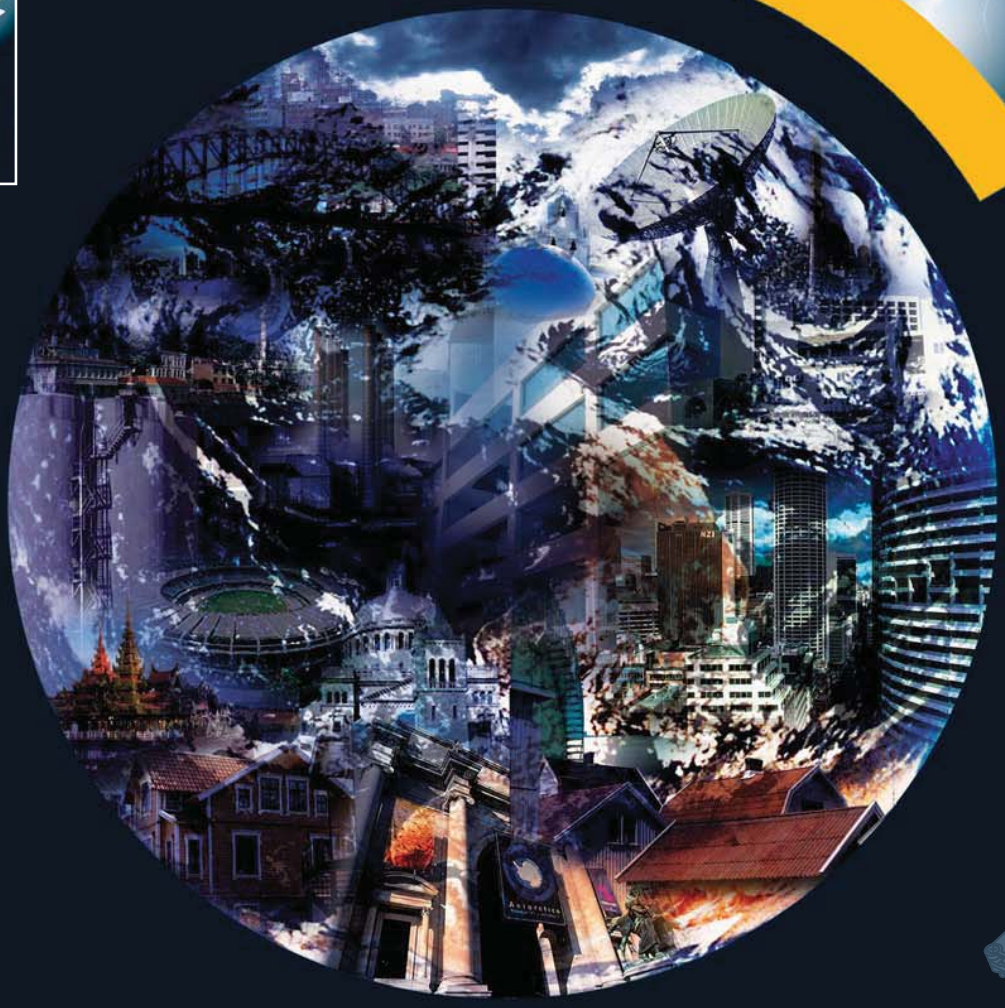
APLICACIONES TECNOLOGICAS S.A.

CERTIFICADO ISO 14001



Lightning external protection

Index

MAY 2008

About Aplicaciones Tecnológicas, S.A.

Our business is focused on the protection of man and the enviroment. Founded in 1986, we investigate, develop, manufacture and market high technology systems which solve very specific problems in specialised areas in the following fields:

Lightning protection technologies

Radiation protection and medical physics

Environmental technologies

Our objective is to supply safe and efficient products of the highest quality based on state of the art technology utilising the latest manufacturing processes in accordance to both national and international standards. In this way, we provide our clients with solutions they can trust.

As a registered company through **AENOR**, the Spanish Regulating Authority, we have a well established quality control system for all our divisions certified as meeting the requirements of **ISO9001:2000**.

As a registered company trough IVAC (Spanish Certification Institute) we have a well established environmental management system for all our divisions certified as meeting the requirements of **ISO14001: 2004**.

Nº REC 101/2008 IVAC CERTIFICADO ISO 14001

AENOR ER Empresa Registrada ER-1055/1998

CERTIFIED IQNet QUALITY SYSTEM UNE-EN ISO 9001:2000

AENOR

CERTIFICADO DE REGISTRO DE EMPRESA

ER-1055/1998

APLICACIONES TECNOLOGICAS, S.A

IQNet

INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and AENOR

hereby certify that the organization

APLICACIONES TECNOLOGICAS, S.A

has implemented and maintains a

Quality Management System

which fulfils the requirements of the following standard

ISO 9001:2000

Registration Number: ES-1055/1998

AENOR

APLICACIONES TECNOLOGICAS

In Aplicaciones Tecnologicas, S.A we are experts in lightning protection. We have at your disposal all the existing technology and innovate everyday, giving suitable solutions to each particular case. We manufacture our products according to maximum quality standards. Research, innovation and safety are the key factor underlining our leadership and presence the world over.

Our strenghths

- **In-house research, development and production facilities.**
- **Continuos product improvement.**
- **Client support from a specialised team providing advise on any matter** concerning lightning protection (technical inquiries, product information, lightning protection and overvoltage projects, installation advice).
- **Products and services compliant with EC requirements.** CE
- **Active participation in national and international regulating committees:**

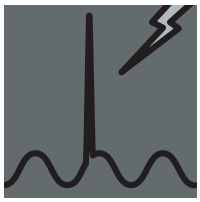
AENOR CENELEC IEC

Certified products

Certified products by tests in official and independent laboratories.

EXTERNAL PROTECTION

INTERNAL PROTECTION



EARTHING TERMINALS

EXOTHERMIC WELDING

PREVENTIVE PROTECTION

This catalogue deals with this subdivision.

Lightning protection catalogues

▶ Present in more than 70 countries

A local presence in more than 70 countries through a world-wide network of distributors who are in continuous contact with engineering and architectural consultancies, wholesalers, electricians and end users (governmental, industrial, construction and services, etc.).

NEED OF PROTECTION

Palau de les Arts. Valencia (Meshed conductors)

Plaza de España. Sevilla (ESE lightning air terminals)

Lightning is one of the most devastating natural phenomena. There are many discharges during lightning storms and some of them can even reach **hundreds of kiloamperes.**

These electrical discharges are a great hazard for people, animals, buildings and electronic equipment. The economical consequences of lightning are also very important; it can cause fire, stop the production of a factory or interrupt critical processes. Besides, direct lightning discharges make the current pass through the persons. This current lasts a very short time but the intensity is enough for provoking electrocution due to heart failures and can also cause burns of different degrees.

Until now, there is no device that can avoid lightning formation. However, it is possible to create a path for the discharge to ground that minimizes the damages on the environs: the Lightning Protection System.

The need of lightning protection should be considered preferably during the first phases of the structure design.

A Lightning Protection System has 4 basic objectives:

1) Capture lightning.
2) Conduct lightning current to earth avoiding damages.
3) Disperse lightning current in the ground quick and safely.
4) Avoid lightning secondary effects (overvoltages).

Aplicaciones Tecnológicas, S.A. assures through its 5 product lines the best option for lightning protection:

· External Protection (in this catalogue).
· Internal Protection.
· Earthing.
· Exothermic welding.
· Preventive Protection.

In a world where buildings and equipment are more complex every day, lightning is a constant hazard. One discharge can damage buildings and cause failures in electronic devices. Besides, it can even provoke fire and important economical losses.

HOW IS LIGHTNING FORMED?

In normal conditions there is in the atmosphere a balance between positive and negative charges, where the ground is more negatively charged than the air and the elements placed on the ground.

However, the formation of storm clouds creates a charge polarization: usually, the lower part of the cloud is charged negatively, inducing then a positive charge at the ground and other elements on it. The electric field at the atmosphere can reach then 10s of kilovolts.

This positive charge becomes more evident at metallic elements, pointed objects and well-earthed objects, including trees.

When the electric field is high enough, the cloud starts discharging towards the ground. The path formed by this discharge is called “downward leader” and produces a very sharp variation of the electric field, causing then corona effect.

One of these objects will be the one forming the **upward leader**, which will move towards the downward leader thus forming the discharge path between **the cloud and the ground**. This object will receive the lightning strike. The cloud charge will search the strightest path to earth. If this path is not controlled, damages can be severe.

LIGHTNING DESTRUCTIVE EFFECTS

Electrical effects: equipment destruction. Ground voltage rises and surges can damage all the equipment connected to the electrical network.(1)

Electrodynamical effects: building damages. Conductors are submitted to mechanical strengths for being placed inside a magnetic field originated in another conductor. They may cause deformations and rupture. (2)

Thermal effects: fires. Heat dissipation by Joule effect can even cause fires. (3)

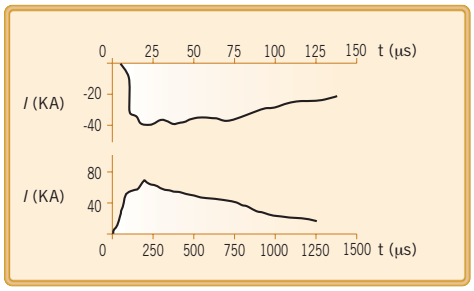
Effects on living beings: electrocutions and burns. Currents passing through during a short lapse are enough for electrocution risk by respiratory or cardiac arrest. Further burn risk appears. (4)

Induction effects: within a variable electromagnetic field, induced currents appear in every conductor. If these conductors are connected to computers or other electronic equipment, damages can be severe.

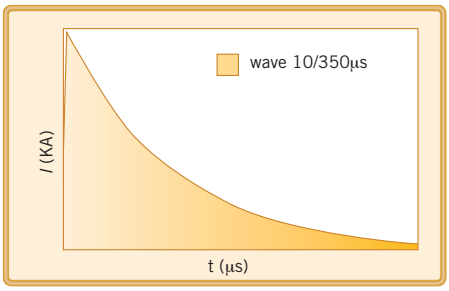
The consequences of all these effects are important economical losses because of the damages in buildings and equipment due to lightning strike or fires caused by a discharge. Costs can be also very high if lightning causes service interruptions, stops production processes or forces to switch off and on again certain machinery if the control equipment is affected by lightning.

LIGHTNING PARAMETERS

The values of the main lightning parameters have been obtained experimentally:



Waveshape and currents for positive (ground to cloud) and negative (cloud to ground) discharges.



The measured values for **lightning peak current range** from hundreds amperes to **several hundred kiloamperes**.

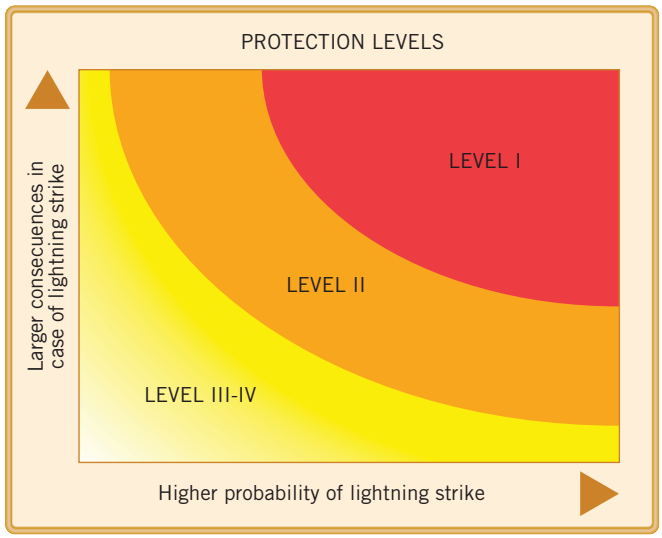
Lightning protection standards assume for a direct strike simulation a current wave, double exponential, which rise time is 10μs (up to 90% of the peak value), the peak is 100kA and the tail (time to half value) is 350μs.

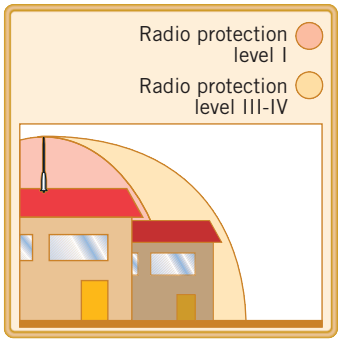
RISK ASSESSMENT

The procedure for calculating the risk factor is described in Lightning Protection standards. The result determines the need of installing a Lightning Protection System and it degree of security (Protection Level). The risk assessment compares the expected lightning incidence with the probability of lightning strike on the structure that can be assumed. The rate between these two factors indicates if the lightning protection system is needed and the security grade. This value depends on several tabulated factors, such as the type of structure and its contents, although sometimes other considerations could be taken into account, improving the protection level over the risk calculations.

Standards consider that lightning protection is needed in the following cases:

- **Any installation or machinery that is used for working.**
- **Large concentrations of persons.**
- **Need of continuity in production or public services.**
- **Areas with high lightning density.**
- **Very high or isolated buildings.**
- **Buildings containing explosive or inflammable materials.**
- **Buildings containing irreplaceable heritage.**
- **Building or structures which risk index, calculated according to the Standard, determines the need of a lightning protection system installation with a certain protection level.**





Lightning Protection standards present the need of calculating the risk factors. Aplicaciones Tecnológicas, S.A. Technical Department is at your disposal for facilitating a full risk assessment according with the relevant standards.

Anyway, the need and level of protection often depends on subjective criteria since the protection level depends on the “acceptable number of strikes on the structure”, which can be taken to a minimum always by adopting Level I, the safest and most effective.

Protection Level is thus related with the accepted probability of a lightning strike on a structure. A scarcely restrictive protection level (level III or IV) will be able to intercept lightning with a high associated current, but a flash with a low current could avoid the Lightning Protection System and strike the structure. Protection Level I considers lower protection radius for the air terminals, hence the system would intercept also lower current lightning.

LEGISLATION AND STANDARDS

The ability of an installation to protect properly is guaranteed by the compliance of all standards with a relation with lightning protection:

▶ Specific Standards for Lightning Protection

NF C 17 102, UNE 21186 and other National Standards: Lightning Protection with Early Streamer Emission Air Terminals.

IEC / BS EN 62305 Series: Lightning Protection using rods and meshed conductors.

BS EN 50164 Series: Lightning Protection Components.

BS EN 62561 Series: Lightning Protection System Components.

▶ Guide documents

BIP 2118: Protection against lightning. A UK guide to the practical application of BS EN 62305.

▶ Other standards

Typically, in every country there are codes that may be related to lightning protection, such as:

- National Electric Code.
- National Construction Code.

It's highly adviceable to check carefully if there are lightning protection requirements within national obligatory standards.

Other laws and codes may also apply to lightning protection. Typical cases are:

- Requirements for protection of flammable and explosive area.
- Work health and safety codes.
- Particular requirements for other high risk structures and areas, such as hospitals, campsites, dangerous industries, etc.

IEC / EN 61663 Series: Lightning protection. Telecommunication lines.

BS EN 2591-214: Aerospace series. Elements of electrical and optical connection. Test methods. Lightning strike, current and voltage pulse.

BS EN 3841-308: Aerospace series. Circuit breakers. Test methods. Lightning.

BS EN 50468: Resistibility requirement to overvoltage and overcurrents due to lightning for equipment having telecommunication port.

BS EN 50289-4-14: Communication cables. Specifications for test methods. Environmental test methods. Lightning.

BS EN 60076-4: Power transformers. Guide to the lightning impulse and switching impulse testing. Power transformers and reactors.

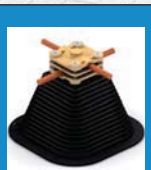
IEC / TR 61400-24: Wind turbine generator systems. Lightning protection.

IEC / TR 60479-4: Effects of current on human beings and livestock. Effects of lightning strokes on human beings and livestock.

Several protection examples: historic buildings, factories, houses, fuel stations, residential buildings, malls, etc.

Interception systems and accesories. Elements installed for intercepting lightning. Nowadays there are standards about two types of lightning protection systems: the ones using Early Streamer Emission (ESE) air terminals and the ones using rods and meshed conductors.

Down-conductors. Components transporting lightning current to the earth. Fixings, lightning event counter and spark gap for aerial mast are included in this point.



LIGHTNING PROTECTION SYSTEMS

This drawing does not pretend to represent real applications but to show the different products appearing in the catalogue in order to perform a lightning protection installation.

Earthing. Components that disperse lightning current in the soil. Elements for equipotentialization are included to join the metallic masses.







Conductors. Metallic components transporting the lightning current. They can be used in the air termination, down-conductor and the earth termination systems.

APLIWELD®: Exothermic welding. Procedure that provides long-lasting connections by welding the conductors autonomously, using graphite moulds.



GUIDE FOR THE DESIGN: EARLY STREAMER EMISSION AIR TERMINALS (ESE AIR TERMINALS) Installation standards

The installation of the LPS using ESE air terminals must follow the relevant standards (NFC 17102, UNE 21186 or similar):

- The radius of an ESE lightning conductor is related to its height (h) relative to the area to be protected, to its triggering advance and to the protection level. The following table shows the DAT CONTROLER® PLUS radii of protection.

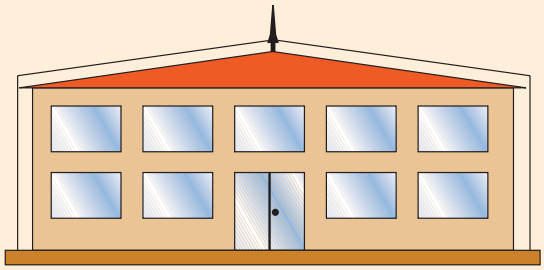
PROTECTION RADIUS (Rp) IN METERS for 3 and 4 protection levels

Protection level		DAT CONTROLER® PLUS			
		AT-1515	AT-1530	AT-1545	AT-1560
	h	DC+15	DC+30	DC+45	DC+60
Level IV	2	20	28	36	43
	4	41	57	72	85
	6	52	72	90	107
	8	54	73	91	108
	10	56	75	92	109
Level III	2	18	25	32	39
	4	36	51	64	78
	6	46	64	81	97
	8	47	65	82	98
	10	49	66	83	99
Level II	2	15	22	28	35
	4	30	44	57	69
	6	38	55	71	87
	8	39	56	72	87
	10	40	57	72	88
Level I	2	13	19	25	31
	4	25	38	51	63
	6	32	48	63	79
	8	33	49	64	79
	10	34	49	64	79

h: air terminal height over the surface to be protected.

- The air terminal must be installed at least 2 meters higher than any other element within its protected area.

- Each air terminal must be connected to the earthing using two down-conductors that will preferably be placed on different external walls of the structure.



- The down conductor should be installed providing that its routing is as straight as possible along the shortest path without sharp bends or upward sections. The proximity and cross with electric lines should also be avoided as much as possible.

- When external routing is impracticable, the down-conductor may be internal routed inside an insulating non-flammable duct with a minimum internal cross-sectional area of 2000mm^2. Anyway, the project manager must be aware of the reduced lightning protection system effectiveness, maintenance difficulties, and the risks resulting from the entry of voltage surges into structures.

- The number of fixings is determined considering 3 clips per meter.

- Down-conductors should have a cross-section of at least 50mm^2. Since lightning current is impulsional then flat conductors (tape) are preferable than round conductors because they have larger surface for the same amount of material. On another side tin-plated copper is recommended due to its physical, mechanical and electrical characteristics (conductivity, malleability, corrosion resistance and so on).

- Down conductors should be protected by installing guard tubes up to a height of 2m above ground level.

- The installation of a Lightning Event Counter over the guard tubeis recommended in order to perform the verification and maintenance operations which are essential for any lightning protection system.

- The down-conductor must be always at least at 3 meters distance from external gas pipes.

- Each down-conductor must have an earth termination system.

- Earth terminations should be oriented towards the external part of the buildings.

- The connection with the earth termination system must be done in the excavation, directly at the end of each down-conductor, using a device that allows the disconnection of the earthing and placed inside an inspection pit with the earth symbol.

- The resistance of the earth measured by conventional means must be lower than 10Ω when separated from other conductive elements.

- The inductance of the earthing must be as low as possible. The recommended arrangement is vertical electrodes forming a triangle with a minimum total length of 6m. The vertical electrodes must be bonded with a conductor buried 50cm deep and separated at a greater distance than their length.

- The use of a soil conductivity improver is recommended in high resistivity grounds.

- All the earth termination systems should be bonded among them and to the general earthing of the building.

- It is recommended to use a spark gap to connect the lightning earth termination system to the general earthing, as well as the lightning air terminal mast to the aerial mast.

- All elements of the earth termination system must be always at least at 5 meters distance from any metallic or electric buried canalization.

GUIDE FOR THE DESIGN:
EARLY STREAMER EMISSION AIR TERMINALS (ESE AIR TERMINALS)
Working basis and main materials

The functioning of Early Streamer Emission Air Terminals is based on the electric characteristics of lightning formation. Lightning initiates with a downward leader, propagating to any direction. Once it approximates to the objects placed on the ground, any of them can be struck. The objective of an external lightning protection system is to control the lightning striking point thus providing the lightning current a path to the ground without damaging the structure.

The main feature of Early Streamer Emission (ESE) Air Terminals is the emission of the continuous upward leader before any other object within its protected area. The standards define this characteristic using a parameter called advance time (Δt): "Average gain in upward leader triggering compared with a reference point having the same geometry. It shall be obtained by laboratory tests. It is measured in microseconds."

The advance time determines the protection radius of each air terminal. If the triggering occurs earlier, then the distance where the downward leader is intercepted increases, thus avoiding the lightning strike in a wider area. The advance time must be measured in a High Voltage laboratory, following the test procedure described in the standards of lightning protection using ESE Air Teminals.

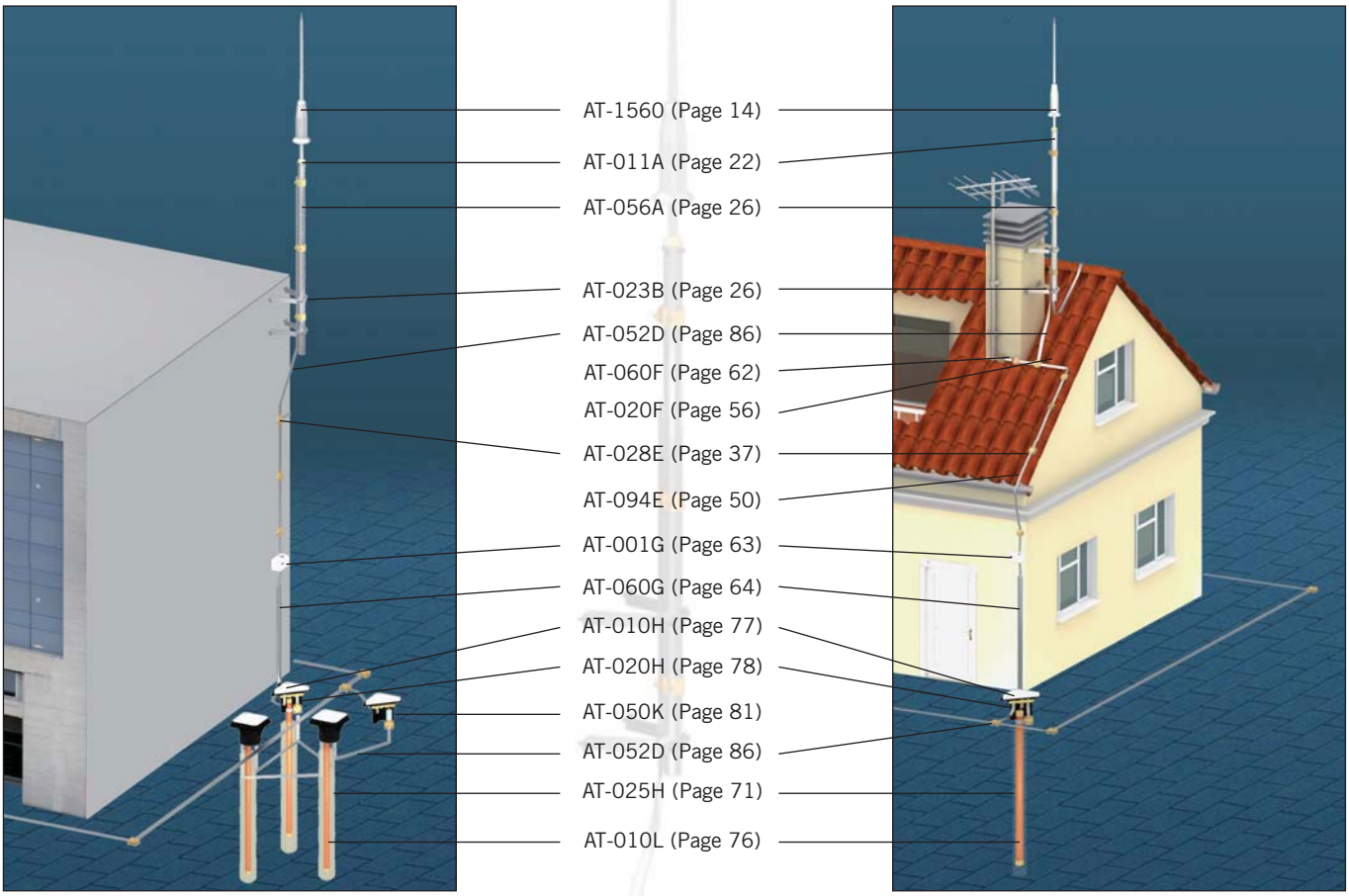
The components for a Lightning Protection System using ESE Air Terminals are the following:

External Lightning Protection System

- One or more air terminals.
- Two or more down-conductors.
- An Earth Termination System.

Internal Lightning Protection System

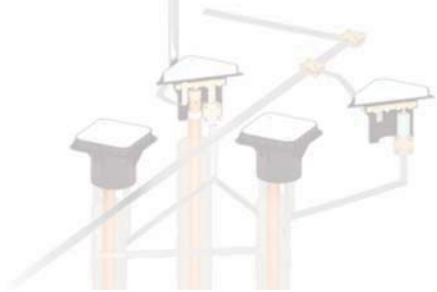
- A correct surge protection installation (see Overvoltage Protection catalogue)
- Other measures minimizing the destructive lightning effects (equipotential bonding, screening, etc.)



Recommended materials for a lightning protection installation using ESE Air Terminals:

	REFERENCE	TABLE
INTERCEPTION SYSTEMS		
ESE lightning air terminal	AT-1560	1
Adapting piece	AT-011A	14
Mast	AT-056A	26
Anchorage	AT-023B	27
DOWN-CONDUCTORS		
Clip	AT-028E	45
Tile support	AT-094E	71
Downpipe support	AT-073E	76
Clamp	AT-020F	87
Spark gap for aerial mast	AT-060F	101
Lightning event counter	AT-001G	102
Guard tube	AT-060G	103
Conductor	AT-052D	148

	REFERENCE	TABLE
EARTHING		
Earth electrode	AT-025H	116
Ground enhancing product	AT-010L	124
Earth pit	AT-010H	126
Bonding bar	AT-020H	127
Spark gap for earthing	AT-050K	135
Conductor	AT-052D	148



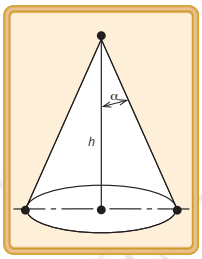
GUIDE FOR THE DESIGN: RODS AND MESHED CONDUCTORS
Installation standards

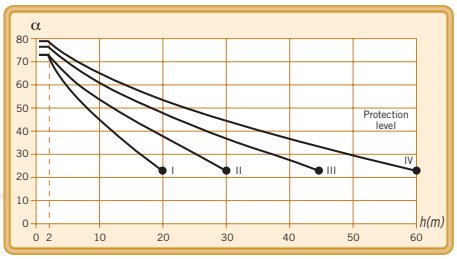
The installation of a lightning protection system using rods and meshed conductors must follow the standards IEC62305 Lightning Protection:

The volume protected by the air terminals can be determined using 3 methods:

ANGLE METHOD

According to this method the protection volume is given by a line which origin is at the air terminal and which angle depends on the height and the protection level according to the following chart and graphic:

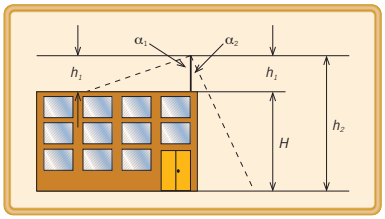




PROTECTION LEVEL	R(m) \ h(m)	20	30	45	60
		α	α	α	α
I	20	25	*	*	*
II	30	35	25	*	*
III	45	45	35	25	*
IV	60	55	45	35	25

*For higher structures regarding this chart, this method cannot be applied.

Franklin rods should be placed on the higher and most vulnerable places (edges, overhangs, etc.), as shown in the figure:



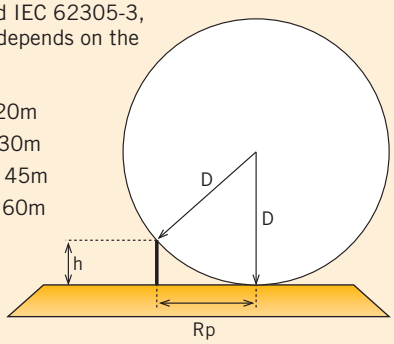
Self-standing rods (table 9) are recommended when the rods have to surpass 8m or higher elements on the roof.

ROLLING SPHERE METHOD

The rolling sphere method is based on an electrogeometrical model when it is assumed that the downward leader that will strike the structure to be protected has the shape of a sphere with a radius D (space where the last step of the downward leader can stay). The points where this sphere can touch the structure should be provided with air terminals.

According to the Standard IEC 62305-3, the rolling sphere radius depends on the protection level:

- Protection Level I: D = 20m
- Protection Level II: D = 30m
- Protection Level III: D = 45m
- Protection Level IV: D = 60m



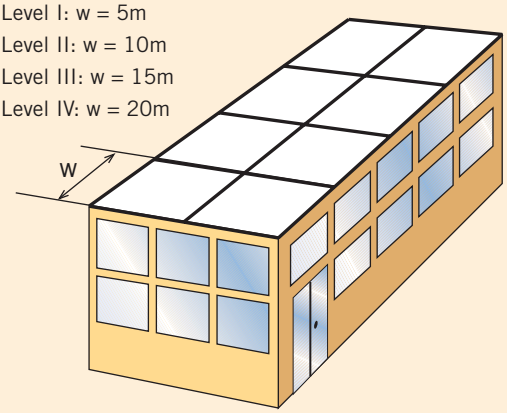
Once these air terminals are installed, the protection radius (Rp) can be defined as shown in the figure and the formula:

$$Rp = \sqrt{2 \cdot D \cdot h - h^2}$$

MESH METHOD

According to this method, conductors forming a mesh should be placed on the structure. The separation depends on the protection level:

- Protection Level I: w = 5m
- Protection Level II: w = 10m
- Protection Level III: w = 15m
- Protection Level IV: w = 20m



The mesh should protect firstly the cover perimeter, especially edges and overhangs.

For buildings higher than 60m, a mesh with the same size has to cover also the upper 20% of the outer walls.

Down-conductors should follow these requirements:

- **To provide several parallel paths for sharing the lightning current.**
- **The length of the current paths to the earthing should be as short and direct as possible.**
- **They should be connected to the grounded metallic parts of the structure if the distance between them is shorter than the separation distance as defined in the standards.**

- The distance between down-conductors depends also on the protection level:

Protection Level	Distance between down-conductors
I	10m
II	10m
III	15m
IV	20m

- The conductors should be fixed to the structure every meter approximately.
- For thermic length compensation of longer conductors, it is recommended to install expansion units each 20 meters.
- A guard tube should be installed for each down-conductor, covering at least 2m over the floor, in order to avoid mechanical damages.
- Every down-conductor must be connected to the earthing. It is recommended to equipotentialize all the down-conductors at ground level and every 20m.
- A disconnecting sleeve should be installed in each down-conductor for measuring earth resistance separated from other conductive elements.
- It is recommended less than 10Ω for earthing resistance.
- Earth conductors should be buried at a depth of at least 0,5m.
- It is not recommended to install aluminium conductors or pieces directly into earth.
- Unions between copper and aluminium conductors or copper and galvanized steel conductors are not recommended to avoid corrosion. It should be used bimetallic or stainless steel clamps.

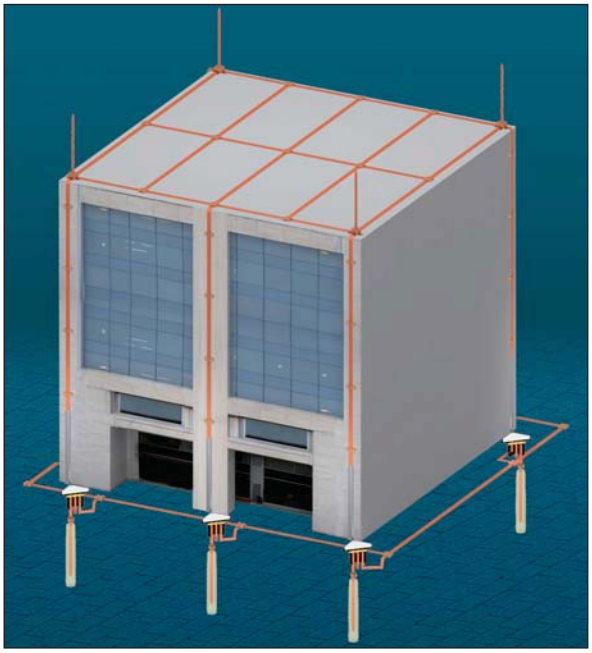
GUIDE FOR THE DESIGN: RODS AND MESHED CONDUCTORS
Main materials

Lightning protection using rods and meshed conductors intends to share and dissipate the lightning current through a network of down-conductors and earth terminations.

The elements of a lightning protection system using rods and meshed conductors are the following:

External Lightning Protection System
- Simple rods or/and meshed conductors.
- Down-conductors.
- Earth Termination System.

Internal Lightning Protection System
- A correct surge protection installation (see Overvoltage Protection catalogue)
- Other measures minimizing the destructive lightning effects (equipotential bonding, screening, etc.)



Recommended materials for a lightning protection installation using rods and meshed conductors:

This table gives the proper material for making a copper, aluminium, galvanized steel or stainless steel mesh. In the column "Table", the number of the table in the catalogue where the recommended material is described.

Denomination	Reference Cu	Table	Reference Al	Table	Reference Galv S	Table	Reference SS	Table	
Air rod	AT-005A	5	AT-008A	5	AT-038A	8	AT-032A	8	Interception systems
Self-supporting air rod					AT-104A	9	AT-104A	9	
Air rod base	AT-115B	16	AT-116B	16	AT-030B	25	AT-030B	25	
Flat washer					AT-095B	25	AT-095B	25	
Roof conductor holder	AT-207E	49	AT-207E	49	AT-042E	64	AT-042E	64	
Clamp	AT-033F	85	AT-039F	85	AT-125F	91	AT-122F	91	
Conductor	AT-011D	147	AT-057D	150	AT-060D	157	AT-128D	157	
Clip	AT-114E	43	AT-121E	43	AT-128E	53	AT-128E	53	Down-conductors
Clip for guard tube					AT-132E	53			
Tile support	AT-094E	71	AT-094E	71	AT-090E	67	AT-090E	67	
Gutter clamp					AT-040F	72	AT-040F	72	
Downpipe support	AT-177E	83	AT-025J	84	AT-186E	77	AT-186E	77	
Clamp	AT-033F	85	AT-039F	85	AT-125F	91	AT-122F	91	
Test clamp	AT-080F	94	AT-094F	100					
Spark gap for aerial mast	AT-060F	101	AT-060F	101	AT-060F	101	AT-060F	101	
Guard tube	AT-060G	103	AT-060G	103	AT-057G	103	AT-053G	103	
Joint protection					AT-010J	125			
Conductor	AT-011D	147	AT-057D	150	AT-060D	157	AT-128D	157	
Earth electrode	AT-041H	117	AT-041H	117	AT-049H	120	AT-080H	119	Earthing
Coupling					AT-038K	120			
Ground enhancing product	AT-010L	124	AT-010L	124	AT-010L	124	AT-010L	124	
Earth pit	AT-010H	126	AT-010H	126	AT-010H	126	AT-010H	126	
Bonding bar	AT-020H	127	AT-020H	127	AT-020H	127	AT-021J	127	
Earth clamp	AT-080J	137	AT-080J	137	AT-131J	146	AT-133J	146	
Conductor	AT-011D	147	AT-011D	147	AT-061D	157	AT-129D	157	

INTERCEPTION SYSTEMS

ESE lightning air terminals

Rods and meshed conductors

AND ACCESORIES

Fixings

Masts and anchorages

1 ESE LIGHTNING CONDUCTOR - DAT CONTROLER® PLUS

An **early streamer emission (ESE)** Air Terminal is characterized by reacting when lightning approaches, intercepting it earlier than any other element within its protection area in order to conduct it safely to the ground.

