

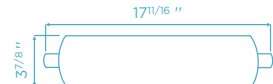
High reactance filter for protection against high frequency ground induced surges

Made of:  
Copper, Ferrite, POM and  
dielectric insulator

Packaging:  
Recycled cardboard & PELD  
26 x 26 x 47 cm



Dimensions



Weight:  
5 kg

The “dinnteco filter” ground filter model DNNFT is a high reactance filter for protection against high frequency ground induced surges derived from atmospheric discharges, electromagnetic pulses and other sources.

### Technical principle of operation

The operating principle of the “dinnteco filter” model DNNFT is based on the fact that when high frequency alternating currents try to pass through the most active part of the winding, the self-inductance produced by the magnetic flux of the current that tries to pass through it generates a counter-electromotive force that opposes the passage of its alternating component. However, it does not prevent direct current or direct current or low frequency alternating current from passing through it and continuing to flow freely through the entire winding and the rest of the electronic circuit. During the process of filtering the high frequency alternating current, the energy contained in the alternating component that cannot pass through the filter is absorbed by the ferrite core in the form of heat. However, the temperature reached by the ferrite for this reason is very low and hardly noticeable. The “dinnteco filter” is complementary to the standard surge protectors, which will be necessary and mandatory. In no case replaces the function of the same.

### Product performance characteristics

Dinnteco filters significantly minimize external ground-induced surges coming from lightning strikes close to the structure or vessel being protected, absorbing part of the energy and reducing the passage and speed of the current, making the risk of incident by the induced overvoltage is much lower, as well as the surge protectors (SPD) can act more appropriately. The dinnteco filter is a complementary product to the SPDs, which will be necessary and mandatory

(if you want to have protective measures for induced surges in power cables) and in no case replaces them.

Dinnteco filters minimize the effects of overvoltage that may be induced by the ground plates, upstream of their placement point, as long as the conductive metal structures located upstream are not in direct or indirect contact with water or the physical earth.

Dinnteco filters do not protect surges that are induced or coupled by the power cables of the boat or equipment to be protected, for which adequate standard surge protectors (SPD) or isolation transformers or similar must be provided.

Dinnteco filters can also protect surges induced in the negative ground of the equipment, for which, in this case, the maximum consumption of the boat or equipment to be protected will have to be taken into account and they will have to be arranged in parallel the necessary filters that allow the maximum load capacity of the boat or equipment to be protected, taking into account that the dinnteco filter supports a consumption of up to 315 A.

### Selection of areas or equipment to protect with the product

To select the areas or equipment to protect and installation points of the dinnteco filter, the following must be taken into account:

- It must be clear which equipment or electrical panels want to be protected with dinnteco filters. This product minimizes the effects of overvoltage that are induced through it, upstream of its location point and will be

installed sandwiched in the ground cable, at the upstream point that is to be protected and always taking into account that upstream there is no other cable or metallic element or other conductive structure directly connected to the seawater or physical ground, either directly or indirectly, since if this connection with the water or physical ground existed, the dinnteco filter would be short-circuited. Therefore, it will be absolutely necessary and important to clearly identify the equipment or electrical panels that you want to protect, as well as verify that the point of placement of the dinnteco filter is the only cable through which the external induced overvoltage can enter the equipment or AC or DC electrical panel to be protected and there are no other conductive connections connected between these electrical equipment or panels to be protected and seawater or land.

- The ground cables from the surge protectors (SPD) to their ground connection must be direct without passing through the dinnteco filter. The connection cable from the surge protector (SPD) to the structural ground of the boat or structure or equipment to be protected must always be direct and in no case must it be connected through the dinnteco filter, since the purpose of this cable is to evacuate to ground the overvoltage that has been induced in the power cables connected to the SPD and this overvoltage must not be filtered by the dinnteco filter. This aspect must be kept in mind when deciding the placement point of the dinnteco filter, as well as it must be taken into account during the protection design of the dinnteco filters and must be verified in the installation phase of the dinnteco filters themselves.
- It is recommended to protect with dinnteco filters all possible entry routes of these potential external induced overvoltages through the ground, as long as, as already mentioned, it can be verified that upstream of the dinnteco filter placed, there are no other points of the direct or indirect electrical contact with water or earth.

