



## Reliably protect buildings

System solutions for isolated air-termination systems



## Isolated lightning protection prevents uncontrolled flashover

Intercepting lightning and the isolated discharge of the energy from installations and objects has, for decades now, proven to be a successful method of preventing uncontrolled flashover between the air-termination rods, earthed electrically conductive parts and installations. Isolated lightning protection products by DEHN are designed to be practical. DEHN has the right solution for every installation, wherever it may be and whatever its purpose.

**Isolated lightning protection systems** and air-termination devices by DEHN are set up using insulators at a distance to the installations. The insulating material we use is glass-fibre reinforced plastic (GRP). The configuration and dimensioning of the supports and functional units is based on electrical and mechanical parameters. Isolated lightning protection also includes free-standing air-termination rods and masts, which are erected at ground level at a distance to the object. Here, one can do without cable routing on roofs and walls.

**HVI Lightning Protection** by DEHN provides top protection and, at the same time, a high degree of flexibility during installation. The high-voltage resistant insulated HVI Conductor is employed here. Isolated lightning protection based on HVI Conductors is permanent and sustainable. Whilst conventional lightning protection systems have to be adjusted to incorporate any retrofitted roof installations, e.g. PV systems or air-conditioning, HVI Lightning Protection can usually be left as it is.

### Isolated lightning protection by DEHN

- Opens up a wide range of applications
- Can be optically adjusted to fit in with the architecture of the building
- Is easy to install
- Offers safe design and execution

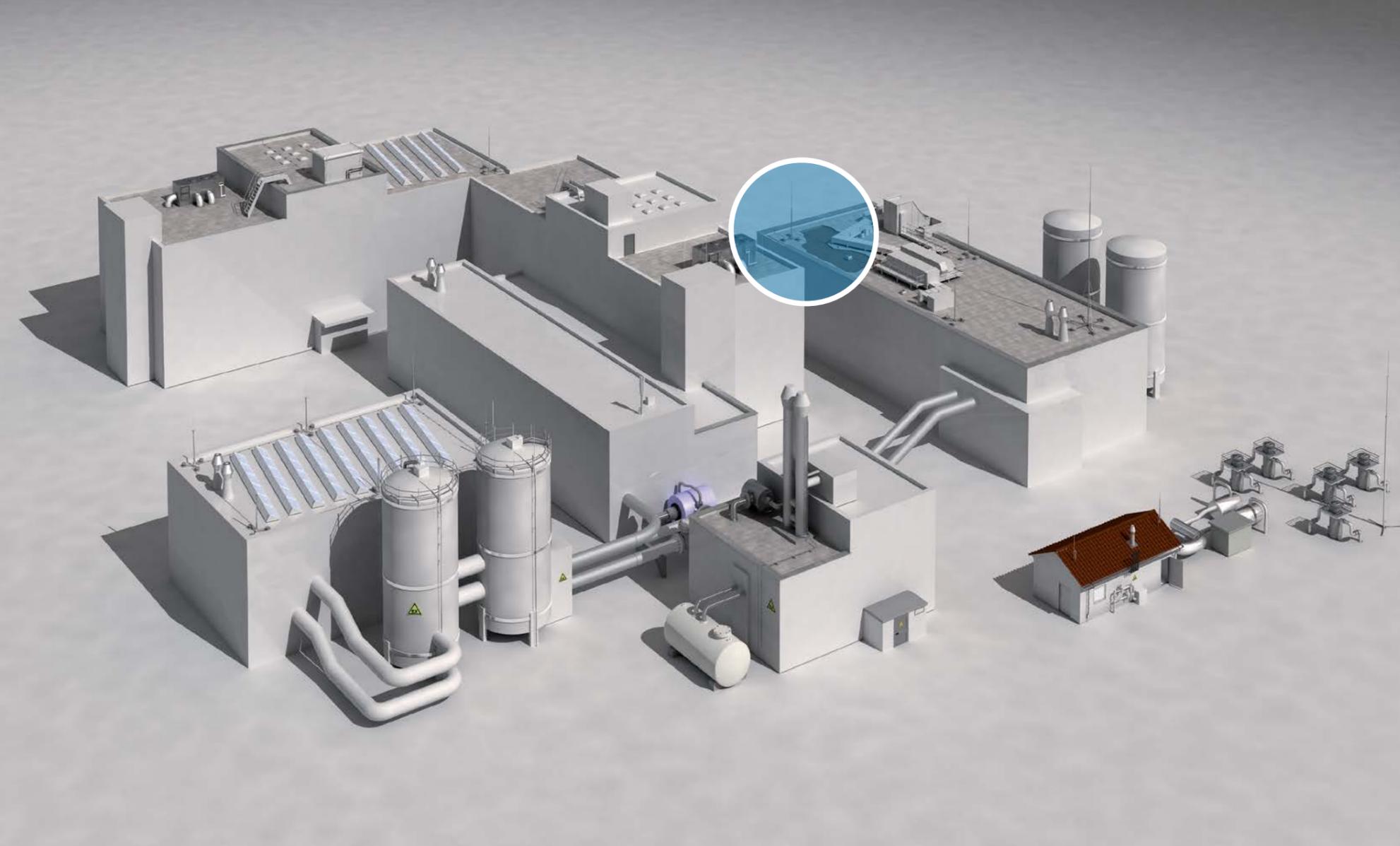
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## Wind load: Correct dimensioning of a lightning protection system

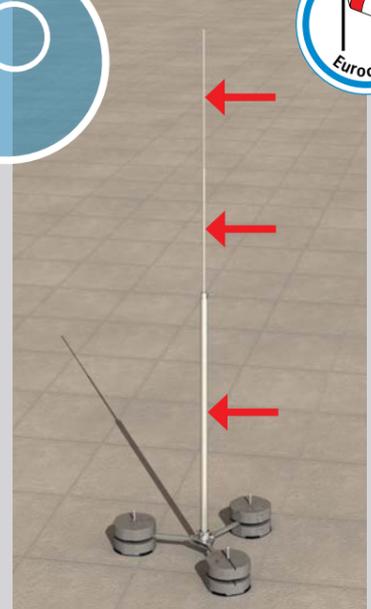
The wind load plays an important role when planning and installing air-termination devices as part of a lightning protection system. In Europe, the Eurocodes provide the basis for static dimensioning and design. Country-specific normative adjustments should also be considered. DEHN provides comprehensive decision-making support with selecting the right products based on the wind load.

### Advantages

- Time-saving on planning and installation
- Certainty when designing air-termination systems
- Possibility of reducing the roof load
- Verification of statics for documentation





**Wind load parameters**

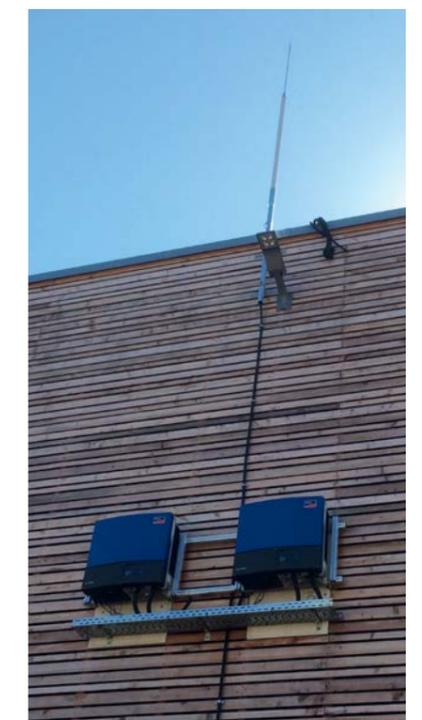
**Wind zone**  
Defines the basic wind speed / pressure in a certain area

**Terrain category**  
Defines the surroundings of a structure, e.g., open country, suburb, urban area

**Height of object above the ground**  
Defines the height of the object above +/- 0.00 m ground level

**Height of location above sea level**  
Defines the height of the location above sea level

Various influencing factors flow into the calculation of the actual expected wind load.