This time ahead is normatively called **"Advance time (Δt)"** and it determines the air terminal protective radius.

For an enhanced guarantee, the DAT CONTROLER® PLUS Air Terminals have been submitted to several tests in official and independent laboratories:

- It is necessary to verify that the air terminals are not perishable and they continue working after repetitive lightning strikes, maintaining the advance time capability. **DAT CONTROLER® PLUS** has been submitted to a withstand current test previously to the test where the advance time is determined (Δt). This group of tests is called **"lightning current – advance time consecutive test"**. **DAT CONTROLER® PLUS** has obtained the AENOR Product Certification for passing this test.
- Besides, an ESE Air Terminal has to maintain the isolation of the source that supplies the triggering device in order to assure its advance time (Δt). It is therefore necessary to verify that the triggering device is not disabled under rain conditions since the air terminal would then loose its protection radius. **DAT CONTROLER® PLUS has been tested under heavy rain conditions thus ensuring this isolation.**

PROTECTION RADIUS (Rp) IN METERS FOR 3 AND 4 PROTECTION LEVELS

4 PROTECTION LEVELS (CTE SU 8,...)	3 PROTECTION LEVELS (UNE 21186, NFC 17102,...)	DAT CONTROLER® PLUS				
		h	AT-1515 DC+15	AT-1530 DC+30	AT-1545 DC+45	AT-1560 DC+60
Level IV	Level III	2	20	28	36	43
		4	41	57	72	85
		6	52	72	90	107
		8	54	73	91	108
		10	56	75	92	109
Level III	Level II	2	18	25	32	39
		4	36	51	64	78
		6	46	64	81	97
		8	47	65	82	98
		10	49	66	83	99
Level II		2	15	22	28	35
		4	30	44	57	69
		6	38	55	71	87
		8	39	56	72	87
		10	40	57	72	88
Level I	Level I	2	13	19	25	31
		4	25	38	51	63
		6	32	48	63	79
		8	33	49	64	79
		10	34	49	64	79

h: air terminal height over the surface to be pojected

The **DAT CONTROLER® PLUS** Air Terminal employs the environmental electric field as the only power supply. It is fully autonomous, maintenance-free and its working can be verified at any moment.

DAT CONTROLER® PLUS must be installed following the relevant standards.

ESE LIGHTNING AIR TERMINALS

The DAT CONTROLER® PLUS Air Terminal is provided with:

A) AENOR* Product Certification nr. 058/000003 "Lightning current-advance time consecutive test"

AENOR Producto Certificado 058-000003

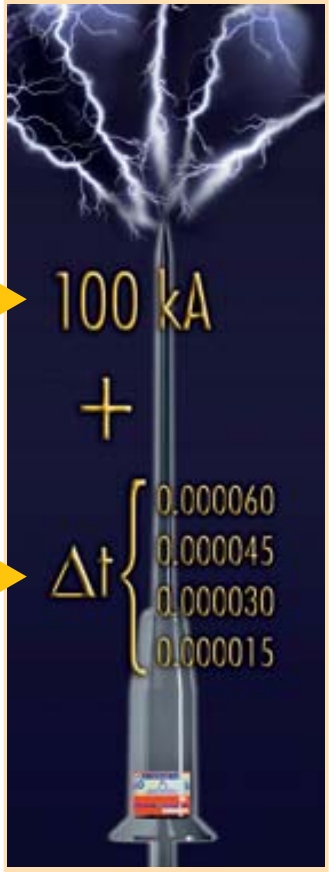
The below described A.1 and A.2 tests have been performed on the same air terminals consecutively with the aim of assuring its proper working after withstanding repetitive lightning currents. These tests have been carried out by the LCOE (Central Official Electrotechnics Laboratory, Ministry of Science and Technology).

A.1) CERTIFIED WITHSTAND CURRENT: 100kA. Direct application of 10 lightning current impulses (10/350μs) with a current peak higher than 100kA and specific energy higher than 2,5MJ/W, according to IEC60060-1 and IEC61083-1.

A.2) CERTIFIED ADVANCE TIME, tested according to UNE 21186** and NFC 17102*** (Annex C "Test for the evaluation of a ESE air terminal") and fixed after applying a security factor equal to twice the uncertainty registered during the test:

Ref.	Model	Advance time during the test	Uncertainty of the test (i)	Security factor	Certified advance time
AT-1515	DAT CONTROLER® PLUS 15	39 μs	± 11 μs	2 x i	15 μs
AT-1530	DAT CONTROLER® PLUS 30	52 μs	± 11 μs	2 x i	30 μs
AT-1545	DAT CONTROLER® PLUS 45	68 μs	± 12 μs	2 x i	45 μs
AT-1560	DAT CONTROLER® PLUS 60	86 μs	± 12 μs	2 x i	60 μs

LIGHTNING CURRENT-ADVANCE TIME CONSECUTIVE TEST



DAT CONTROLER® PLUS remains working properly after withstanding repetitive lightning discharges, with no disruption to the advance time (Δt)

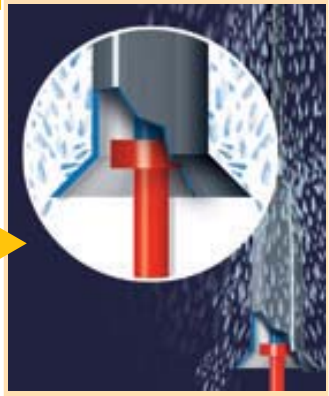
B) CERTIFICATE OF EFFECTIVE PERFORMANCE UNDER RAIN. Insulation superior to 95%

These tests have been performed according to the standard UNE 21308 (IEC60060-1) in the LCOE (Central Official Electrotechnics Laboratory, Ministry of Science and Technology).

B.1) Comparative dry/rain tests with continuous voltage (simulating the electric field during a storm).

B.2) Comparative dry/rain tests with switching impulses (simulating the approach of the downward leader).

CERTIFICATE OF EFFECTIVE PERFORMANCE UNDER RAIN



For an ESE Air Terminal, the triggering device supply comes from the high difference of potential, in storm conditions, between its isolated metallic armatures. It is therefore necessary to guarantee this potential difference under bad weather conditions.
The patented design of DAT CONTROLER® PLUS avoids the contact between the metallic framework at atmospheric potential (in blue) and the metallic axis connected to earth (in red)

C) CERTIFICATE OF PROTECTION RADIUS AND FULFILLMENT OF THE RELEVANT STANDARDS

Certificate of the protection radius for each model and protection level calculated according to the relevant standards.

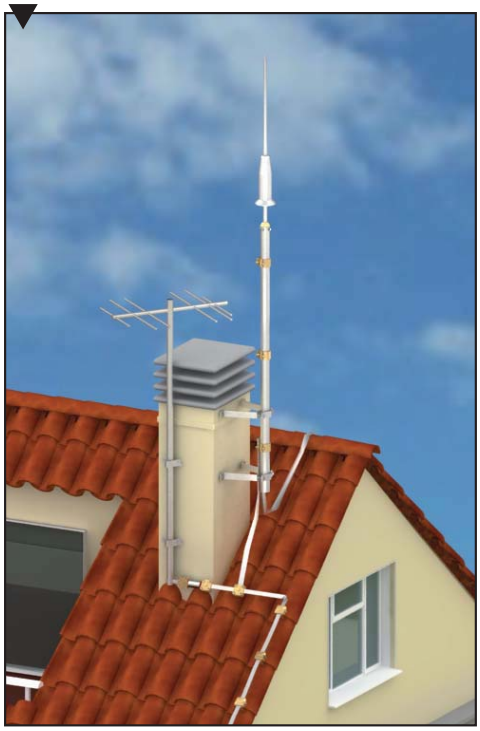
* Spanish Standardisation Organisation.
** Protección de estructuras, edificaciones y zonas abiertas mediante pararrayos con dispositivo con dispositivo de cebado. (Protection of structures, buildings and open areas with early streamer emission air terminals).
*** Protection des structures et des zones ouvertes contre la foudre par paratonnerre à dispositif d'amorçage.

ESE LIGHTNING AIR TERMINALS

ESE LIGHTNING AIR TERMINALS EXAMPLES

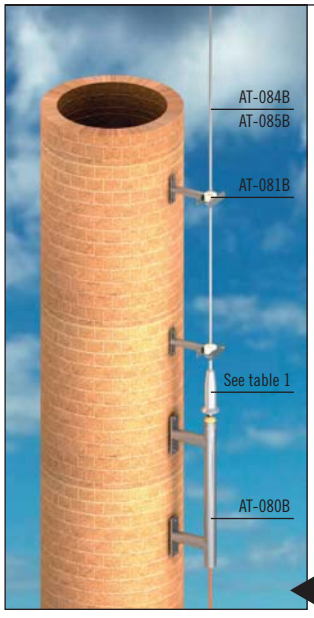
These are several examples of interception systems with ESE lightning air terminals, showing the most relevant material:

Reference	Denomination	Table
AT-1560	DAT CONTROLER® PLUS	1
AT-011A	Tape adapting piece	14
AT-056A	Mast	26
AT-023B	U shaped anchorage	27
AT-028E	Tape clip	45
AT-094E	Tile support	71
AT-020F	Square tape clamp	87
AT-060F	Spark gap for aerial mast	101
AT-052D	Tape conductor	148



Reference	Denomination	Table
AT-1560	DAT CONTROLER® PLUS	1
AT-011A	Tape adapting piece	14
AT-012C	Free standing mast	38
AT-052D	Tape conductor	148

Reference	Denomination	Table
AT-1560	DAT CONTROLER® PLUS	1
AT-010A	Cable adapting piece	14
AT-031C	Trestle tower	39
AT-044C	Cable trestle tower clip	40
AT-046C	Cable to Guy wire clamp	40
AT-050D	Cable conductor	148



AT-080B, AT-081B, AT-084B, AT-085B (example)

Reference	Denomination	Table
AT-1560	DAT CONTROLER® PLUS	1
AT-011A	Tape adapting piece	14
AT-080B	Chimney anchorage	36
AT-081B	Isolated support for chimneys	36
AT-085B	5m rod for chimneys	36
AT-028E	Tape clip	45
AT-052D	Tape conductor	148

RODS AND MESHED CONDUCTORS

RODS AND MESHED CONDUCTORS EXAMPLES

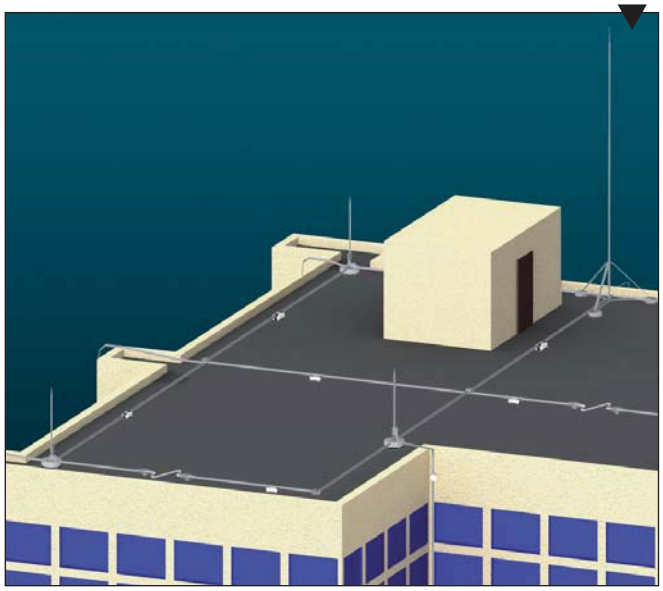
These are several examples of interception systems with rods and meshed conductors, showing the most relevant material:

Reference	Denomination	Table
AT-005A	Taper pointed air rod	5
AT-115B	Air rod base	16
AT-033F	Square tape clamp	85
AT-011D	Tape conductor	147

Reference	Denomination	Table
AT-002A	Multi-point	12
AT-056A	Mast	26
AT-023B	U shaped anchorage	27
AT-043E	Cable clip	56
AT-090E	Curve tile support	67
AT-120F	T clamp	88
AT-060F	Spark gap for aerial mast	101
AT-060D	Round conductor	157

Reference	Denomination	Table
AT-038A	Lightning rod for wedge	8
AT-111A	Self-supporting air termination rod	9
AT-030B	Concrete base	25
AT-095B	Flat washer for concrete base	25
AT-042E	Roof conductor holder	64
AT-025F	Rod universal clamp	91
AT-125F	Universal clamp	91
AT-012G	Expansion unit	104
AT-060D	Round conductor	157

Reference	Denomination	Table
AT-041E	Pyramidal roof conductor holder	63
AT-145E	Pyramidal roof conductor holder with square clamp	63
AT-052D	Tape conductor	148



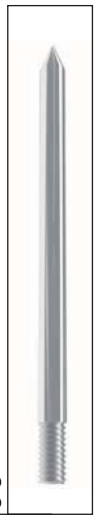
RODS AND MESHED CONDUCTORS

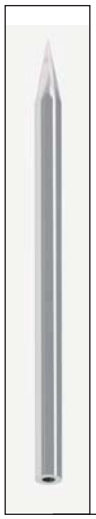
2 ESE LIGHTNING CONDUCTOR – TRAZOR


AT-1465

Reference	Model	Dimensions (mm)	Material	Weight (Kg)
AT-1465	TRAZOR T - PDC / 5	175 x 175 x 750	Stainless steel	4,75
AT-1467	TRAZOR T - PDC / 7	175 x 175 x 750	Stainless steel	4,75
AT-1469	TRAZOR T - PDC / 9	175 x 175 x 750	Stainless steel	4,75
AT-1470	TRAZOR T - PDC / 10	175 x 175 x 750	Stainless steel	4,75
				Meets UNE 21186, NFC 17102

3 AIR TERMINATION ROD


AT-023A (SS)
AT-019A (CC)


AT-053L (SS)
AT-097A (CC)

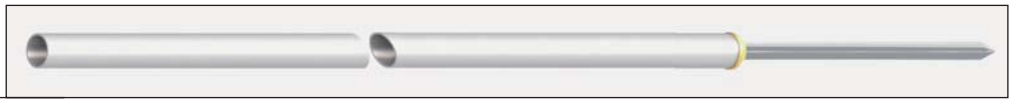
Reference	Dimensions (mm)	Thread	Material	Weight (Kg)
AT-053L	Ø20 x 300	female thread M10	Stainless steel	0,65
AT-055L	Ø20 x 500	female thread M10	Stainless steel	1,14
AT-096A	Ø20 x 1000	female thread M10	Stainless steel	2,35
AT-097A	Ø20 x 300	female thread M10	Chromed plated copper	0,7
AT-098A	Ø20 x 500	female thread M10	Chromed plated copper	1,25
AT-099A	Ø20 x 1000	female thread M10	Chromed plated copper	2,6
AT-023A	Ø20 x 400	M20	Stainless steel	0,9
AT-019A	Ø20 x 400	M20	Chromed plated copper	1
AT-121A	Ø16 x 300	M16	Stainless steel	0,5
AT-122A	Ø16 x 600	M16	Stainless steel	1
				Meets with IEC 62305, EN 50164

Ø20mm rods assemble for example with AT-022F or AT-003M (Tables 23, 24), except AT-023A and AT-019A that assemble for example into AT-010A (Table 14). Ø16mm rods assemble with AT-124B (Table 17).

4 AIR TERMINAL WITH MAST

Reference	Dimensions	Total heigth (m)	Material	Weight (Kg)
AT-013A	Ø20 x 400 mm + Mast Ø1" x 1000 mm	1,4	Stainless steel / Stainless steel (mast)	2,5
AT-014A	Ø20 x 400 mm + Mast Ø1" x 2000 mm	2,4	Stainless steel / Stainless steel (mast)	4,5
AT-024A	Ø20 x 400 mm + Mast Ø 1 1/2" x 2000 mm	2,4	Stainless steel / Galvanized steel (mast)	8,3
AT-015A	Ø20 x 400 mm + Mast Ø1" x 1000 mm	1,4	Chromed plated copper / Stainless steel (mast)	2,6
AT-016A	Ø20 x 400 mm + Mast Ø1" x 2000 mm	2,4	Chromed plated copper / Stainless steel (mast)	4,6
AT-017A	Ø20 x 400 mm + Mast Ø 1 1/2" x 2000 mm	2,4	Chromed plated copper / Galvanized steel (mast)	8,4
				Meets with IEC 62305, EN 50164

For using in conjunction with the mast anchorages (Tables 27 to 35). AT-024A and AT-017A include an adapting piece AT-011A (Table 14) for fixing the conductor (tape, cable or round) inside the mast. The rest of the references need to fix the conductor outside the mast. (For example AT-033A. Table 61).


AT-024A (SS)
AT-017A (CC)

RODS AND MESHED CONDUCTORS

TAPER POINTED AIR ROD 5

Reference	Dimensions (mm)	Total length (m)	Thread	Included	Material	Weight (Kg)
AT-004A	Ø16 x 350 + Ø15 x 150	0,5	M16	Tightening nut	Copper	0,73
AT-005A	Ø16 x 850 + Ø15 x 150	1	M16	Tightening nut	Copper	1,51
AT-006A	Ø16 x 1850 + Ø15 x 150	2	M16	Tightening nut	Copper	3
AT-007A	Ø16 x 350 + Ø15 x 150	0,5	M16	Tightening nut	Aluminium	0,29
AT-008A	Ø16 x 850 + Ø15 x 150	1	M16	Tightening nut	Aluminium	0,53
AT-009A	Ø16 x 1850 + Ø15 x 150	2	M16	Tightening nut	Aluminium	1,06
						Meets with IEC 62305, EN 50164, BS 6651, BS 1432 C101, BS 2897, AS 1567

These air rods are available in copper or aluminium and fit into the rod couplings, the flat and ridge saddles, air rod base, and multi-point. (For example AT-104B, AT-110B or AT-000A. Tables 15 to 20, 10).

AT-004A (Cu)
AT-007A (Al)

Ø10 TAPER POINTED AIR ROD 6

Reference	Dimensions (mm)	Thread	Included	Material	Weight (gr)
AT-092A	Ø10 x 500	M10	Tightening nut	Copper	330
AT-093A	Ø10 x 1000	M10	Tightening nut	Copper	650
AT-094A	Ø10 x 500	M10	Tightening nut	Aluminium	110
AT-095A	Ø10 x 1000	M10	Tightening nut	Aluminium	220
					Meets with IEC 62305, EN 50164, BS 6651, BS 1432 C101, BS 2897, AS 1567

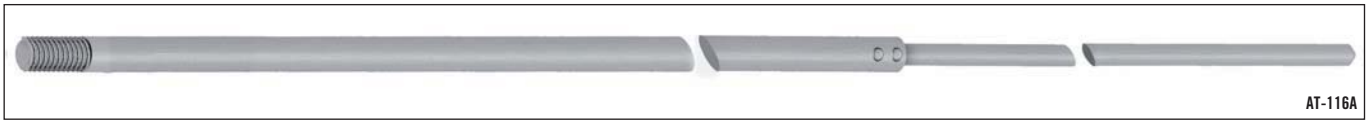
These air rods are available in copper or aluminium and fit into the horizontal and vertical air terminal saddles. (For example AT-122B. Tables 21 and 22). Only for applications where mechanical stress such as wind loading is not critical.

AT-092A (Cu)
AT-094A (Al)

THREADED LIGHTNING ROD 7

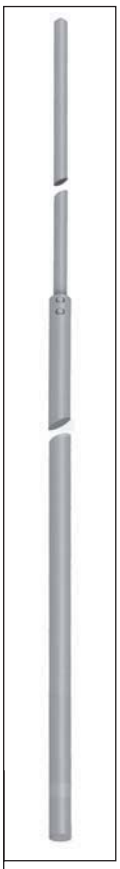
Reference	Dimensions (mm)	Total heigth (m)	Thread	Material	Weight (Kg)
AT-114A	Ø16 x 1000 + Ø10 x 500	1,5	M16	Aluminium	0,48
AT-115A	Ø16 x 1000 + Ø10 x 1000	2	M16	Aluminium	0,76
AT-116A	Ø16 x 1500 + Ø10 x 1000	2,5	M16	Aluminium	1,02
AT-117A	Ø16 x 2000 + Ø10 x 1000	3	M16	Aluminium	1,3
AT-118A	Ø16 x 2500 + Ø10 x 1000	3,5	M16	Aluminium	1,52
AT-119A	Ø16 x 3000 + Ø10 x 1000	4	M16	Aluminium	1,73
					Meets with IEC 62305, EN 50164

Suitable for using with threaded concrete bases. (For example AT-097B. Table 25).

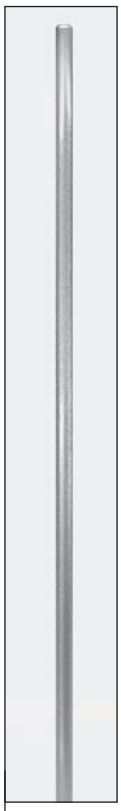


AT-116A

8 LIGHTNING ROD FOR WEDGE



AT-045A

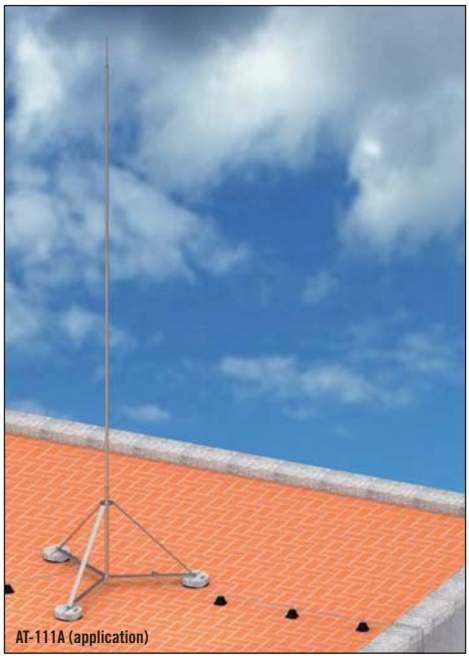


AT-026A (GS)
AT-032A (SS)
AT-036A (Cu)
AT-038A (Al)

Reference	Dimensions (mm)	Total heigth (m)	Material	Weight (Kg)
AT-025A	Ø16 x 750	0,75	Galvanized steel	1,22
AT-026A	Ø16 x 1000	1	Galvanized steel	1,6
AT-027A	Ø16 x 1250	1,25	Galvanized steel	2
AT-028A	Ø16 x 1500	1,5	Galvanized steel	2,4
AT-029A	Ø16 x 2000	2	Galvanized steel	3,2
AT-030A	Ø16 x 2500	2,5	Galvanized steel	4
AT-031A	Ø16 x 3000	3	Galvanized steel	4,8
AT-032A	Ø16 x 1000	1	Stainless steel	1,6
AT-034A	Ø16 x 1500	1,5	Stainless steel	2,38
AT-035A	Ø16 x 2000	2	Stainless steel	3,2
AT-036A	Ø16 x 1000	1	Copper	1,85
AT-037A	Ø16 x 1500	1,5	Copper	2,77
AT-038A	Ø16 x 1000	1	Aluminium	0,54
AT-039A	Ø16 x 1500	1,5	Aluminium	0,82
AT-040A	Ø16 x 2000	2	Aluminium	1,8
AT-041A	Ø16 x 2500	2,5	Aluminium	1,4
AT-042A	Ø16 x 3000	3	Aluminium	1,68
AT-043A	Ø10 x 1000	1	Aluminium	0,22
AT-044A	Ø16 x 500 + Ø10 x 1000	1,5	Aluminium	0,48
AT-045A	Ø16 x 1000 + Ø10 x 1000	2	Aluminium	0,76
AT-046A	Ø16 x 1500 + Ø10 x 1000	2,5	Aluminium	1,02
AT-047A	Ø16 x 2000 + Ø10 x 1000	3	Aluminium	1,3
				Meets with IEC 62305, EN 50164

No threaded lightning rods suitable for using with stackable wedge concrete bases (For example AT-030B. Table 25).

9 SELF-SUPPORTING AIR TERMINATION ROD



AT-111A (application)

Reference	Base occupation Ø(mm)	Mast height (m)	Nº of concrete bases	Material	Weight (Kg)
AT-100A	1700	3	3	Stainless steel / Aluminium	60
AT-101A	1700	3,5	3	Stainless steel / Aluminium	61
AT-102A	1700	4	3	Stainless steel / Aluminium	62
AT-103A	1700	4,5	3	Stainless steel / Aluminium	63
AT-104A	1700	5	3	Stainless steel / Aluminium	64
AT-105A	1700	5,5	6	Stainless steel / Aluminium	115
AT-106A	1700	6	6	Stainless steel / Aluminium	116
AT-107A	2200	6,5	6	Stainless steel / Aluminium	125
AT-108A	2200	7	6	Stainless steel / Aluminium	127
AT-109A	2200	7,5	9	Stainless steel / Aluminium	180
AT-110A	2200	8	12	Stainless steel / Aluminium	232
AT-111A	2200	8,5	12	Stainless steel / Aluminium	234
					Meets with IEC 62305, EN 50164

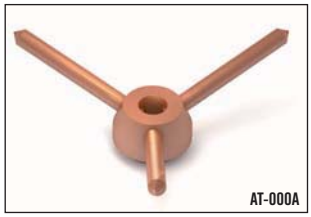
Reduced air-termination rod with hinged tripod support for protection of greater roof structures such as air conditioners... The air termination rods are designed for wind velocity up to 145 Km/h. The stackable concrete bases (AT-030B. Table 25), the flat washers (AT-095B. Table 25) and the clip for round conductor Ø 6-10 mm (AT-138E. Table 59) are included. The rod is made of stainless steel except the last 2 meters made of aluminium.

RODS AND MESHED CONDUCTORS

GUNMETAL MULTI-POINT 10

Reference	Points dimensions (mm)	Material	Weight (gr)
AT-000A	3 x (Ø9 x 90)	Gunmetal	325
	Meets with IEC 62305, EN 50164, BS 6651, BS 1432 C101, BS 1400, BS 2897, BS 2874, AS 1567		

Multi-point suitable only for use with copper taper pointed air rod.
(For example AT-004A. Table 5).

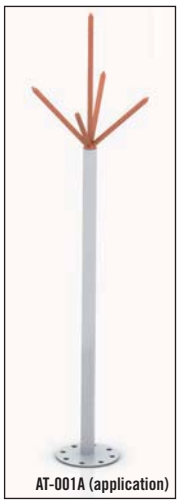

AT-000A


AT-000A (application)

COPPER MULTI-POINT WITH MAST 11

Reference	Multi-point dimensions (mm)	Material	Weight (Kg)
AT-001A	(Ø16 x 450) + 4 x (Ø16 x 270)	Copper (points) / Galvanized steel (mast)	9,5
			Meets with IEC 62305, EN 50164

Copper multi-point to be mounted at the top of metallic structures. Total height: 1,5m (including mast and anchorage).
It includes 8 anchorage holes of Ø18 mm, at 80 mm from the centre.


AT-001A (application)

MULTI-POINT 12

Reference	Multi-point dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Material	Weight (gr)
AT-002A	(Ø16 x 185) + 4 x (Ø8 x 72)	8 - 10	50 - 70	Stainless steel (points)	885
AT-003A	(Ø16 x 185) + 4 x (Ø8 x 72)	8 - 10	50 - 70	Copper (points)	940
					Meets with IEC 62305, EN 50164

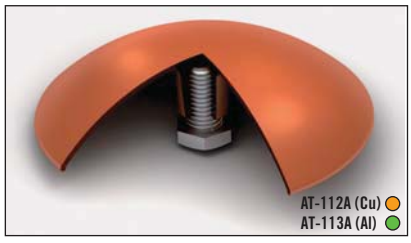
Multi-point with the adapting piece made of naval brass, suitable for use with galvanized steel mast 1 1/2".
(For example AT-066A. Table 26)


AT-003A (Cu)
AT-002A (SS)

STRIKE PAD 13

Reference	Dimensions (mm)	Material	Weight (gr)
AT-112A	112 x 112 x 25	Copper	410
AT-113A	112 x 112 x 25	Aluminium	130

Provided with a screw to attach it to the lightning conductors.


AT-112A (Cu)
AT-113A (Al)

FIXINGS

14 ADAPTING PIECE

AT-011A (application)

Reference	Mast Ø	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Conductor range Tape (mm)	Material	Weight (gr)
AT-010A	1 1/2 "	Ø48 x 70	8-10	50 - 70	-	Naval brass	675
AT-011A	1 1/2"	Ø48 x 70	8-10	50 - 70	30x2 - 30x3,5	Naval brass	655
AT-012A	1"	Ø34 x 97	8-10	50 - 70	-	Naval brass	420
AT-020A	1 1/2 "	Ø48 x 70	8-10	50 - 70	-	Stainless steel	615
AT-021A	1 1/2 "	Ø48 x 70	8-10	50 - 70	30x2 - 30x3,5	Stainless steel	640
AT-022A	1"	Ø34 x 97	8-10	50 - 70	-	Stainless steel	400

Meets with EN 50164, UNE 21186, NFC 17102


AT-011A (NB)
AT-021A (SS)

Suitable for fixing the lightning rod in the mast (Table 26) with internal conductor, (tape, cable or round) connection. The lightning rod-adapting piece thread is M20.

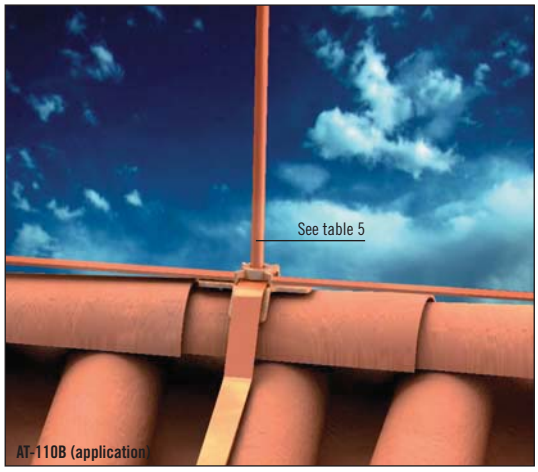
15 RIDGE SADDLE


AT-110B (Gu)
AT-111B (Al)

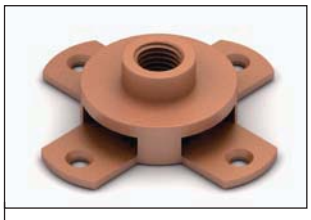
Reference	Dimensions (mm)	Conductor range (mm)	Thread	Material	Weight (gr)
AT-110B	150 x 150 x 71	25x3 - 30x3	M16	Gunmetal	1070
AT-111B	150 x 150 x 71	25x3 - 30x3	M16	Aluminium	340

Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1471, AS 1866, AS 1567

Used for supporting lightning conductor air terminals onto the ridge of the roof and connecting to the tape.



AT-110B (application)


AT-115B (Gu)
AT-116B (Al)

16 AIR ROD BASE

Reference	Dimensions (mm)	Tape (mm)	Thread	Material	Weight (gr)
AT-115B	100 x 100 x 33	25 x 3	M16	Gunmetal	470
AT-116B	100 x 100 x 33	25 x 3	M16	Aluminium	150

Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1471, AS 1866, AS 1567

Used for supporting lightning conductor air terminals onto the roof and connecting to the tape.

FIXINGS

FLAT SADDLE 17

Reference	Dimensions (mm)	Conductor Ø(mm)	Conductor mm²	Thread	Material	Weight (gr)
AT-112B	85 x 85 x 64	8	50	M16	Gunmetal	1030
AT-113B	85 x 85 x 64	10	70	M16	Gunmetal	950
AT-114B	85 x 85 x 64	13	95	M16	Gunmetal	950
AT-124B	30 x 34 x 57	8 -10	50 - 70	M16	Stainless steel	170
AT-125B	30 x 34 x 57	8 -10	50 - 70	M20	Stainless steel	170
Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1471, AS 1866, AS 1567						


AT-114B

Used for supporting lightning conductor air terminals onto the roof and connecting to the cable or round.

ROD BRACKETS 18

Reference	Dimensions (mm)	Rod Ø(mm)	Material	Weight (gr)
AT-104B	120 x 24 x 60	16	Gunmetal	900
AT-105B	120 x 24 x 60	16	Aluminium	280
Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1494, BS 2897, AS 1567				

The brackets are mainly used where it is not possible to fit a saddle on the roof. Used in conjunction with couplings and taper pointed air rods.


AT-104B (Gu)
AT-105B (Al)

ROD TO TAPE COUPLING 19

Reference	Dimensions (mm)	Thread	Material	Weight (gr)
AT-100B	39 x 39 x 80	M16	Gunmetal	200
AT-101B	39 x 39 x 80	M16	Aluminium	60
Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1494, BS 2897, AS 1567				

This unit screws onto the air rod and connects to the tape with the fixing screw provided. Used in conjunction with rod brackets and taper pointed air rods.


AT-100B (Gu)
AT-101B (Al)

AT-104B
AT-100B (application)

ROD TO CABLE COUPLING 20

Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Thread	Material	Weight (gr)
AT-102B	39 x 39 x 80	8 - 10	50 -70	M16	Gunmetal	220
AT-103B	39 x 39 x 80	13	95	M16	Gunmetal	70
Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1494, BS 2897, AS 1567						

This unit screws onto the air rod and connects to the cable with the fixing screw provided. Used in conjunction with rod brackets and taper pointed air rods.


AT-102B (Gu)
AT-103B (Al)

FIXINGS

21 VERTICAL AIR TERMINAL SADDLE

Reference	Dimensions (mm)	Conductor Ø(mm)	Conductor mm²	Thread	Material	Weight (gr)
AT-122B	65 x 65 x 35	8	50	M10	Gunmetal	300
AT-123B	65 x 65 x 35	8	50	M10	Aluminium	110
						Meets with IEC 62305, EN 50164, BS 6651

AT-122B (Gu)
AT-123B (Al)

Used for supporting Ø10 taper pointed air rods on the wall and connecting to the cable or round. An additional fixing AT-192E or AT-193E (Table 51) may be used for 1 m taper pointed air rods.

22 HORIZONTAL AIR TERMINAL SADDLE

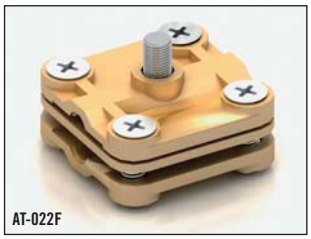
Reference	Dimensions (mm)	Conductor Ø(mm)	Conductor mm²	Thread	Material	Weight (gr)
AT-120B	65 x 65 x 35	8	50	M10	Gunmetal	300
AT-121B	65 x 65 x 35	8	50	M10	Aluminium	110
						Meets with IEC 62305, EN 50164, BS 6651

AT-120B (Gu)
AT-121B (Al)

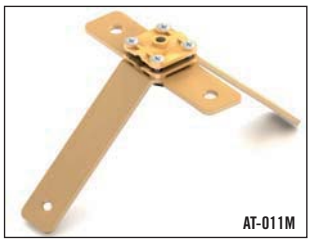
Used for supporting Ø10 taper pointed air rods on the roof and connecting to the cable or round. It's not recommended to use it in combination with the 1 m taper pointed air rods.

