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HEDNO TECHNICAL DESCRIPTION **ND-399/29.11.2018**

METAL OXIDE SURGE ARRESTERS 5 kA AND 10 kA, WITHOUT GAPS, WITH COMPOSITE HOUSING, FOR 20kV DISTRIBUTION NETWORKS

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METAL OXIDE SURGE ARRESTERS 5 kA AND 10 kA, WITHOUT GAPS, WITH COMPOSITE HOUSING, FOR 20kV DISTRIBUTION NETWORKS

1. SCOPE

The present Technical Description (TD) determines the manufacturing and testing requirements for metal oxide surge arresters (ZnO) without gaps, of class distribution high-DH, 10 kA, and distribution medium-DM, 5 kA, according to the EN 60099-1 classification, intended for the protection of 20kV overhead and underground distribution networks and MV/LV substations.
The surge arrester (assembly) shall consist of the main body (surge arrester), the disconnecting device and the insulating mounting bracket, which shall be steadily assembled together.
The surge arrester shall be suitable for mounting on the transformer tank or on a cross arm (wooden or steel). The surge arrester is mounted on the transformer via a special supporting assembly (accompanying the transformer), placed on the transformer tank (Drawing 1). The surge arrester is mounted on the cross arms via a steel mounting assembly (Drawing 2).
Surge arresters shall be supplied either with or without steel mounting assembly (Drawing 2), with a corresponding formulation of the inquiry.

2. KEYWORDS

Surge arrester, disconnecting device, insulating mounting bracket, Medium Voltage, lightning protection, steel mounting assembly

3. OPERATING CONDITIONS

3.1. Environmental conditions

The surge arrester shall be suitable for outdoor operation and operation in areas with high corrosion (deposits of dust, salt, industrial pollutants, presence of humidity, rain, and snow). The majority of installations are placed at altitude of up to 1000 m above sea level. Environmental conditions are defined below:

– Maximum ambient air temperature	:	+40 ° C
– Minimum ambient air temperature	:	- 40 ° C
– Maximum mean value of the ambient air temperature measured at a period of 24 hours	:	+35 ° C
– Direct exposure to sun, rain, snow and wind	:	Yes
– Minimum duration of direct exposure to sunlight	:	2800 h

3.2. System characteristics – Medium Voltage (MV) Network

The surge arrester is intended for use on three - phase, three conductors distribution MV networks, with earthed neutral node of the HV/MV transformer, through a resistor limiting the earth fault current to 1000 A, with the following characteristics:

- Nominal system voltage, U_N : 20kV
- Maximum system voltage : 24kV
- Frequency : 50Hz
- Short circuit power : 250 MVA
- Maximum earth fault current : 1000 A

4. STANDARDS - SPECIFICATIONS

– EN 60099-4	:	Surge Arresters – Part 4: Metal Oxide Surge Arresters without gaps for a.c. systems
– EN 60060-1	:	High-voltage test techniques – Part 1: General definitions and test requirements
– EN 61952	:	Insulators for overhead lines - Composite line post insulators for A.C. systems with a nominal voltage greater than 1 000 V - Definitions, test methods and acceptance criteria
– PPC Technical Specification XK 11.02/10.03.88	:	Hot dip zinc coating of iron or steel articles

NOTE: The text of the present Technical Description is predominant and its requirements prevail against any other Standard or Specification.