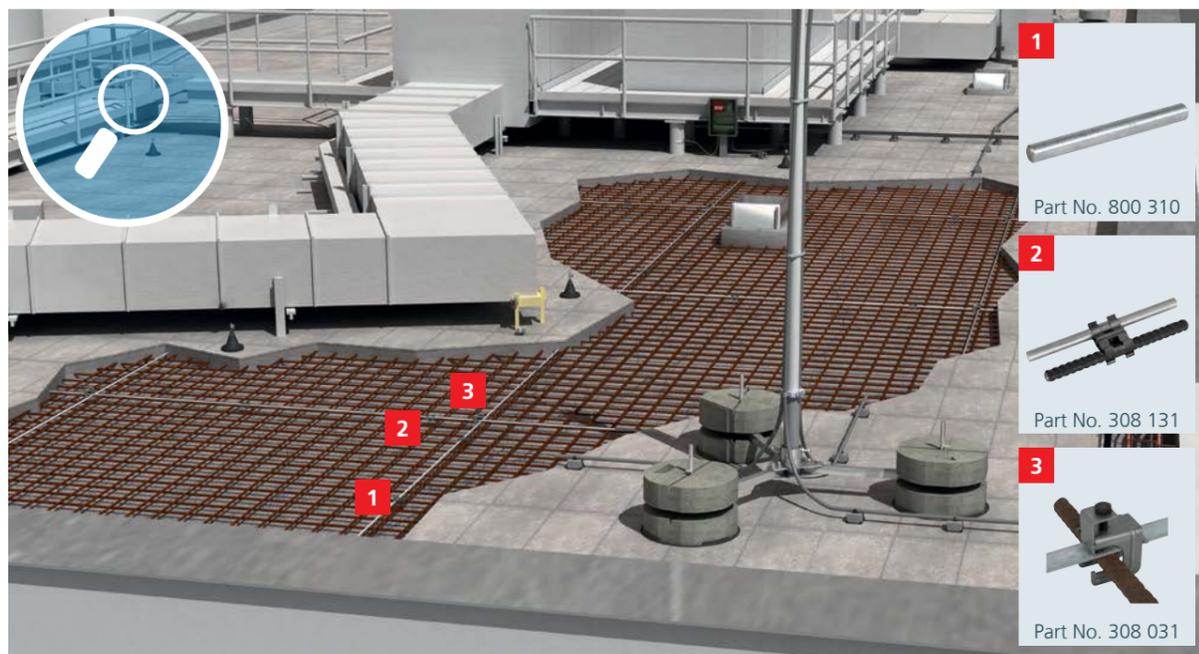


## Separation distance and equipotential surfaces

Industrial and functional buildings are often made of reinforced concrete or have a steel framework with metal cladding. Plastic sheeting, sealing strips or flat roof sealing is installed on concrete ceilings and metal roofs in order to seal them. Under certain circumstances, it is also possible to use the reinforcement in the ceiling / metal roofing to create a reference plane / equipotential surface for calculating the separation distance. The air-termination system is connected to the equipotential surface at regular intervals. Used in combination, the equipotential surface and HVI Lightning Protection offer the best possible level of protection for the building.

### Advantages

- Sensible use of resources: natural building substance as a lightning protection system
- Minimum separation distances
- Protection concept also suitable for tall objects

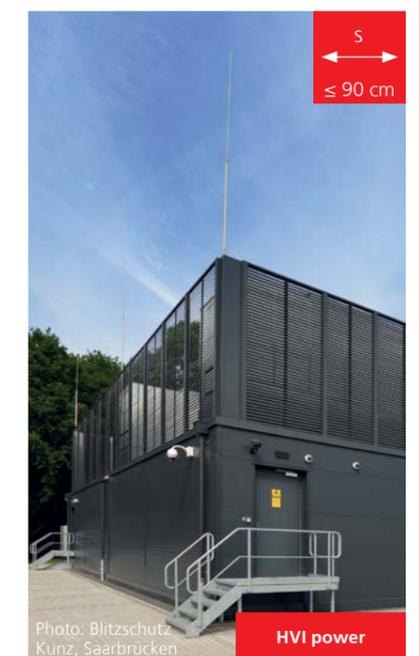
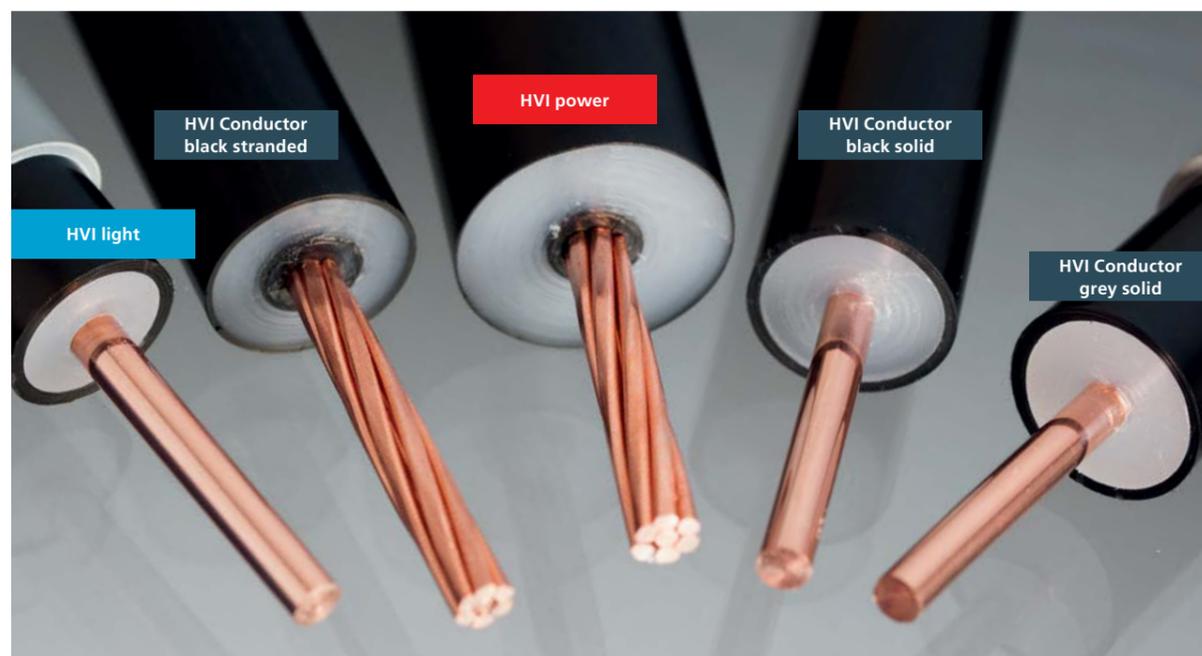


## HVI Lightning Protection for maximum safety

HVI Lightning Protection provides top protection and a high degree of flexibility during installation. The HVI Conductor is a high-voltage-resistant, insulated down conductor by DEHN. The lightning current carrying conductor is sheathed in insulation and a semi-conductive coat to prevent uncontrolled sparking and creeping flashover and safely discharge lightning currents. Therefore, with the HVI Conductor, unlike insulated conductors with a metal braided shield, there is no danger of high-energy induced currents. It is not necessary to connect metal / earthed building installations so that they are capable of carrying lightning current. As a result, the coordination and installation of additional equipotential bonding measures is simple.