23 NAVAL BRASS ROOF CLAMP

Reference	Model	Dimensions (mm)	Conductor range (mm) Ø(mm)	Conductor range (mm) mm²	Conductor range (mm) Tape (mm)	Thread	Material	Weight (gr)
AT-022F	For flat roofs	55 x 55 x 40	8 - 10	50 - 70	30x2 - 30x3,5	M10	Naval brass	360
AT-011M	For the ridge of the roof	270 x 160 x 140	8 - 10	50 - 70	30x2 - 30x3,5	M10	Naval brass	610
								Meets with EN 50164, UNE 21186, NFC 17102

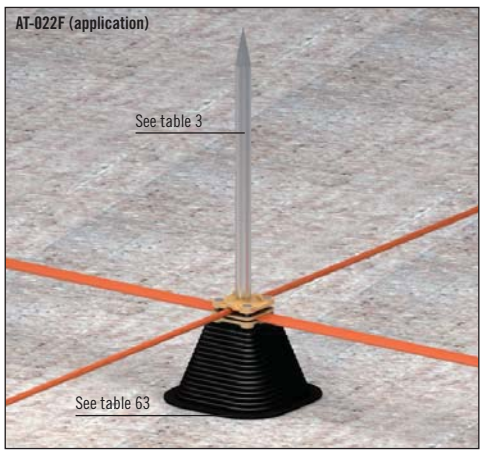


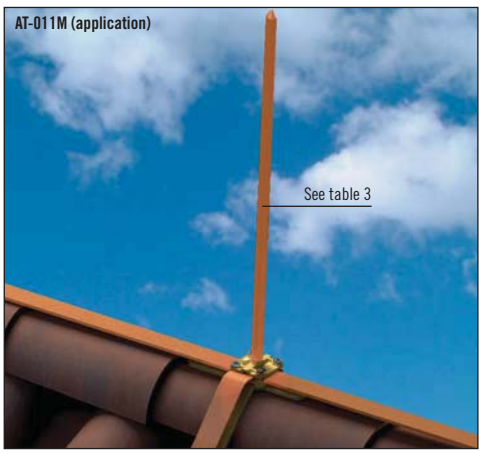
AT-022F



AT-011M

Used for supporting lightning conductor air terminals onto the roof and connecting to the earth rod.





FIXINGS

SPECIAL ROD SUPPORTS 24

Reference	Model	Dimensions (mm)	Included	Material	Weight (gr)
AT-003M	To vertical surface	40 x 40 x 40	M10	Stainless steel	130
AT-030M	To top of the antenna's mast	Ø60 x 70	M10 female	Stainless steel	600
					Meets with UNE 21186, NFC 17102

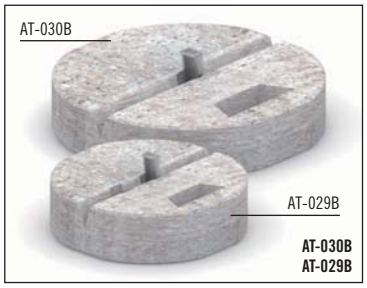
For fixing air rods with male or female M10 (for example AT-053L, AT-092A tables 3, 6) to vertical surface or to the top of the antenna's mast. AT-030M accepts masts from Ø6 – 50 mm.

AT-003M (application)

AT-030M (application)

CONCRETE BASE 25

Reference	Model	Dimensions (mm)	Rod Ø(mm)	Included	Material	Weight (Kg)
AT-030B	Stackable wedged concrete base	Ø325 x 90	16	Wedge	Concrete	17
AT-029B	Stackable wedged concrete base	Ø230 x 90	10 or 16	Wedge	Concrete	8,5
AT-095B	Flat washer	Ø360 x 10	-	-	EVA	0,22
AT-096B	Flat washer	Ø270 x 10	-	-	EVA	0,19
AT-097B	Threaded concrete base	Ø350 x 100	16	Female M16	Concrete	12
AT-098B	Threaded concrete base	Ø350 x 120	16	Female M16	Concrete	16
AT-099B	Threaded concrete base	Ø350 x 140	16	Female M16	Concrete	25
						Meets with UNE 21186, NFC 17102



AT-030B
AT-029B

For supporting air termination rods, on flat roofs. For air rods higher than 3 m, these bases are not recommendable due to wind load. AT-029B only allows Ø10 x 1000 mm and Ø16 x 1000 mm air termination rods (for example AT-043A or AT-026A. Table 8).


AT-095B


AT-097B

AT-030B (application)

MASTS AND ANCHORAGES

26 MASTS FOR WALL OR STRUCTURAL FIXING

AT-056A (GS)
AT-066A (SS)

Reference	Model	Dimensions	Included	Material	Weight (Kg)
AT-051A	1 m mast	Ø1 1/2 " x 1 m	1 section x 1 m	Galvanized steel	3,3
AT-052A	2 m mast	Ø1 1/2 " x 2 m	1 section x 2 m	Galvanized steel	6,6
AT-053A	3 m mast	Ø1 1/2 " x 3 m	1 section x 3 m	Galvanized steel	10
AT-050A	4 m mast	Ø1 1/2 " x 4 m	2 sections x 2 m	Galvanized steel	13
AT-056A	6 m mast (2 sections)	Ø1 1/2 " x 6 m	2 sections x 3 m	Galvanized steel	20
AT-057A	6 m mast (3 sections)	Ø1 1/2 " x 6 m	3 sections x 2 m	Galvanized steel	20
AT-058A	8 m mast	Ø2" - Ø1 1/2 " x 8 m	3 sections x 3 m	Galvanized steel	32
AT-060A	1 m mast	Ø1 1/2 " x 1 m	1 section x 1 m	Stainless steel	3
AT-062A	2 m mast	Ø1 1/2 " x 2 m	1 section x 2 m	Stainless steel	6
AT-063A	3 m mast	Ø1 1/2 " x 3 m	1 section x 3 m	Stainless steel	9
AT-085A	4 m mast	Ø1 1/2 " x 4 m	2 sections x 2 m	Stainless steel	12
AT-066A	6 m mast (2 sections)	Ø1 1/2 " x 6 m	2 sections x 3 m	Stainless steel	18
AT-067A	6 m mast (3 sections)	Ø1 1/2 " x 6 m	3 sections x 2 m	Stainless steel	18
AT-068A	8 m mast	Ø2" - Ø1 1/2 " x 8 m	3 sections x 3 m	Stainless steel	30

Meets with UNE 21186, NFC 17102

1 1/2" elevation fixture up to 8 m. To be fixed with 2 anchorage supports, except the 8 m height with 3 anchorage supports. The distance between supports must be 60 cm. In atmospheres with a high level of corrosion, the use of stainless steel masts is recommended.

27 U SHAPED ANCHORAGE

AT-013B

Reference	Model	Dimensions (mm)	Included	Material	Weight (Kg)
AT-013B	30 cm U shaped anchorage to embed into the wall	2 x (50 x 340 x 390)	2 supports	Galvanized steel	4,6
AT-014B	30 cm U shaped anchorage to embed into the wall	3 x (50 x 340 x 390)	3 supports	Galvanized steel	6,9
AT-016B	60 cm U shaped anchorage to embed into the wall	2 x (50 x 640 x 615)	2 supports	Galvanized steel	6
AT-017B	60 cm U shaped anchorage to embed into the wall	3 x (50 x 640 x 615)	3 supports	Galvanized steel	9
AT-023B	30 cm U shaped anchorage to screw into the wall	2 x (50 x 400 x 290)	2 supports	Galvanized steel	6
AT-024B	30 cm U shaped anchorage to screw into the wall	3 x (50 x 400 x 290)	3 supports	Galvanized steel	9
AT-026B	60 cm U shaped anchorage to screw into the wall	2 x (50 x 600 x 670)	2 supports	Galvanized steel	10
AT-027B	60 cm U shaped anchorage to screw into the wall	3 x (50 x 600 x 670)	3 supports	Galvanized steel	15

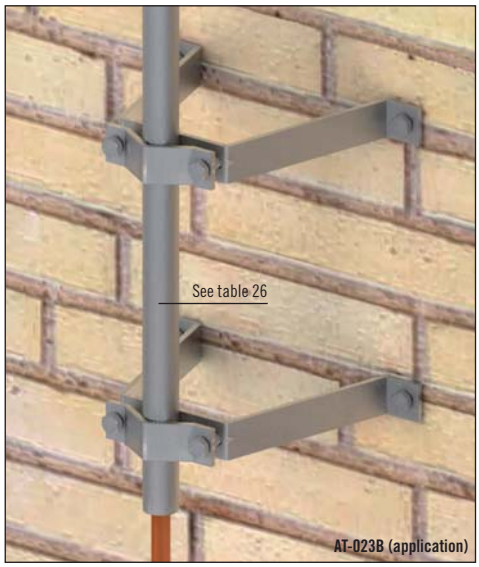
Meets with UNE 21186, NFC 17102

Single extra supports, ref: AT-012B, AT-015B, AT-021B, AT-025B respectively.

AT-023B

1" - 1 1/2" mast anchorage to be embedded or screwed into the wall. The 60 cm U shaped anchorages are design to avoid obstacles such as 50 cm cornices. The anchorages need a minimum separation of 60 cm from each other and at least 30 cm from the top of the wall, in order to assure a correct fixation.

AT-013B (application)



AT-023B (application)

MASTS AND ANCHORAGES

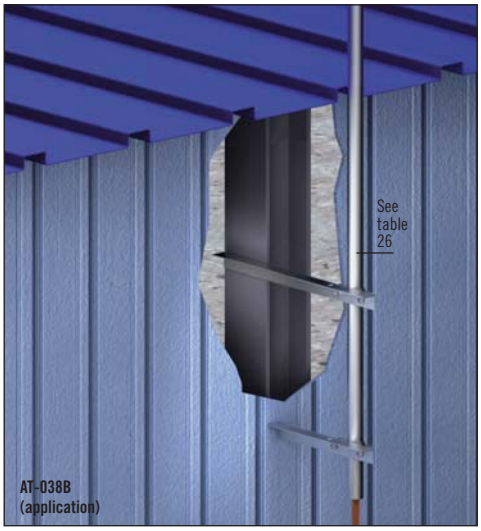
ANGLE BAR ANCHORAGE 28

Reference	Model	Dimensions (mm)	Included	Material	Weight (Kg)
AT-035B	30 cm angle bar anchorage	2 x (50 x 120 x 300)	2 supports	Galvanized steel	3
AT-036B	30 cm angle bar anchorage	3 x (50 x 120 x 300)	3 supports	Galvanized steel	4,5
AT-045B	30 cm angle bar anchorage	2 x (50 x 120 x 300)	2 supports	Stainless steel	3
AT-046B	30 cm angle bar anchorage	3 x (50 x 120 x 300)	3 supports	Stainless steel	4,5
AT-038B	60 cm angle bar anchorage	2 x (50 x 120 x 600)	2 supports	Galvanized steel	6
AT-039B	60 cm angle bar anchorage	3 x (50 x 120 x 600)	3 supports	Galvanized steel	9
AT-048B	60 cm angle bar anchorage	2 x (50 x 120 x 600)	2 supports	Stainless steel	6
AT-049B	60 cm angle bar anchorage	3 x (50 x 120 x 600)	3 supports	Stainless steel	9

Meets with UNE 21186, NFC 17102

Single extra supports, ref: AT-034B, AT-044B, AT-037B, AT-047B respectively.

1" - 1 1/2" mast anchorage to be welded to metallic structures. The anchorages need a minimum separation of 60 cm from each other, in order to assure a correct fixation.



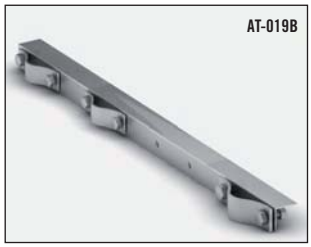
AT-038B (application)

MAST TO TRESTLE TOWER ANCHORAGE 29

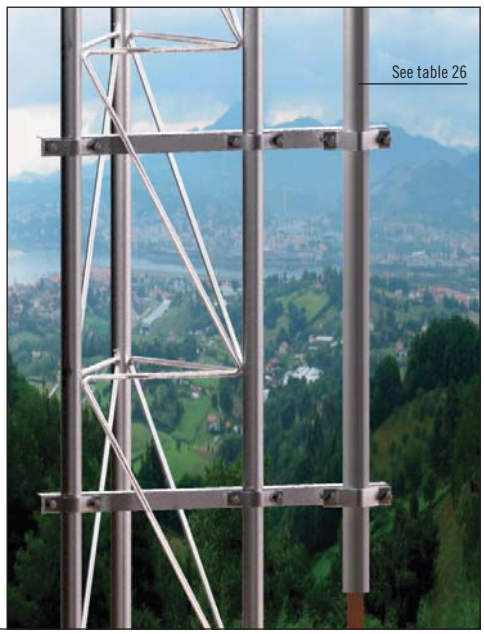
Reference	Dimensions (mm)	Included	Material	Weight (Kg)
AT-019B	2 x (50 x 120 x 700)	2 supports	Galvanized steel	7,6
AT-020B	3 x (50 x 120 x 700)	3 supports	Galvanized steel	11,4

Meets with UNE 21186, NFC 17102

Single extra support, ref: AT-018B



1" - 1 1/2" mast anchorage to be fixed in trestle towers. Not recommendable for masts higher than 6 m. The anchorages need a minimum separation of 60 cm from each other, in order to assure a correct fixation.



AT-019B (application)

MASTS AND ANCHORAGES

30 LIGHT ANCHORAGE

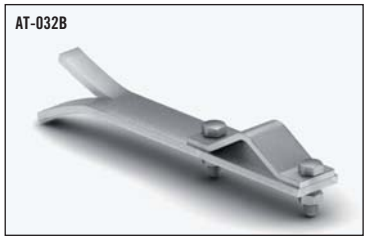
Reference	Model	Dimensions (mm)	Included	Material	Weight (Kg)
AT-032B	30 cm light anchorage to embed into the wall	2 x (50 x 100 x 300)	2 supports	Galvanized steel	3,4
AT-033B	30 cm light anchorage to embed into the wall	3 x (50 x 100 x 300)	3 supports	Galvanized steel	5,1
AT-042B	30 cm light anchorage to screw into the wall	2 x (50 x 165 x 300)	2 supports	Galvanized steel	4,2
AT-043B	30 cm light anchorage to screw into the wall	3 x (50 x 165 x 300)	3 supports	Galvanized steel	6,3
					Meets with UNE 21186, NFC 17102

Single extra supports, ref: AT-031B, AT-041B respectively.

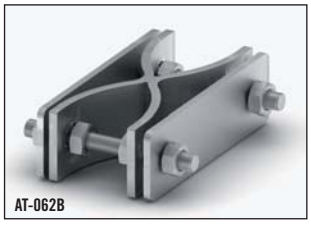
1" - 1 1/2" mast anchorage to be embedded or screwed into the wall. The anchorages need a minimum separation of 60 cm from each other and at least 30 cm from the top of the wall, in order to assure a correct fixation.

AT-042B

AT-032B



31 PARALLEL ANCHORAGE



Reference	Dimensions (mm)	Included	Material	Weight (Kg)
AT-052B	2 x (50 x 90 x 340)	2 supports	Galvanized steel	5
AT-053B	3 x (50 x 90 x 340)	3 supports	Galvanized steel	7,5
AT-062B	2 x (50 x 90 x 165)	2 supports	Galvanized steel	5
AT-063B	3 x (50 x 90 x 165)	3 supports	Galvanized steel	7,5
				Meets with UNE 21186, NFC 17102

Single extra support, ref: AT-051B , AT-061B respectively

Double bracket anchoring system, for fixing 1" - 1 1/2" mast in parallel to a handrail or pipe. The anchorages need a minimum separation of 60 cm from each other, in order to assure a correct fixation.

MASTS AND ANCHORAGES

LAMPPOST ANCHORAGE 32

Reference	Dimensions (mm)	Included	Material	Weight (Kg)
AT-068B	2 x (50 x 90 x 190)	2 supports	Galvanized steel	10
AT-069B	3 x (50 x 90 x 190)	3 supports	Galvanized steel	15
				Meets with UNE 21186, NFC 17102

Single extra support, ref: AT-067B.

1" - 1 1/2" mast anchorage fixture adjustable for conic structures such lampposts. The anchorages need a minimum separation of 60 cm from each other, in order to assure a correct fixation.

CROSS SHAPED ANCHORAGE 33

Reference	Dimensions (mm)	Included	Material	Weight (Kg)
AT-072B	2 x (170 x 170 x 200)	2 supports	Galvanized steel	5,8
AT-073B	3 x (170 x 170 x 200)	3 supports	Galvanized steel	8,7
				Meets with UNE 21186, NFC 17102

Single extra support, ref: AT-071B

Double bracket anchoring system, for fixing 1" - 1 1/2" mast in cross to a handrail or pipe. The anchorages need a minimum separation of 60 cm from each other, in order to assure a correct fixation.

ADJUSTABLE ANCHORAGE 34

Reference	Dimensions (mm)	Included	Material	Weight (Kg)
AT-078B	2 x (300 x 450 x 800)	2 supports	Galvanized steel	14
AT-079B	3 x (300 x 450 x 800)	3 supports	Galvanized steel	21
				Meets with UNE 21186, NFC 17102

Single extra support, ref: AT-077B

Due to the covers or cornices of the roofs, a substantial horizontal distance (from 60 to 80 cm) needs to be dodged. In these cases it is necessary to use the extendable tube. The anchorages need a minimum separation of 60 cm from each other, in order to assure a correct fixation.

35 MAST TO POST ANCHORAGE

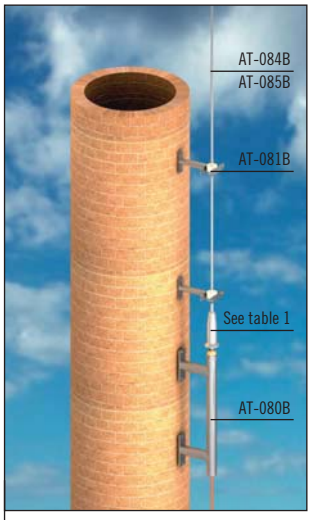
Reference	Model	Dimensions (mm)	Included	Material	Weight (Kg)
AT-074B	Mast to 25 cm square post anchorage	2 x (40 x 360 x 300)	2 supports	Galvanized steel	6
AT-075B	Mast to 25 cm square post anchorage	3 x (40 x 360 x 300)	3 supports	Galvanized steel	9
AT-083B	Mast to Ø25 cm round post anchorage	2 x (45 x 360 x 300)	2 supports	Galvanized steel	7,5
AT-086B	Mast to Ø25 cm round post anchorage	3 x (45 x 360 x 300)	3 supports	Galvanized steel	11,25
					Meets with UNE 21186, NFC 17102

Single extra supports, ref: AT-070B, AT-076B respectively.

AT-074B, AT-083B (application)

Suitable to fix a 1" - 1 1/2" mast to 25 cm square or round post. The anchorages need a minimum separation of 60 cm from each other and at least 30 cm from the top of the wall, in order to assure a correct fixation.

36 ISOLATED CHIMNEY ANCHORAGE



AT-080B, AT-081B, AT-084B, AT-085B (application)

Reference	Model	Dimensions (mm)	Material	Weight (Kg)
AT-080B	Chimney anchorage for Dat Controler® Plus	50 x 520 x 1000	Galvanized steel	7,5
AT-088B	Dat Controler® Plus rod isolated support for high temperatures chimneys (2 supports)	50 x 160 x 520	Galvanized steel + Teflon	3
AT-084B	4 m Dat Controler® Plus rod for high temperature chimneys	Ø20 x 4000	Stainless steel	10
AT-085B	5 m Dat Controler® Plus rod for high temperature chimneys	Ø20 x 5000	Stainless steel	12,5
Single extra support, ref: **AT-081B**.				**Meets with UNE 21186, NFC 17102**

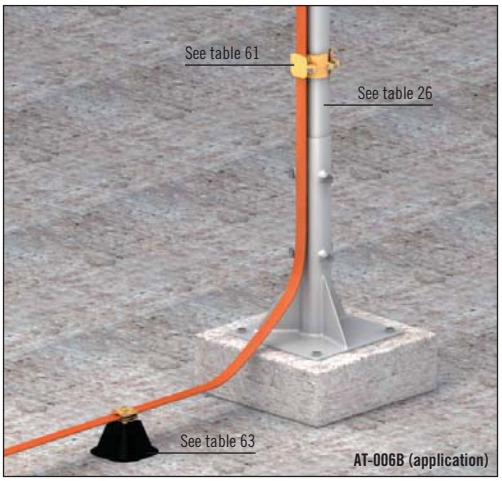
1" - 1 1/2" mast anchorage fixture suitable for chimney in operation. The isolation of the anchorage is necessary in order to maintain the difference of potential between the parts of the Dat Controler® Plus. The body of the Dat Controler® Plus has to be mounted at least 2 m below the hole of the chimney to avoid that the heat of the gases might deform the structure of the mast and quicken its corrosion rate. The anchorages (AT-088B) have to be mounted right in the threaded union between the Dat Controler® Plus and the rod (AT-084B or AT-085B), and right in the threaded union between the two parts of the rod (AT-084B or AT-085B), and at least 30 cm from the top of the wall, in order to assure a correct fixation. In order to comply with UNE 21186, the rod AT-085B has to be mounted to make sure that the rod is 2m higher than the chimney. "

MASTS AND ANCHORAGES

MAST ANCHORAGE FOR FLAT ROOF 37

Reference	Model	Dimensions (mm)	Material	Weight (Kg)
AT-003B	For 1 1/2" masts up to 3m high	(300 x 300) x 500	Galvanized steel	8
AT-006B	For 1 1/2" masts up to 6m high	(500 x 500) x 800	Galvanized steel	21
				Meets with UNE 21186, NFC 17102

1 1/2" mast supporter for flat roof which allows to be drilled. If not a concrete dice will be needed. 70 x 70 x 25 cm concrete base is recommended in order to avoid any damage to the roof.



AT-006B (application)

FREE STANDING MAST 38

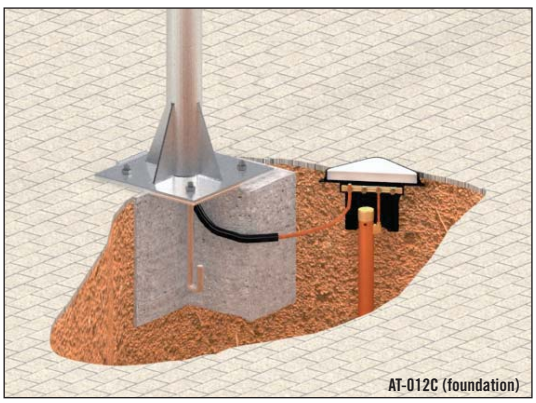
Reference	Model	Mast Dimensions	Solid Base Dimensions (mm)	Foundation Dimensions (mm)	Sections	Included	Material	Weight (Kg)
AT-006C	6 m free standing mast	Ø(2" - 1 1/2 ") x 6 m	400 x 400	0,8 x 0,8 x 0,8	Screwed	Hinge	Galvanized steel	55
AT-008C	8 m free standing mast	Ø(2 1/2" - 1 1/2 ") x 8 m	400 x 400	0,8 x 0,8 x 0,8	Screwed	Hinge	Galvanized steel	75
AT-010C	10 m free standing mast	Ø(4" - 1 1/2 ") x 10 m	500 x 500	1 x 1 x 1	Screwed	Hinge	Galvanized steel	120
AT-012C	12 m free standing mast	Ø(5" - 1 1/2 ") x 12 m	500 x 500	1 x 1 x 1	Screwed	Hinge	Galvanized steel	155
AT-015C	15 m free standing mast	Ø(6" - 1 1/2 ") x 15 m	500 x 500	1,5 x 1,5 x 1,5	Screwed	Hinge	Galvanized steel	200
AT-020C	20 m free standing mast	Ø(9" - 1 1/2 ") x 20 m	600 x 600	2 x 2 x 2	Welded	-	Galvanized steel	435
AT-025C	25 m free standing mast	Ø(12" - 1 1/2 ") x 25 m	750 x 750	2 x 2 x 2	Welded	-	Galvanized steel	805
								Meets with UNE 21186, NFC 17102

Self supporting mast dimensioned for wind velocity up to 145 Km/h. Ø1 1/2" at the top.

In the models up to 15 m, the sections are joined by stud-bolts (it is not necessary to weld them) and the hinge allows the use a small crane for its elevation.

In the models from 20 to 25 m, the sections have to be welded. It's important to use the Anti-corrosion spray (AT-023G table 113) to protect the weld.

Preliminary work is needed, consisting of placing the steel support containing the hinge, embedded in a concrete dice (of different dimensions depending on the mast's height, as shown in the table). It's necessary to wait until the concrete has hardened, to place the mast in its support. It's recommendable to mount the air terminal with the conductor inside the mast before elevate it. The conductor does not need to be fixed inside the mast.


AT-012C (foundation)


AT-012C (application)

39 TRESTLE TOWER

Reference	Total height from ground (m)	Included				Material	Weight (Kg)
		Guy wire (AT-040C)	Guy wire anchorage (AT-041C)	Turnbuckle (AT-042C)	Guy wire clamp (AT-043C)		
AT-031C	8,5	1	3	3	9	Galvanized steel	50
AT-032C	11,5	1	3	6	18	Galvanized steel	60
AT-033C	14,5	1	3	6	18	Galvanized steel	75
AT-034C	17,5	2	3	9	27	Galvanized steel	100
AT-035C	20,5	2	3	12	36	Galvanized steel	115
							Meets with UNE 21186, NFC 17102

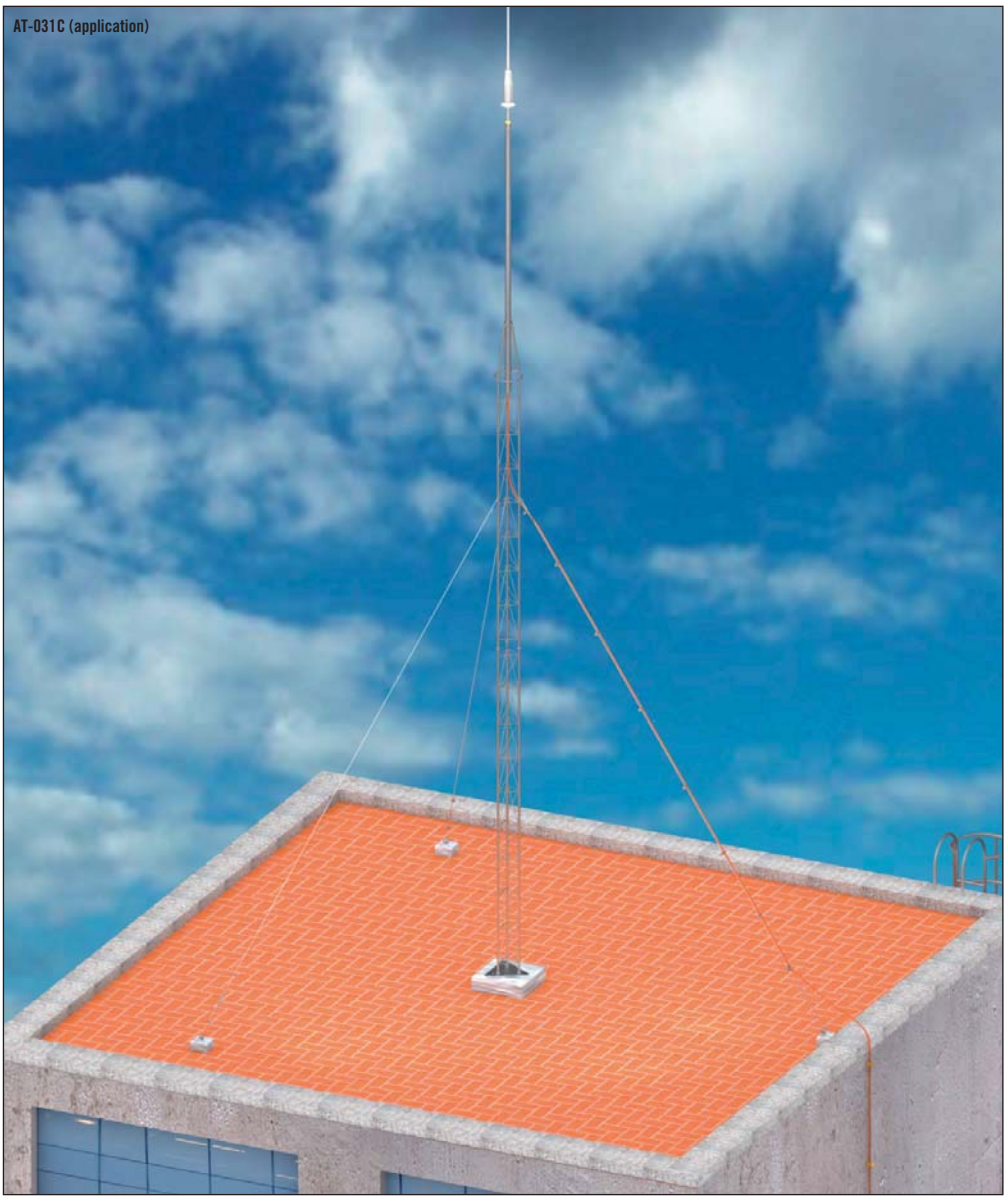
Elevation fixture up to 20,5 m with guy wires. Ø1 1/2" x 3 m mast is included. Each section measure Δ 180 mm x 3 m.
If the flat roof does not allow perforation a concrete dice is needed for the trestle tower and the guy wire anchorages. 3 Guy wire anchorages are needed with 120º between them.

The trestle towers can also be placed on walls using a trestle tower-wall anchorage (AT-037C).

The trestle towers are not assembled on the ground and are not lifted by a crane. They must be assembled section by section tightened by guy wires.

The 3 guy wire anchorages must be joined to the down-conductor at roof level.

- For the first section (3 meters) no guy wires are needed.
- For the second section, guy wires are fixed at the middle point of the section.
- From the third section, guy wires are fixed at the upper part of the section.



AT-031C (application)

MASTS AND ANCHORAGES

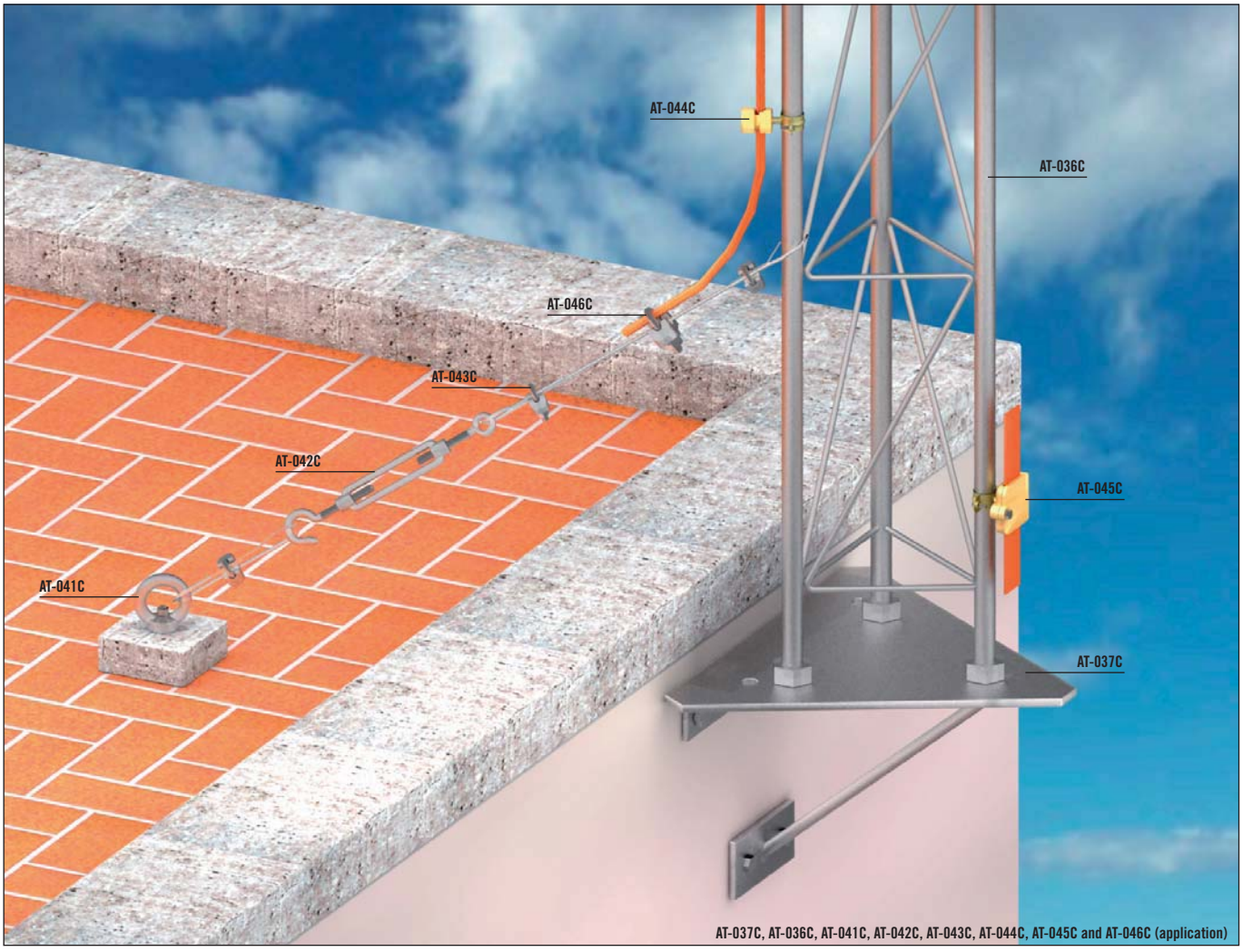
TRESTLE TOWER ACCESSORIES

Reference	Model	Dimensions (mm)	Included	Material	Weight (gr)
AT-036C	Trestle tower middle section	Δ 180 mm x 3 m	-	Galvanized steel	11500
AT-037C	Trestle tower - wall anchorage	400 x 350 x 400	-	Galvanized steel	6000
AT-038C	Guy wire kit		1 AT-040C + 3 AT-041C + 3 AT-042C + 9 AT-043C		7500
AT-040C	Guy wire ring	Ø4 mm x 100 m	100 m	Galvanized steel	6000
AT-041C	Guy wire anchorage	55 x 30 x 55	-	Galvanized steel	155
AT-042C	Turnbuckle	25 x 15 x 200	-	Galvanized steel	160
AT-043C	Guy wire clamp	30 x 15 x 30	-	Cast iron	40
AT-044C	Cable to trestle tower clip	25 x 45 x 55	AT-010E	Naval Brass - Stainless steel	85
AT-045C	Tape to trestle tower clip	40 x 45 x 50	AT-015E	Gunmetal - Stainless steel	125
AT-046C	Cable to Guy wire clamp	40 x 20 x 40	-	Cast iron	75
					Meets with UNE 21186, NFC 17102


AT-040C

Different devices to complete a trestle tower installation.


AT-038C



AT-037C, AT-036C, AT-041C, AT-042C, AT-043C, AT-044C, AT-045C and AT-046C (application)

MASTS AND ANCHORAGES

41 SELF SUPPORTED TOWER

AT-050C (application)

Reference	Height from ground (m)*	Dimensions	Foundation Dimensions (m)	Material	Weight (Kg)
AT-050C	14	☐ 0,73 x 8,5 m + 1 1/2" x 5,5 m	0,9 x 0,9 x 1,85	Galvanized steel	300
AT-051C	16	☐ 0,8 x 10,5 m + 1 1/2" x 5,5 m	0,95 x 0,95 x 1,95	Galvanized steel	390
AT-052C	18	☐ 0,87 x 12,5 m + 1 1/2" x 5,5 m	1,02 x 1,02 x 2	Galvanized steel	460
AT-053C	20	☐ 0,95 x 14,5 m + 1 1/2" x 5,5 m	1,1 x 1,1 x 2	Galvanized steel	560
AT-054C	22	☐ 1 x 16,5 m + 1 1/2" x 5,5 m	1,15 x 1,15 x 2,05	Galvanized steel	630
AT-055C	24	☐ 1,1 x 18,5 m + 1 1/2" x 5,5 m	1,25 x 1,25 x 2,05	Galvanized steel	725
AT-056C	26	☐ 1,15 x 20,5 m + 1 1/2" x 5,5 m	1,3 x 1,3 x 2,1	Galvanized steel	800
					Meets with UNE 21186, NFC 17102

* Other dimensions are available on customer request.