## Technical characteristics

Concept	High frequency ground filter
Product	dinnteco filter
Model	DNNFT
Filter type certified according to UNE EN IEC 62561-1:2017	H
Direct Current Electrical Resistance using 10 A source	0,37 mΩ
Resistance after 3 current injections of 100 kA 10/350 in 3 samples according to standard UNE EN IEC 62561-1:2017	0,39 mΩ 0,37 mΩ 0,49 mΩ
Electrical resistance value requirement of the filter using 10 A sources before and after the 3 current injections of 100 kA 10/350.	< 1 mΩ
Intensity	100 kA 10/350 200 kA 10/350
Specific energy	2500 kJ/Ω (100 kA) 10000 kJ/Ω (200 kA) accum. > 30000 kJ/Ω Q = 200 C Level I accum. > 2400 C (Winter lightning)
Cable insertion in brass part	Cable up to 0 <sup>3/8</sup> " ∅ (use accessory piece brass. See figure 4). Cable between 0 <sup>3/8</sup> " ∅ and 0 <sup>5/8</sup> " ∅ (Do not use accessory part brass. See figure 5).
Allen type clamping screws	M8x10
Required tightening torque of Allen screws M8x10	8 Nm
Certified Normative	UNE EN IEC 62305-1:2011 (Report No. LCOE 2019033F0172) UNE EN IEC 62561-1:2017 (Report No. LCOE 2020073F0309) UNE EN IEC 61400-24:2019 (Report No. LCOE 2021093F0356)

Figure 1. Technical characteristics of the dinnteco ground filter.

## Result of the tests of 100 kA 10/350

Test	I <sub>peak</sub> (kA)	W/R (kJ/Ω)	Q (C)	t1 (μs)	t2 (μs)	Visual inspection
RG13-01	111,2	2.069	40,1	19,4	253,9	OK
RG13-02	106,6	3.215	57,2	21,7	467,3	OK
RG13-03	103,5	3.032	55,6	21,7	457,6	OK
RG13-04	101,7	2.764	50,5	21,7	438,7	OK
RG13-05	102,7	2.820	51,0	21,7	438,7	OK
RG13-06	103,2	2.976	54,5	21,7	464,6	OK

Figure 2. Results of the 100 kA 10/350 tests according to UNE EN IEC 62561-1:2017.

### Conclusions

No sample presented evidence of visual damage. The measured resistance of its contacts was less than 1 mΩ.

### Current impulses with 200 kA 10/350 μs waveform and charge transfer Q = 200 C. Level I according to the UNE EN IEC 61400-24:2019 standard

The “dinnteco filter” has passed the current impulse tests of 200 kA with waveform 10/350 μs, with accumulated energy of W/R > 30000 (kJ/Ω) and charge transfer Q = 200 C up to an accumulated of Q > 2400 C (winter lightning exposure requirement) in accordance with the requirements of the UNE EN IEC 61400-24:2019 standard for LPS in wind turbines.

### High current impulse

I<sub>p</sub> = 200 kA ± 10%  
 W/R = 10000 kJ/Ω -10%, ± 35%  
 Q = 100 C ± 20%  
 Duration < 10 ms

### Charge transfer Q

Q = 200 C ± 20%  
 Carried out in the Official Central Laboratory of Electrotechnics (LCOE) of Getafe (Madrid) with satisfactory results.

Test	I <sub>peak</sub> (kA)	W/R (kJ/Ω)	Q (C)	t1 (μs)	t2 (μs)	Visual inspection
TI02-02	224,1	9002	92,0	19,0	249,2	OK
TI02-03	217,5	10940	104,3	19,0	363,0	OK
TI02-04	218,0	10921	105,9	19,0	348,8	OK
Accum.	...	30863	302,2	...	...	OK