### Advantages

- Wide range of applications
- Permanent and sustainable
- Simple installation
- Assistance with planning special applications
- Certified products for use in ex areas



## HVI light Conductor

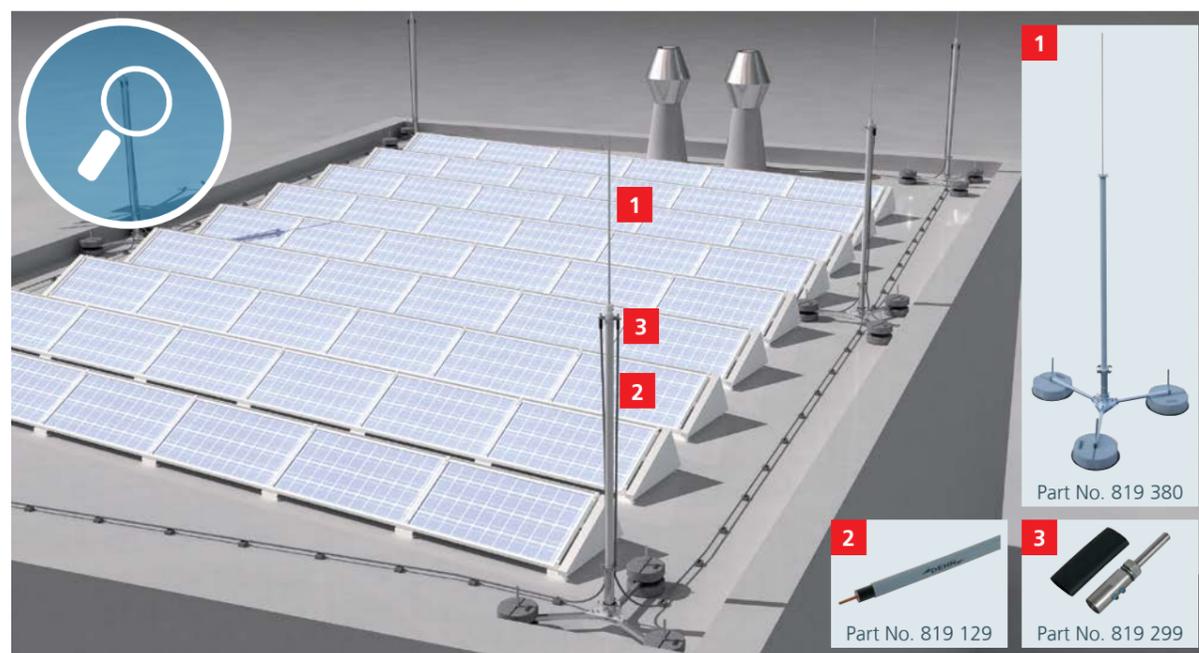
The roof surfaces of buildings are usually the last level of installation. Pipes, electrical / IT / PV systems are installed there without giving a thought to the danger of a lightning strike. These systems have conductive connections through which lightning currents can enter the building. The HVI light Conductor is specially designed for low, largescale buildings where the separation distance cannot be maintained. The high-voltage resistant isolation prevents uncontrolled flashover, e.g., through the roofing to metal or electrical installations underneath.

### Advantages

- Ideal solution for flat roofs
- Quick and easy to mount

### Technical characteristics

- Equivalent separation distance  $s \leq 45$  cm (in the air) or  $s \leq 90$  cm (solid building material)
- Tested with  $I_{imp}$  150 kA ( $k_c = 1$ ; 10/350  $\mu$ s)
- Configured according to IEC TS 62561-8 Edition 1.0 2018-01
- Support tubes in aluminium design with insulating clearance made of glass fibre reinforced plastic (GRP), colour light grey, UV-stabilised



## DEHNcon-H

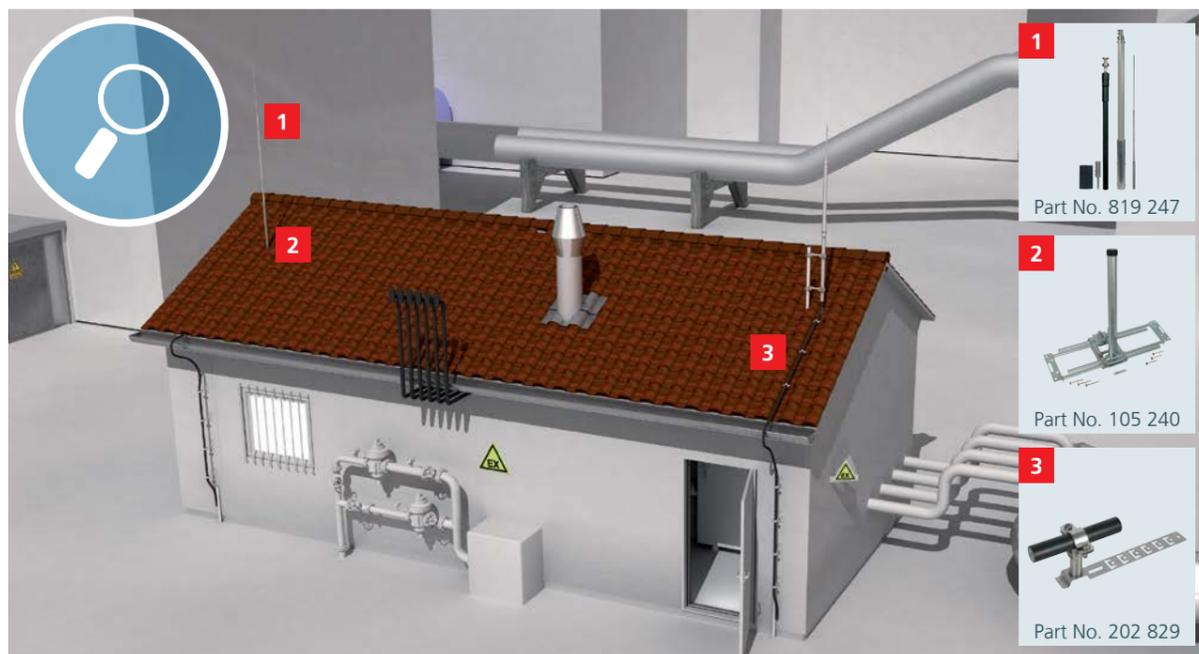
When installing bare, non-insulated conductors in houses and other buildings which are not very high, there can be a proximity problem. In such cases, it is often not possible to keep the separation distances. DEHNcon-H offers an optically unobtrusive solution by which the HVI / HVI light Conductor is installed in the supporting tube.

### Advantages

- Perfect for residential buildings with pitched roofs
- Invisible when the conductor is installed under the roofing

### Technical characteristics

- DEHNcon-H system with HVI light Conductor for a maximum equivalent separation distance  $s \leq 45$  cm (in the air),  $s \leq 90$  cm (solid building material)
- DEHNcon-H system with HVI Conductor for a maximum equivalent separation distance  $s \leq 75$  cm (in the air),  $s \leq 150$  cm (solid building material)
- Configured according to IEC TS 62561-8 Edition 1.0 2018-01
- Supporting tube with insulating section of glassfibre reinforced plastic (GRP), light grey in colour, UV stabilised