1 1/2" elevation fixture up to 26m. Specially used where welding work is not allowed.

The total height from ground includes the tower + 6m mast provided.

INSTALLATION

First of all, a hole for the foundation has to be done (the dimensions of the hole depend of the tower's height).

The first section has to be embedded in the foundation, and wait 24 hours to harden the concrete. The top of the concrete foundation needs a small slope to avoid the accumulation of water.

The rest of the tower (assembled on the ground previously) has to be lifted with a crane and bolted to the embedded one.

DOWN-CONDUCTORS

Clips for tape

Clips for cable

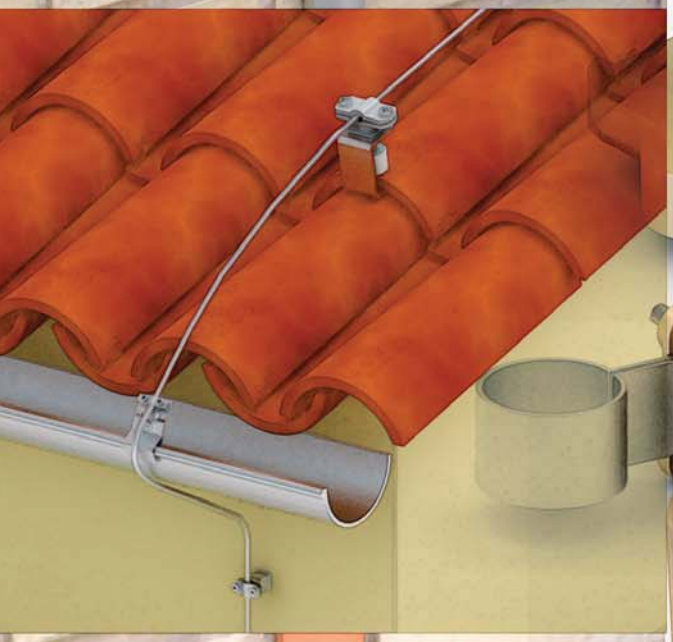
Clips for tape and cable

Supports

Clamps

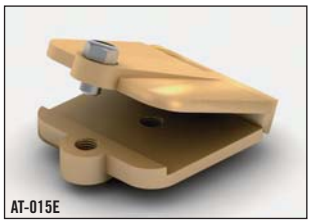
Test clamps

Accessories



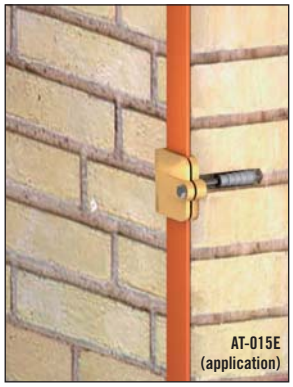
CLIPS FOR TAPE

42 NAVAL BRASS TAPE CLIP

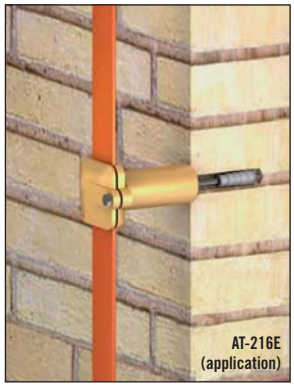

AT-015E

Reference	Dimensions (mm)	Tape range (mm)	Conductor elevation (mm)	Included	Material	Weight (gr)
AT-015E	48 x 19 x 40	30x2 - 30x3,5	8	Plug and screw spike M6x25	Naval brass	115
AT-006E	48 x 19 x 40	30x2 - 30x3,5	8	Self-drill screw + neoprene washer	Naval brass	115
AT-216E	48 x 69 x 40	30x2 - 30x3,5	58	Plug and screw spike M8x40	Naval brass	290
AT-217E	48 x 119 x 40	30x2 - 30x3,5	108	Plug and screw spike M8x40	Naval brass	485
					Meets with EN 50164, UNE 21186, NFC 17102	

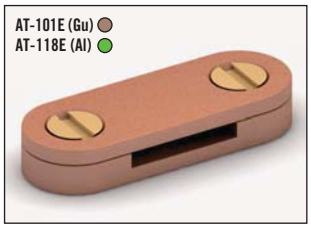
Down-conductor holder suitable for fixing 30 x 2 or 30 x 3,5 mm tape to flat surface. The AT-006E includes screw and washer suitable for metallic sheets or sandwich roofs. AT-180E and AT-181E designed to avoid obstacles such as cornices.

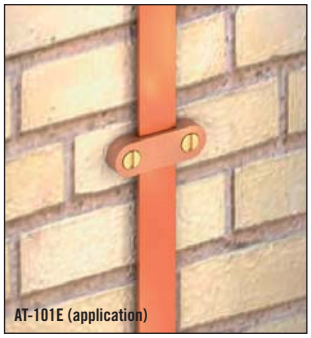

AT-015E (application)


AT-006E (application)


AT-216E (application)

43 DC TAPE CLIP


AT-101E (Gu)
AT-118E (Al)


AT-101E (application)

Reference	Dimensions (mm)	Tape (mm)	Tape kind	Material	Weight (gr)
AT-100E	50 x 20 x 10	20 x 3	Bare Copper	Gunmetal	60
AT-101E	50 x 20 x 10	25 x 3	Bare Copper	Gunmetal	70
AT-102E	50 x 20 x 10	25 x 4	Bare Copper	Gunmetal	70
AT-103E	50 x 20 x 13	25 x 6	Bare Copper	Gunmetal	80
AT-104E	70 x 20 x 13	31 x 3	Bare Copper	Gunmetal	90
AT-105E	70 x 20 x 13	31 x 6	Bare Copper	Gunmetal	100
AT-106E	64 x 20 x 10	38 x 3	Bare Copper	Gunmetal	120
AT-107E	63 x 20 x 10	38 x 5	Bare Copper	Gunmetal	120
AT-108E	63 x 20 x 10	38 x 6	Bare Copper	Gunmetal	140
AT-109E	65 x 20 x 10	40 x 4	Bare Copper	Gunmetal	140
AT-110E	65 x 20 x 10	40 x 6	Bare Copper	Gunmetal	150
AT-111E	80 x 20 x 10	50 x 3	Bare Copper	Gunmetal	150
AT-112E	80 x 20 x 10	50 x 4	Bare Copper	Gunmetal	150
AT-113E	80 x 20 x 16	50 x 6	Bare Copper	Gunmetal	160
AT-114E	55 x 20 x 13	25 x 3	PVC covered Copper	Gunmetal	100
AT-115E	55 x 20 x 16	25 x 6	PVC covered Copper	Gunmetal	130
AT-116E	85 x 20 x 13	50 x 6	PVC covered Copper	Gunmetal	260
AT-117E	50 x 20 x 10	20 x 3	Bare Aluminium	Aluminium	20
AT-118E	50 x 20 x 10	25 x 3	Bare Aluminium	Aluminium	30
AT-119E	50 x 20 x 13	25 x 6	Bare Aluminium	Aluminium	40
AT-120E	80 x 20 x 16	50 x 6	Bare Aluminium	Aluminium	50
AT-121E	55 x 20 x 23	25 x 3	PVC covered Aluminium	Aluminium	40
AT-122E	85 x 20 x 20	50 x 6	PVC covered Aluminium	Aluminium	60
				Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1471, BS 2874, BS 2897, AS 1567	

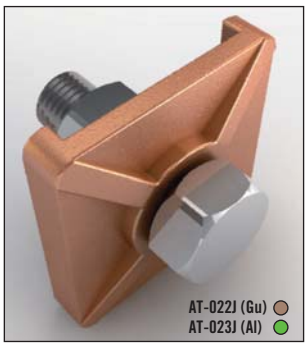
Suitable to secure the tape conductor to the building, fixed by one screw. Plug and screw included.

CLIPS FOR TAPE

B BOND 44

Reference	Dimensions (mm)	Tape (mm)	Material	Weight (gr)
AT-022J	35 x 35 x 25	25 x 3	Gunmetal	100
AT-023J	35 x 35 x 25	25 x 3	Aluminium	60
				Meets with IEC 62305, EN 50164, BS 6651

This connection allows the joint between copper or aluminium tapes to metallic structures. The bolt size is M10.



METALLIC TAPE CLIP 45

Reference	Dimensions (mm)	Tape range (mm)	Conductor elevation (mm)*	Included	Material	Weight (gr)
AT-027E	60 x 20 x 20	30x2 - 30x3,5	14	Plug and screw M6x25	Copper	47
AT-028E	60 x 20 x 20	30x2 - 30x3,5	14	Plug and screw M6x25	Stainless steel	46
						Meets with UNE 21186, NFC 17102

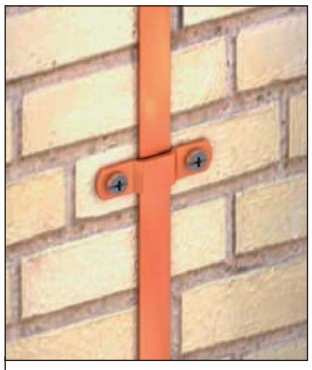
* Other dimensions are available on customer request.

Down-conductor holder suitable for fixing 30x2 or 30x3,5 mm tape to flat surface.

TAPE CLIP 46

Reference	Dimensions (mm)	Tape		Material	Weight (gr)
		Size (mm)	Kind		
AT-123E	70 x 20 x 7	20 x 3	Bare Copper	Copper	30
AT-124E	75 x 20 x 7	25 x 3	Bare Copper	Copper	30
AT-125E	70 x 20 x 7	25 x 3	PVC covered Copper	Copper	30
AT-126E	70 x 20 x 7	20 x 3	Bare Aluminium	Aluminium	10
AT-127E	70 x 20 x 7	25 x 3	Bare Aluminium	Aluminium	10
AT-072F	70 x 11 x 8	30 x 2	Bare Copper	Tin-plated copper	6
					Meets with IEC 62305, EN 50164, BS 6651, BS 2870, BS 1471

Suitable to secure the tape conductor to a flat surface, fixed by two screws. Plug and screw included.



CLIPS FOR TAPE

47 PUSH-IN TAPE CLIP


AT-060E

Reference	Dimensions (mm)	Tape (mm)	Material	Weight (gr)
AT-059E	45 x 10 x 8	25 x 3	Stainless steel	1,3
AT-068E	45 x 10 x 8	28 x 2	Stainless steel	1,3
AT-060E	45 x 10 x 8	30 x 2	Stainless steel	1,3
				Meets with UNE 21186, NFC 17102

Holdfast clip to secure the tape conductor to a flat surface. Plug and screw included.


AT-060E (application)

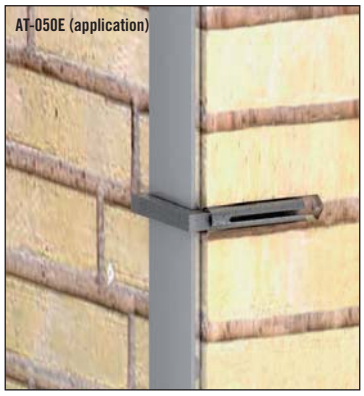
48 LIGHT BRACKET


AT-050E

Reference	Dimensions (mm)	Tape range (mm)	Material	Weight (gr)
AT-050E	42 x 35 x 8	30x2 - 30x3,5	Galvanized steel	15
AT-051E	43 x 35 x 8	30x2 - 30x3,5	Stainless steel	15
AT-218E	13 x 11 x 40	-	Nylon	1,2
				Meets with UNE 21186, NFC 17102

Down-conductor holder suitable for fixing 30x2 mm or 30x3,5 mm tape to flat surface. Using AT-050E with bare copper tape may cause galvanic coupling.


AT-218E


AT-050E (application)

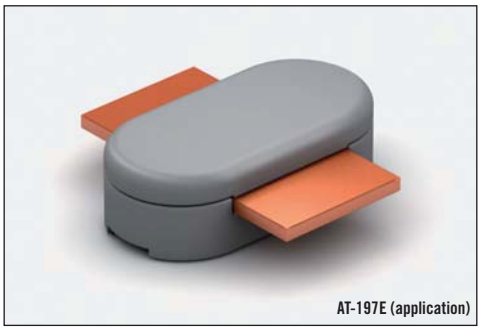
CLIPS FOR TAPE

POLYPROPYLENE TAPE CLIP

Reference	Model	Dimensions (mm)	Tape (mm)	Tape kind	Colour	Included	Material	Weight (gr)
AT-196E	Non-metallic DC tape clip	45 x 25 x 25	20 x 3	Bare tape	Brown	Plug and screw	Polypropylene	10
AT-197E	Non-metallic DC tape clip	45 x 25 x 25	20 x 3	Bare tape	Grey	Plug and screw	Polypropylene	10
AT-198E	Non-metallic DC tape clip	45 x 25 x 25	25 x 3	Bare tape	Brown	Plug and screw	Polypropylene	10
AT-199E	Non-metallic DC tape clip	45 x 25 x 25	25 x 3	Bare tape	Grey	Plug and screw	Polypropylene	10
AT-200E	Non-metallic DC tape clip	45 x 25 x 25	25 x 3	PVC covered tape	Brown	Plug and screw	Polypropylene	10
AT-201E	Non-metallic DC tape clip	45 x 25 x 25	25 x 3	PVC covered tape	Grey	Plug and screw	Polypropylene	10
AT-202E	Non-metallic DC tape clip	45 x 25 x 25	25 x 3	PVC covered tape	Black	Plug and screw	Polypropylene	10
AT-203E	Non-metallic DC tape clip	45 x 25 x 25	25 x 3	PVC covered tape	Green	Plug and screw	Polypropylene	10
AT-204E	Non-metallic DC tape clip	45 x 25 x 25	25 x 3	PVC covered tape	Stone	Plug and screw	Polypropylene	10
AT-205E	Non-metallic DC tape clip	45 x 25 x 25	25 x 3	PVC covered tape	White	Plug and screw	Polypropylene	10
AT-206E	Adhesive DC tape clip	Ø 65 x 35	25 x 3	Bare tape	Brown	-	Polypropylene	30
AT-207E	Adhesive DC tape clip	Ø 65 x 35	25 x 3	Bare tape	Grey	-	Polypropylene	30
AT-208E	Adhesive DC tape clip	Ø 65 x 35	25 x 3	PVC covered tape	Brown	-	Polypropylene	30
AT-209E	Adhesive DC tape clip	Ø 65 x 35	25 x 3	PVC covered tape	Grey	-	Polypropylene	30
AT-210E	Adhesive DC tape clip	Ø 65 x 35	25 x 3	PVC covered tape	Black	-	Polypropylene	30
AT-211E	Adhesive DC tape clip	Ø 65 x 35	25 x 3	PVC covered tape	Stone	-	Polypropylene	30
AT-212E	Adhesive DC tape clip	Ø 65 x 35	25 x 3	PVC covered tape	White	-	Polypropylene	30

Meets with UNE 21186, NFC 17102

Suitable to secure the tape conductor to the building.



AT-197E (application)

AT-207E (application)

CLIPS FOR CABLE

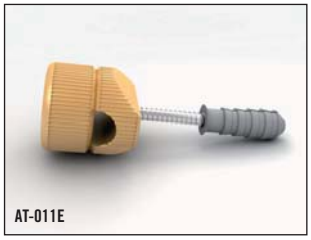
50 NAVAL BRASS CABLE CLIP

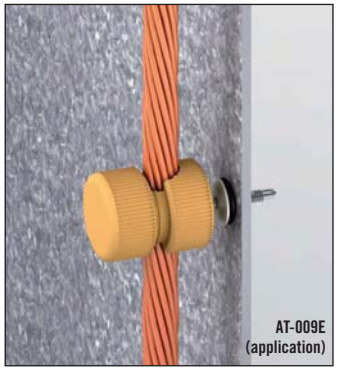

AT-010E

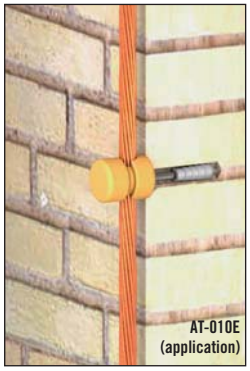
Reference	Dimensions (mm)	Round conductor range Ø(mm)	mm²	Conductor elevation (mm)	Included	Material	Weight (gr)
AT-010E	24 x 32 x 24	6 - 10	25 - 70	7	Plug and screw spike M6x25	Naval brass	70
AT-009E	24 x 32 x 24	6 - 10	25 - 70	7	Self-drill screw + neoprene washer	Naval brass	70
AT-011E	24 x 32 x 24	6 - 10	25 - 70	7	Plug and screw spike M6x25	Naval brass	65
AT-013E	24 x 82 x 24	6 - 10	25 - 70	57	Plug and screw spike M8x40	Naval brass	245
AT-014E	24 x 132 x 24	6 - 10	25 - 70	107	Plug and screw spike M8x40	Naval brass	435
AT-025E	30 x 30 x 40	13	95	10	Plug and screw spike M8x40	Naval brass	165

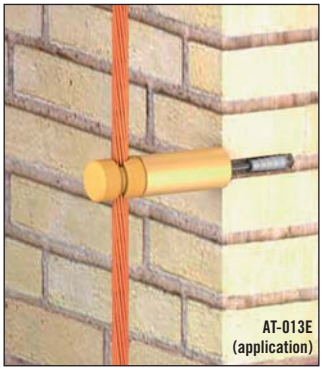
Meets with EN 50164, UNE 21186, NFC 17102

Down-conductor holder suitable for fixing round or cable to flat surface. AT-011E suitable to use in corners. The AT-009E includes screw and washer suitable for metallic sheets or sandwich roofs. AT-013E and AT-014E designed to avoid obstacles such as cornices.


AT-011E


AT-009E (application)


AT-010E (application)


AT-013E (application)

51 DC CLIP


AT-192E (Gu) (application)
AT-193E (Al)

Reference	Dimensions (mm)	Conductor Ø(mm)	mm²	Material	Weight (gr)
AT-190E	50 x 17 x 20	8	50	Gunmetal	60
AT-191E	50 x 17 x 20	8	50	Aluminium	30
AT-192E	50 x 17 x 20	10	70	Gunmetal	60
AT-193E	50 x 17 x 20	10	70	Aluminium	30

Meets with IEC 62305, EN 50164, BS 6651

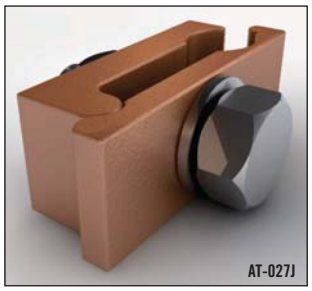
Cable or round holder to flat surfaces, fixed by one screw.

CLIPS FOR CABLE

TOWER EARTH CLAMP 52

Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Material	Weight (gr)
AT-026J	30 x 45 x 60	6 - 8	25 - 50	Aluminium	50
AT-027J	30 x 45 x 60	5 - 10	16 - 70	Gunmetal	130
AT-028J	35 x 50 x 65	10 - 15	70 - 120	Gunmetal	220
AT-029J	40 x 55 x 65	15 - 18	120 - 185	Gunmetal	300
AT-030J	40 x 60 x 65	18 - 20	185 - 240	Gunmetal	400
					Meets with IEC 62305, EN 50164, BS 6651

This connection allows the joint between copper cable or round to metallic structures. The bolt size of AT-026J and AT-027J is M10. Other references have a bolt size of M12. AT-026J has only a single plate.


AT-027J


AT-027J (application)

METALLIC CABLE CLIP 53

Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Conductor elevation (mm)*	Included	Material	Weight (gr)
AT-128E	40 x 20 x 40	6 - 10	25 - 70	18	Plug, screw and nylon support	Stainless steel	21
AT-129E	40 x 25 x 40	6 - 10	25 - 70	18	Metallic support	Stainless steel	25
AT-130E	40 x 25 x 40	6 - 10	25 - 70	18	Metallic support	Copper	28
AT-131E	45 x 25 x 50	16	150	18	Plug, screw and nylon support	Stainless steel	36
AT-132E	45 x 25 x 50	16	150	18	Plug, screw and metallic support	Stainless steel	40
							Meets with UNE 21186, NFC 17102

* Other dimensions are available on customer request.

Down-conductor holder suitable for fixing round or cable to flat surface.


AT-128E (application)


AT-129E (SS) (application)
AT-130E (Cu)

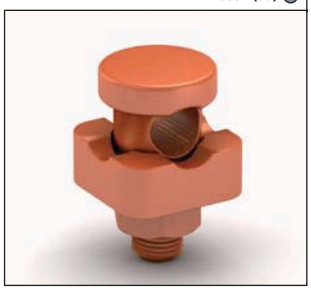

AT-131E (application)

CLIPS FOR CABLE

54 KS CABLE CLIP

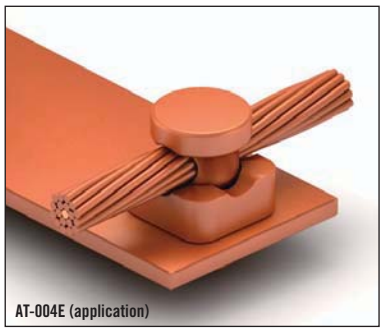
AT-003E (GS)
AT-005E (Cu)

AT-004E (Cu)
AT-002E (GS)
AT-000E (SS)



Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Conductor elevation (mm)	Material	Weight (gr)
AT-002E	25 x 25 x 40	6 - 10	25 - 70	8	Galvanized steel	65
AT-004E	25 x 25 x 40	6 - 10	25 - 70	8	Copper	65
AT-000E	25 x 25 x 40	6 - 10	25 - 70	8	Stainless steel	65
AT-003E	25 x 55 x 40	6 - 10	25 - 70	8	Galvanized steel	120
AT-005E	25 x 55 x 40	6 - 10	25 - 70	8	Copper	154

For connecting round or cable to flat profiles.



AT-004E (application)

55 PUSH-IN CABLE CLIP

Reference	Dimensions (mm)	Conductor Ø(mm)	Conductor mm²	Conductor elevation (mm)*	Included	Material	Weight (gr)
AT-133E	20 x 15 x 30	8	50	18	Plug, screw and nylon support	Stainless steel	10
AT-134E	20 x 15 x 30	10	70	18	Plug, screw and nylon support	Stainless steel	10
AT-135E	20 x 15 x 30	8	50	18	Plug, screw and metallic support	Stainless steel	13
AT-136E	20 x 15 x 30	10	70	18	Plug, screw and metallic support	Stainless steel	13
AT-137E	20 x 14 x 12	8	50	-	Plug and screw	Stainless steel	4

* Other dimensions are available on customer request.

Holdfast clips to secure round or cable conductor.

AT-133E (application)

AT-135E (application)

AT-137E (application)

CLIPS FOR CABLE

NYLON CABLE CLIP 56

Reference	Dimensions (mm)	Conductor range Ø(mm)	mm²	Conductor elevation (mm)*	Included	Material	Weight (gr)
AT-043E	50 x 23 x 25	6 - 10	25 - 70	18	Plug and screw spike M6x25	Nylon	17
AT-044E	50 x 23 x 25	6 - 10	25 - 70	18	Integrated plug and screw	Nylon	18
							Meets with UNE 21186, NFC 17102

* Other dimensions are available on customer request.

Nylon clips to secure round or cable conductor.


AT-043E (application)


AT-044E (application)

NYLON CABLE CLIP 57

Reference	Dimensions (mm)	Conductor Ø(mm)	mm²	Conductor elevation (mm)*	Included	Material	Weight (gr)
AT-045E	50 x 23 x 30	13	95	18	Plug and screw spike M6x25	Nylon	24
AT-046E	50 x 23 x 30	16	150	20	Plug and screw spike M6x25	Nylon	24
AT-047E	50 x 23 x 52	13	95	42	Plug and screw spike M6x25	Nylon	29
AT-048E	50 x 23 x 54	16	150	44	Plug and screw spike M6x25	Nylon	29
AT-049E	50 x 23 x 30	16	150	30	Integrated plug and screw	Nylon	32
							Meets with UNE 21186, NFC 17102

* Other dimensions are available on customer request.

Nylon clips to secure round or cable conductor. Suitable also to secure air termination rods to the side of the building.


AT-045E (application)


AT-047E (application)


AT-049E (application)

CLIPS FOR CABLE

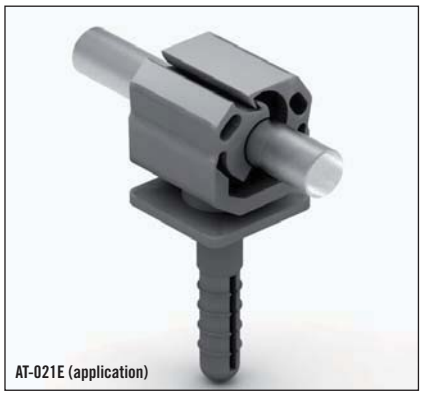
58 NYLON HOLDFAST CABLE CLIP

Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm^2	Conductor elevation (mm)	Included	Material	Weight (gr)
AT-020E	25 x 25 x 35	8	50	18	Plug and screw spike M6x25	Nylon	9
AT-034E	25 x 25 x 35	10	70	18	Plug and screw spike M6x25	Nylon	9
AT-035E	25 x 25 x 35	8	50	25	Plug and screw spike M6x25	Nylon	10
AT-036E	25 x 25 x 35	10	70	25	Plug and screw spike M6x25	Nylon	10
AT-037E	25 x 25 x 70	8	50	40	Plug and screw spike M6x25	Nylon	11
AT-038E	25 x 25 x 70	10	70	40	Plug and screw spike M6x25	Nylon	13
AT-021E	25 x 25 x 90	8	50	18	Integrated plug and screw	Nylon	10
AT-039E	25 x 25 x 90	10	70	18	Integrated plug and screw	Nylon	10
AT-022E	25 x 25 x 80	8	50	25	Anti-humidity plug and screw	Nylon	20

Meets with UNE 21186, NFC 17102

Nylon holdfast clips to secure round or cable conductor.


AT-020E (application)


AT-021E (application)


AT-022E (application)


AT-037E (application)


AT-035E (application)

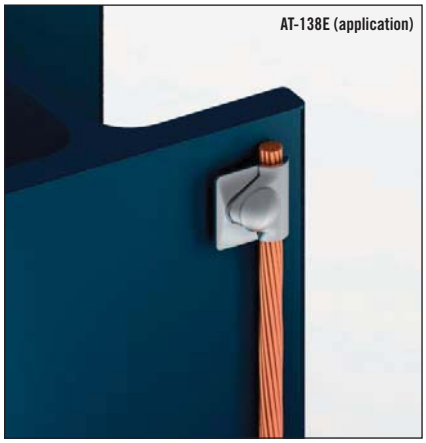
CLIPS FOR CABLE

CLAMPING FRAME 59

Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Material	Weight (gr)
AT-138E	33 x 33 x 35	6 - 10	25 - 70	Stainless steel	34
AT-139E	33 x 33 x 35	6 - 10	25 - 70	Copper	35
AT-140E	33 x 33 x 35	6 -10	25 - 70	Aluminium	27

Used for fixing the down-conductor (round or cable) to metallic structures.
Include bolt M8 x 30 mm.

AT-138E (SS)
AT-139E (Cu)
AT-140E (Al)



AT-138E (application)

ONE HOLE CABLE CLIP 60

Reference	Dimensions (mm)	Conductor Ø(mm)	Conductor mm²	Kind	Material	Weight (gr)
AT-056E	15 x 10 x 25	8	50	Bare copper	Copper	9
AT-058E	20 x 15 x 30	10	70	Bare copper	Copper	10
AT-057E	25 x 20 x 35	13	95	Bare copper	Copper	11
AT-141E	20 x 15 x 30	8	50	PVC covered copper	Copper	10
AT-142E	15 x 10 x 25	8	50	Bare aluminium	Aluminium	4
AT-143E	20 x 15 x 30	10	70	Bare aluminium	Aluminium	5
AT-144E	20 x 15 x 30	8	50	PVC covered aluminium	Aluminium	5

Meets with IEC 62305, EN 50164, BS 6651, BS 1474, BS 2879

Simple holder to secure cable or round to the wall. Plug and screw included.

AT-056E (Cu) (application)
AT-142E (Al)

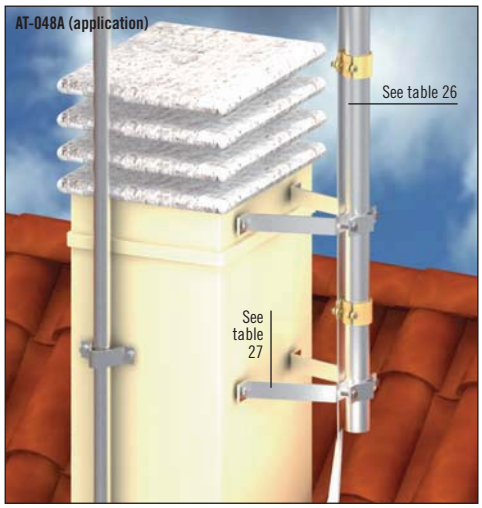
CLIPS FOR TAPE AND CABLE

61 CONDUCTOR-MAST SUPPORT CLIP

Reference	Model	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Tape (mm)	Material	Weight (gr)
AT-033A	Ø1“	73 x 52 x 40	8 - 10	50 - 70	30x2 - 30x3,5	Naval brass	275
AT-048A	Ø1 1/4"-1 1/2 “	60 x 72 x 40	8 - 10	50 - 70	30x2 - 30x3,5	Naval brass	310

Meets with EN 50164, UNE 21186, NFC 17102

Down-conductor clip with 1” - 1/2” pipe support holding the down-conductor outside the mast.

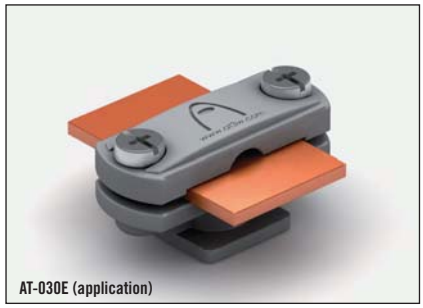


62 NYLON CONDUCTOR CLIP

Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Tape (mm)	Conductor elevation	Included	Material	Weight (gr)
AT-030E	20 x 50 x 25	6 - 10	25 - 70	30x2 - 30x3,5	17	Plug and screw spike M6x25	Nylon	21
AT-053E	20 x 50 x 30	6 - 10	25 - 70	30x2 - 30x3,5	23	Plug and screw spike M6x25	Nylon	23
AT-054E	20 x 50 x 70	6 - 10	25 - 70	30x2 - 30x3,5	40	Plug and screw spike M6x25	Nylon	25
AT-031E	20 x 50 x 60	6 - 10	25 - 70	30x2 - 30x3,5	17	Integrated plug and screw	Nylon	28

Meets with UNE 21186, NFC 17102

Nylon clips to secure round, cable or tape conductor.



SUPPORTS

PYRAMIDAL ROOF CONDUCTOR HOLDER 63

Reference	Dimensions (mm)	Conductor range Ø(mm)	mm²	Tape (mm)	Conductor elevation (mm)	Included	Material	Weight (gr)
AT-041E	140 x 140 x 90	6 - 10	25 - 70	30x2 - 30x3,5	80	Empty with base	Polyethylene UV-resistant	80
AT-183E	140 x 140 x 90	6 - 10	25 - 70	30x2 - 30x3,5	80	Full of concrete	Polyethylene UV-resistant + concrete	1000
AT-040E	140 x 140 x 90	8	50	-	65	Empty with base Holdfast clip	Polyethylene UV-resistant	95
AT-184E	140 x 140 x 90	8	50	-	65	Full of concrete	Polyethylene UV-resistant + concrete	1000
AT-005M	140 x 140 x 95	-	-	-	-	Empty with base. M10	Polyethylene UV-resistant	105
AT-145E	140 x 140 x 120	8 – 10*	50 – 70*	30x2 – 30x3,5	90	Empty with base	Polyethylene UV-resistant	400

Meets with UNE 21186, NFC 17102

* Other conductor dimensions are available on customer request.

AT-005M (application)

Conductor holder for flat roofs, where it's not possible to drill to fix the conductor, such as bitumen roofs. Supplied empty to fill with concrete, or already full of concrete. The lip at the bottom of the pyramid allows it to embed in concrete or bitumen.


AT-005M


AT-040E (application)
AT-183E (application)


AT-041E (application)
AT-184E (application)


AT-145E (application)

ROOF CONDUCTOR HOLDER 64

Reference	Dimensions (mm)	Round conductor range Ø(mm)	mm²	Conductor elevation (mm)	Material	Weight (Kg)
AT-042E	140 x 75 x 50	8 - 10	50 - 70	60	Polypropylene / concrete	1

Double holdfast fixing concrete support for cable or round.


AT-042E (application)

PLASTIC SUPPORT BLOCK 65

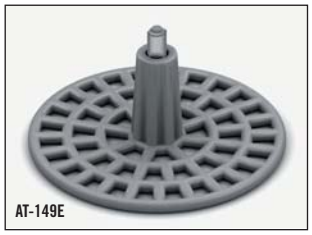
Reference	Dimensions (mm)	Material	Weight (gr)
AT-147E	70 x 70 x 20	Nylon	10
AT-148E	110 x 110 x 40	Nylon	25
AT-149E	110 x 110 x 60	Nylon	30

Clip support to adhesive or to embed in flat roofs.

Suitable to use in conjunction with clips from (table 42, table 43, table 45, table 49, table 50, table 53, table 55, table 56, table 57, table 58, table 62)


AT-147E (application)


AT-147E


AT-149E

SUPPORTS

66 METALLIC SUPPORT

AT-178E

AT-179E

Reference	Dimensions (mm)	Included	Material	Weight (gr)
AT-178E	100 x 100 x 20	female M10	Galvanized steel	155
AT-179E	80 x 30 x 12	female M10	Galvanized steel	55

These supports are fixed by screws or adhesive to flat surfaces or welded to metallic structures.
Suitable to use in conjunction with rods such as AT-053L (table 3)

67 CURVE TILE SUPPORT

AT-090E (SS)
AT-151E (Cu)

Reference	Model	Dimensions (mm)	Material	Weight (gr)
AT-090E	170 - 240 mm curve tile support	180 x 25 x 140	Stainless steel	79
AT-150E	190 - 300 mm curve tile support	200 x 25 x 155	Stainless steel	113
AT-151E	170 - 240 mm curve tile support	180 x 25 x 140	Copper	85
AT-152E	190 - 300 mm curve tile support	200 x 25 x 155	Copper	120

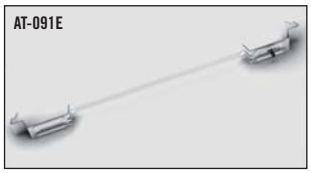
Meets with UNE 21186, NFC 17102

AT-090E (application)

For fixing the conductor clips to curve tiles or to the ridge of the roof.

Suitable to use in conjunction with clips from (table 42, table 45, table 50, table 53, table 55, table 56, table 57, table 58, table 62)

68 SPRING TILE SUPPORT



AT-091E

Reference	Dimensions (mm)	Material	Weight (gr)
AT-091E	20 x 35 x 220	Stainless steel	55

Meets with UNE 21186, NFC 17102

AT-091E (application)

For fixing any kind of clip to a tile. This support has a spring to adjust it to the tile from 180 to 280mm.

Suitable to use in conjunction with clips from (table 42, table 45, table 50, table 53, table 55, table 56, table 57, table 58, table 62).

