



## ESE LIGHTNING AIR TERMINALS

## 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 ( $\Delta t$ )**” 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 ( $\Delta t$ ). 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 ( $\Delta t$ ). It is therefore necessary to verify that the triggering device is not disabled under rain conditions since the air terminal would then lose its protection radius. **DAT CONTROLER® PLUS has been tested under heavy rain conditions thus ensuring this isolation.**



**PROTECTION RADIUS ( $R_p$ ) 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	Level I	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 protected

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”**



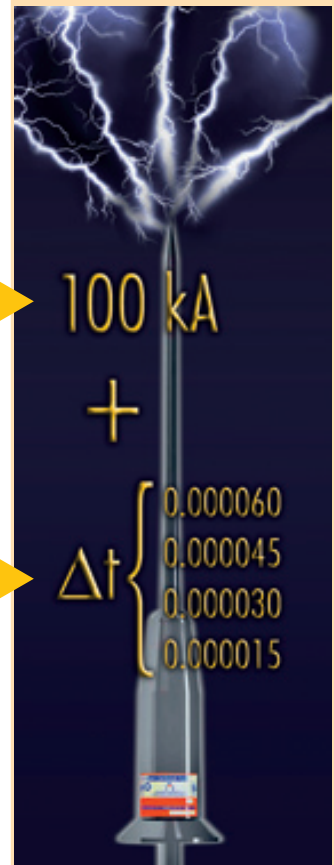
The below described A.1 and A.2 tests have been performed on the same air terminals consecutively with the aim of assuring its proper working after withstanding repetitive lightning currents. These tests have been carried out by the LCOE (Central Official Electrotechnics Laboratory, Ministry of Science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

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

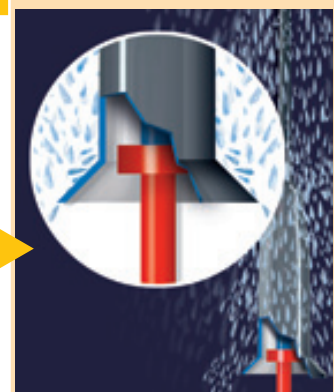
Certificate of the protection radius for each model and protection level calculated according to the relevant standards.

\* 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.

**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)