## HVI Conductor

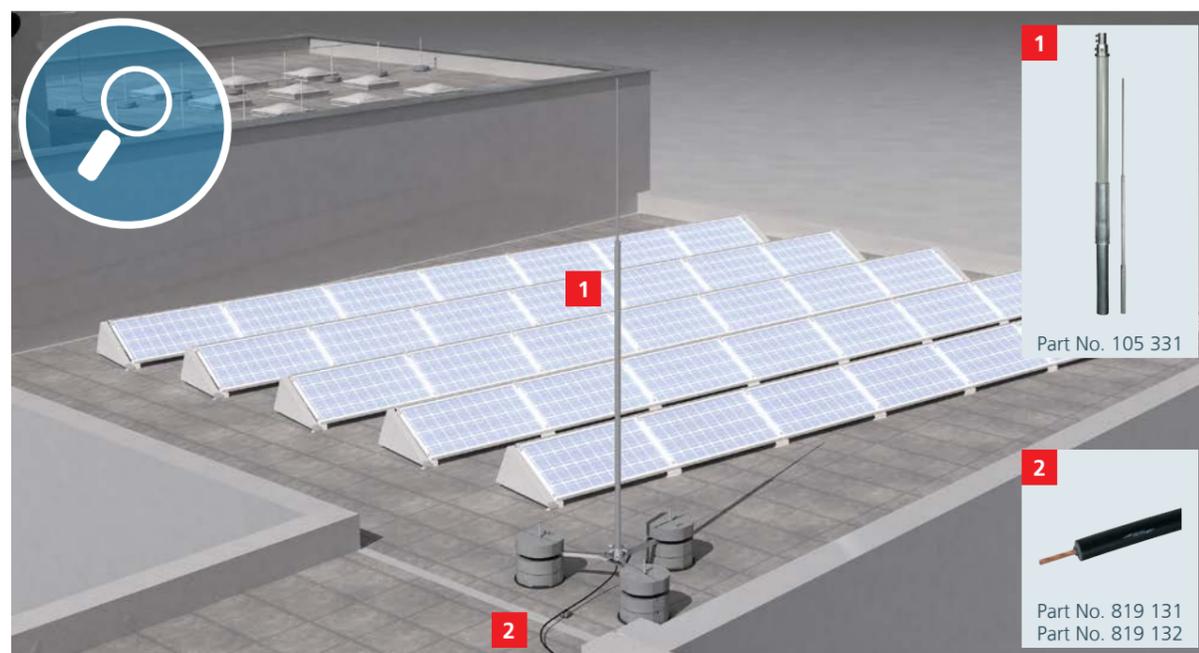
The HVI Conductor has a wide range of application. It protects large rooftop constructions, antennas or masts with information technology devices against direct lightning strikes – also in potentially explosive areas. It also enables installation directly onto the earthing system. If this is not required, connections with already existing conventional lightning protection systems (elevated / separated ring conductor) are also possible.

### Advantages

- The ideal solution for a wide range of applications

### Technical characteristics

- Equivalent separation distance  $s \leq 75$  cm (in air) or  $s \leq 150$  cm (solid material)
- Tested with  $I_{imp}$  150 kA ( $k_c = 1$ ; 10/350  $\mu$ s)
- Configured according to IEC TS 62561-8 Edition 1.0 2018-01
- Supporting tube of aluminium / stainless steel for mounting on walls or, in combination with a tripod, as a free-standing air-termination system.
- Outside diameter black 20 mm, grey 23 mm
- Available as a cable reel for cutting to length on site and as preassembled conductors with head piece



## HVI power Conductor

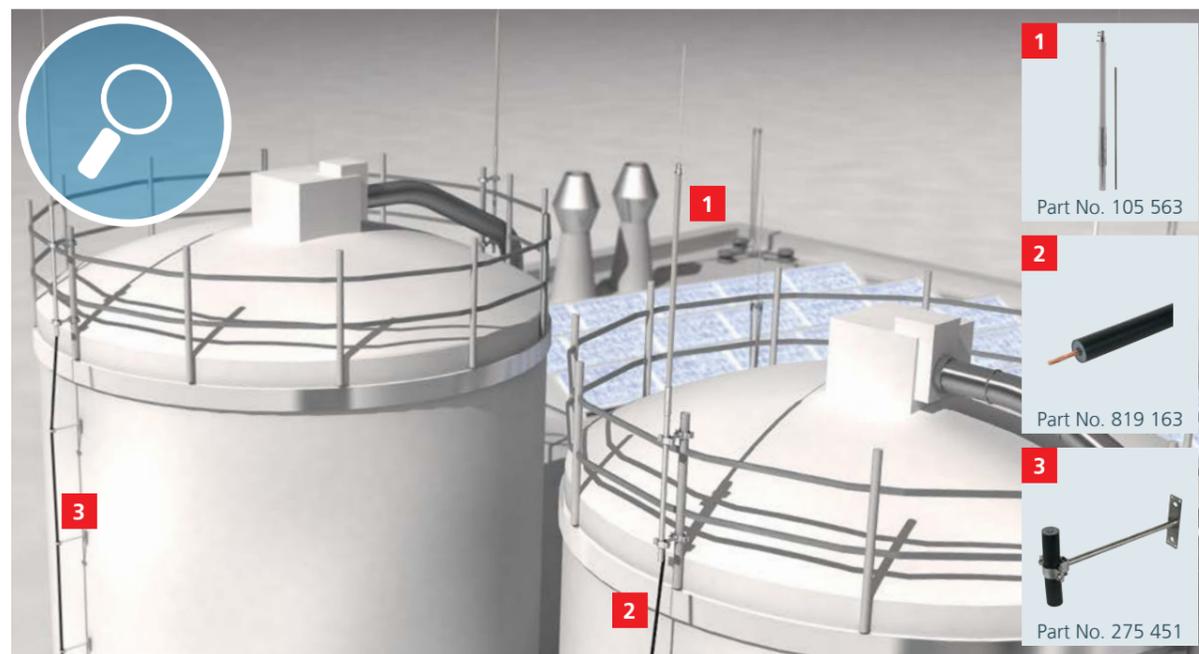
The HVI power Conductor is the highest capacity version of the high-voltage resistant insulated conductors. It is used, for example, in hospitals, data centres and silos which require large separation distances due to their dimensions (height). With the HVI power Conductor longer cable routing up to the earthing system is also possible.

### Advantages

- Suitable for all lightning protection levels

### Technical characteristics

- Equivalent separation distance  $\leq 90$  cm (in air) or  $s \leq 180$  cm (solid materials)
- Tested with  $I_{imp}$  200 kA ( $k_c = 1$ ; 10/350  $\mu$ s)
- Configured according to IEC TS 62561-8 Edition 1.0 2018-01
- Supporting tubes of aluminium / stainless steel for mounting on walls or in combination with a tripod / stand as a free-standing air-termination system
- Outer diameter 27 mm
- Available on a reel for cutting to length on site and as preassembled conductors with head piece



## HVI Conductor in ex areas

In many industrial sectors, technical processes may lead to the formation of hazardous and potentially explosive atmospheres. As a lightning strike is a possible source of ignition, it must be carefully considered when planning and installing lightning protection systems. This is achieved by electrically insulating the lightning protection system from conductive elements in the building structure and installations. The special way in which the HVI Conductor and HVI power Conductor by DEHN are installed provides a safe and proven solution for discharging lightning currents.

### Advantages

- Safe and tested solution for discharge of lightning currents in ex zones 1 and 21 without sparking

### Technical characteristics

- HVI power Conductor tested with  $I_{imp}$  200 kA ( $k_c = 1$ ; 10/350  $\mu$ s)
- HVI Conductor with  $I_{imp}$  150 kA ( $k_c = 1$ ; 10/350  $\mu$ s)
- Configured according to IEC TS 62561-8 Edition 1.0 2018-01
- Mounting material made of stainless steel for use in corrosive surroundings
- TÜV certified

TÜV: Technischer Überwachungsverein, a German safety monitoring agency.