	Test	I <sub>mean</sub> (A)	Q (C)	Duration (ms)	Visual inspection
LPL I	TI02-05	438,2	199,1	438,2	OK
	TI02-06	457,6	212,9	457,6	OK
	TI02-07	459,9	213,8	459,9	OK
Winter lightning exposure	TI02-08	474,2	224,9	474,2	OK
	TI02-09	463,8	213,9	463,8	OK
	TI02-10	463,7	217,8	463,7	OK
	TI02-11	461,2	212,4	461,2	OK
	TI02-12	482,0	243,0	482,0	OK
	TI02-13	463,8	217,2	463,8	OK
	TI02-14	466,8	216,9	466,8	OK
	TI02-15	466,3	219,3	466,3	OK
	TI02-16	481,1	230,9	481,1	OK
Accum.	...	2622,1	...	OK	

Figure 3. Tabulated results of the test

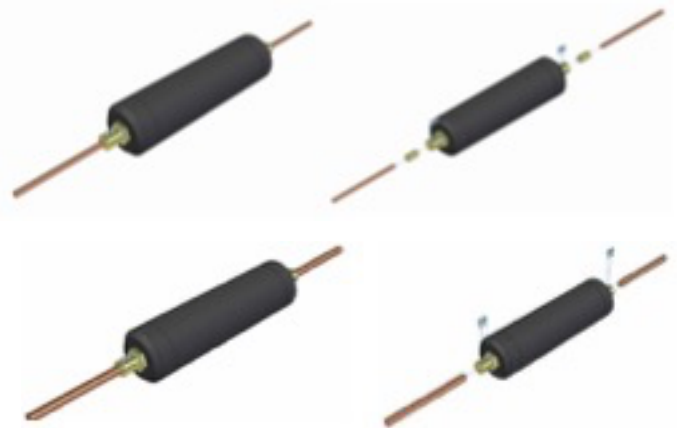


Figure 4. Cable insertion up to 3/8" diameter.

Figure 5. Cable insertion from from 3/8" to 5/8" diameter.

### Materials, measurements and weight

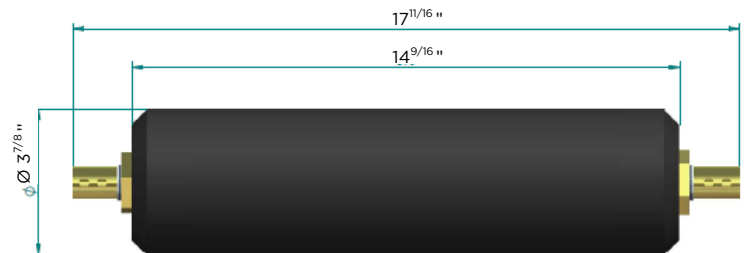


Figure 6. Measurements of the dinnteco ground filter DNNFT model.

Concept	dinnteco ground filter DNNFT model
Length (inch)	17 <sup>11/16</sup>
Diameter (inch)	3 <sup>7/8</sup>
Weight (lb)	11,02
Box weight (lb)	0,44
Materials	Copper, Ferrite, POM and dielectric insulator

Figure 7. Materials, measurements and weight of the DNNFT.

## Installation

It is installed between the earth connection and the element to be protected, as close as possible to the earth connection

In order to protect the electrical and electronic equipment of a structure, as well as the DDCE, an equipotential bonding bar can be installed and all the earth connections of the same can be connected to this bar and the filter inserted between the earth connection and the bar. In any case, the number of filters to be installed will depend on the potential earth overvoltage inputs and the design of the installation. It can be installed vertically or horizontally. The filter will be placed on the wall or other type of structures, by means of flanges and the necessary accessories to have a secure fixation.

It must be taken into account that the ground cable of the surge protectors (SPD) must have a direct connection to ground and not pass through the “dinnteco filters”. In figures 10 and 11, two examples are presented, one with only the SPDs (Figure 10) and another with SPD and “dinnteco filter” (Figure 11). The example presents an electrical power panel where the ground connections of the electrical equipment and the SPD are connected to a plate, which in turn is connected to the metal structure of the electrical panel, which in turn is connected (the metal structure) to the ground. (Figures 8, 9, 10 and 11).