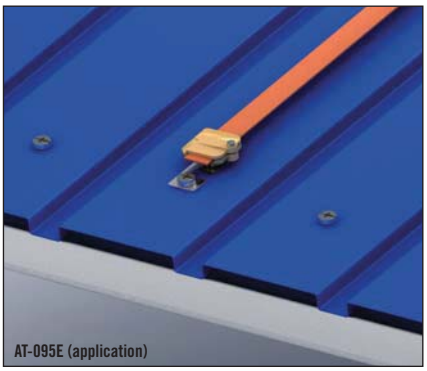
SUPPORTS

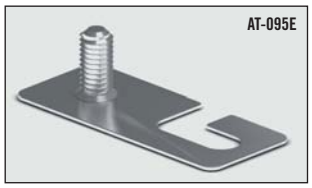
SANDWICH ROOF SUPPORT 69

Reference	Dimensions (mm)	Material	Weight (gr)
AT-095E	25 x 60 x 15	Stainless steel	15
AT-169E	25 x 60 x 25	Stainless steel	20
		Meets with UNE 21186, NFC 17102	

Corrugated or sandwich roof support.

Suitable to use in conjunction with clips from (table 42, table 45, table 50, table 53, table 55, table 56, table 57, table 58, table 62).


AT-095E (application)


AT-095E

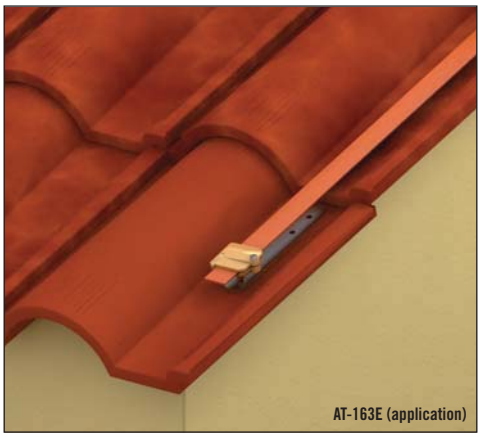

AT-169E

CLIP SUPPORT FOR ROOFS 70

Reference	Model	Dimensions (mm)	Material	Weight (gr)
AT-159E	210 mm flat tile elevated support	40 x 25 x 210	Stainless steel	37
AT-160E	260 mm flat tile elevated support	40 x 25 x 260	Stainless steel	46
AT-161E	335 mm flat tile elevated support	40 x 25 x 335	Stainless steel	70
AT-162E	210 mm flat tile smooth support	15 x 25 x 210	Stainless steel	43
AT-163E	260 mm flat tile smooth support	15 x 25 x 260	Stainless steel	51
AT-164E	210 mm flat tile support with tabs	15 x 25 x 210	Stainless steel	37
AT-165E	260 mm flat tile support with tabs	15 x 25 x 260	Stainless steel	43
AT-166E	210 mm flat tile support (against-hook)	15 x 25 x 210	Stainless steel	40
AT-167E	260 mm flat tile support (against-hook)	15 x 25 x 260	Stainless steel	48
AT-168E	130 mm flat tile angled support	60 x 25 x 130	Stainless steel	45
AT-092E	180 mm flat tile angled support	60 x 25 x 180	Stainless steel	55
AT-093E	440 mm flat tile angled support	60 x 25 x 440	Stainless steel	100
				Meets with UNE 21186, NFC 17102

Different solutions for fixing the conductor clips to the roof.

Suitable to use in conjunction with clips from (table 42, table 45, table 50, table 53, table 55, table 56, table 57, table 58, table 62).

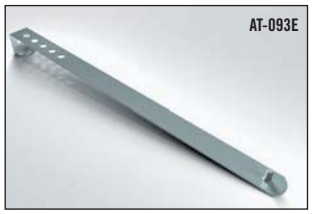

AT-163E (application)


AT-161E


AT-163E

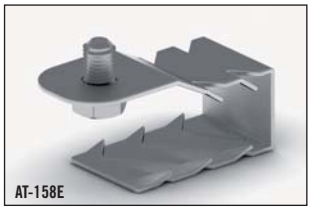

AT-165E


AT-167E


AT-093E

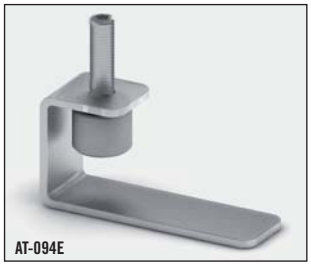
SUPPORTS

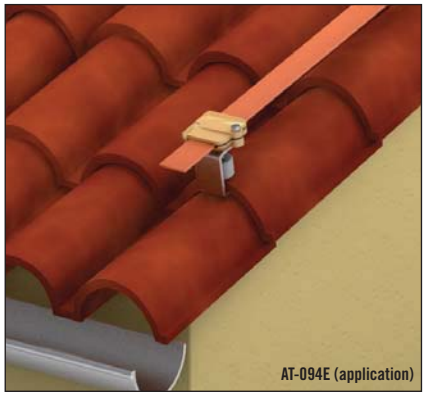
71 TILE SUPPORT


AT-158E

Reference	Model	Dimensions (mm)	Material	Weight (gr)
AT-156E	15 - 20 mm tile support	50 x 20 x 35	Stainless steel	30
AT-157E	20 - 25 mm tile support	50 x 20 x 40	Stainless steel	31
AT-158E	25 - 30 mm tile support	50 x 20 x 45	Stainless steel	32
AT-094E	Universal tile support	25 x 40 x 80	Galvanized steel	85
				Meets with UNE 21186, NFC 17102

For fixing the clip to the tile without the tile getting damaged and allow the conductor to be fixed afterwards.


AT-094E


AT-094E (application)

Suitable to use in conjunction with clips from (table 42, table 45, table 50, table 53, table 55, table 56, table 57, table 58, table 62).

72 GUTTER CLAMP

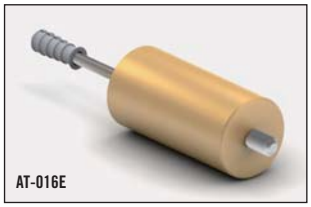

AT-040F (SS) ○
AT-153E (Cu) ●


AT-040F (application)

Reference	Dimensions (mm)	Material	Weight (gr)
AT-040F	50 x 50 x 40	Stainless steel	65
AT-153E	50 x 50 x 40	Copper	72
			Meets with UNE 21186, NFC 17102

Clamp for Ø6-10 mm round conductor to be fixed at the edge of the gutter.

73 EXTENSION


AT-016E


AT-016E (application)

Reference	Dimensions (mm)	Material	Weight (gr)
AT-016E	Ø24 x 50	Naval brass	175
AT-017E	Ø24 x 100	Naval brass	370
			Meets with EN 50164, UNE 21186, NFC 17102

Used where the installation requires the conductor to be secured away from the face of the building. To use in conjunction with for example AT-010E or AT-015E (Tables 42 and 50). Include plug and screw spike M8x40.

Suitable to use in conjunction with clips from (table 42, table 45, table 50, table 53, table 55, table 56, table 57, table 58, table 62).

SUPPORTS

BACK PLATE HOLDFAST 74

Reference	Dimensions (mm)	Material	Weight (gr)
AT-170E	Ø63 x 74	Gunmetal	300
AT-171E	Ø63 x 74	Aluminium	100
			Meets with IEC 62305, EN 50164, BS 6651

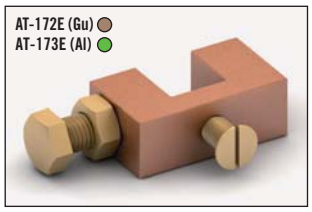
Used where the installation requires the conductor to be secured away from the face of the building. To use in conjunction with for example AT-101E (Tables 43). Include plug and screw.

Suitable to use in conjunction with clips from (table 43, table 49).


AT-170E (application)

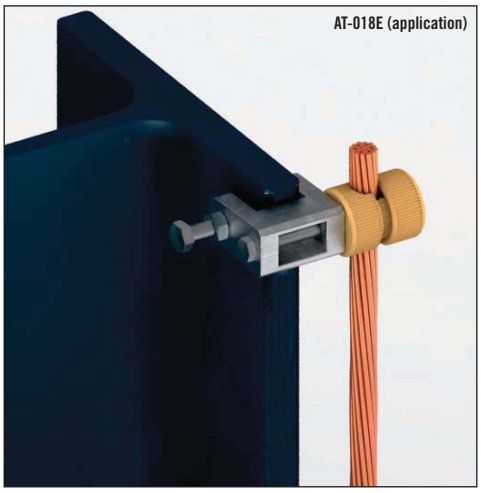
GLAZING BAR HOLDFAST 75

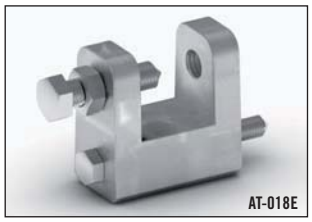
Reference	Dimensions (mm)	Max. width (mm)	Material	Weight (gr)
AT-172E	20 x 15 x 35	12	Gunmetal	110
AT-173E	20 x 15 x 35	12	Aluminium	50
AT-018E	38 x 19 x 40	18	Galvanized steel	85
AT-174E	58 x 24 x 60	26	Galvanized steel	220
				Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 2874



Suitable for holding any clip to narrow flanges such metallic angles.

Suitable to use in conjunction with clips from (table 42, table 43, table 45, table 49, table 50, table 53, table 55, table 56, table 57, table 58, table 62).


AT-018E (application)


AT-018E


AT-172E (application)

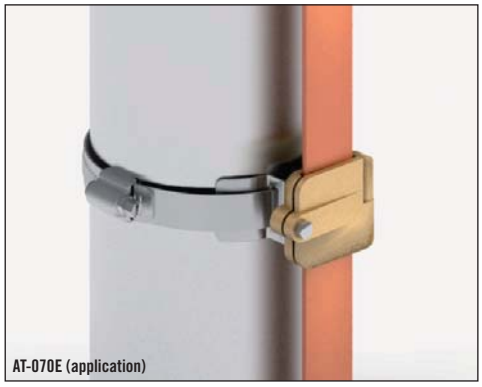
SUPPORTS

76 SCREWDRIVER DOWNPIPE SUPPORT


AT-070E


AT-076E

Reference	Model	Dimensions (mm)	Downpipe Ø (mm)	Material	Weight (gr)
AT-070E	50 - 70 mm Spiral pipe support	25 x 12 x 100	50 - 70	Stainless steel	70
AT-071E	70 - 90 mm Spiral pipe support	25 x 12 x 120	70 - 90	Stainless steel	75
AT-072E	80 - 100 mm Spiral pipe support	25 x 12 x 130	80 - 100	Stainless steel	77
AT-073E	100 - 120 mm Spiral pipe support	25 x 12 x 150	100 - 120	Stainless steel	78
AT-182E	120 - 140 mm Spiral pipe support	25 x 12 x 170	120 - 140	Stainless steel	84
AT-194E	140 - 160 mm Spiral pipe support	25 x 12 x 190	140 - 160	Stainless steel	87
AT-195E	160 - 180 mm Spiral pipe support	25 x 12 x 210	160 - 180	Stainless steel	96
AT-076E	25 - 27 mm Tube clip support	40 x 35 x 25	25 - 27	Stainless steel	30
AT-077E	31 - 34 mm Tube clip support	47 x 35 x 25	31 - 34	Stainless steel	33


AT-070E (application)

Rainwater support adjustable with a screwdriver.

Suitable to use in conjunction with clips from (table 42, table 45, table 50, table 53, table 55, table 56, table 57, table 58, table 62).

77 EARTHING PIPE CLAMP

Reference	Model	Dimensions (mm)	Conductor Ø(mm)	Downpipe Ø (mm)	Material	Weight (gr)
AT-097E	3/4 -2" Earthing Pipe Clamp	60 x 25 x 35	2.5 - 6 (4 - 25 mm^2)	27 - 60 (3/4 -2")	Stainless steel	71
AT-098E	3/4 -4" Earthing Pipe Clamp	60 x 25 x 35	2.5 - 6 (4 - 25 mm^2)	27 - 115 (3/4 -4")	Stainless steel	76
AT-099E	3/4 -6" Earthing Pipe Clamp	60 x 25 x 35	2.5 - 6 (4 - 25 mm^2)	27 - 165 (3/4 -6")	Stainless steel	94
AT-185E	3/4 -3" Pipe Clamp for antenna mast or rainwater pipe	70 x 35 x 40	6 - 10	27 - 89 (3/4 -3")	Stainless steel	133
AT-186E	3/4 -6" Pipe Clamp for antenna mast or rainwater pipe	70 x 35 x 40	6 - 10	27 - 165 (3/4 -6")	Stainless steel	137

Rainwater or antenna mast support with clamp to connect with the earthing system.


AT-097E (application)


AT-185E (application)

SUPPORTS

DOWNPIPE CLAMP 78

Reference	Dimensions (mm)	Downpipe Ø (mm)	Material	Weight (gr)
AT-082E	120 x 180 x 40	50 - 120	Copper	155
AT-083E	120 x 180 x 40	50 - 120	Stainless steel	130

50-120 mm rainwater pipe clamp, for Ø6 - 10 mm round or 25 - 70 mm² cable.

AT-082E (Cu)
AT-083E (SS)

DOWNPIPE SUPPORT 79

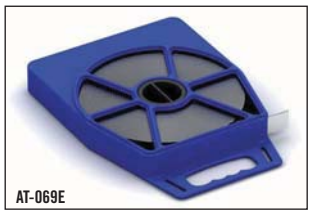
Reference	Model	Dimensions (mm)	Downpipe Ø (mm)	Material	Weight (gr)
AT-096E	Adjustable tensioning strap up to 160 mm	160 x 180 x 20	Up to 160	Stainless steel	40
AT-069E	Continuous tensioning strap 14 x 0,3 mm (50 m)	14 x 0,3 (50 m)	-	Stainless steel	1800
AT-029E	Continuous tensioning strap 14 x 0,3 mm (100 m)	14 x 0,3 (100 m)	-	Stainless steel	4000
AT-067E	Separate grip holder	36 x 22 x 20	-	Stainless steel	10
AT-066E	Downpipe clip holder	25 x 30 x 65	-	Stainless steel	20

AT-096E

AT-069E, AT-067E, AT-066E (application)

AT-066E

AT-067E



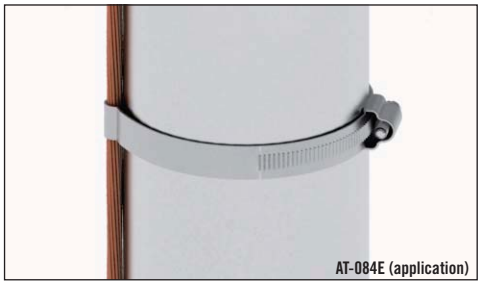
AT-069E

Different pieces to customize your downpipe support.
Suitable to use in conjunction with clips from (table 42, table 45, table 50, table 53, table 55, table 56, table 57, table 58, table 62).

DOWNPIPE CABLE HOLDER 80

Reference	Dimensions (mm)	Downpipe Ø (mm)	Material	Weight (gr)
AT-084E	70 x 80 x 12	50 - 70	Stainless steel	27
AT-085E	90 x 100 x 12	70 - 90	Stainless steel	31
AT-086E	100 x 110 x 12	80 - 100	Stainless steel	33
AT-087E	120 x 130 x 12	100 - 120	Stainless steel	37
AT-088E	140 x 150 x 12	120 - 140	Stainless steel	41
AT-089E	160 x 170 x 12	140 - 160	Stainless steel	45

Adjustable rainwater pipe conductor holder, for Ø8 mm round or 50 mm² cable.

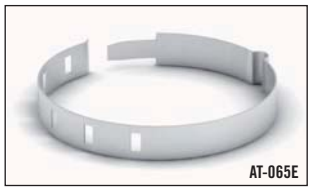


AT-084E (application)

ALUMINIUM DOWNPIPE CABLE HOLDER 81

Reference	Dimensions (mm)	Downpipe Ø (mm)	Material	Weight (gr)
AT-065E	120 x 120 x 18	80 - 120	Aluminium	10

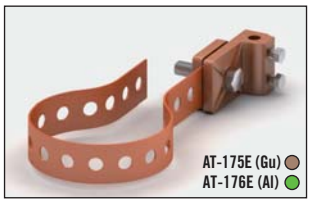
80 - 120 mm Aluminium rainwater pipe conductor holder, for Ø8 mm round or 50 mm² cable.



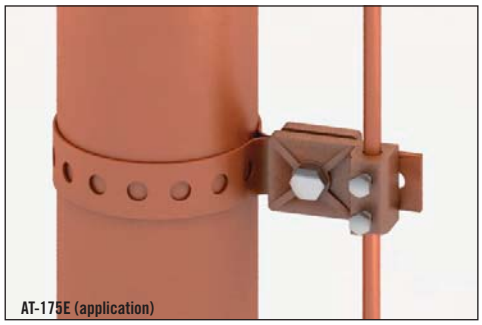
AT-065E

SUPPORTS

82 PIPE BOND



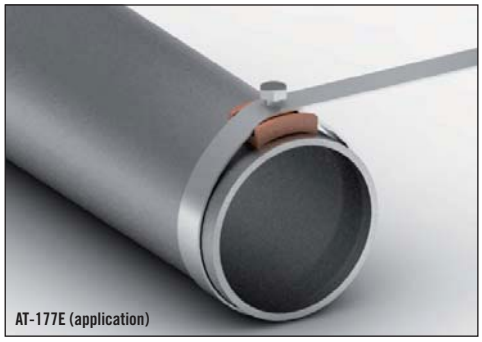
Reference	Dimensions (mm)	Pipe Ø(mm)	Material	Weight (gr)
AT-175E	60 x 35 x 40	50 - 200	Gunmetal	460
AT-176E	60 x 35 x 40	50 - 200	Aluminium	250
				Meets with IEC 62305, EN 50164, BS 6651



For fixing a Ø8mm down-conductor to large diameter pipeworks.

83 WATERMAIN PIPE BOND

Reference	Dimensions (mm)	Tape (mm)	Material	Weight (gr)
AT-177E	45 x 35 x 40	25 x 3	Gunmetal	260
				Meets with IEC 62305, EN 50164, BS 6651



Used for bonding copper tape to watermain pipes.

84 RAINWATER PIPE (RWP) BOND

AT-024J (Gu)
AT-025J (Al)

Reference	Dimensions (mm)	Tape (mm)	Material	Weight (gr)
AT-024J	32 x 32 x 40	25 x 3	Gunmetal	180
AT-025J	32 x 32 x 40	25 x 3	Aluminium	70
				Meets with IEC 62305, EN 50164, BS 6651

This connection allows the joint between copper or aluminium tapes to metallic circular surfaces such as rainwater pipes, handrails... The bolt size is M10.

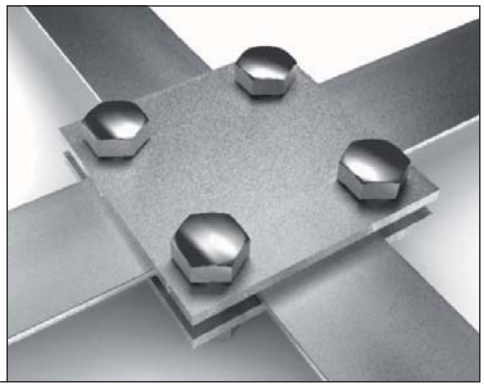
CLAMPS

SQUARE TAPE CLAMP 85

Reference	Dimensions (mm)	Tape (mm)	Material	Weight (gr)
AT-033F	55 x 55 x 15	25 x 3	Gunmetal	230
AT-034F	55 x 55 x 20	25 x 6	Gunmetal	420
AT-035F	85 x 85 x 25	50 x 6	Gunmetal	980
AT-039F	55 x 55 x 15	25 x 3	Aluminium	70
AT-026F	60 x 60 x 6	30x2 - 30x3,5	Galvanized steel	330
AT-029F	60 x 60 x 6	25x3 - 30x3,5	Copper	315
AT-131F	60 x 60 x 6	30x2 - 30x3,5	Stainless steel	300
		Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1471, BS 2874, UNE 21186, NFC 17102		

AT-033F (Gu) (application)
AT-039F (Al)

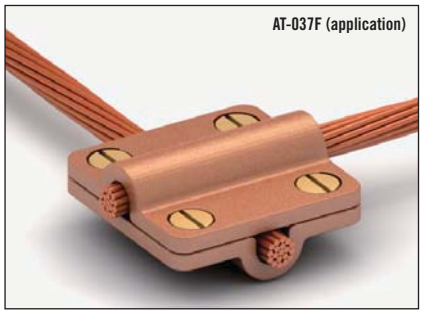
Lineal, in T, in L and in cross shape equipotential joint for tape.



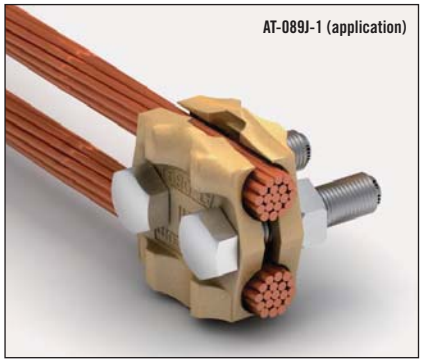
AT-026F (GS) (application)
AT-029F (Cu)
AT-131F (SS)

SQUARE CABLE CLAMP 86

Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Rod Ø (mm)	Material	Weight (gr)
AT-036F	60 x 60 x 40	8	50	-	Gunmetal	320
AT-037F	60 x 60 x 40	10	70	-	Gunmetal	290
AT-038F	60 x 60 x 40	13	95	-	Gunmetal	250
AT-032F	60 x 60 x 22	8 - 10	50 - 70	-	Copper	330
AT-023F	60 x 60 x 19	8 - 10	50 - 70	-	Galvanized steel	330
AT-028F	60 x 60 x 21	8 - 10	50 - 70	-	Stainless steel	330
AT-136J	60 x 60 x 22	8 - 10	50 - 70	16	Galvanized steel	330
AT-137J	60 x 60 x 22	8 - 10	50 - 70	16	Stainless steel	330
AT-138J	60 x 60 x 22	8 - 10	50 - 70	16	Copper	330
AT-089J-1	50 x 50 x 45	8 - 15	50 - 120	-	Naval brass	250
		Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1471, BS 2874, UNE 21186, NFC 17102				



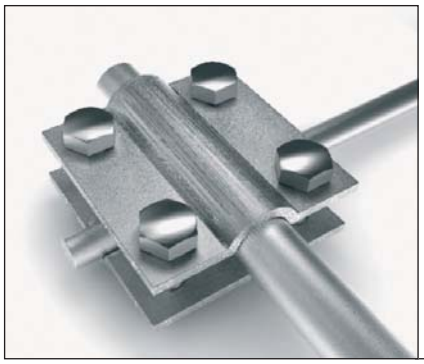
AT-037F (application)



AT-089J-1 (application)

Lineal, in T, in L and in cross shape equipotential joint for round and cable.

AT-023F (GS) (application)
AT-032F (Cu)
AT-028F (SS)



AT-136J (GS) (application)
AT-138J (Cu)
AT-137J (SS)

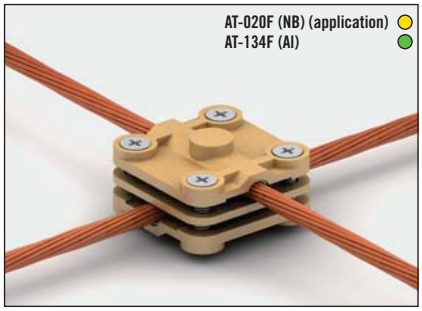
CLAMPS

87 SQUARE TAPE AND CABLE CLAMP

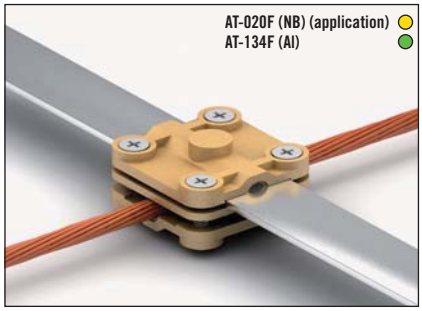
AT-031F (GS) (application)
AT-133F (Cu)
AT-136F (SS)

Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Tape (mm)	Material	Weight (gr)
AT-020F	57 x 57 x 25	7 - 13	35 - 95	30x2 - 30x3,5	Naval brass	330
AT-031F	60 x 60 x 14	8 - 10	50 - 70	30x2 - 30x3,5	Galvanized steel	330
AT-130F	60 x 80 x 70	8 - 10	50 - 70	30x2 - 30x3,5	Galvanized steel	280
AT-133F	60 x 60 x 14	8 - 10	50 - 70	30x2 - 30x3,5	Copper	450
AT-134F	57 x 57 x 25	7 - 13	35 - 95	30x2 - 30x3,5	Aluminium	120
AT-136F	60 x 60 x 14	8 - 10	50 - 70	30x2 - 30x3,5	Stainless steel	313
						Meets with UNE 21186, NFC 17102

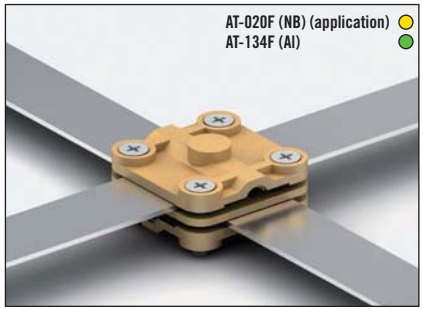
Lineal, in T, in L and in cross shape equipotential joint for round, cable and tape.



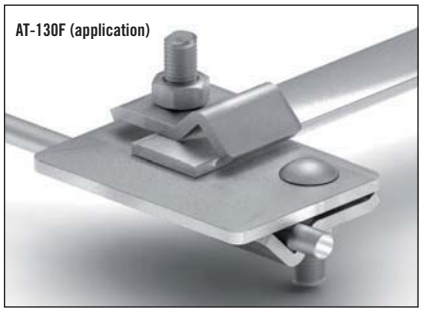
AT-020F (NB) (application)
AT-134F (Al)



AT-020F (NB) (application)
AT-134F (Al)

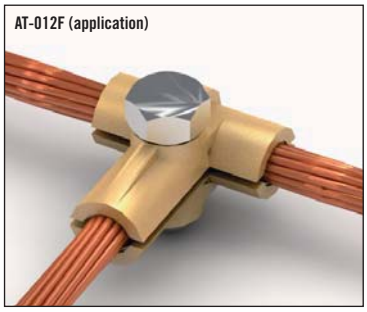


AT-020F (NB) (application)
AT-134F (Al)



AT-130F (application)

88 T CLAMP



AT-012F (application)

AT-119F (Gu) (application)
AT-120F (GS)

Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Material	Weight (gr)
AT-012F	50 x 40 x 20	8 - 10	50 - 70	Naval brass	120
AT-119F	49 x 27 x 21	8	50	Gunmetal	120
AT-120F	49 x 27 x 21	8	50	Galvanized steel	120
					Meets with IEC 62305, EN 50164, BS 6651, UNE 21186, NFC 17102

T shape equipotential joint for round and cable.

CLAMPS

STRAIGHT CLAMP 89

Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Conductor range Tape (mm)	Rod Ø (mm)	Material	Weight (gr)
AT-015F	Ø21 x 100	8 - 10	50 - 70	-	-	Naval brass	140
AT-116F	Ø15 x 75	6 - 8	25 - 50	-	-	Copper	140
AT-117F	Ø15 x 75	6 - 8	25 - 50	-	-	Stainless steel	140
AT-118F	60 x 27 x 20	8	50	-	-	Galvanized steel	140
AT-105F	40 x 30 x 17	8 - 10	50 - 70	-	-	Aluminium	50
AT-135J	43 x 41 x 30	7 - 10	35 - 70	-	16	Galvanized steel	120
AT-090H	85 x 41 x 44	8 - 10	50 - 70	30x2 - 30x3,5	20	Naval brass	265
AT-135F	60 x 27 x 20	8	50	-	-	Gunmetal	100

Meets with IEC 62305, EN 50164, BS 6651, UNE 21186, NFC 17102

AT-015F (NB)
AT-116F (Cu)
AT-117F (SS)

Lineal joint for cable or round.

AT-135J (application)

AT-105F (application)

AT-118F (GS) (application)
AT-135F (Gu)

AT-090H

AT-090H (application)

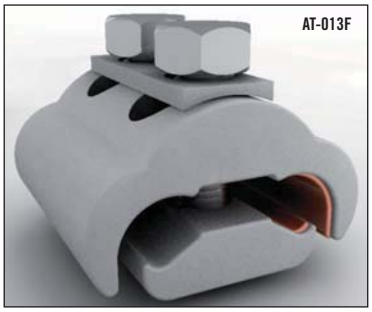
PARALLEL CLAMP 90

Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Conductor range tape (mm)	Material	Weight (gr)
AT-011F	45 x 45 x 14	8	50	30x2 - 30x3,5	Naval brass	290
AT-013F	62 x 52 x 57	6 - 16	25 - 150	-	Copper / Aluminium	250
AT-016F	42 x 42 x 25	4 - 13	16 - 95	-	Naval brass	220
AT-009F	42 x 42 x 25	4 - 13	16 - 95	-	Aluminium	217

Meets with IEC 62305, EN 50164, UNE 21186, NFC 17102

AT-011F

Connection in parallel for cable or round.



AT-013F

AT-016F (NB)
AT-009F (Al)

CLAMPS

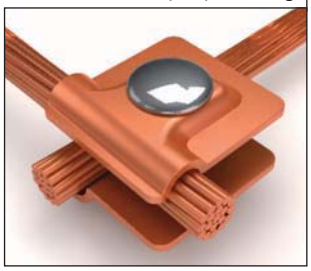
91 UNIVERSAL CLAMP

AT-113F (SS) (application)
AT-112F (Cu)

Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Rod Ø (mm)	Material	Weight (gr)
AT-112F	33 x 33 x 35 (Miniature)	6 - 8	25 - 50	-	Copper	80
AT-113F	33 x 33 x 35 (Miniature)	6 - 8	25 - 50	-	Stainless steel	80
AT-115F	48 x 44 x 35	8 - 10	50 - 70	-	Aluminium	60
AT-121F	48 x 44 x 35	8 - 10	50 - 70	-	Copper	120
AT-122F	48 x 44 x 35	8 - 10	50 - 70	-	Stainless steel	120
AT-125F	48 x 44 x 35	8 - 10	50 - 70	-	Galvanized steel	120
AT-128F	48 x 44 x 35	8 - 10	50 - 70	-	Copper / Aluminium	120
AT-025F	48 x 44 x 20	8 - 10	50 - 70	16	Stainless steel	130
AT-127J	48 x 44 x 20	8 - 10	50 - 70	16	Copper	130
AT-128J	48 x 44 x 20	8 - 10	50 - 70	16	Galvanized steel	130

Meets with IEC 62305, EN 50164, UNE 21186, NFC 17102

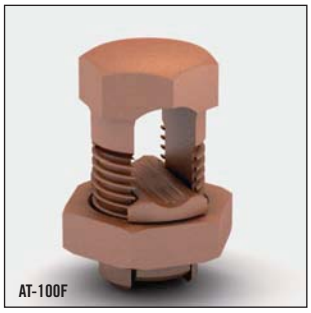
AT-121F (Cu) (application)
AT-115F (Al)
AT-122F (SS)
AT-125F (GS)
AT-128F (Cu/Al)



AT-025F (SS) (application)
AT-127J (Cu)
AT-128J (GS)

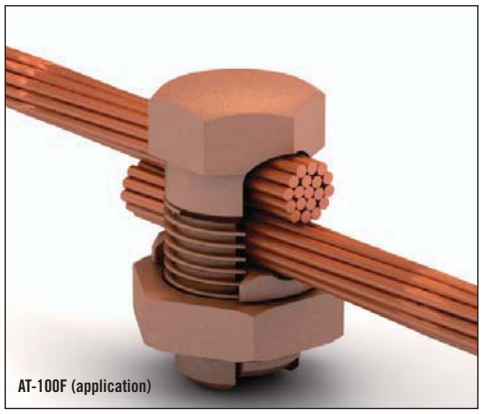
Connection in cross or in parallel between copper cables or round conductors.

92 SPLIT BOLT CLAMP TYPE H



AT-100F

Reference	Dimensions (mm)	Conductor range Conductor A (mm²)	Conductor range Conductor B (mm²)	Material	Weight (gr)
AT-096F	20 x 20 x 25	10	2,5 - 8	Gunmetal	20
AT-097F	20 x 20 x 25	10 - 16	2,5 - 16	Gunmetal	30
AT-098F	20 x 20 x 30	16 - 25	2,5 - 25	Gunmetal	40
AT-099F	25 x 25 x 35	16 - 35	2,5 - 35	Gunmetal	60
AT-100F	27 x 27 x 42	25 - 50	2,5 - 50	Gunmetal	90
AT-101F	30 x 30 x 50	35 - 70	2,5 - 70	Gunmetal	140
AT-102F	35 x 35 x 55	50 - 95	10 - 95	Gunmetal	170
AT-103F	40 x 40 x 55	50 - 120	10 - 120	Gunmetal	180
AT-104F	45 x 45 x 60	50 - 185	10 - 185	Gunmetal	350



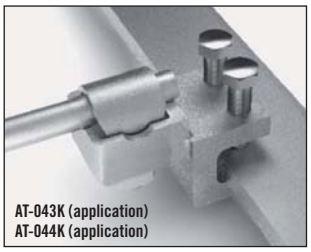
AT-100F (application)

Connection in parallel between two stranded or solid circular conductor.

CLAMPS

METAL SHEET CLAMP 93

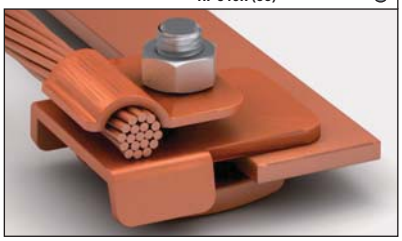
Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Conductor range Tape (mm)	Sheet (mm)	Material	Weight (gr)
AT-043K	56 x 45 x 60	7 - 10	35 - 70	-	5 - 18	Galvanized steel	210
AT-044K	56 x 45 x 50	6 - 10	25 - 70	-	1 - 12	Galvanized steel	190
AT-045K	27 x 47 x 50	7 - 10	35 - 70	-	1 - 12	Galvanized steel	155
AT-046K	35 x 40 x 40	6 - 10	25 - 70	-	1 - 8	Galvanized steel	110
AT-047K	30 x 40 x 50	6 - 10	25 - 70	-	1 - 8	Copper	280
AT-048K	30 x 40 x 50	6 - 10	25 - 70	-	1 - 8	Stainless steel	270
AT-049K	35 x 35 x 40	7 - 10	35 - 70	-	1 - 5	Zinc alloy	110
AT-052K	65 x 50 x 20	6 - 10	25 - 70	-	1 - 5	Galvanized steel	135
AT-053K	65 x 50 x 20	6 - 10	25 - 70	-	1 - 5	Copper	148
AT-054K	50 x 60 x 30	8 - 10	50 - 70	-	1 - 8	Galvanized steel	120
AT-055K	50 x 40 x 60	7 - 10	35 - 70	-	1 - 5	Galvanized steel	160
AT-056K	55 x 30 x 40	-	-	30x2 - 30x3,5	1 - 5	Copper	280
AT-057K	55 x 30 x 40	-	-	30x2 - 30x3,5	1 - 5	Galvanized steel	270


AT-043K (application)
AT-044K (application)

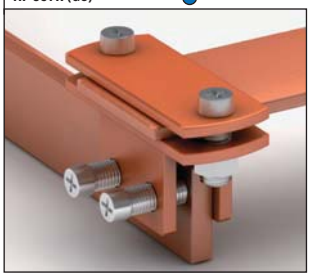

AT-045K (application)

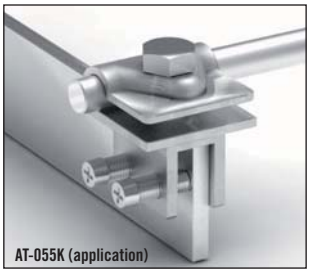
Equipotential connection between round, cable or tape and metal sheet.