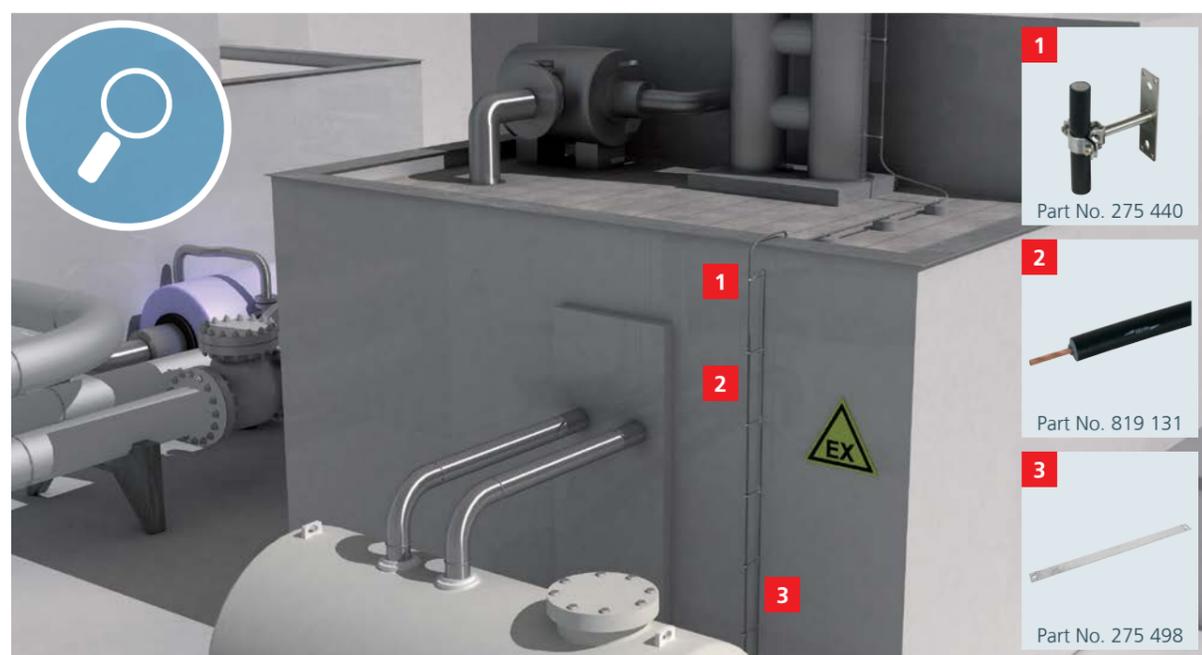
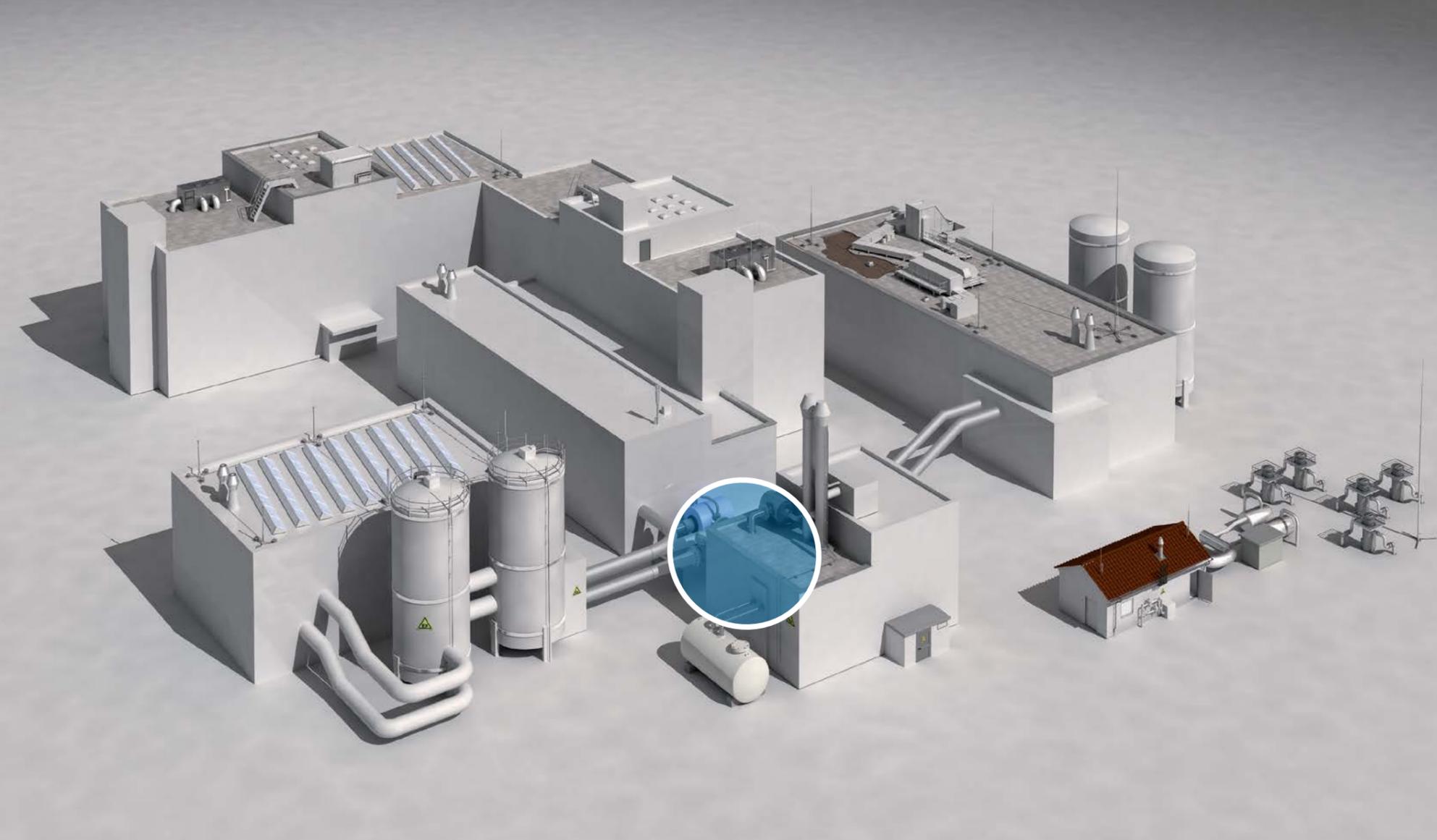


