22 /16 / 10 mm, length 2500 mm

Type	Part No.
HVI®Conductor in supporting tube with air-termination rod	819 328



### Accessories

Variable support for air-termination masts, adjustment range from 250 to 350 mm.

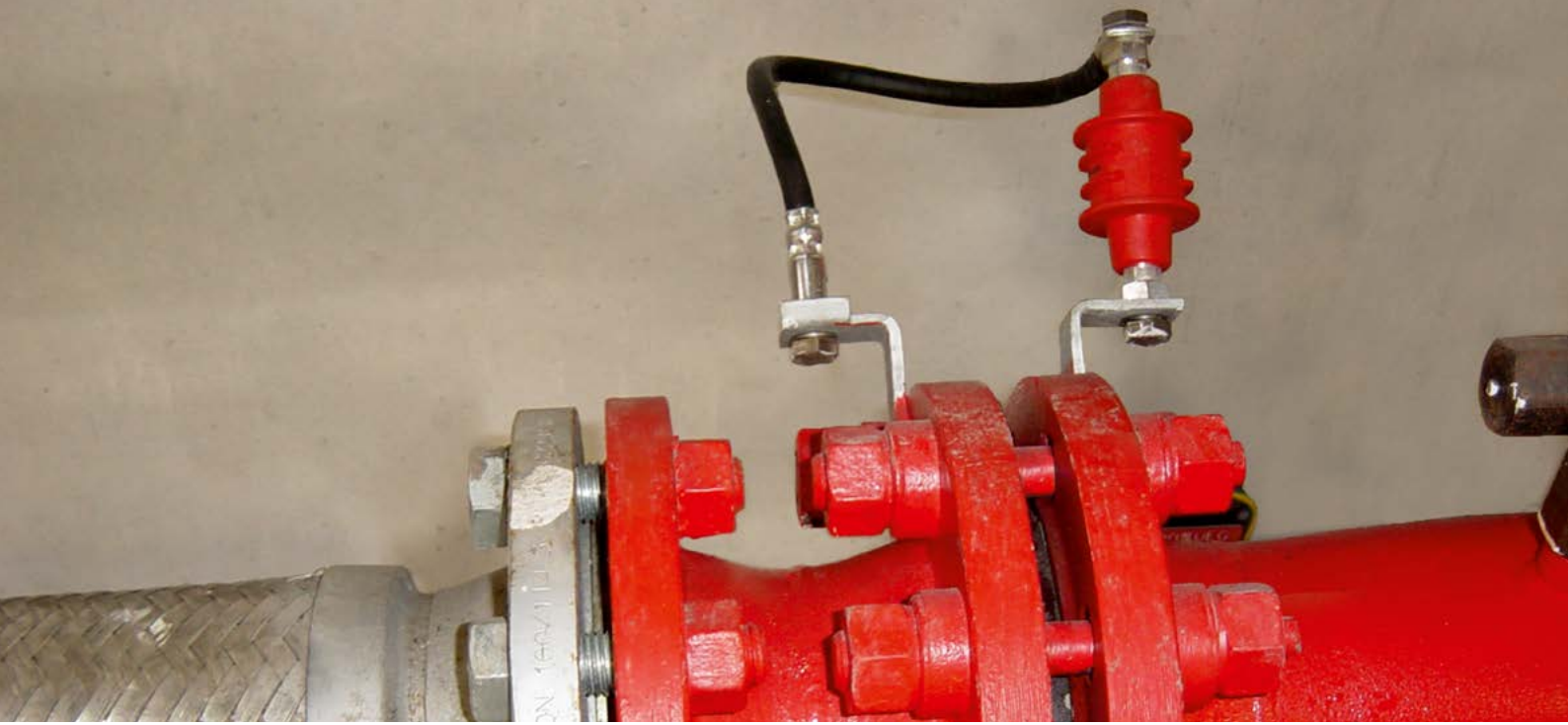


Type	Part No.
Variable support for air-termination masts	105 345

Earthing busbar for connecting HVI®Conductors to the earth-termination system.



Type	Part No.
Earthing busbar, 2 x 2 terminals	472 109



### Conductor holder

For installing HVI®Conductors in hazardous areas.



Type	Part No.
HVI®Ex W70 holder	275 440
HVI®Ex P200 holder	275 442

### Conductor holder

For installing HVI®Conductors by means of HVI-Ex conductor holders on a non-conducting structure, for example stone or wood.



Type	Part No.
HVI-Ex busbar 500	275 498

### Isolating spark gap

Isolating spark gap for protecting insulating joints and indirectly earthing isolated plant parts in case of lightning effects in hazardous areas.



Type	Part No.
EXFS 100	923 100

### Pipe clamp for use in hazardous areas

Pipe clamp for electrically contacting pipes without sparks, for use in Ex zone 1 and 2 (or 21 and 22).