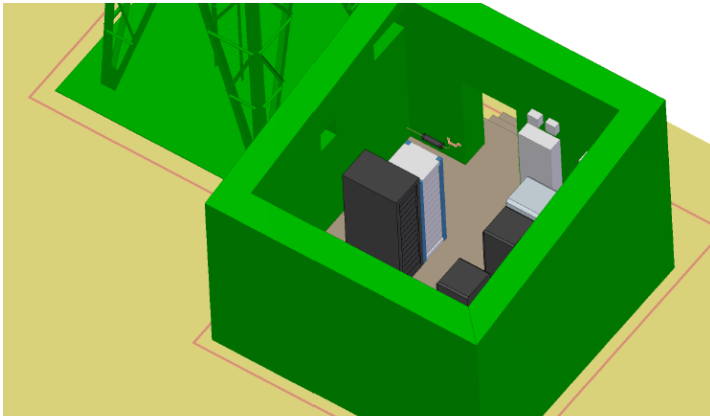


Figure 8. Installation of a “dinnteco filter” in a telecommunications center for the protection of internal equipment.

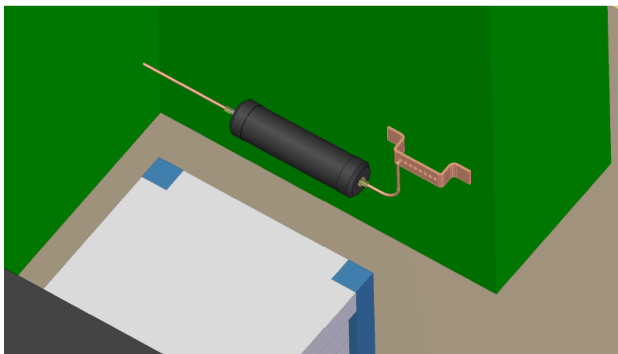


Figure 9. Enlarged view of figure 8.

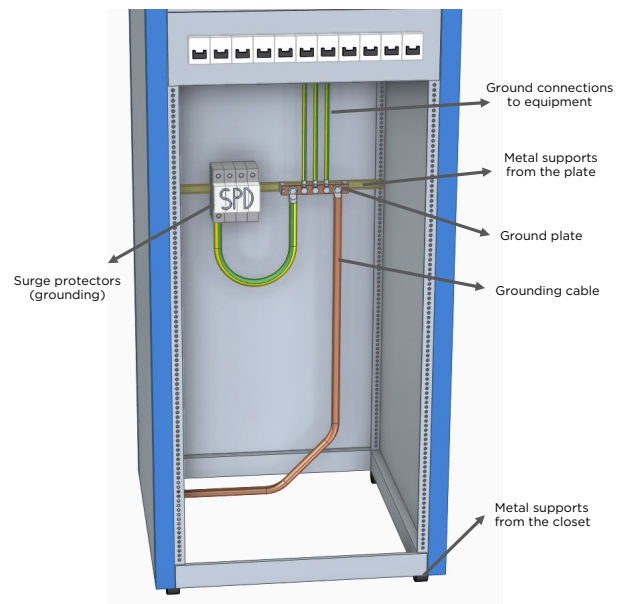


Figure 10. Example of a ground protection scheme for an electrical cabinet without a “dinnteco filter”.

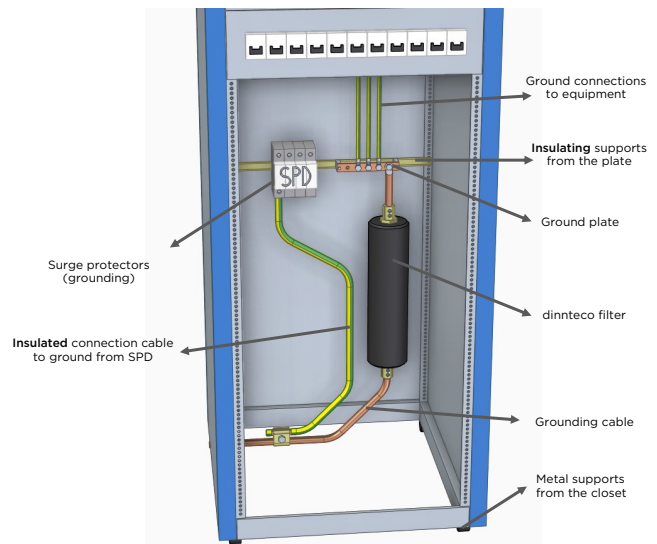


Figure 11. Example of a ground protection scheme for an electrical cabinet using the “dinnteco filter”.