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## DEHNiso Combi

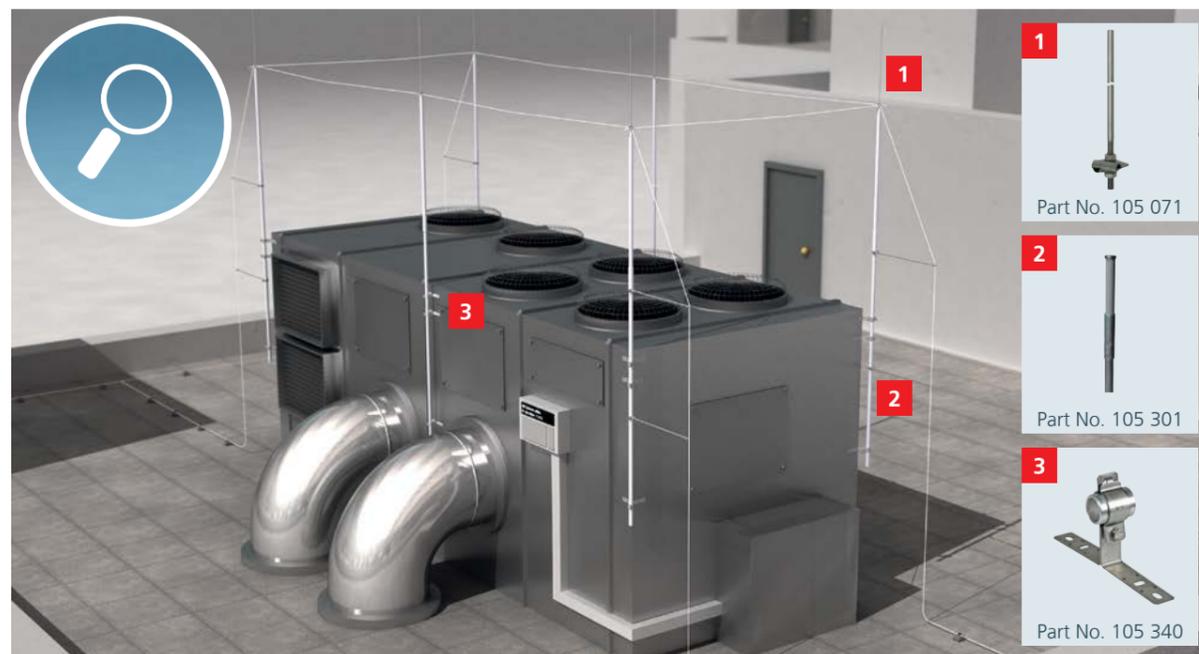
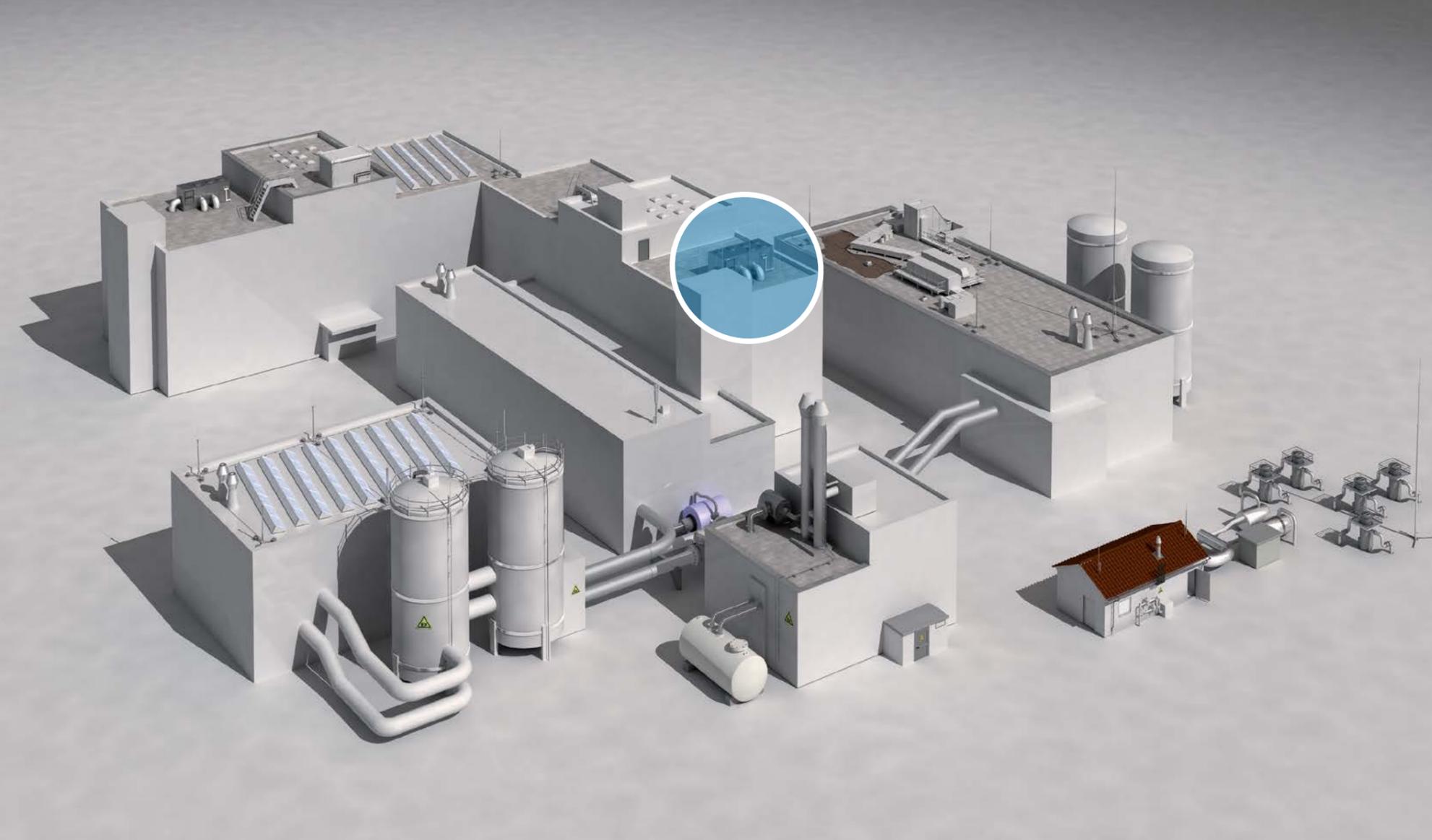
DEHNiso Combi is a practical, modular and flexible component range which satisfies the mechanical and constructional requirements on site. DEHNiso Combi makes it possible to install isolated air-termination devices even when the volume to be protected has complicated contours. Electric and metallic installations which protrude beyond the roof are protected against lightning strikes and the coupling of lightning current in the building structure is prevented. The separation distance is maintained via an insulating part in the supporting tube and a spacer bar made of glass-fibre reinforced plastic. Installing isolated air-termination devices is a simple matter with DEHNiso Combi.

### Advantages

- Creation of extensive protected volumes through intelligent positioning of the air-termination rods
- Comprehensive fastening system: mounted (pipe, Profi I system, wall) or self-supporting in a stand / tripod
- Subsequently installed superstructures

### Technical characteristics

- Configured according to IEC TS 62561-8 Edition 1.0 2018-01
- Dimensioned and set out under consideration of possible wind loads (Eurocode)
- Tested and set out material factor  $k_m = 0.7$  for calculating the separation distance



## DEHNiso Spacer

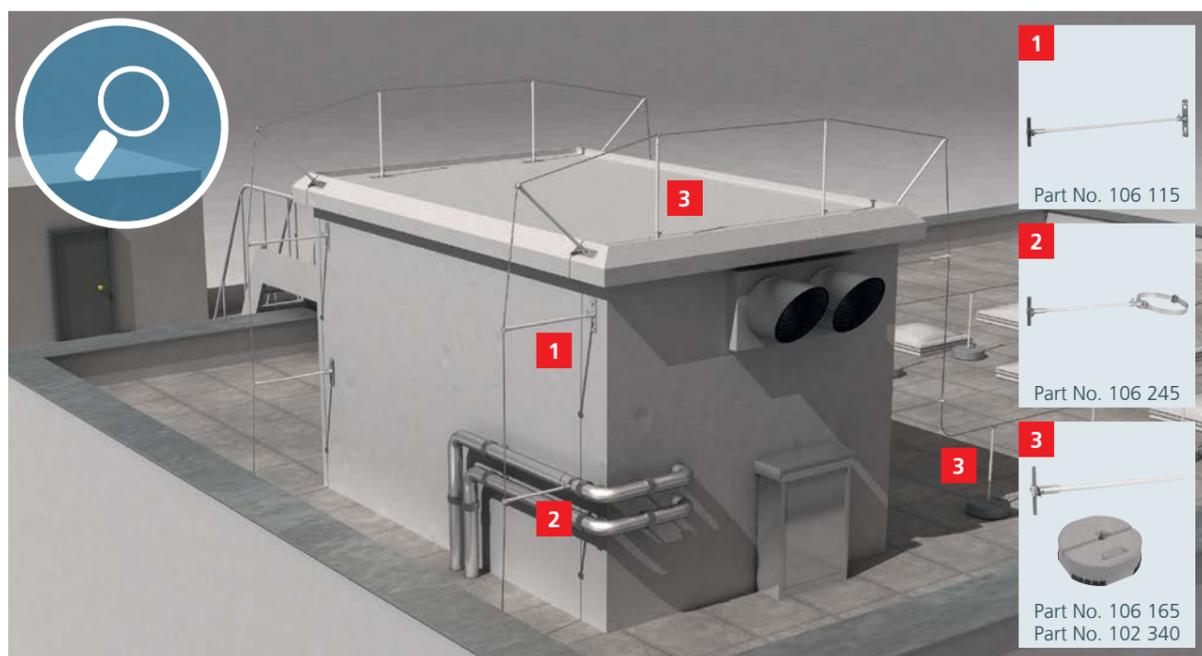
The DEHNiso spacer system is a practical and versatile component programme. For maintaining separation distances. This system offers easy and cost-effective solutions for almost every application. It can be used as static support for isolated air-termination rods. Provided that the separation distance  $s$  is observed, the installation of ring conductors is also possible.