Type	Part No.
Ex-BRS 90	540 801



## Internal lightning and surge protection

High plant availability can only be achieved if suitable internal lightning protection measures are taken in addition to the external lightning protection measures. In this way, electrical and electronic systems can be protected from the effects of lightning strikes and switching operations. The energy coordinated product lines from DEHN provide reliable solutions:

- Red/Line® for power supply systems
- Yellow/Line for data and information technology systems

### Surge protection for power supply systems

Lightning equipotential bonding, which must be established for all incoming conductive systems, is an integral part of the internal lightning protection system. All energized systems are indirectly integrated into the equipotential bonding system by means of type 1 arresters. Type 2 arresters are installed in the downstream sub-distribution boards.

#### DEHNventil® M

Modular type 1 + type 2 spark-gap-based combined arrester for DIN rail mounting with a high discharge capacity



Type	Part No.
DV M TT 255 FM	951 315

#### DEHnbloc® Maxi S

Coordinated single-pole type 1 lightning current arrester with integrated arrester backup fuse for busbar mounting



Type	Part No.
DBM 1 255 S	900 220

#### DEHNguard® M

Modular multipole type 2 surge arrester for DIN rail mounting



Type	Part No.
DG M TT 275 FM	952 315





### Surge protection for data / information technology systems

The control system is a key element of a biogas plant. Its function is to control all pumps and mixers, record process data such as the gas volume and gas quality, monitor the temperature, acquire all input materials and document all data. If the control system is damaged as a result of surges,

the process technology is disrupted.

To ensure continuous and undisturbed transmission of the measured data to the control systems, incoming control and signal lines, for example from temperature measuring points, must be protected by lightning current arresters. DEHN offers a comprehensive product portfolio of arresters for all interfaces and installation requirements.

#### BLITZDUCTOR® XT

Pluggable lightning current and surge arrester for different signal interfaces and bus systems.



Type	Part No.
BXT ML2 BD 180	920 247
BXT BAS base part	920 300

#### DEHNpatch

Universal arrester for Ethernet and PoE applications.



Type	Part No.
DPA M CAT6 RJ45S 48	929 100

#### BLITZDUCTOR® XT Ex (i)

Pluggable surge arrester for protecting intrinsically safe measuring circuits and bus systems.



Type	Part No.
BXT ML4 BD EX 24	920 381
BXT BAS EX base part	920 301

#### DEHNpipe

Screw-on surge arrester for protecting field devices.



Type	Part No.
DPI MD EX 24 M 2	929 960



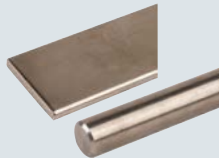
## Earth-termination system

The earth-termination system forms the basis for all equipotential bonding measures and conducts the lightning current to the ground. To avoid high potential differences between the individual earth-termination systems, they are interconnected to an overall earth-termination system. This is achieved by intermeshing the individual earth-termination

systems of the buildings and systems. Thus, the voltage stress on the connecting cables between several buildings and the connected electrical systems in case of lightning effects is considerably reduced.

### Stainless steel strip

Stainless steel (V4A – AISI/ASTM 316 Ti)  
30 mm x 3.5 mm or Rd 10 mm.



Type	Part No.
Stainless steel strip	860 335
Stainless steel wire	860 010

### Connecting components

Stainless steel (V4A) MV clamp and cross unit for a lightning-current-tested connection of round and flat conductors.



Type	Part No.
Cross unit	319 209
MV clamp	390 079

### Equipotential bonding bar

Stainless steel with M10 self-locking screws to avoid accidental loosening.



Type	Part No.
Equipotential bonding bar	472 209



## Approvals and certificates

Electrical devices can become a potential ignition source in potentially explosive atmospheres. Therefore, devices and equipment for use in these atmospheres must fulfil different requirements depending on the frequency and duration of a dangerous potentially explosive atmosphere. The aim is to reduce or prevent the probability of ignition sources by means of structural and protection measures.

Devices and equipment, which are developed and produced according to the relevant standards and guidelines and are thus suited for use in potentially explosive atmospheres, are labelled accordingly and are approved by certified and independent institutes. DEHN products comply with the relevant regulations and standards and are approved for use in potentially explosive atmospheres. This is confirmed by certificates such as ATEX, IECEx or CSA HazLoc to name just a few. All certificates are available on the relevant product page at [www.dehn-international.com](http://www.dehn-international.com).

## DEHN test laboratory

We carry out laboratory tests to verify the lightning current carrying capability of system components or plant parts and the coordination of DEHN products with downstream equipment. Tests in the DEHN impulse current laboratory show whether the selected protection measures are effective.

We offer operators and manufacturers the following engineering and test services:

- Lightning current tests, for example for equipotential bonding connections without ignition sparks
- Coordination tests, for example for SPDs with programmable logic controls
- Coordination tests between isolating spark gaps and insulating flanges

Our test laboratory is equipped with high-performance devices. Tests are carried out in line with the latest national and international standards. Thanks to our representation in standardisation committees over decades, our employees are always familiar with the latest standards and have in-depth knowledge of technical basics. We use this knowledge to carry out our engineering and test services, thus making our protection concepts feasible in practice.

[www.dehn-international.com/partners](http://www.dehn-international.com/partners)



**Surge Protection  
Lightning Protection  
Safety Equipment  
DEHN protects.®**

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