AT-046K (application)

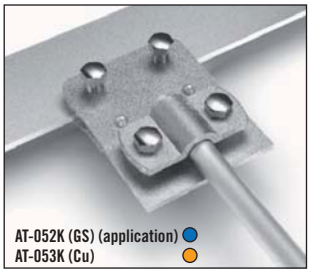
AT-047K (Cu) (application)
AT-048K (SS)



AT-049K (application)

AT-056K (Cu) (application)
AT-057K (GS)



AT-055K (application)


AT-054K (application)


AT-052K (GS) (application)
AT-053K (Cu)

TEST CLAMPS

94 TAPE TEST CLAMP

Reference	Model	Dimensions (mm)	Tape (mm)	Material	Weight (gr)
AT-081F	OBLONG TEST CLAMP	60 x 35 x 30	25 x 3	Gunmetal	290
AT-083F	OBLONG TEST CLAMP	60 x 35 x 30	25 x 3	Aluminium	120
AT-084F	PLATE TYPE TEST CLAMP	80 x 80 x 40	25 x 3	Gunmetal	620
AT-085F	SCREW DOWN TEST CLAMP	60 x 60 x 60	25 x 3	Gunmetal	720

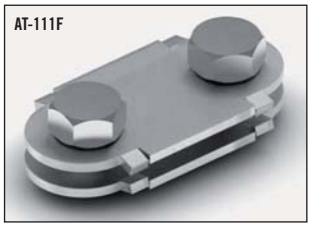
Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1471, BS 2874, UNE 21186, NFC 17102

Specially used for disconnections and test purposes for tape conductors.

AT-081F(Gu) (application)
AT-083F (Al)

AT-084F (application)

AT-085F (application)



AT-111F

95 UNI DISCONNECTING TAPE CLAMP

Reference	Dimensions (mm)	Tape range (mm)	Material	Weight (gr)
AT-111F	58 x 30 x 20	30x2 - 30x3,5	Galvanized steel	180

Lineal connection between tapes.

96 UNI DISCONNECTING CABLE CLAMP

AT-110F (GS)
AT-124F (SS)
AT-108F (Cu/GS)

Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Rod Ø (mm)	Material	Weight (gr)
AT-108F	50 x 30 x 20	8	50	-	Copper / Galvanized steel	80
AT-110F	50 x 30 x 20	8 - 10	50 - 70	-	Galvanized steel	180
AT-124F	50 x 30 x 20	8 - 10	50 - 70	-	Stainless steel	200
AT-113J	58 x 30 x 20	8 - 10 (Copper)	50 - 70 (Copper)	16 (Galvanized steel)	Copper / Galvanized steel	150
AT-114J	58 x 30 x 20	8 - 10	50 - 70	16	Galvanized steel	150
AT-115J	58 x 30 x 20	8 - 10	50 - 70	16	Stainless steel	100

Lineal connection between cables.

AT-114J (GS) (application)
AT-113J (Cu/GS)
AT-115J (SS)

AT-109F (GS)
AT-107F (Cu/GS)
AT-123F (SS)

97 UNI DISCONNECTING CABLE AND TAPE CLAMP

Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Tape (mm)	Material	Weight (gr)
AT-107F	58 x 30 x 20	8 - 10 (Copper)	50 - 70 (Copper)	30x2 - 30x3,5 (Galvanized steel)	Copper / Galvanized steel	80
AT-109F	58 x 30 x 20	8 - 10	50 - 70	30x2 - 30x3,5	Galvanized steel	180
AT-123F	58 x 30 x 20	8 - 10	50 - 70	30x2 - 30x3,5	Stainless steel	200

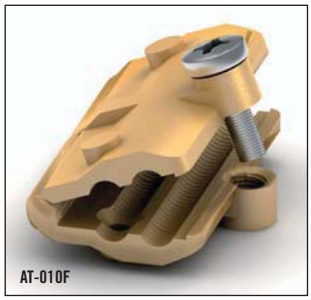
Lineal connection between cable and tape.

TEST CLAMPS

CABLE AND TAPE TEST CLAMP 98

Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Conductor range Tape (mm)	Included	Material	Weight (gr)
AT-010F	55 x 30 x 75	8	50	30x2 - 30x3,5	Plug and screw M4x38	Naval brass	295
AT-086F	30 x 65 x 45	7	35	25 x 3	-	Gunmetal	400
AT-087F	30 x 65 x 45	8	50	25 x 3	-	Gunmetal	400
AT-088F	30 x 65 x 45	10	70	25 x 3	-	Gunmetal	400
AT-089F	30 x 65 x 45	13	95	25 x 3	-	Gunmetal	390
AT-090F	30 x 65 x 45	15	120	25 x 3	-	Gunmetal	390
AT-091F	30 x 65 x 45	8	50	25 x 3	-	Aluminium	90
AT-095F	55 x 75 x 20	8 - 10	50 - 70	30 x 3,5	Plug and screw M4x38	Nickel plated brass	500

Meets with IEC 62305, EN 50164, BS 6651, BS 1400, BS 1471, BS 2874, UNE 21186, NFC 17102


AT-010F

Specially used for disconnections and test purposes, for cable, round or tape conductors.

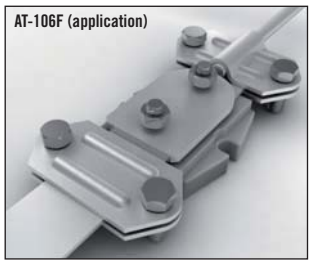

AT-010F (application)


AT-086F (Gu) (application)
AT-091F (Al)


AT-095F (application)

TEST JOINT 99

Reference	Dimensions (mm)	Conductor range Ø (mm)	Conductor range mm²	Conductor range Tape (mm)	Material	Weight (gr)
AT-106F	136 x 70 x 30	8 - 10	50 - 70	30x2 - 30x3,5	Galvanized steel	330

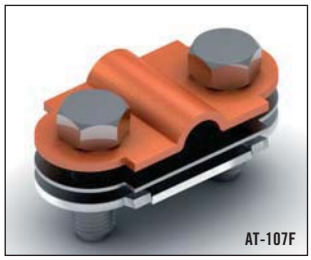

AT-106F (application)

Disconnecting sleeve between galvanized steel round and tape.

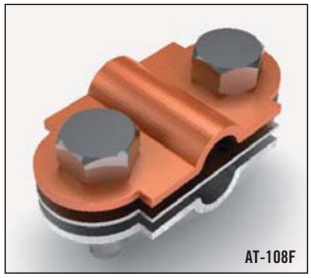
BIMETALLIC CONNECTOR 100

Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Conductor range Tape (mm)	Material	Weight (gr)
AT-092F	100 x 30 x 30	8	50	-	Copper / Aluminium	250
AT-093F	100 x 30 x 30	8 (Aluminium)	50 (Aluminium)	25 x 3 (Copper)	Copper / Aluminium	225
AT-094F	100 x 30 x 25	-	-	25 x 3	Copper / Aluminium	200
AT-107F	58 x 30 x 20	8 - 10 (Copper)	50 - 70 (Copper)	30x2 - 30x3,5 (Galvanized steel)	Copper / Galvanized steel	80
AT-108F	50 x 30 x 20	8	50	-	Copper / Galvanized steel	80

Meets with IEC 62305, EN 50164, BS 6651, BS 970, BS 1471, BS 2874


AT-107F

Used for joining copper to aluminium or galvanized steel conductors avoiding galvanic coupling, particularly where an aluminium or galvanized steel lightning protection system has to be earthed with copper.


AT-108F

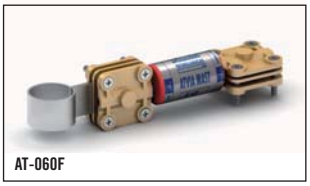

AT-092F (application)


AT-093F (application)


AT-094F (application)

ACCESSORIES

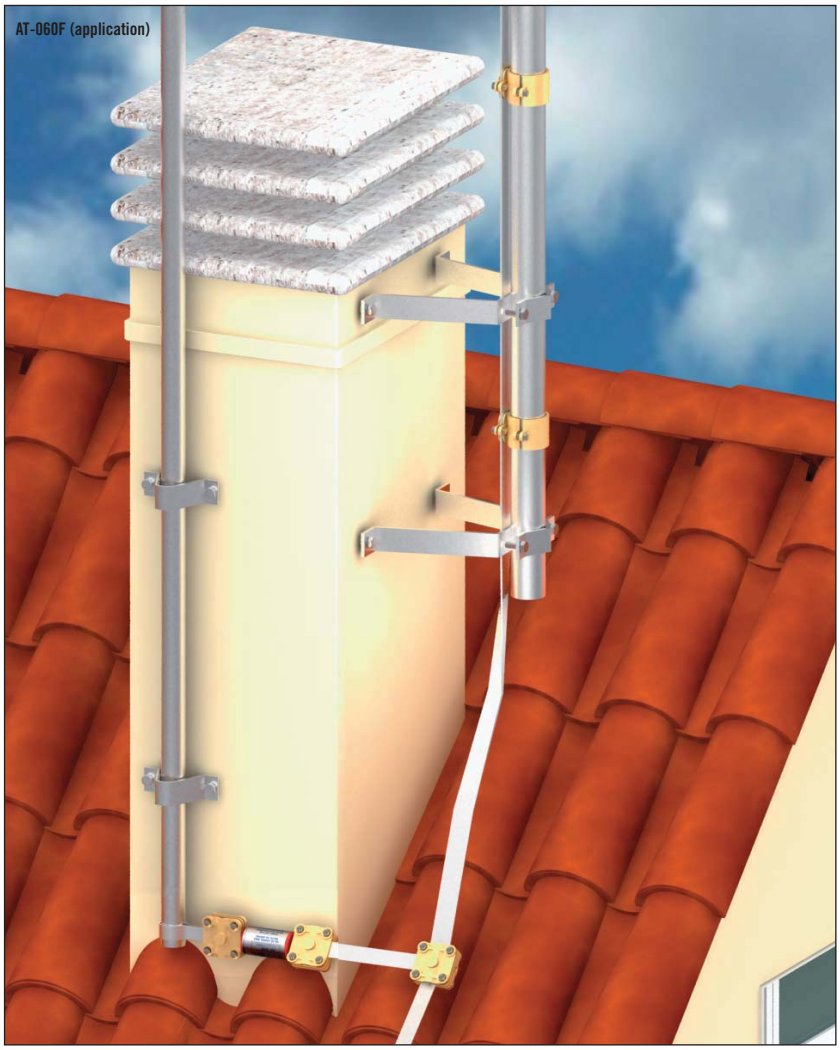
101 SPARK GAP FOR AERIAL MAST



AT-060F

Reference	Dimensions (mm)	Included	Weight (gr)
AT-060F	50 x 50 x 230	Naval brass clamps for 8-10 mm round and/or 30 x 2 mm tape conductor	900

Aerials are objects specially exposed to lightning strikes and their consequences. The Lightning Protection system must protect the aerial against direct impact, but part of the lightning current could side-strike it, following then an uncontrolled path to earth. Even being only part of the lightning current, the damage caused can be very important.



AT-060F (application)

The protector AT-060F is connected to the aerial mast in order to assure an equipotential union between the metallic elements and thus avoid dangerous sparks between the Lightning Protection System and the aerial mast, which can provoke fire and damage to the structure.

Aplicaciones Tecnológicas, S.A. supplies a specific Surge Protective Device for the aerial signal cable (ATFREQ Series. Please, consult our Overvoltage Protection catalogue), which will protect the connected equipment.

INSTALLATION

AT-060F is to be installed connecting the aerial mast to the closest grounded element of the Lightning Protection System. Its connecting clamp is suitable for a wide range of conductors.

TECHNICAL DATASHEET

Lightning Impulse Current (10/350µs wave):	I_p (10/350) > 100kA
Nominal Discharge Current:	I_n(8/20µs) = 50kA
Protection Level at In (8/20µs wave):	$U_p(I_n)$ < 4kA
Working Temperature:	-55ºC to + 85ºC
Dimensions:	Ø 32 x 40mm
Connections:	Mast: holdfast for aerial of Ø30-50mm. LPS: clamp for Ø8-10mm cable or 30x2mm / 25x3mm tape
Material:	Polyurethane resin
Certificated tests according to:	• EN 50164 • IEC61643

ACCESSORIES

LIGHTNING EVENT COUNTER 102

Reference	Dimensions (mm)	Included	Material	Weight (Kg)
AT-001G	130 x 76 x 59	Plug and screw M4 x 49	Polypropylene	0,5
AT-000G	250 x 185 x 50	-	Galvanized steel	1,04


AT-001G

Registers the number of strokes of lightning received by the lightning protection system.

The AT-001G lightning event counter is a device to be inserted at the down-conductor, ahead of the guard tube. It allows the automatic counting of the strikes received by the lightning protection system. It is very robust and totally autonomous, but it is advisable to verify it periodically in order to check if there has been a strike and, therefore, if the lightning protection systems needs a special maintenance.

AT-000G is useful when no drill is allowed.


AT-000G

INSTALLATION

The counter installation is simple, requiring only passing the down-conductor through the built-in hole existing at the counter.

PERFORMANCE SPECIFICATIONS

Register capacity:	0 - 999999
Counting starting current:	1 kA (8/20μs)
Working temperature:	-25º … 70º
Power supply:	No need, totally autonomous
No fungible elements	
Direct display of registered data	

The lightning counter has been successfully tested in official and independent laboratories. In these tests, it has proved its effective working, counting capacity and strength withstanding lightning currents (100kA, 10/350μs) without suffering any damage.


See table 103
AT-001G and AT-053G (application)

ACCESSORIES

103 GUARD TUBE


AT-053G (SS)
AT-051G (GS)


AT-055G


AT-060G

Reference	Dimensions (mm)	Conductor range Ø(mm)	Conductor range mm²	Conductor range Tape (mm)	Included	Material	Weight (kg)
AT-051G	Ø27 x 2000	8 – 10	50 – 70	-	Bonding clamps	Galvanized steel	3
AT-050G	Ø27 x 3000	8 – 10	50 – 70	-	Bonding clamps	Galvanized steel	5
AT-053G	Ø27 x 2000	8 – 10	50 – 70	-	Bonding clamps	Stainless steel	2,3
AT-054G	Ø27 x 3000	8 – 10	50 – 70	-	Bonding clamps	Stainless steel	3,5
AT-060G	40 x 14 x 2000	-	-	30x2 – 30x3,5	Bonding clamps	Galvanized steel	1
AT-055G	70 x 15 x 2000	8 – 10	50 – 70	30x2 – 30x3,5	Plug and screw	Galvanized steel	3
AT-057G	40 x 30 x 1500	7 – 10	35 – 70	-	Straight clamp and KS cable clip	Galvanized steel	2,6

Meets with BS 1449-1, BS 970, AS 1397, UNE 21186, NFC 17102

Anti vandal guard for round or tape down-conductors. In order to avoid the break of the cable by accidental impacts, it is necessary to install a guard tube, at least 2 meter high, wherever the cable is accessible.


AT-051G (application)

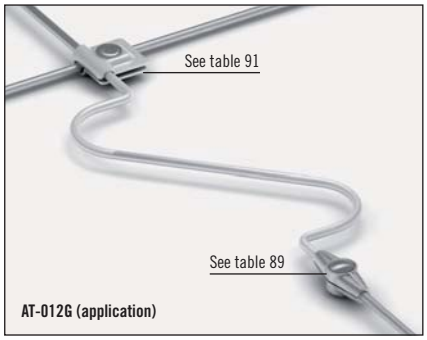
AT-057G (application)

ACCESSORIES

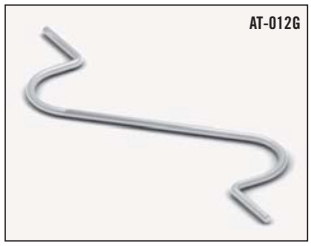
EXPANSION UNIT 104

Reference	Dimensions (mm)	Material	Weight (gr)
AT-012G	400 x 100 x 8	Aluminium	80

For thermic length compensation of longer conductors. Suitable to install it each 20 m. To install in copper down-conductor system use a bimetallic clamp such as AT-128F (Table 91).



AT-012G (application)


AT-012G

BRIDGING BRAID 105

Reference	Dimensions (mm)	Included	Material	Weight (gr)
AT-032G	33 x 4,5 x 300	Ø11 mm hole	Tinned copper	530
AT-033G	33 x 4,5 x 300	Ø11 mm hole	Aluminium	230

This flexible braid in cross is used for thermic length compensation. Suitable to install it each 20 m. AT-032G suitable to install in conjunction with AT-004E (Table 54), and AT-033G suitable to install in conjunction with AT-000E (Table 54).

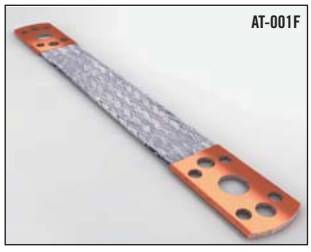

AT-032G (Cu)
AT-033G (Al)


AT-032G (application)

FLEXIBLE BRAID BOND 106

Reference	Dimensions (mm)	Included	Material	Weight (gr)
AT-001F	25 x 3,5 x 200	Ø11 mm hole	Tinned copper	80
AT-032J	25 x 3,5 x 400	Ø11 mm hole	Copper	150
AT-033J	33 x 4 x 180	Ø11 mm hole	Aluminium	30

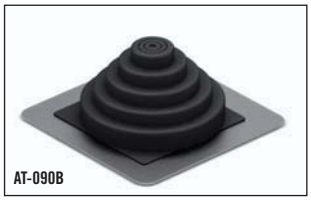
This flexible braid allows the equipotential connection between diverse metallic elements such as fences, doors and windows.

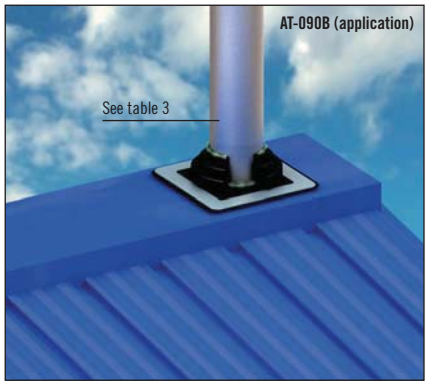

AT-001F


AT-001F (application)

ACCESSORIES

107 WATERTIGHT CONE

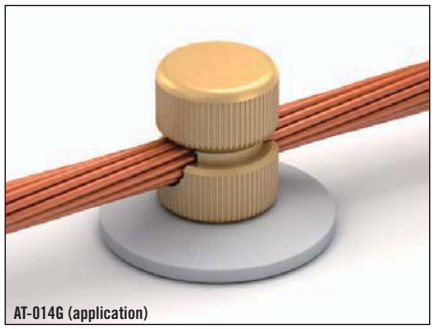




Reference	Dimensions (mm)	Material	Weight (gr)
AT-090B	115 x 115 x 60	Rubber	76

To protect from water in flat surfaces. Used with air rods and masts (6 - 50 mm).

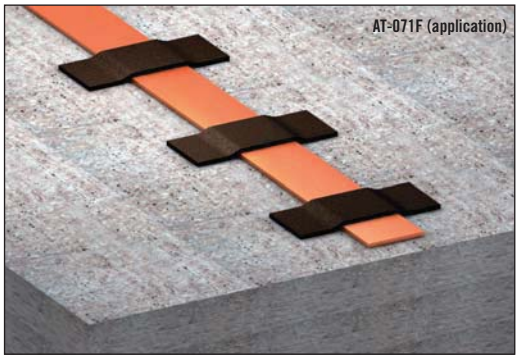
108 COVER PLATE



Reference	Dimensions (mm)	Material	Weight (gr)
AT-014G	Ø35 x 5	Rubber	2
			Meets with UNE 21186, NFC 17102

Use in conjunction with any screw threaded conductor holder, to protect it from water in flat surfaces.

109 ASPHALT STRIP



Reference	Dimensions (mm)	Material	Weight (gr)
AT-071F	100 x 40 x 3	Asphalt	35
			Meets with UNE 21186, NFC 17102

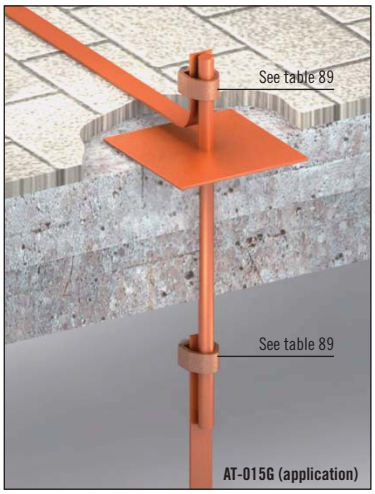
For fixing conductor to flat roof (fixing by heating).

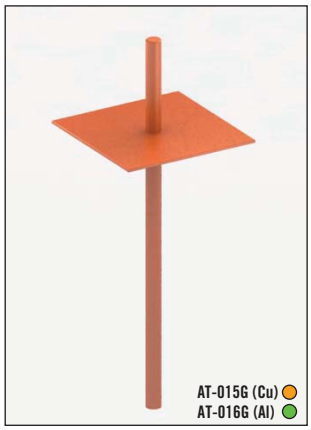
ACCESSORIES

PUDDLE FLANGE 110

Reference	Dimensions (mm)	Material	Weight (Kg)
AT-015G	150 x 150 x 600	Copper	1,7
AT-016G	150 x 150 x 600	Aluminium	0,5
		Meets with BS 6651, BS 1432 C101, BS 2897	

Suitable to pass the conductor through the roof.

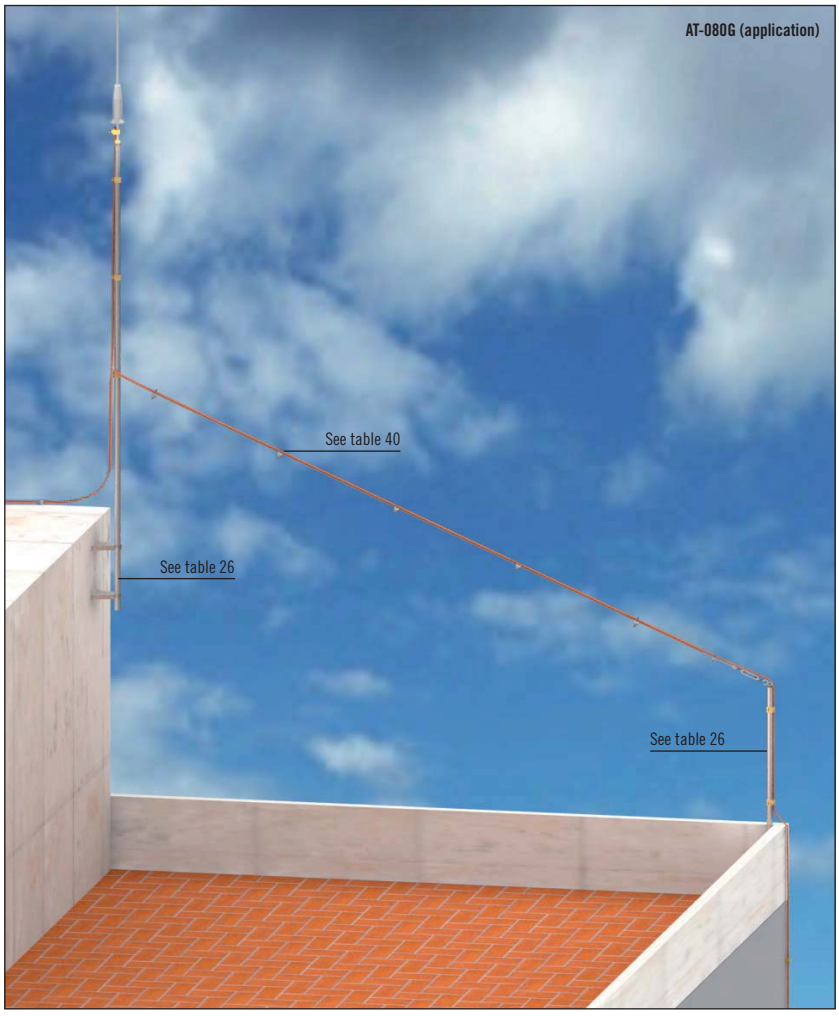




HANGING GUY WIRE KIT 111

Reference	Included	Weight (Kg)
AT-080G	12m of guy wire + 2 AT-042C + 4 AT-043C + 10 AT-046C (See table 40)	1

For installing guy wire which will withstand the cable or round over flat terraces to allow passing people under. The cable is joined to the guy wire using AT-046C. (See table 40).

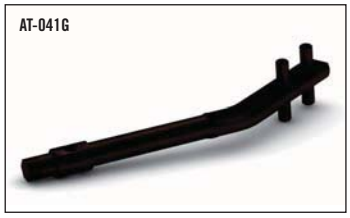


ACCESSORIES

112 WIRE STRAIGHTENER

Reference	Model	Dimensions (mm)	Material	Weight (Kg)
AT-040G	5 straightening coils, with handles	300 x 200 x 150	Galvanized steel	6,2
AT-041G	For angling and straightening round conductors	260 x 50 x 60	Steel	0,33

For straightening round conductors made of different (medium-hard) materials.

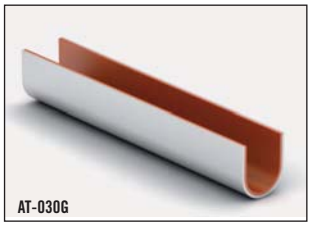


113 ANTI-CORROSION SPRAY

Reference	Dimensions (mm)	Weight (gr)
AT-023G	60 x 60 x 200	435

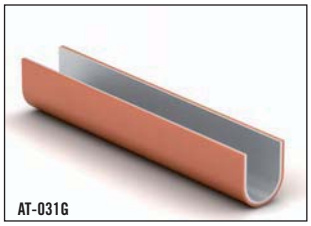
This cold galvanizer spray protects all kind of metals from corrosion. Specially used to protect welding.

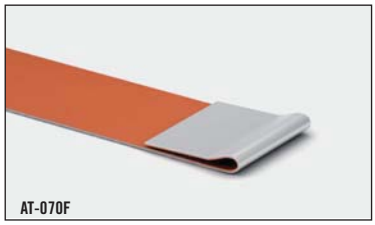
114 BIMETALLIC SHEET (CUPAL)



Reference	Model	Dimensions (mm)	Material	Weight (gr)
AT-030G	Copper inside / Aluminium outside	Ø8 x 60	Copper / Aluminium	4
AT-031G	Copper outside / Aluminium inside	Ø8 x 60	Aluminium / Copper	3
AT-070F	Strip	40 x 0,5 x 500	Copper / Aluminium	38

For avoiding galvanic coupling between conductors and structures of different nature.





EARTHING

Earth electrodes, ground enhancing products and earth pits

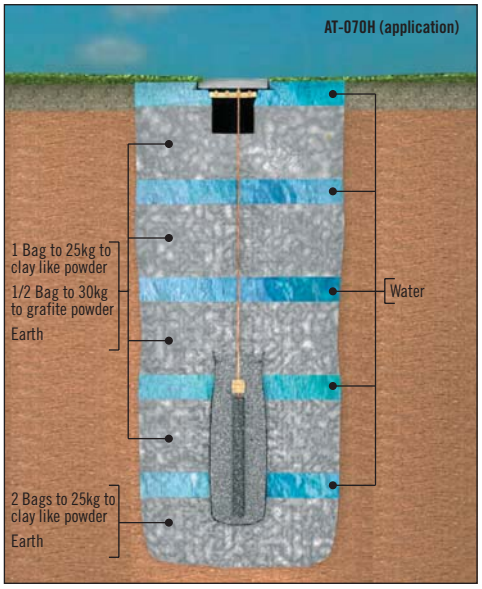
Equipotential bonding

Earth clamping

115 ENHANCED ELECTRODES FOR LOW-CONDUCTIVITY SOILS - GRAPHITE ELECTRODE

Reference	Dimensions (mm)	Shape	Included	Weight (kg)
AT-070H	600 x Ø150	Rigid graphite core + graphite powder with bag	AT-020F	10
AT-073H	1500 x Ø50	Rigid graphite core	AT-020F + AT-032L	35

The graphite, with its high electric and thermic conductivity, being unattackable and inert against chemical agents (apart from oxygen at a high temperature), is a very good element to make an earth electrode. The materials used such as perforation filling (graphite powder and thin clay-like powder) assure the contact between the electrode and the ground thanks to its capacity to even penetrate into rocky cracks.



INSTALLATION

This electrode is formed of a rigid graphite core surrounded by a layer of graphite powder and salts, which whilst helping to avoid mechanical damages during transportation and installation, it also improves the conductivity of the electrode. This ensemble is what is introduced in the perforation, which connects to the test bonding bar installed in the earth pit, using cable of Ø8-10mm or tape of 30x2mm.

In order to optimize its duration and effectiveness, the hole should be filled with thin clay-like powder and special graphite powder for earthing:

Perforation of Ø200mm

Machinery needed:

· Perforator with drill of Ø200mm and 2 metres length.

· Mixer (recommended).

Material:

· 2kg of graphite powder (AT-020L).

· 6kg of thin clay-like powder (AT-030L).

Procedure:

1.Make a perforation of Ø200mm with a depth of at least 2 metres.

2.Connect to the electrode the necessary metres of cable of Ø8-10mm or tape of 30x2mm to be able to make afterwards the connections in the earth pit.

3.Install the electrode with the wrapping in the perforation, being careful of not making strong impacts.

4.In an adequate recipient (preferably a mixer), mix the fine clay-like powder (AT-030L) and the graphite powder (AT-020L) with 60 litres of water.

Note: If a mixer or adequate tool is not available, the filling of the perforation will be done in batches. For example, the filling can be done in four batches, using each time approximately 15 litres of water, 1,5kg of thin clay-like powder and 0,5kg of graphite powder.

5.Empty the mixture into the perforation, making sure it reaches the bottom of the hole.

6.Make the necessary connections in the test bonding bar installed in the earth pit and close.

Hole of 1,5 x 1,5 x 2 metres

Machinery needed:

· Retroexcavator

Material:

· 2 bags of graphite powder 25kg (AT-020L).

· 6 bags of thin clay-like powder of 25kg (AT-030L).

· Plenty of water.

Procedure:

1.With the retroexcavator make a hole of 1,5 metres of width and 2 metres of depth.

2.Mix two bags of thin clay-like powder (AT-020L) and enough earth to sufficiently cover approximately 30cm height of the hole. Fill the bottom of the excavation.

3.Connect to the electrode, the necessary metres of cable of Ø8-10mm or tape of 30x2mm to be able to make afterwards the connections in the earth pit.

4.Install the electrode with the wrapping in the perforation, being careful of not making strong impacts.

5.Cover with water until you reach a level of 10 cm (approximately 225 litres of water). Wait a few minutes for the filter of the water and the increase in volume of the thin clay-like powder.

6.Continue filling the hole mixing a bag of thin clay-like powder, half a bag of graphite powder and enough earth to fill another 30 cm of height. Empty the mixture into the hole evenly.

7.Repeat steps 5 and 6 until you have used up the thin clay-like powder and the graphite (3 times).

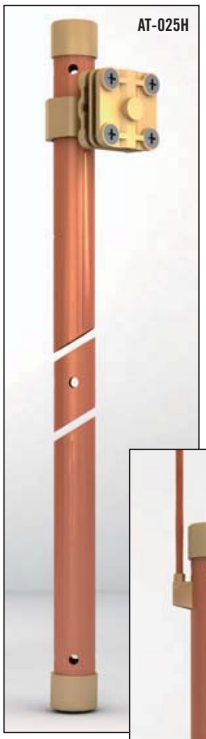
8.Make the necessary connections in the test bonding bar installed in the earth pit and close.

EARTH ELECTRODES, GROUND ENHANCING PRODUCTS AND EARTH PITS

ENHANCED ELECTRODES FOR LOW-CONDUCTIVITY SOILS - APLIROD® DYNAMIC ELECTRODE

Reference	Dimensions (mm)	Shape	Included	Material	Weight (kg)
AT-024H	2000 x Ø28	Vertical	AT-020F + AT-031L	Copper + Salts	4
AT-025H	2500 x Ø28	Vertical	AT-020F + AT-031L	Copper + Salts	4,5
AT-012H	(1000 + 2000) x Ø54	L-shaped	AT-020F + 2 x AT-032L	Copper + Salts	62,5
AT-030H	(1000 + 3000) x Ø54	L-shaped	AT-020F + 2 x AT-032L	Copper + Salts	67
AT-032H	2000 (threaded) x Ø54	Vertical	AT-020F + 2 x AT-032L	Copper + Salts	58,5
AT-033H	3000 (threaded) x Ø54	Vertical	AT-020F + 2 x AT-032L	Copper + Salts	62,5
AT-102H	2000 x Ø28	Vertical	AT-031L	Copper + Salts	4
AT-103H	2500 x Ø28	Vertical	AT-031L	Copper + Salts	4,5
AT-108H	(1000 + 2000) x Ø54	L-shaped	2 x AT-032L	Copper + Salts	62,5
AT-104H	(1000 + 3000) x Ø54	L-shaped	2 x AT-032L	Copper + Salts	67
AT-105H	2000 x Ø54	Vertical	2 x AT-032L	Copper + Salts	58,5
AT-106H	3000 x Ø54	Vertical	2 x AT-032L	Copper + Salts	62,5
AT-035H	190 x Ø220	Charge for APLIROD®	Charge for APLIROD®	Salts	5,5

Meets UL 467, IEC 62305, EN 50164, UNE 21186, NFC 17102

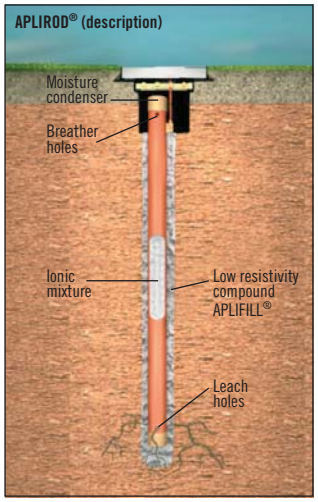


INSTRUCTIONS FOR USE

1. For vertical electrodes bore a hole, minimum 20cm diameter and 50cm deeper than the length of the rod to be buried (AT-025H needs 40mm of diameter). For the L-Shaped installation, bore a trench suitable to the electrode dimensions.
2. Withdraw the covers of the leaching holes.
3. Mix the low resistivity compound APLIFILL® (AT-031L / AT-032L), supplied together with the electrode, with water outside the excavation and gradually fill the hole using the proportion of 1 kilo of APLIFILL® to 8 litres of water. The mixture fills the perforation up.
4. Place the electrode in the hole so that the upper end is approximately 20cm below the surface. The filling will expand in few minutes.
5. Place the inspection pit so that the cover remains at surface level. The electrode will stand out approximately 10cm over the bottom of the inspection pit, leaving the breathing holes uncovered.
6. Withdraw the covers of the upper breathing holes.
7. Connect the grounding electrode to the test bonding bar.
8. More electrodes should be placed at even intervals, and interconnected with bare copper, buried at least 0.5m deep. It is recommended to cover the conductor with APLIFILL®.

The absence of free ions in the surrounding soil damages the proper performance of the earthing. Dynamic Electrodes are based on the contribution of ions to the ground.

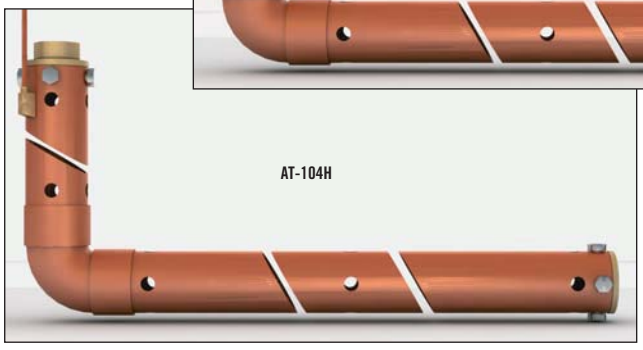
The system consists mainly of a conductive electrode (APLIROD®) made of copper and filled with a mixture of ionic compounds. The moisture condenser absorbs environmental moisture and leaches out at the bottom of the rod, lowering gradually the resistivity of the surrounding soil:

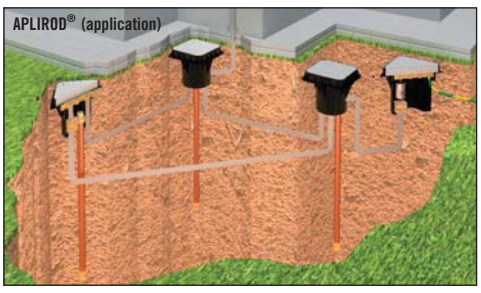


The efficacy of this earth electrode is improved by placing a ground conductivity improver such as CONDUCTIVER PLUS (AT-010L) around the rod.