### Advantages

- Pre-assembled spacers for the relevant installation location (pipe, wall, Profi I)
- Can be cut to size on site: all system components are available individually (GRP spacer bar, conductor holder, pipe clamp)

### Technical characteristics

- Configured according to IEC TS 62561-8 Edition 1.0 2018-01
- Dimensioned and set out under consideration of possible wind loads (Eurocode)
- Tested and set out material factor  $k_m = 0.7$  for calculating the separation distance
- High quality GRP insulating material



## Free-standing air-termination devices

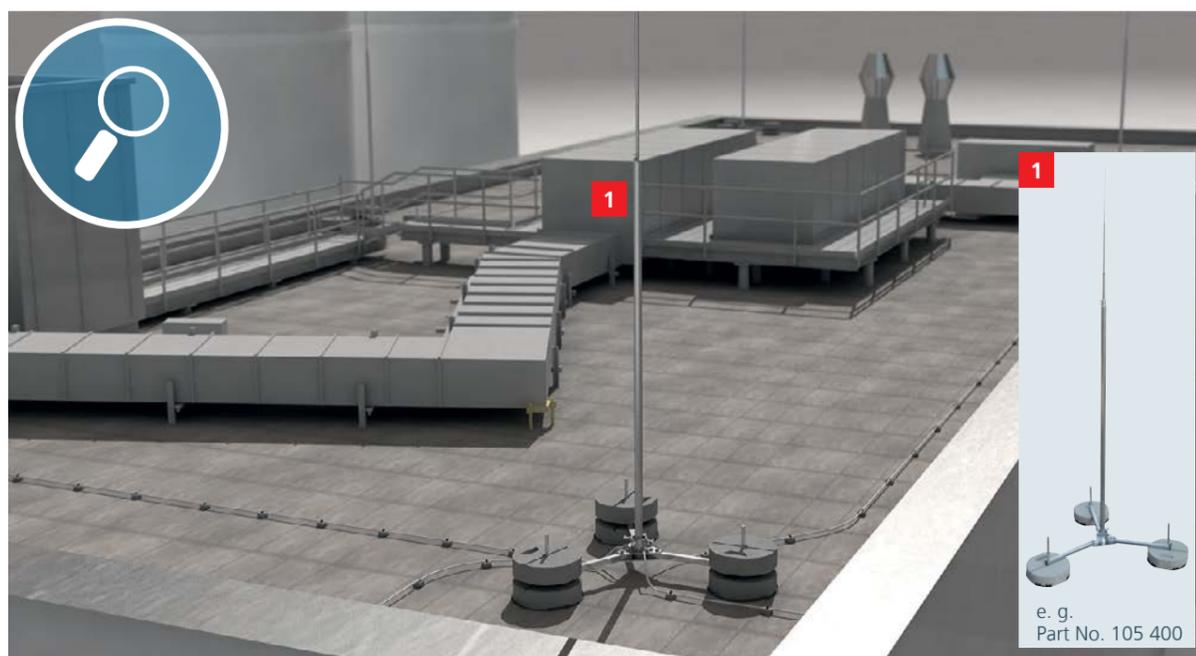
Self-supporting air-termination rods make it possible to protect large areas against lightning strikes by including them in the protected volume. There is no need for additional mechanical contacting of rooftop constructions such as air-conditioning and ventilation systems. Free-standing air-termination rods are erected using a tripod or six-legged stand in combination with concrete bases. The number of concrete bases depends on the maximum gust wind speed. When correctly designed with a view to stability and the correct dimensions of the air-termination rod, the planning engineer, installer and owner of the object can count on getting a high-quality air-termination system.

### Advantages

- Comprehensive product portfolio: air-termination rods from 1.0 m to 14.0 m
- Weight-optimised, simple transportation and assembly
- High degree of stability and low space requirement
- Flexible and universal installation

### Technical characteristics

- Adjustment of the air-termination rods to fit roof or building slopes of 5-10°
- Tested system solution according to EN 62561-1
- Dimensioned and set out under consideration of possible wind loads (Eurocode)



## Telescopic lightning protection masts

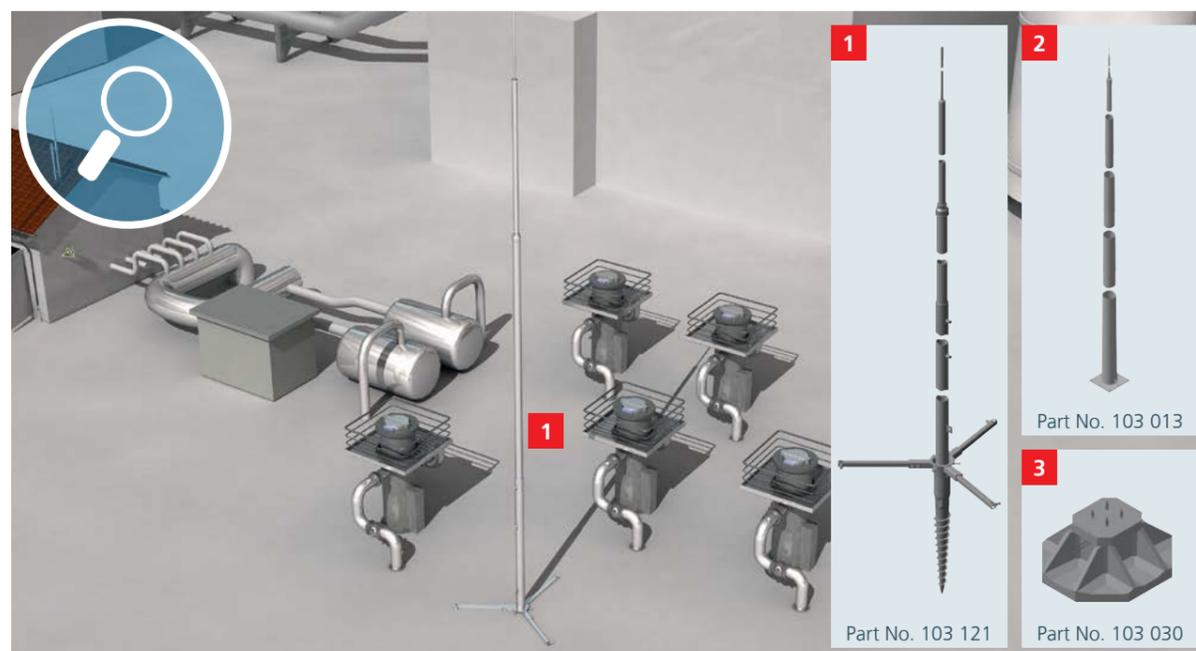
Our wide range of telescopic lightning protection masts protects plants in open spaces from direct lightning strikes. Depending on the height of the air-termination device, the masts can be installed using either a screw-in or bucket foundation. In the case of telescopic lightning protection masts with a screw-in foundation, no excavation or foundation work is necessary. The screw-in foundation is simply screwed into the undisturbed ground and fixed in place with earth rods. When using telescopic lightning protection masts with a bucket or concrete foundation, a foundation is produced upon which the telescopic lightning protection masts can be mounted using a flange plate.

### Advantages

- Comprehensive product portfolio: air-termination rods from 6.0 m to 24.85 (above ground level)
- Creation of large protected volumes
- Low space requirement

### Technical characteristics

- Maximum transport length of 6.0 m
- Tested system solution according to EN 62561-1
- Dimensioned and set out under consideration of possible wind loads (Eurocode)





DEHN products have  
ADDED value

**Our isolated lightning protection products and systems prevent fire and destruction caused by lightning. Take advantage of the comprehensive DEHN range of services and consultation.**



**All from one source**

The DEHN portfolio includes specific protection solutions, a variety of services and high-quality products for lightning protection, earthing, equipotential bonding, internal lightning protection and surge protection.