## Applications

Unique and effective system for the protection of earth induced high frequency surges in all types of structures on land and sea.

- Service life (1): 20 years outdoors <sup>(1)</sup> and 30 years indoors <sup>(1)</sup>.

<sup>(1)</sup> Refers exclusively to the product materials.

- Uses and applications: Protection against induced overvoltages through the grounding conductor.

Land: all types of structures.

Marine: industrial and specialized vessels, on/off-shore platforms, and structures with saline or corrosive environments.

Restrictions on use: private (residential), luxury and recreational vessels, and/or maximum consumption on the negative cable > 315 A.

- Applicable sectors: cultural heritage, military, OGP, institutions and services, energy, transportation, mountain skiing, wind turbines, telecommunications, industry.

### **DDCE product certificate by Bureau Veritas (ES140751)**

Requirements for components of lightning protection systems (UNE EN 62561-1:2017).

Lightning protection (UNE EN IEC 61400-24:2019, the waveforms injected in this test are defined in the UNE EN IEC 62305-1:2011 standard).

### **CE Labeling**

Product Safety | Directives 2014/35/EU

Electromagnetic Compatibility | Directivas 2014/30/EU

Equipment Directive | Directives 2014/53/EU

### ***Electromagnetic compatibility (Emissions, immunity and disturbances)***

UNE-EN-IEC 61000-6-1: 2019

UNE-EN-IEC 61000-6-2: 2019 UNE-EN-IEC 61000-6-3: 2021

UNE-EN-IEC 61000-6-4: 2019

UNE-EN-IEC 61000-4-2/3/4/5/6/8

UNE-EN 55032:2016+AC:2016-07+A11:2020+A1:2021 Clase B

UNE-EN 55035:2017 + A11:2020 UNE EN 301 489-1 V2.2.3 (2020-01-01)

### ***Electrical safety***

UNE-EN-IEC 62368-1:2020/AC2020-05 (Partial)

### ***Extreme climatic tests (insulation resistance, dielectric strength, earth resistance, leakage current and transient overvoltages)*** | Product performance tests

### **Quality Management System**

Dinnteco International works with the Quality Management System according to international standards ISO 9001: 2015 applied to: design, manufacture and sale of compensating devices for variable electric fields, variable radio frequency electromagnetic shield and electrostatic charge deionizers: DDCE models, DDCE Plus, dineol and PDCE. Design, manufacture and sale of dinnteco high frequency earth filters and dinco protection connector.

### **Labor Risk Prevention**

The DDCE is compliant with the requirements of preventive action (Article 5) of the Law 31/1995 of November 8th of Labor Risk Prevention, as well as RD 614/2001 of June 8th about health and safety protection of workers from electric risk.

### **Environmental Protection**

Rohs standards compliant.

### **Maintenance**

Annual mandatory, executed and certified by the official installer. The maintenance operations described in the document "Annual Maintenance Protocol" must be carried out and recorded.

### **Product warranty**

#### **1. Coverage**

**This warranty issued by Dinnteco Factory Gasteiz covers the replacement of the defective product with a new product.**

The costs of shipping, handling and packaging of the defective product must be paid initially by the customer, but will be reimbursed by the manufacturer after verifying that the conditions for the repair or replacement of the defective product are met. It does not include the uninstallation of the defective product or the installation of the new product sent under warranty with its associated costs in accessories and personnel.

#### **2. Warranty period**

The products have a maximum warranty period of 5 years (1 year of start-up plus 4 years of annual maintenance), subject to mandatory compliance with the requirements of point 3 of the "product warranty protocol".

The application and exclusions of the product guarantee are described and updated on the official website of dinnteco.



ISO 9001  
BUREAU VERITAS  
Certification