Soil resistivity and site characteristics are the main factors for determining the model of electrode to be selected. Poor soil conditions or extremely sensitive equipment will require longer rods, multiple rods, or a combination of both.

The adequate configuration in most cases is a triangular arrangement. Vertical shapes are good to obtain low earth resistance values. L-shaped models are better when it is recommended a horizontal configuration of earth terminations.

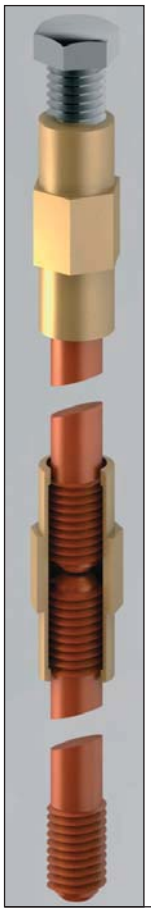




117 254µm COPPERBOND EARTH RODS

AT-041H

AT-072H


AT-041H (application)


AT-003K


AT-002K

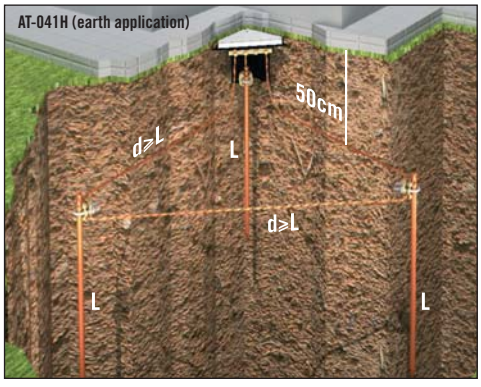
Reference	Nominal size (mm)	Shank diameter (mm)	Shape	Weight (kg)
AT-076H	1200 x Ø5/8"	14,23	Two threads 5/8"	1,5
AT-077H	1500 x Ø5/8"	14,23	Two threads 5/8"	1,9
AT-078H	1800 x Ø5/8"	14,23	Two threads 5/8"	2,28
AT-041H	2000 x Ø5/8"	14,23	Two threads 5/8"	2,53
AT-016H	2400 x Ø5/8"	14,23	Two threads 5/8"	3
AT-098H	3000 x Ø5/8"	14,23	Two threads 5/8"	3,8
AT-069H	1200 x Ø5/8"	14,23	No thread	1,5
AT-071H	1500 x Ø5/8"	14,23	No thread	1,9
AT-053H	1800 x Ø5/8"	14,23	No thread	2,28
AT-072H	2000 x Ø5/8"	14,23	No thread	2,53
AT-026H	2400 x Ø5/8"	14,23	No thread	3
AT-043H	3000 x Ø5/8"	14,23	No thread	3,8
AT-086H	1200 x Ø3/4"	17,28	Two threads 3/4"	2,15
AT-087H	1500 x Ø3/4"	17,28	Two threads 3/4"	2,75
AT-017H	1800 x Ø3/4"	17,28	Two threads 3/4"	3,27
AT-042H	2000 x Ø3/4"	17,28	Two threads 3/4"	3,62
AT-018H	2400 x Ø3/4"	17,28	Two threads 3/4"	4,35
AT-019H	3000 x Ø3/4"	17,28	Two threads 3/4"	5,44
AT-079H	1200 x Ø3/4"	17,28	No thread	2,15
AT-081H	1500 x Ø3/4"	17,28	No thread	2,75
AT-027H	1800 x Ø3/4"	17,28	No thread	3,27
AT-082H	2000 x Ø3/4"	17,28	No thread	3,62
AT-028H	2400 x Ø3/4"	17,28	No thread	4,35
AT-029H	3000 x Ø3/4"	17,28	No thread	5,44
				Meets BS 7430, UL 467, IEC 62305, EN 50164, BS 6651, NFPA 780, UNE 21186, NFC 17102

Other copper thickness as 100µm and 300µm are available on request.

Couplings of copperbond earth rods

Reference	Denomination	Dimensions (mm)	Material	Weight (gr)
AT-002K	5/8" Threaded coupling	70 x Ø19	Naval brass	80
AT-003K	5/8" Threaded driving stud	54 x 22	Stainless steel	80
AT-004K	3/4" Threaded coupling	70 x Ø24	Naval brass	130
AT-005K	3/4" Threaded driving stud	54 x 25	Stainless steel	130
				Meets EN 50164

Aplicaciones Tecnológicas, S.A. has available copperbond earth rods of a high quality which comply by the most demanding regulations, for efficient and long lasting earthings. All these electrodes have a covering of electrolytic copper with a width of 254µm and purity 99,9% which allows a proven resistance to corrosion. This type of electrolytic covering does not produce cracks or fissures, which are produced in the exterior layer of the copperclad rods, worsening its resistance to corrosion.



Numerous regulations specify that on the copperbond earth electrodes the covering of copper should be at least 250µm. This especially applies to the regulations on lightning protection systems:

- BS 7430: Code of practice of earthing.
- UL 467: Grounding and bonding equipment.
- Section 250 of National Electrical Code (NEC).
- Application technical guide nº 18 of Spanish "Low Voltage Electrotechnical Regulation".
- IEC 62305-3 (international lightning protection standard).
- EN 50164-2 (european lightning protection components standard).
- UNE 21186 (spanish lightning protection standard).

Using the adequate accesories, threaded copperbond earth rods allow the extension of the rod to get better earthing resistances.

INSTALLATION

The electrodes should be installed with a depth of at least 50cm.

It is preferable to use various conductors conveniently spread rather than only one very long earth conductor.

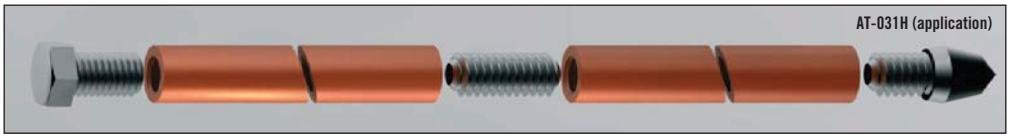
In the case of an earthing formed by various interconnected electrodes, it is recommended that:

- The buried rods are in a triangle or line and spaced out with a distance of at least the same as the depth buried.
- The buried rods are connected by an identical or compatible conductor to the one used for the down-conductor.
- The conductor which joins the rods is buried with a depth of at least 50cm.
- Apply the ground enhancing product CONDUCTIVER PLUS (AT-010L) to the buried electrodes in order to obtain less earthing resistance.

EARTH ELECTRODES, GROUND ENHANCING PRODUCTS AND EARTH PITS

SOLID COPPER EARTH RODS 118

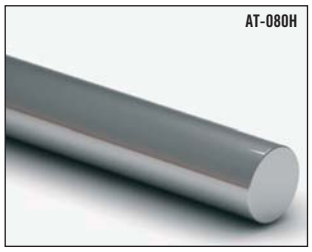
Reference	Dimensions (mm)	Female thread	Weight (Kg)
AT-031H	1200 x Ø15	M10	1,63
AT-036H	1200 x Ø20	M16	3,35
		Meets BS 7430, UL 467, IEC 62305, EN 50164, BS 6651, NFPA 780, UNE 21186, NFC 17102	


AT-031H (application)


AT-031H

STAINLESS STEEL EARTH RODS 119

Reference	Dimensions (mm)	Shape	Weight (Kg)
AT-000H	1500 x Ø10	No thread	1,5
AT-099H	1000 x Ø16	No thread	1,6
AT-100H	1500 x Ø16	No thread	2,2
AT-080H	2000 x Ø16	No thread	3,33
AT-038H	1500 x Ø20	Extensible type AZ	3,75
AT-037H	1200 x Ø16	Female thread M10	1,65
		Meets BS 7430, UL 467, IEC 62305, EN 50164, BS 6651, NFPA 780, UNE 21186, NFC 17102	


AT-080H


AT-038H (application)


AT-038H

Couplings of solid copper and stainless steel earth rods

Reference	Denomination	Dimensions (mm)	Material	Weight (gr)
AT-006K	15/16mm Driving stud	39 x Ø14	Stainless steel	40
AT-007K	15/16mm Spike	42 x Ø14	Stainless steel	40
AT-008K	Coupling dowel	40 x Ø10	Stainless steel	20
AT-009K	20mm Driving stud	42 x Ø19	Stainless steel	60
AT-042K	20mm Spike	55 x Ø19	Stainless steel	80
				Meets EN 50164


AT-006K

The solid copper and stainless steel rods allow a long lasting earthing in grounds with a high corrosion level. Threaded electrodes allow, with the appropriate accessories to increase the length, achieving in this way a better earthing resistance.


AT-007K


AT-008K

EARTH ELECTRODES, GROUND ENHANCING PRODUCTS AND EARTH PITS

120 GALVANIZED STEEL EARTH RODS

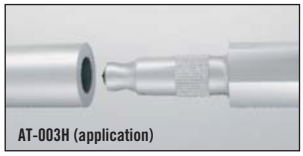

AT-045H


AT-046H (type Z)


AT-003H (type S)

Reference	Dimensions (mm)	Shape	Weight (Kg)
AT-039H	1000 x Ø16	No thread	1,65
AT-044H	1500 x Ø16	No thread	2,53
AT-045H	2000 x Ø16	No thread	3,42
AT-046H	1500 x Ø20	Extensible type Z	3,71
AT-003H	1500 x Ø20	Extensible type S	3,71
AT-047H	1500 x Ø25	Extensible type Z	5,62
AT-049H	1500 x Ø25	Extensible type S	5,62
AT-093H	1000 x 50 x 50 x 5	X-shaped profile	3,9
AT-094H	1500 x 50 x 50 x 5	X-shaped profile	5,85
AT-095H	2000 x 50 x 50 x 5	X-shaped profile	7,81
AT-096H	2500 x 50 x 50 x 5	X-shaped profile	9,75
AT-097H	3000 x 50 x 50 x 5	X-shaped profile	11,75

Meets DIN 48-452


AT-003H (application)


AT-095H


AT-095H (application)


AT-037K

Couplings of galvanized steel earth rods

Reference	Denomination	Dimensions (mm)	Material	Weight (gr)
AT-037K	Impact tip for earth rods Ø20mm	40 x Ø20	Galvanized steel	50
AT-038K	Impact tip for earth rods Ø25mm	45 x Ø25	Galvanized steel	70

Meets EN 50164

The galvanized steel rods are a good option to obtain good resistances in not very aggresive grounds. There are extendable models in order to reach longer lengths and better earthing resistances.

EARTH ELECTRODES, GROUND ENHANCING PRODUCTS AND EARTH PITS

GOOSE FOOT 121

Reference	Dimensions	Material	Weight (Kg)
AT-000K	30 x 2 mm (4 m + 3 x 7m)	Tin-plated Copper Tape	5,5
AT-001K	30 x 2 mm (1 m + 3 x 3m)	Tin-plated Copper Tape	1
			Meets UNE 21186, NFC 17102

The goose foot is a configuration that the regulation of Lightning Protection UNE21186 and NFC17102 recommends in order to obtain low earthing inductances. It is formed with tin-plated copper tape of 30x2mm.

INSTALLATION

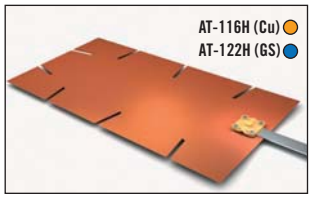
· Make ditches of at least half a metre depth.
· Extend the tape and cut the corresponding lengths.
· Unscrew the clamp and introduce the stretches of tape as indicated in the drawing with an angle of 45º.
· Firmly fix the screws of the clamp.

EARTH PLATES 122

Reference	Dimensions (mm)	Included	Material	Weight (kg)
AT-050J	500 x 500 x 2	AT-020F	Copper	4
AT-116H	1000 x 500 x 2	AT-020F	Copper	8
AT-117H	600 x 600 x 1,5	-	Copper	5
AT-118H	600 x 600 x 3	-	Copper	10
AT-119H	900 x 900 x 1,5	-	Copper	11
AT-120H	900 x 900 x 3	-	Copper	22
AT-121H	500 x 500 x 3	-	Galvanized steel	4
AT-122H	1000 x 500 x 3	-	Galvanized steel	8
			Meets IEC 62305, EN 50164, EN 13601, BS 2874, UNE 21186, NFC 17102, NFPA 780	

The use of earth plates as electrodes reduces the resistance of earthing in stony grounds, as it increases the area of contact between the electrode and the ground.

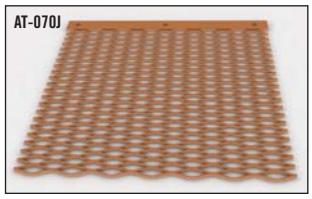
The references AT-116H and AT-122H comply with the minimum dimensions recommended in the nº18 Technical Application Guide "Earthing installations" of the 2002 Low Voltage Spanish Electrotechnical Regulation.

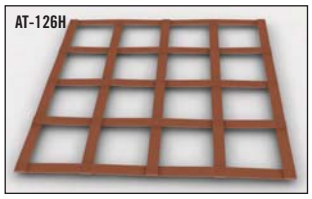


COPPER LATTICES AND GRIDS 123

Reference	Dimensions (mm)	Grid	Weight (kg)
AT-070J	3000 x 1000 x 2	115 x 55 mm	12,6
AT-126H	600 x 600 x 3	120 x 120 mm	4
AT-125H	900 x 900 x 3	190 x 190 mm	7,3
		Meets IEC 62305, EN 50164, EN 13601	

Meshed earthings are a more economical option than the earth plates and continue working well in stony ground, reducing the contact voltages that may occur.





124 GROUND ENHANCING PRODUCTS

Reference	Denomination	Description	Weight (kg)
AT-010L	CONDUCTIVER PLUS	Non-corrosive and ecological gel that improves soil conductivity	4,5
AT-020L	Graphite powder	Backfill specific for earth termination systems	25
AT-030L	Thin clay-like powder	Backfill specific for earth termination systems	25
AT-031L	APLIFILL®	Compound that reduces soil resistivity by retaining moisture	1
AT-032L	APLIFILL®	Compound that reduces soil resistivity by retaining moisture	25
			Meets EN 50164, UNE 21186, NFC 17102

CONDUCTIVER PLUS is a non corrosive ground enhancing gel with low solubility but very hygroscopic. It is made of an electrolyte base, which is what contributes to the conductivity of the mixture.

The conductivity of the ground is almost exclusively of an electrolytic nature due to the salts dispersed in the water which impregnate it and which concentrate on the surface due to an adhesive phenomenon of the sand grains and clay in the ground.

Therefore, it is possible to increase the conductivity of the ground, improving its absorption power, retention of water and increasing its richness in soluble salts.

It would be very easy to achieve this effect using a simple method, impregnating it with any electrolyte, such as common salt (NaCl) or sodium carbonate (Na_2CO_3), but the high solubility of these salts, as well as their low absorption in the ground mean that they are very quickly swept away by the infiltration waters, making their action very short term. Another inconvenience of common salt is its corrosive power on the earthing electrodes.

The components of the CONDUCTIVER PLUS gel have been selected according to their solubility, in order to obtain from the soluble components, a low soluble product, which will provide us with a long lasting conductor product deposit.The main advantage of this product is that a **conductor gel is formed below the soil near the electrode.**

In summary, the CONDUCTIVER PLUS gel is characterised by:

- Having the capacity to create partially ionized electrolytes, with a high charge and a high capacity to retain water and to form gels.
- Remaining in the ground for a long time, thanks to the formation of links with the particles.
- Increasing conductivity (approximately 200%) of the ground during one year and rainfall of 700 litres/m^2.
- Not causing corrosion in the earth electrodes.
- Being totally ecological.

METHOD OF APPLICATION

- The ground can be dry, no previous preparation is necessary.
- Prepare a mixture of the YELLOW product in 5 litres of water using the measuring recipient.
- Empty the first solution to the ground and add another 5 litres of water.
- Leave the product to disappear into the ground.
- Clean the recipient before continuing with the next product.
- Prepare a second solution with the WHITE product and 5 litres of water. Empty this mixture evenly on the ground. Add another 5 litres of water. Leave to filter until complete absorption.
- Once the second product has filtered, you can then take the earth resistance measurement.

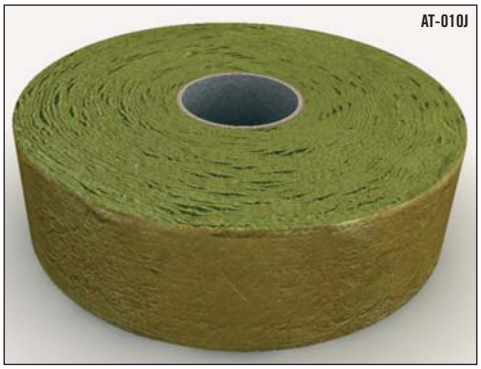
EARTH ELECTRODES, GROUND ENHANCING PRODUCTS AND EARTH PITS

JOINT PROTECTION 125

Reference	Dimensions	Material	Weight (gr)
AT-000J	20 mm x 10 m roll	Self-vulcanising strip	500
AT-010J	50 mm x 10 m roll	Denso tape (Bituminous strip)	610

Strips to protect the buried connections from high corrosion.


AT-000J


AT-010J

EARTH PITS 126

Reference	Dimensions (mm)	Material	Weight (Kg)
AT-010H	250 x 250 x 250	Polypropylene	1,5
AT-011K	320 x 320 x 190	Concrete	31
AT-012K	245 x 245 x 115	Iron cast	31
			Meets EN 50164, UNE 21186, NFC 17102

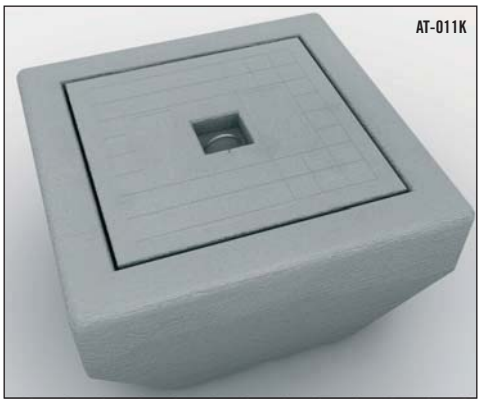
Aplicaciones Tecnológicas earth pits cover the totality of industrial and commercial applications as they are available in 3 materials: polypropylene, concrete and iron cast. **AT-010H** reaches a resistance charge of **5.000 kg/cm²**. The principle advantages of these earth pits are the following:

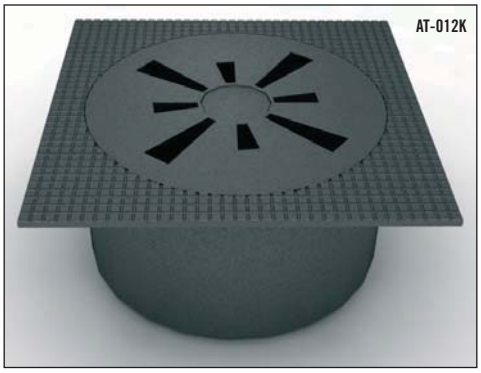
· Adequate to make usage and storage easy.

· Good resistance to chemical substances.

· Resistant to sunlight rays.

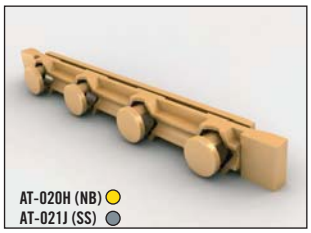

AT-010H

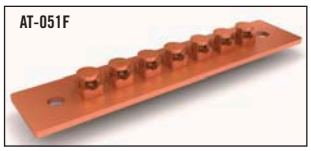

AT-011K


AT-012K

EQUIPOTENTIAL BONDING

127 BONDING BARS FOR EARTH PITS

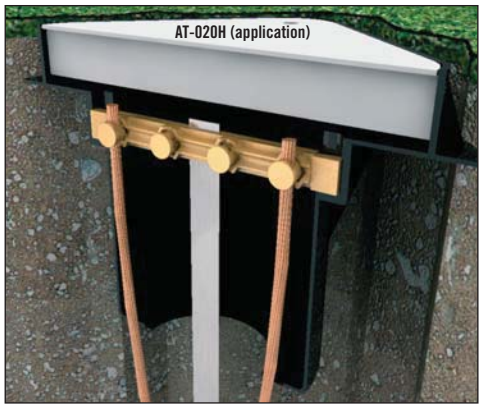


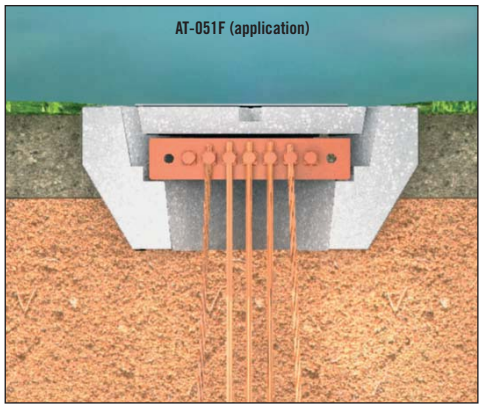


Reference	Dimensions (mm)	Conductor range - Round	Conductor range - Tape	Material	Weight (gr)
AT-020H	235 x 40 x 25	4 x (Ø 8 - 10 mm) (50 - 70 mm^2)	3 x (30 x 2 mm - 30 x 3,5 mm)	Naval brass	500
AT-021J	235 x 40 x 25	4 x (Ø 8 - 10 mm) (50 - 70 mm^2)	3 x (30 x 2 mm - 30 x 3,5 mm)	Stainless steel	500
AT-051F	325 x 70 x 6	7 x (Ø 8 - 10 mm) (50 - 70 mm^2)	-	Copper	1500
					Meets EN 50164, UNE 21186, NFC 17102

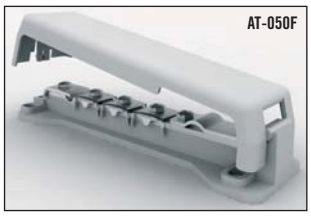
AT-020H and AT-021J allow to disconnect the down-conductor of a lightning protection system from the earthing, to be able to measure the earth resistance adequately. They are ready to be fixed to the earth pit AT-010H. You can fix up to 4 copper cables or rounds and 3 tapes.

AT-051F allows joints up to 7 copper cables or rounds. This bar can be fixed to the earth pit AT-011K. The fixation holes at the end of the bar are separated 264mm and have a diameter of 16mm.





128 EQUIPOTENTIAL BONDING BAR



Reference	Dimensions (mm)	Conductor range - Round	Conductor range - tape	Material	Weight (gr)
AT-050F	190 x 52 x 42	7 x (2,5 - 25 mm^2) / 1 x (Ø 6 - 11 mm) (25 - 70 mm^2)	30 x 2 mm - 30 x 3,5 mm	Tin-plated copper (contact bar)	200
					Meets BS 2874

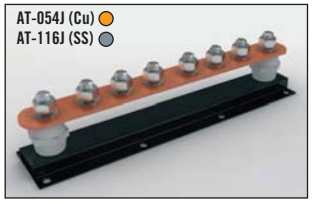
Equipotential bar which allows the joint of various conductors (cable, tape, round). The fixation holes at the end of the bar are separated 164 x 35mm and have a diameter of 8,5mm.

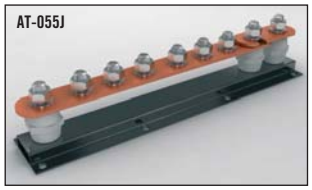
EQUIPOTENTIAL BONDING

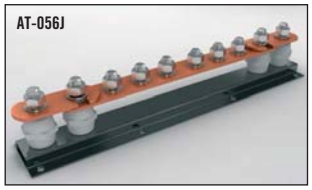
EARTH BARS

Reference	Denomination	Dimensions (mm)	Conductor range (Round)	Conductor range (Tape)	Material	Weight (Kg)
AT-053J	Insulator	51 x Ø36	M10 bolt	-	Polyester	0,12
AT-054J	Earth bar 6 way	400 x 90 x 90	M10 bolt	-	Copper	1,8
AT-116J	Earth bar 6 way	400 x 90 x 90	M10 bolt	-	Stainless steel	1
AT-055J	Earth bar 6 way with single disconnecting link	475 x 90 x 96	M10 bolt	-	Copper	2.3
AT-056J	Earth bar 6 way with twin disconnecting links	550 x 90 x 96	M10 bolt	-	Copper	2,8
AT-057J	Disconnecting link	125 x 90 x 90	M10 bolt	-	Copper	0,6
AT-058J	Earth bar 8 way	500 x 90 x 90	M10 bolt	-	Copper	2,2
AT-117J	Earth bar 8 way	500 x 90 x 90	M10 bolt	-	Stainless steel	1,2
AT-020J	Earth bar 8 way with single disconnecting link	575 x 90 x 96	M10 bolt	-	Copper	2,7
AT-079J	Earth bar 8 way with twin disconnecting links	650 x 90 x 96	M10 bolt	-	Copper	3,2
AT-090J	Earth bar 10 way	650 x 90 x 90	M10 bolt	-	Copper	2,8
AT-118J	Earth bar 10 way	650 x 90 x 90	M10 bolt	-	Stainless steel	1,4
AT-062J	Earth bar 10 way with single disconnecting link	725 x 90 x 96	M10 bolt	-	Copper	3,3
AT-063J	Earth bar 10 way with twin disconnecting links	800 x 90 x 96	M10 bolt	-	Copper	3,8
AT-064J	Earth bar 12 way	750 x 90 x 90	M10 bolt	-	Copper	3,2
AT-119J	Earth bar 12 way	750 x 90 x 90	M10 bolt	-	Stainless steel	1,6
AT-065J	Earth bar 12 way with single disconnecting link	825 x 90 x 96	M10 bolt	-	Copper	3,7
AT-066J	Earth bar 12 way with twin disconnecting links	900 x 90 x 96	M10 bolt	-	Copper	4,2
AT-067J	Earth bar 14 way	850 x 90 x 90	M10 bolt	-	Copper	3,6
AT-068J	Earth bar 14 way with single disconnecting link	925 x 90 x 96	M10 bolt	-	Copper	4,1
AT-069J	Earth bar 14 way with twin disconnecting links	1000 x 90 x 96	M10 bolt	-	Copper	4,6
AT-059J	Earth bar 16 way	950 x 90 x 90	M10 bolt	-	Copper	4
AT-071J	Earth bar 16 way with single disconnecting link	1025 x 90 x 96	M10 bolt	-	Copper	4,5
AT-072J	Earth bar 16 way with twin disconnecting links	1100 x 90 x 96	M10 bolt	-	Copper	5
AT-073J	Earth bar 18 way	1050 x 90 x 90	M10 bolt	-	Copper	4,4
AT-074J	Earth bar 18 way with single disconnecting link	1125 x 90 x 96	M10 bolt	-	Copper	4,9
AT-075J	Earth bar 18 way with twin disconnecting links	1200 x 90 x 96	M10 bolt	-	Copper	5,4
AT-076J	Earth bar 20 way	1200 x 90 x 90	M10 bolt	-	Copper	5
AT-077J	Earth bar 20 way with single disconnecting link	1275 x 90 x 96	M10 bolt	-	Copper	5,5
AT-078J	Earth bar 20 way with twin disconnecting links	1350 x 90 x 96	M10 bolt	-	Copper	6

Meets BS 2874





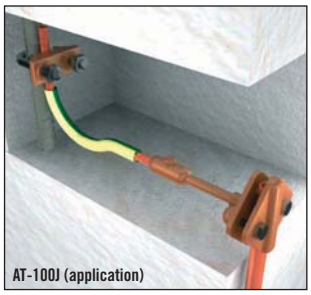


Equipotential bars which allow the joint of various copper cables or rounds with tin plated copper compression terminals (for instance AT-021K).

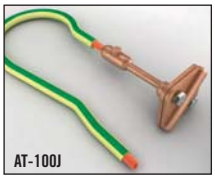
EQUIPOTENTIAL BONDING

130 EARTH POINTS

Reference	Denomination	Dimensions (mm)	Material	Weight (gr)
AT-096J	1 hole (M8 x 15 mm)	80 x Ø33	Gunmetal	140
AT-097J	2 holes (M8 x 12 mm)	80 x 63 x 63	Gunmetal	280
AT-098J	4 holes (M8 x 14 mm)	80 x 63 x 63	Gunmetal	410
AT-099J	1 hole (M8 x 15 mm) with 500mm tail of 70 mm^2	80 x Ø33	Gunmetal / PVC covered copper	560
AT-100J	2 holes (M8 x 12 mm) with 500mm tail of 70 mm^2	80 x 63 x 63	Gunmetal / PVC covered copper	840
AT-101J	4 holes (M8 x 14 mm) with 500mm tail of 70 mm^2	80 x 63 x 63	Gunmetal / PVC covered copper	1140
				Meets EN 50164

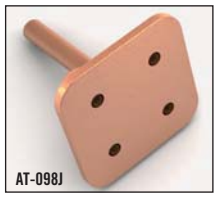

AT-100J (application)

Equipotential earth points which are fixed to the structure to provide grips to the ground.


AT-100J


AT-096J


AT-097J


AT-098J

131 EARTH BOSS

Reference	Dimensions	Material	Weight (gr)
AT-102J	M10 x 50 x 50 mm	Mild steel	800


AT-102J

Earth point to weld to a metallic structure.

132 FIXED EARTHING TERMINAL

Reference	Dimensions	Material	Weight (gr)
AT-120J	M10 x Ø80 x 200 mm	Stainless steel	300


AT-120J

Terminal which is fixed to the structure to provide accessible earth point.

EQUIPOTENTIAL BONDING

DISTANCE HOLDER 133

Reference	Dimensions (mm)	Conductor range - Round	Conductor range - Tape	Material	Weight (gr)
AT-036K	280 x 35 x 8	Ø 8 - 10 mm / 50 - 70 mm^2	30 x 2 mm - 40 x 3,5 mm	Galvanized steel	200

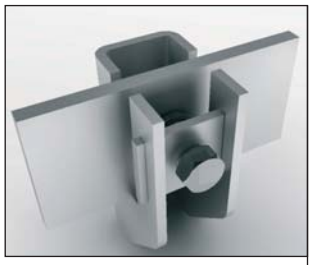
Allows to use the galvanized steel tape as a ground conductor at foundation level.


AT-036K

SUPPORT FOR TAPE CONDUCTORS 134

Reference	Dimensions (mm)	Conductor range - Round	Conductor range - Tape	Material	Weight (gr)
AT-033K	60 x 36 x 27	-	30 x 2 mm - 50 x 6 mm	Copper	120
AT-034K	60 x 36 x 27	-	30 x 2 mm - 50 x 6 mm	Galvanized steel	120
AT-035K	60 x 36 x 27	-	30 x 2 mm - 50 x 6 mm	Stainless steel	120
AT-039K	70 x 40 x 27	-	30 x 2 mm - 50 x 11 mm	Copper	120
AT-040K	70 x 40 x 27	-	30 x 2 mm - 50 x 11 mm	Galvanized steel	120
AT-041K	70 x 40 x 27	-	30 x 2 mm - 50 x 11 mm	Stainless steel	120

Allows to make an equipotential ring with tape conductor.


AT-040K (GS)
AT-039K (Cu)
AT-041K (SS)

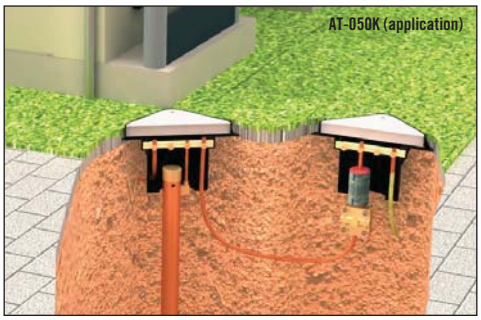
SPARK GAP FOR EARTH BONDING 135

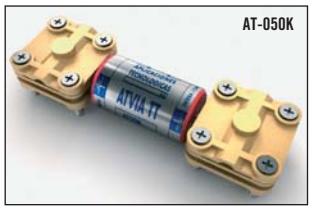
Reference	Dimensions (mm)	Conductor range - Round	Conductor range - Tape	Material	Weight (Kg)
AT-050K	216 x 57 x 38	Ø 8 - 10 mm (50 - 70 mm^2)	3 x (30 x 2 mm - 30 x 3,5 mm)	Naval brass (contact)	1
				Meets EN 50164, UNE 21186, NFC 17102	

In the lightning protection regulations it is recommended to join all earthings, the ones corresponding to the general network as well as the lightning protection earthing. In this way we avoid serious problems of resistance earth couplings.

However, on some occasions this connection can not be made, for example, because it would cause corrosion problems. In these cases the AT-050K is the most appropriate means of making the earthing connections.

In normal conditions, this protector keeps the earthings isolated, thus avoiding corrosion problems. When a discharge occurs and the voltage increases in the earthings, the spark gap will activate, directly joining the earthings and thus avoiding the current to pass from one to another through the equipments and internal installations.


AT-050K (application)


AT-050K

INSTALLATION

For its installation, the protector has two joints AT-020F. It is recommended to make the installation in a specific earth pit.

EARTH CLAMPING

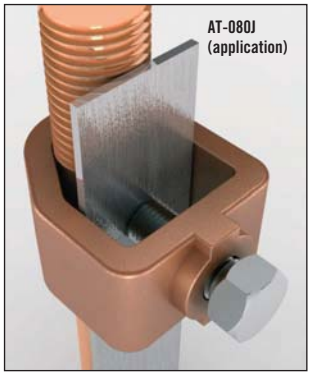
136 MULTIPURPOSE CLAMP

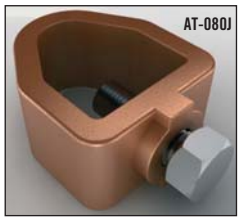
Reference	Dimensions (mm)	Range - Earth Rod	Range - Round / Tape	Material	Weight (gr)
AT-090H	52 x 41 x 30	Ø 14 - 19 mm	Ø 8 - 10 mm (50 - 70 mm²) / 30 x 2 mm - 30 x 3,5 mm	Naval brass	240
					Meets EN 50164, UNE 21186, NFC 17102

Earth clamp for connection between copper cable, round or tape to copper or copperbond earth rod.

137 ROD TO TAPE A CLAMP

Reference	Dimensions (mm)	Range - Earth Rod	Range - Tape	Material	Weight (gr)
AT-080J	51 x 36 x 18	Ø 12 - 20 mm	25 x 3 mm - 26 x 12 mm	Gunmetal	150
AT-081J	44 x 51 x 22	Ø 16 - 20 mm	30 x 2 mm - 40 x 12 mm	Gunmetal	240
AT-082J	47 x 69 x 21	Ø 16 - 20 mm	50 x 6 mm - 51 x 12 mm	Gunmetal	300
					Meets EN 50164, BS 1400

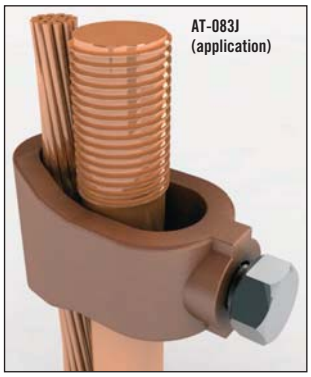




Earth clamp for connection between copper tape and copper or copperbond earth rod.

138 ROD TO CABLE G CLAMP

Reference	Dimensions (mm)	Range - Earth Rod	Range - Round	Material	Weight (gr)
AT-083J	41 x 21 x 18	Ø 16 mm	16 - 70 mm²	Gunmetal	60
AT-111J	41 x 21 x 18	Ø 16 mm	16 - 70 mm²	Naval brass	60
AT-112J	41 x 21 x 18	Ø 16 mm	16 - 70 mm²	Galvanized steel	60
AT-086J	48 x 30 x 19	Ø 20 mm	35 - 95 mm²	Gunmetal	60
					Meets EN 50164, BS 2874, BS 1400



AT-083J (Gu)
AT-111J (NB)
AT-112J (GS)

Earth clamp for connection between cable or round and copper or copperbond earth rod.