**Special solutions provided fast**

You need to react to new circumstances when installing? We quickly and simply customise "your" product in tried and tested DEHN quality.



**Intelligent planning**

Safe and easy planning using the DEHNsupport Toolbox software. With the DEHNconcept planning service for comprehensive protection systems, you save even more time.



**Quick answers to technical questions**

You have a question about a technology or application? Our staff will advise you on site or you can contact our experts in technical support:

Telephone: +49 9181 906 1750

E-mail: [technik.support@dehn.de](mailto:technik.support@dehn.de)

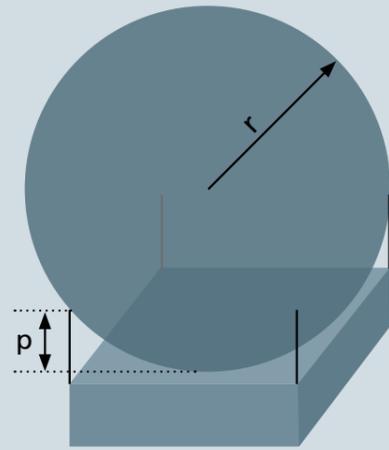


**Broaden your expertise**

Get practical information on lightning protection/earthing, surge protection and safety equipment at the DEHNacademy seminars.

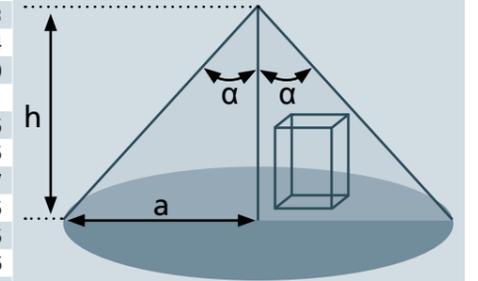
## Rolling sphere

Distance between air-termination rods [m]	Class of LPS I Radius (r) 20.0m sag (p) [m]	Class of LPS II Radius (r) 30.0m sag (p) [m]	Class of LPS III Radius (r) 45.0m sag (p) [m]	Class of LPS IV Radius (r) 60.0m sag (p) [m]
1	0.01	0.00	0.00	0.00
2	0.03	0.02	0.01	0.01
3	0.06	0.04	0.03	0.02
4	0.10	0.07	0.04	0.03
5	0.16	0.10	0.07	0.05
6	0.23	0.15	0.10	0.08
7	0.31	0.20	0.14	0.10
8	0.40	0.27	0.18	0.13
9	0.51	0.34	0.23	0.17
10	0.64	0.42	0.28	0.21
11	0.77	0.51	0.34	0.25
12	0.92	0.61	0.40	0.30
13	1.09	0.71	0.47	0.35
14	1.27	0.83	0.55	0.41
15	1.46	0.95	0.63	0.47
16	1.67	1.09	0.72	0.54
17	1.90	1.23	0.81	0.61
18	2.14	1.38	0.91	0.68
19	2.40	1.54	1.01	0.76
20	2.68	1.72	1.13	0.84
21	2.98	1.90	1.24	0.93
22	3.30	2.09	1.37	1.02
23	3.64	2.29	1.49	1.11
24	4.00	2.50	1.63	1.21
25	4.39	2.73	1.77	1.32
26	4.80	2.96	1.92	1.43
27	5.24	3.21	2.07	1.54
28	5.72	3.47	2.23	1.68
29	6.23	3.74	2.40	1.78
30	6.77	4.02	2.57	1.91
31	7.36	4.31	2.75	2.04
32	8.00	4.62	2.94	2.17
33	8.70	4.95	3.13	2.31
34	9.46	5.28	3.33	2.46
35	10.32	5.63	3.54	2.61
36	11.28	6.00	3.76	2.76
37	12.40	6.38	3.98	2.92
38	13.76	6.78	4.21	3.09
39	15.56	7.20	4.44	3.26
40	20.00	7.64	4.69	3.43
41		8.10	4.94	3.61
42		8.58	5.20	3.80
43		9.08	5.47	3.98
44		9.60	5.74	4.18
45		10.16	6.03	4.38
46		10.74	6.32	4.58
47		11.35	6.62	4.79
48		12.00	6.93	5.01
49		12.69	7.25	5.23
50		13.42	7.58	5.46
51		14.20	7.92	5.69
52		15.03	8.27	5.93
53		15.94	8.63	6.17
54		16.92	9.00	6.42
55		18.01	9.38	6.67
56		19.23	9.77	6.93
57		20.63	10.18	7.20
58		22.32	10.59	7.47
59		24.55	11.02	7.75
60		30.00	11.46	8.04



## Protective angle

Height of the air-termination rod h [m]	Class of LPS I Angle $\alpha$	Distance a [m]	Class of LPS II Angle $\alpha$	Distance a [m]	Class of LPS III Angle $\alpha$	Distance a [m]	Class of LPS IV Angle $\alpha$	Distance a [m]
1	71	2.90	74	3.49	77	4.33	79	5.14
2	71	5.81	74	6.97	77	8.66	79	10.29
3	66	6.74	71	8.71	74	10.46	76	12.03
4	62	7.52	68	9.90	72	12.31	74	13.95
5	59	8.32	65	10.72	70	13.74	72	15.39
6	56	8.90	62	11.28	68	14.85	71	17.43
7	53	9.29	60	12.12	66	15.72	69	18.24
8	50	9.53	58	12.80	64	16.40	68	19.80
9	48	10.00	56	13.34	62	16.93	66	20.21
10	45	10.00	54	13.76	61	18.04	65	21.45
11	43	10.26	52	14.08	59	18.31	64	22.55
12	40	10.07	50	14.30	58	19.20	62	22.57
13	38	10.16	49	14.95	57	20.02	61	23.45
14	36	10.17	47	15.01	55	19.99	60	24.25
15	34	10.12	45	15.00	54	20.65	59	24.96
16	32	10.00	44	15.45	53	21.23	58	25.61
17	30	9.81	42	15.31	51	20.99	57	26.18
18	27	9.17	40	15.10	50	21.45	56	26.69
19	25	8.86	39	15.39	49	21.86	55	27.13
20	23	8.49	37	15.07	48	22.21	54	27.53
21			36	15.26	47	22.52	53	27.87
22			35	15.40	46	22.78	52	28.16
23			36	16.71	47	24.66	53	30.52
24			32	15.00	44	23.18	50	28.60
25			30	14.43	43	23.31	49	28.76
26			29	14.41	41	22.60	49	29.91
27			27	13.76	40	22.66	48	29.99
28			26	13.66	39	22.67	47	30.03
29			25	13.52	38	22.66	46	30.03
30			23	12.73	37	22.61	45	30.00
31					36	22.52	44	29.94
32					35	22.41	44	30.90
33					35	23.11	43	30.77
34					34	22.93	42	30.61
35					33	22.73	41	30.43
36					32	22.50	40	30.21
37					31	22.23	40	31.05
38					30	21.94	39	30.77
39					29	21.62	38	30.47
40					28	21.27	37	30.14
41					27	20.89	37	30.90
42					26	20.48	36	30.51
43					25	20.05	35	30.11
44					24	19.59	35	30.81
45					23	19.10	34	30.35
46							33	29.87
47							32	29.37
48							32	29.99
49							31	29.44
50							30	28.87
51							30	29.44
52							29	28.82
53							28	28.18
54							27	27.51
55							27	28.02
56							26	27.31
57							25	26.58
58							25	27.05
59							24	26.27
60							23	25.47



Surge Protection  
Lightning Protection  
Safety Equipment  
DEHN protects.

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