139 U-BOLT ROD E CLAMP

Reference	Range - Earth Rod	Range - Tape	Material	Weight (gr)
AT-087J	Ø 16 mm	25 x 3 mm	Gunmetal	260
AT-088J	Ø 20 mm	25 x 3 mm	Gunmetal	260
				Meets EN 50164, BS 1400

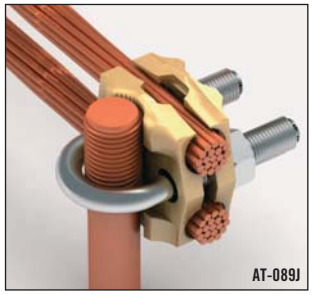
Earth clamp for connection between copper tape and earth rod or metal reinforced bar.

EARTH CLAMPING

ROD TO CABLE CGUV CLAMP 140

Reference	Range - Earth Rod	Range - Round	Material	Weight (gr)
AT-089J	Ø 14 - 20 mm	2 x (50 - 120 mm²)	Naval brass	250
AT-094J	Ø 16 - 20 mm	16 - 70 mm²	Gunmetal	390
AT-091J	Ø 16 - 20 mm	70 - 185 mm²	Gunmetal	390
AT-092J	Ø 16 - 20 mm	150 - 300 mm²	Gunmetal	620
		Meets EN 50164, UNE 21186, NFC 17102, BS 1400		

Earth clamp for connection between copper cable or round and earth rod or metal reinforced bar.


AT-089J

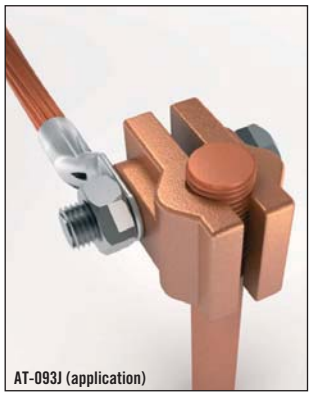

AT-094J

ROD TO CABLE LUG B CLAMP 141

Reference	Dimensions (mm)	Range - Earth Rod	Range - Round	Material	Weight (gr)
AT-093J	52 x 26 x 25	Ø 16 mm	M10 bolt	Gunmetal	300
AT-095J	50 x 29 x 28	Ø 20 mm	M10 bolt	Gunmetal	300
				Meets EN 50164, BS 2874, BS 1400	

Earth clamp for connection between copper cable with copper compression terminal (for instance AT-021K) and copper or copperbond earth rod.


AT-093J


AT-093J (application)

DISCONNECTING SLEEVE 142

Reference	Dimensions (mm)	Range - Earth Rod	Range - Round	Material	Weight (gr)
AT-135J	43 x 41 x 30	Ø 16 mm	Ø 7 - 10 mm (35 - 70 mm²)	Galvanized steel	120

Lineal earth clamp for connection between galvanized steel round and galvanised steel earth rod.


AT-135J

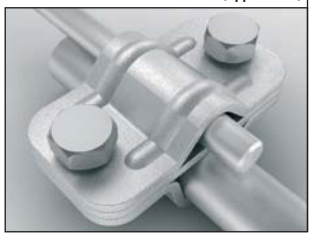
UNI DISCONNECTING CLAMP FOR CABLE 143

Reference	Dimensions (mm)	Range - Earth Rod	Range - Round	Material	Weight (gr)
AT-113J	58 x 30 x 20	Ø 16 mm (Galvanized steel)	Ø 8 - 10 mm (50 - 70 mm²) (Copper)	Bimetallic	150
AT-114J	58 x 30 x 20	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²)	Galvanized steel	150
AT-115J	58 x 30 x 20	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²)	Stainless steel	100

Earth clamp for connection between cable or round to galvanized steel or stainless steel earth rod.


AT-114J (GS)
AT-115J (SS)
AT-113J (GS/Cu)

AT-114J (application)



EARTH CLAMPING

144 UNIVERSAL CLAMP

AT-025F (SS)
AT-127J (Cu)
AT-128J (GS)

Reference	Dimensions (mm)	Range - Earth Rod	Range - Round	Material	Weight (gr)
AT-025F	48 x 44 x 20	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²)	Stainless steel	130
AT-126J	48 x 44 x 20	Ø 15 - 25 mm	Ø 8 - 10 mm (50 - 70 mm²)	Galvanized steel	130
AT-127J	48 x 44 x 20	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²)	Copper	130
AT-128J	48 x 44 x 20	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²)	Galvanized steel	130

L-shape earth clamp for connection between cable or round to earth rod.

AT-025F (application)

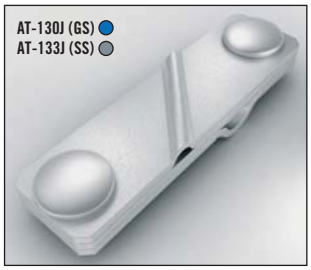
145 T, L CLAMP

AT-136J (GS)
AT-137J (SS)
AT-138J (Cu)

Reference	Dimensions (mm)	Range - Earth Rod	Range - Round	Material	Weight (gr)
AT-136J	60 x 60 x 22	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²)	Galvanized steel	330
AT-137J	60 x 60 x 22	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²)	Stainless steel	330
AT-138J	60 x 60 x 22	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²)	Copper	330

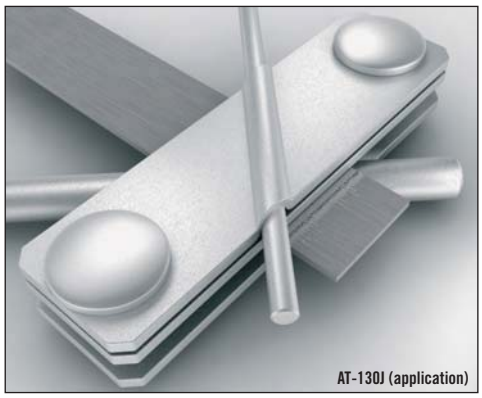
Cross-shape earth clamp for connection between cable or round to earth rod.

146 CONNECTING CLAMP



AT-130J (GS)
AT-133J (SS)

Reference	Dimensions (mm)	Range - Earth Rod	Range - Round	Material	Weight (gr)
AT-129J	108 x 30 x 22	Ø 20 mm	Ø 8 - 10 mm (50 - 70 mm²) / 30 x 2 mm - 30 x 3,5 mm	Galvanized steel	370
AT-130J	108 x 30 x 18	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²) / 30 x 2 mm - 30 x 3,5 mm	Galvanized steel	370
AT-131J	108 x 30 x 27	Ø 25 mm	Ø 8 - 10 mm (50 - 70 mm²) / 30 x 2 mm - 30 x 3,5 mm	Galvanized steel	370
AT-132J	108 x 30 x 22	Ø 20 mm	Ø 8 - 10 mm (50 - 70 mm²) / 30 x 2 mm - 30 x 3,5 mm	Stainless steel	370
AT-133J	108 x 30 x 18	Ø 16 mm	Ø 8 - 10 mm (50 - 70 mm²) / 30 x 2 mm - 30 x 3,5 mm	Stainless steel	370
AT-134J	108 x 30 x 27	Ø 25 mm	Ø 8 - 10 mm (50 - 70 mm²) / 30 x 2 mm - 30 x 3,5 mm	Stainless steel	370



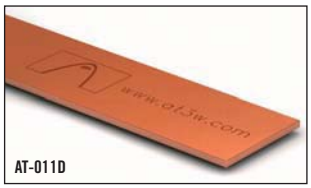
AT-130J (application)

Cross-shaped earth clamp for connection between cable, tape or round to earth rod.

CONDUCTORS

CONDUCTORS

147 BARE COPPER TAPE CONDUCTORS



Reference	Dimensions (mm)	Weight per metre (gr)
AT-006D	12,5 x 1,5	200
AT-007D	12,5 x 3	300
AT-008D	20 x 1,5	250
AT-009D	20 x 3	320
AT-010D	25 x 1,5	350
AT-011D	25 x 3	700
AT-012D	25 x 4	900
AT-013D	25 x 6	1350
AT-014D	30 x 2	500
AT-015D	30 x 3	800
AT-016D	30 x 4	1100
AT-017D	30 x 5	1400
AT-018D	38 x 3	1000
AT-019D	38 x 5	1700
AT-020D	38 x 6	1800
AT-021D	40 x 3	1100
AT-022D	40 x 4	1400
AT-023D	40 x 5	1800
AT-024D	40 x 6	2200
AT-025D	50 x 3	1400
AT-026D	50 x 4	1800
AT-027D	50 x 5	2200
AT-028D	50 x 6	2750
		Meets IEC 62305, EN 50164, EN 13601, BS 7430, UNE 21186, NFC 17102, AS 1567

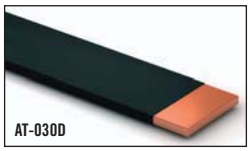
Copper tape recommended for down-conductor and earthing in lightning protection systems.

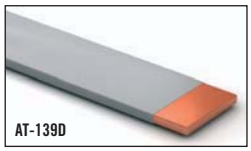
148 TINNED COPPER TAPE CONDUCTORS

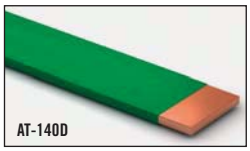
Reference	Dimensions (mm)	Weight per metre (gr)
AT-000D	12,5 x 1,5	200
AT-055D	25 x 3	700
AT-052D	30 x 2	500
AT-002D	25 x 6	1300
AT-003D	31 x 3	800
AT-004D	38 x 5	1700
AT-005D	50 x 6	2700
		Meets IEC 62305, EN 50164, EN 13601, BS 6746, UNE 21186, NFC 17102, AS 1567

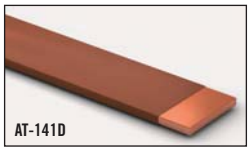
Tin copper tape recommended for down-conductor and earthing in lightning protection systems.

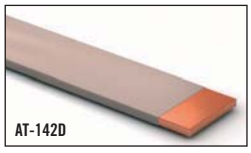
149 PVC COVERED COPPER TAPE CONDUCTORS

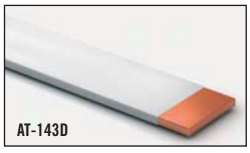












Reference	Nominal size (mm)	PVC colour	Weight per metre (gr)
AT-029D	12,5 x 1,5	Black	200
AT-030D	25 x 3	Black	700
AT-139D	25 x 3	Grey	700
AT-140D	25 x 3	Green	700
AT-141D	25 x 3	Brown	700
AT-142D	25 x 3	Stone	700
AT-143D	25 x 3	White	700
AT-031D	25 x 6	Green	1500
AT-032D	50 x 6	Green	3000
			Meets EN 50164, EN 13601, BS 6746, AS 1567.

Copper tape covered with PVC sheet used to blend the down-conductor into the building.Not suitable for earth termination system.

CONDUCTORS

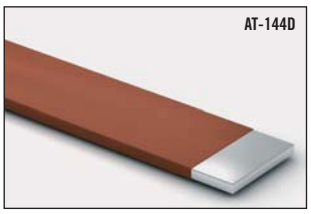
ALUMINIUM TAPE CONDUCTORS 150

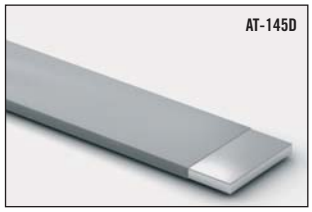
Reference	Dimensions (mm)	Weight per metre (gr)
AT-033D	12,5 x 1,5	50
AT-034D	20 x 3	180
AT-057D	25 x 3	220
AT-056D	30 x 3	270
AT-037D	25 x 6	410
AT-038D	40 x 6	690
AT-039D	50 x 6	850
		Meets IEC 62305, EN 50164, EN 13601, BS 2898, UNE 21186, NFC 17102

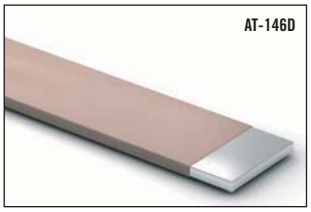
Aluminium tape easier to install than copper tape but with a worse conductivity. Not suitable for earth termination system.

PVC COVERED ALUMINIUM TAPE CONDUCTORS 151

Reference	Nominal size (mm)	PVC colour	Weight per metre (gr)
AT-040D	12,5 x 1,5	Black	10
AT-041D	20 x 3	Black	250
AT-042D	25 x 3	Black	320
AT-144D	25 x 3	Brown	320
AT-145D	25 x 3	Grey	320
AT-146D	25 x 3	Stone	320
			Meets IEC 62305, EN 50164, EN 13601, BS 2898







Aluminium tape covered with PVC sheet used to blend the down-conductor into the building.

GALVANIZED STEEL TAPE CONDUCTORS 152

Reference	Dimensions (mm)	Weight per metre (gr)
AT-130D	20 x 2,5	400
AT-131D	30 x 3,5	800
AT-132D	30 x 4	1000
AT-133D	40 x 4	1300
AT-134D	40 x 5	1600
		Meets IEC 62305, EN 50164

Galvanized steel tape has an acceptable resistance in air, in concrete and in benign soil.

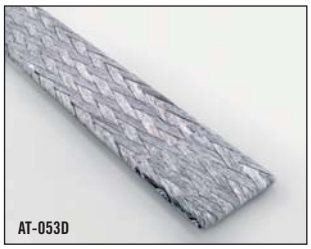
STAINLESS STEEL TAPE CONDUCTORS 153

Reference	Dimensions (mm)	Weight per metre (gr)
AT-135D	30 x 3,5	800
		Meets IEC 62305, EN 50164, UNE 21186, NFC 17102

Stainless steel tape is strongly recommended in high corrosion environment.

CONDUCTORS

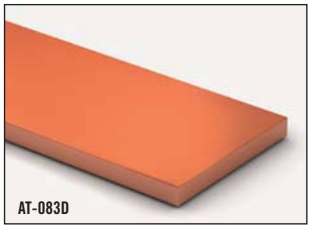
154 FLEXIBLE COPPER BRAID CONDUCTORS


AT-053D

Reference	Dimensions (mm)	Weight per metre (gr)
AT-043D	12 x 1	50
AT-044D	15 x 1,5	100
AT-045D	10 x 2 (Tinned)	100
AT-046D	16 x 2 (Tinned)	130
AT-047D	19 x 2,5	160
AT-048D	25 x 3,5	350
AT-049D	25 x 3,5 (Tinned)	350
AT-053D	30 x 3,5 (Tinned)	400
AT-051D	32 x 6	650
		Meets BS 4109, UNE 21186, NFC 17102

Copper braid tape recommended when there is movement between the objects connected equipotentially.

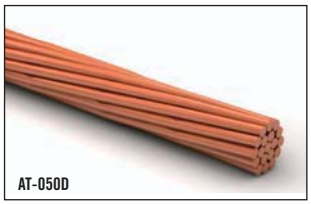
155 HARD DRAWN COPPER BARS


AT-083D

Reference	Dimensions (mm)	Weight per metre (gr)
AT-080D	25 x 3 x 3m	650
AT-081D	25 x 6 x 4m	1350
AT-082D	38 x 6 x 4m	2000
AT-083D	50 x 6 x 3m	2700
AT-084D	50 x 6 x 3m (Tinned)	2700
AT-085D	50 x 10 x 4m	4500
AT-086D	75 x 6 x 4m	4000
AT-087D	100 x 6 x 4m	5400
		Meets BS 2874

Hard drawn copper bar suitable for a rigid connection.

156 STRANDED ELECTROLYTIC COPPER CABLE


AT-050D

Reference	Dimensions (mm^2)	Stranding (mm)	Weight (gr)
AT-035D	35	7 x Ø 2,5	400
AT-050D	50	19 x Ø 1,8	470
AT-070D	70	19 x Ø 2,2	650
AT-095D	95	19 x Ø 2,5	850
AT-120D	120	37 x Ø 2	1100
AT-150D	150	37 x Ø 2,3	1340
			Meets IEC 62305, EN 50164, BS 6360, UNE 21186, NFC 17102

Stranded cable easier to install than solid round conductor.

157 BARE SOLID ROUND


AT-058D (Cu)
AT-138D (Al)
AT-060D (GS)
AT-128D (SS)

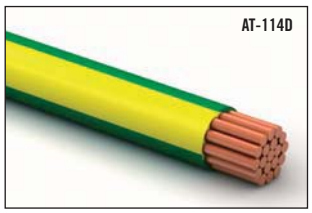
Reference	Dimensions (mm)	Material	Weight (gr)
AT-058D	8	Copper	450
AT-110D	8	Aluminium alloy (AlMgSi) semi-hard	140
AT-138D	8	Aluminium alloy (AlMgSi) soft	140
AT-125D	10	Aluminium	150
AT-060D	8	Galvanized steel	400
AT-061D	10	Galvanized steel	620
AT-128D	8	Stainless steel	400
AT-129D	10	Stainless steel	600
			Meets IEC 62305, EN 50164, EN 13601, BS 7430, BS 2898, UNE 21186, NFC 17102, AS 1567, AS 1866

Solid round conductor more suitable for high corrosion environment.

CONDUCTORS

PVC INSULATED STRANDED COPPER CABLE 158

Reference	Dimensions (mm^2)	Stranding (mm)	Weight (gr)
AT-113D	35	7 x Ø 2,5	400
AT-114D	50	19 x Ø 1,8	550
AT-115D	70	19 x Ø 2,2	750
AT-116D	95	19 x Ø 2,5	1000
AT-117D	120	37 x Ø 2	1200
AT-118D	150	37 x Ø 2,3	1550
			Meets IEC 62305, EN 50164, BS 6004



Stranded electrolytic copper cable covered with PVC sheet used as an internal earth conductor.

PVC COVERED SOLID ROUND 159

Reference	Nominal size (mm)	Material	Weight (gr)
AT-123D	8	Copper	500
AT-124D	8	Aluminium	150
AT-126D	8	Galvanized steel	450
AT-127D	10	Galvanized steel	650
			Meets IEC 62305, EN 50164, EN 13601, BS 2898, AS 1567, AS 1866

Solid round conductor covered with black PVC sheet used to blend the down-conductor into the building.

TIN-PLATED COPPER COMPRESSION TERMINALS 160

Reference	Dimensions (mm^2)	Screw size	Weight (gr)
AT-015K	16	M6	10
AT-016K	16	M8	10
AT-017K	25	M8	10
AT-018K	25	M10	10
AT-019K	35	M8	10
AT-020K	35	M10	10
AT-021K	50	M12	20
AT-022K	70	M10	40
AT-023K	70	M12	40
AT-024K	95	M12	60
AT-025K	95	M14	60
AT-026K	95	M16	60
AT-027K	120	M14	60
AT-028K	120	M16	60
AT-029K	150	M14	90
AT-030K	150	M16	90
AT-031K	185	M16	110
AT-032K	240	M16	140

Copper compression terminals to correctly connect cable with screw-nut connections.

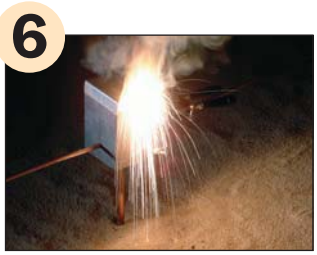
APLIWELD®

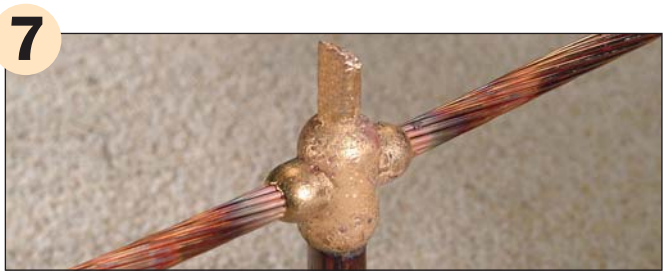
161 APLIWELD®. Exothermic welding

APLIWELD® is a welding system that employs an exothermic reaction to obtain on-site, homogeneous connections among conductors.

The procedure consists of fixing the conductors to be welded using a graphite mould. Welding mixture and starting powder are also placed inside this mould. When a spark is applied, it starts the reduction of the copper oxide by the aluminium. This reaction is highly exothermic, thus reaching a high enough temperature to melt both the preparation and the conductors. The whole mass therefore becomes homogeneously welded. The conductivity of the connection is the same or even higher than in the conductors, being able to stand high currents and avoiding corrosion problems that could appear with simple mechanical joints.

The graphite mould is semi-permanent and specific to each of the conductors to be welded. The amount of welding mixture must also be selected according to the welding size desired. When conductors are welded, the mould is opened using the handle clamps and cleaned, being then ready for another welding.





As it has no need for an external energy supply, the process is totally autonomous. This, together with electrical, mechanical and corrosion-resistance characteristics makes it especially suitable for welding conductors forming part of the external lightning protection system, as well as for any earth termination system.

The basic kit for installations can be requested for cables from 35mm^2 to 95mm^2 and ground rods from 14,2mm to 18,3mm.

Installation kit C50-T15

· E-90: Welding mixture (60uds.)
· C50/C50/12: Mould cable/cable in “T” horizontal.
· C50/C50/16: Mould cable on cable in “X”.
· C50/T15/64: Mould cable/tape in “T” vertical.
· AT-50N: Clamp for graphite mould.
· AT-68N: Basic tool set.
  - AT-60N: Flint igniter (2uds.).
  - AT-61N: File card brush to clean the pieces to be welded.
  - AT-62N: Brush to clean the slag from moulds with a vertical opening.
  - AT-63N: Mould scraper to clean the slag from a horizontal opening.
  - AT-64N: Paint brush to clean the welding cavity.
  - AT-65N: Sealing paste (450g).
  - AT-73N: Security gloves (1 pair).

APLIWELD® Multiple-mould

It is a patented model able to weld the most regular joint types in the same graphite mould.

There is a complete catalogue of APLIWELD® published by Aplicaciones Tecnologicas. Please refer to your local distributor.

INDEX BY REFERENCE

AT-••••

AT-•••A

AT-•••B

AT-•••C

AT-•••D

INDEX BY REFERENCE

AT-•••E

Ref.	Description	Page

AT-•••F

Ref.	Description	Page

AT-•••G

Ref.	Description	Page
AT-000G	Lightning event counter support	63
AT-001G	Lightning event counter	63
AT-012G	Expansion unit	65
AT-014G	Cover plate	66
AT-015G	Copper puddle flange	67
AT-016G	Aluminium puddle flange	67
AT-023G	Anti corrosion spray	68
AT-030G	Copper-aluminium bimetallic sheet	68
AT-031G	Aluminium-copper bimetallic sheet	68
AT-032G	Tinned copper bridging braid	65
AT-033G	Aluminium bridging braid	65
AT-040G	Wire straighetner with coils	68
AT-041G	Wire straightener	68
AT-050G	3 m galvanized steel guard tube for cable	64
AT-051G	2 m galvanized steel guard tube for cable	64
AT-053G	2 m stainless steel guard tube for cable	64
AT-054G	3 m stainless steel guard tube for cable	64
AT-055G	2 m galvanized steel guard tube for cable and tape	64
AT-057G	Lead-in earthing rod	64
AT-060G	2 m galvanized steel guard tube for tape	64
AT-080G	Hanging guy wire kit	67

AT-•••H

Ref.	Description	Page
AT-000H	Ø10 x 1500 mm stainless steel earth rod	73
AT-003H	Ø20 x 1500 mm S-threaded galvanized steel earth rod	74
AT-010H	Polypropylene earth pit	77
AT-012H	(1000 + 2000) x Ø54 APLIROD® dynamic electrode with AT-020F	71
AT-016H	Ø5/8" x 2400 mm threaded 254µm copperbond earth rod	72
AT-017H	Ø3/4" x 1800 mm threaded 254µm copperbond earth rod	72
AT-018H	Ø3/4" x 2400 mm threaded 254µm copperbond earth rod	72
AT-019H	Ø3/4" x 3000 mm threaded 254µm copperbond earth rod	72
AT-020H	235 x 40 x 25 mm bonding bar for polypropylene earth pit	78
AT-024H	Ø28 x 2000 mm APLIROD® dynamic electrode with AT-020F	71
AT-025H	Ø28 x 2500 mm APLIROD® dynamic electrode with AT-020F	71
AT-026H	Ø5/8" x 2400 mm 254µm copperbond earth rod	72
AT-027H	Ø3/4" x 1800 mm 254µm copperbond earth rod	72
AT-028H	Ø3/4" x 2400 mm 254µm copperbond earth rod	72
AT-029H	Ø3/4" x 3000 mm 254µm copperbond earth rod	72
AT-030H	Ø54 x (1000 + 3000) APLIROD® dynamic electrode with AT-020F	71
AT-031H	Ø15 x 1200 mm solid copper earth rod	73
AT-032H	Ø54 x 2000 mm APLIROD® dynamic electrode with AT-020F	71
AT-033H	Ø54 x 3000 mm APLIROD® dynamic electrode with AT-020F	71
AT-035H	Charge for APLIROD®	71
AT-036H	Ø20 x 1200 mm solid copper earth rod	73
AT-037H	Ø16 x 1200 mm threaded stainless steel earth rod	73
AT-038H	Ø20 x 1500 mm AZ threaded stainless steel earth rod	73
AT-039H	Ø16 x 1000 mm galvanized steel earth rod	74
AT-041H	Ø5/8" x 2000 mm threaded 254µm copperbond earth rod	72
AT-042H	Ø3/4" x 2000 mm threaded 254µm copperbond earth rod	72
AT-043H	Ø5/8" x 3000 mm 254µm copperbond earth rod	72
AT-044H	Ø16 x 1500 mm galvanized steel earth rod	74
AT-045H	Ø16 x 2000 mm galvanized steel earth rod	74
AT-046H	Ø20 x 1500 mm Z-threaded galvanized steel earth rod	74
AT-047H	Ø25 x 1500 mm Z-threaded galvanized steel earth rod	74
AT-049H	Ø25 x 1500 mm S-threaded galvanized steel earth rod	74
AT-053H	Ø5/8" x 1800 mm 254µm copperbond earth rod	72
AT-069H	Ø5/8" x 1200 mm 254µm copperbond earth rod	72
AT-070H	Ø150 x 600 mm graphite electrode	70
AT-071H	Ø5/8" x 1500 mm 254µm copperbond earth rod	72
AT-072H	Ø5/8" x 2000 mm 254µm copperbond earth rod	72
AT-073H	Ø50 x 1500 mm graphite electrode	70
AT-076H	Ø5/8" x 1200 mm threaded 254µm copperbond earth rod	72
AT-077H	Ø5/8" x 1500 mm threaded 254µm copperbond earth rod	72
AT-078H	Ø5/8" x 1800 mm threaded 254µm copperbond earth rod	72
AT-079H	Ø3/4" x 1200 mm 254µm copperbond earth rod	72
AT-080H	Ø16 x 2000 mm stainless steel earth rod	73
AT-081H	Ø3/4" x 1500 mm 254µm copperbond earth rod	72
AT-082H	Ø3/4" x 2000 mm 254µm copperbond earth rod	72
AT-086H	Ø3/4" x 1200 mm threaded 254µm copperbond earth rod	72
AT-087H	Ø3/4" x 1500 mm threaded 254µm copperbond earth rod	72
AT-090H	Multipurpose clamp	57, 82
AT-093H	1000 x 50 x 50 x 5 mm X-shaped galvanized steel earth rod	74
AT-094H	1500 x 50 x 50 x 5 mm X-shaped galvanized steel earth rod	74
AT-095H	2000 x 50 x 50 x 5 mm X-shaped galvanized steel earth rod	74
AT-096H	2500 x 50 x 50 x 5 mm X-shaped galvanized steel earth rod	74
AT-097H	3000 x 50 x 50 x 5 mm X-shaped galvanized steel earth rod	74
AT-098H	Ø5/8" x 3000 mm threaded 254µm copperbond earth rod	72
AT-099H	Ø16 x 1000 mm stainless steel earth rod	73
AT-100H	Ø16 x 1500 mm stainless steel earth rod	73
AT-102H	Ø28 x 2000 mm APLIROD® dynamic electrode	71
AT-103H	Ø28 x 2500 mm APLIROD® dynamic electrode	71
AT-104H	Ø54 x (1000 + 3000) mm APLIROD® dynamic electrode	71
AT-105H	Ø54 x 2000 mm APLIROD® dynamic electrode	71
AT-106H	Ø54 x 3000 mm APLIROD® dynamic electrode	71
AT-108H	(1000 + 2000) x Ø54 APLIROD® dynamic electrode	71
AT-116H	1000 x 500 x 2 mm earth plate	75
AT-117H	600 x 600 x 1,5 mm earth plate	75
AT-118H	600 x 600 x 3 mm earth plate	75
AT-119H	900 x 900 x 1,5 mm earth plate	75
AT-120H	900 x 900 x 3 mm earth plate	75
AT-121H	500 x 500 x 3 mm galvanized steel earth plate	75
AT-122H	1000 x 500 x 3 mm galvanized steel earth plate	75
AT-125H	900 x 900 x 3 mm copper lattice	75
AT-126H	600 x 600 x 3 mm cooper lattice	75

AT-•••J

Ref.	Description	Page
AT-000J	Self-vulcanising strip	77
AT-010J	Denso tape (Bituminous strip)	77
AT-020J	Earth bar 8 way with single disconnecting link	79
AT-021J	Bonding bar 235 x 40 x 25 mm for polypropylene earth pit	78
AT-022J	Copper B bond	37
AT-023J	Aluminium B bond	37
AT-024J	Copper rainwater pipe (RWP) bond	54
AT-025J	Aluminium rainwater pipe (RWP) bond	54
AT-026J	25 - 50 mm² aluminium tower earth clamp	41
AT-027J	16 - 70 mm² tower earth clamp	41
AT-028J	70 - 120 mm² tower earth clamp	41
AT-029J	120 - 185 mm² tower earth clamp	41
AT-030J	185 - 240 mm² tower earth clamp	41
AT-032J	Copper flexible braid bond	65
AT-033J	Aluminium flexible braid bond	65
AT-050J	500 x 500 x 2 mm earth plate	75
AT-053J	Insulator	79
AT-054J	Earth bar 6 way	79
AT-055J	Earth bar 6 way with single disconnecting link	79
AT-056J	Earth bar 6 way with twin disconnecting links	79
AT-057J	Disconnecting link	79
AT-058J	Earth bar 8 way	79
AT-059J	Earth bar 16 way	79
AT-062J	Earth bar 10 way with single disconnecting link	79
AT-063J	Earth bar 10 way with twin disconnecting links	79
AT-064J	Earth bar 12 way	79
AT-065J	Earth bar 12 way with single disconnecting link	79
AT-066J	Earth bar 12 way with twin disconnecting links	79
AT-067J	Earth bar 14 way	79
AT-068J	Earth bar 14 way with single disconnecting link	79
AT-069J	Earth bar 14 way with twin disconnecting links	79
AT-070J	3000 x 1000 x 2 copper grid	75
AT-071J	Earth bar 16 way with single disconnecting link	79
AT-072J	Earth bar 16 way with twin disconnecting links	79
AT-073J	Earth bar 18 way	79
AT-074J	Earth bar 18 way with single disconnecting link	79
AT-075J	Earth bar 18 way with twin disconnecting links	79
AT-076J	Earth bar 20 way	79
AT-077J	Earth bar 20 way with single disconnecting link	79
AT-078J	Earth bar 20 way with twin disconnecting links	79
AT-079J	Earth bar 8 way with twin disconnecting links	79
AT-080J	25 x 3 mm - 26 x 12 mm rod to tape A clamp	82
AT-081J	30 x 2 mm - 40 x 12 mm rod to tape A clamp	82
AT-082J	50 x 6 mm - 51 x 12 mm rod to tape A clamp	82
AT-083J	Gunmetal rod to cable G clamp	82
AT-086J	Ø 20 mm rod to cable G clamp	82
AT-087J	U-bolt rod E clamp	82
AT-088J	Ø 20 mm U-bolt rod E clamp	82
AT-089J	Naval brass rod to cable CGUV clamp	83
AT-089J-1	Naval brass square 50 - 120 mm² cable clamp	55
AT-090J	Earth bar 10 way	79
AT-091J	70 - 185 mm² rod to cable CGUV clamp	83
AT-092J	150 - 300 mm² rod to cable CGUV clamp	83
AT-093J	Rod to cable lug B clamp	83
AT-094J	16 - 70 mm² rod to cable CGUV clamp	83
AT-095J	Ø 20 mm rod to cable lug B clamp	83
AT-096J	Earth point 1 hole (M8 x 15 mm)	80
AT-097J	Earth point 2 holes (M8 x 12 mm)	80
AT-098J	Earth point 4 holes (M8 x 14 mm)	80
AT-099J	Earth point 1 hole (M8 x 15 mm) with 500mm tail of 70 mm²	80
AT-100J	Earth point 2 holes (M8 x 12 mm) with 500mm tail of 70 mm²	80
AT-101J	Earth point 4 holes (M8 x 14 mm) with 500mm tail of 70 mm²	80
AT-102J	M10 x 50 x 50 mm earth boss	80
AT-111J	Naval brass rod to cable G clamp	82
AT-112J	Galvanized steel rod to cable G clamp	82
AT-113J	Cu / Gal bimetallic UNI disconnecting cable and rod clamp	60, 83
AT-114J	Galvanized steel UNI disconnecting cable and rod clamp	60, 83
AT-115J	Stainless steel UNI disconnecting cable and rod clamp	60, 83
AT-116J	Stainless steel earth bar 6 way	79
AT-117J	Stainless steel earth bar 8 way	79
AT-118J	Stainless steel earth bar 10 way	79
AT-119J	Stainless steel earth bar 12 way	79
AT-120J	Fixed earthing terminal M10 with connecting plate Ø 80 mm	80
AT-126J	Ø 15 - 25 mm universal clamp	84
AT-127J	Copper cable and rod universal clamp	58, 84
AT-128J	Galvanized steel cable and rod universal clamp	58, 84
AT-129J	Ø 20 mm galvanized steel connecting clamp	84
AT-130J	Ø 16 mm galvanized steel connecting clamp	84
AT-131J	Ø 25 mm galvanized steel connecting clamp	84
AT-132J	Ø 20 mm stainless steel connecting clamp	84
AT-133J	Ø 16 mm stainless steel connecting clamp	84
AT-134J	Ø 25 mm stainless steel connecting clamp	84
AT-135J	Disconnecting sleeve	57, 83
AT-136J	Galvanized steel square 50 - 70 mm² cable - Ø16 mm rod clamp	55, 84
AT-137J	Stainless steel square 50 - 70 mm² cable - Ø16 mm rod clamp	55, 84
AT-138J	Copper square 50 - 70 mm² cable - Ø16 mm rod clamp	55, 84

AT-•••K

Ref.	Description	Page
AT-000K	4 m + 3 x 7m goose foot	75
AT-001K	1 m + 3 x 3m goose foot	75
AT-002K	5/8" threaded coupling	72
AT-003K	5/8" threaded driving stud	72
AT-004K	3/4" threaded coupling	72
AT-005K	3/4" threaded driving stud	72
AT-006K	15/16mm driving stud	73
AT-007K	15/16mm spike	73
AT-008K	Coupling dowel	73
AT-009K	20mm driving stud	73
AT-011K	Concrete earth pit	77
AT-012K	Iron cast earth pit	77
AT-015K	16mm² M6 tin-plated copper compression terminal	89
AT-016K	16mm² M8 tin-plated copper compression terminal	89
AT-017K	25mm² M8 tin-plated copper compression terminal	89

AT-•••L

Ref.	Description	Page

AT-•••M

Ref.	Description	Page

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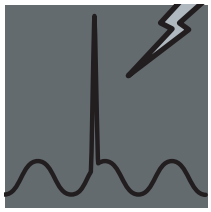
High technology applied to the protection of man and the environment

Lightning protection division

This catalogue deals with this subdivision.

EXTERNAL PROTECTION



INTERNAL PROTECTION

EARTHING TERMINAL

EXOTHERMIC WELDING

PREVENTIVE PROTECTION

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