5. DESCRIPTION

5.1 Electrical Characteristics

The surge arrester shall comply with the Standard EN 60099-4 and its electrical characteristics shall be the following:

Class	:	DH	DM
Rated voltage (Vr)	:	21 kV	21 kV
Continuous operating voltage (Vc), minimum value	:	16 kV	16 kV
Nominal discharge current (In), 8/20 μs	:	10 kA	5 kA
Maximum residual voltage (Ures) • at nominal discharge current (In) • at steep current impulse, 1/10 μs	: :	 65 kV 65 kV	 65 kV 65 kV
High current impulse 4/10 μs	:	100 kA	65 kA
Repetitive charge transfer rating (Q_{rs})	:	≥0.4 C	≥0.2 C
Thermal charge transfer rating (Q_{th})	:	≥1.1 C	≥0.7 C
Insulation withstand of the arrester housing at lightning impulse voltage 1.2/50 μs	:	125 kV	125 kV

Insulation withstand of the arrester housing at power frequency voltage under wet conditions, 1 min	:	54 kV	43 kV
SSL (Specified short-term load)	:	100 Nm min	100 Nm min
SLL (Specified long-term load)	:	100 Nm min	100 Nm min

5.2 Housing material

The outer housing of the surge arrester shall be made of silicon rubber with a minimum creepage distance of **670** mm, suitable for the environmental conditions described in par. 3.1 of the present TD. Overcoated insulators are not acceptable.

5.3 Manufacturing characteristics

5.3.1. Surge arrester

5.3.1.1. The surge arrester shall be equipped with a disconnecting device, which shall be intended for connection to the earthing conductor and it shall be automatically disconnected from the surge arrester in case of an electric fault of the arrester. The disconnection shall be visible by an observer standing a few meters away from the surge arrester, for example near the pole, where it is installed. The disconnecting device shall present a current-time curve lower than the current-time curve of the 10T fuse (as per ANSI C 37.43), when both curves are plotted on the same logarithmic chart.
The current-time curve of the 10T fuse shall be plotted on a logarithmic chart taking into account the following points:

Melting time (s)	300 or 600	10	0,1
Minimum current value (A)	19,5	26,5	224

5.3.1.2. The surge arrester shall be equipped with two tightening lugs. The lugs shall be stainless, suitable for connecting Cu conductors of 16 to 35 mm^2 effective cross section.

5.3.1.3. The metallic parts of the surge arrester shall be made of stainless steel or tin plated bronze with minimum tin-plating thickness of 15 μm.

5.3.1.4. The surge arrester shall be equipped with a suitable insulating mounting bracket, which shall be placed between the main body of the surge arrester and the steel mounting assembly that is described in par. 1. The distance between the axes of the insulating bracket holes, at which the surge arrester lower bolt and the mounting bolt of the steel mounting assembly are fastened, shall be minimum 13 cm.
The insulating mounting bracket shall withstand the system voltages described in par. 3.2 and it shall be subjected to the tests described in par. 6.1.13 of the present TD. Furthermore, the insulating bracket shall withstand environmental stress (exposure to sunlight, rain, humidity, etc.) and its withstand shall be proved by documents submitted with the technical offer (technical brochures, test reports, etc.)

5.3.1.5. The surge arrester shall be suitable to withstand the forces from the connection of the network conductor, as well as the forces applied to the housing of the surge arrester when it is connected to the network. Particularly, its cantilever strength shall be minimum:

- SSL (Specified short-term load) = 100 Nm min and
- SLL (Specified long-term load) = 100 Nm min.

and it shall be proved by test report of bending moment as per par. 10.8.11 and ANEX G of the EN 60099-4.

5.3.1.6. The surge arrester shall be accompanied by tinned copper flexible stranded wire (or braid of circular cross-section) of 16 mm^2 minimum cross-section and a minimum length of 0.70 m. The flexible wire at its one edge shall end to a lug with hole (of minimum diameter 13 mm) suitable for the connection to the disconnecting device. The other edge shall be free for the connection with the earthing conductor of the pole through a brass split bolt connector. Each flexible wire shall be delivered adapted to the disconnecting device of each surge arrester.

5.3.2. Steel mounting assembly (if it is included in the purchase)

Each surge arrester shall be suitable for mounting on a cross-arm of width 50-126 mm and of height 100-176 mm, through the mounting assembly shown in Drawing 1. The supporting base of the surge arrester (item 1 in Drawing 2) and the back plate for the mounting of the base (item 2 in Drawing 2) shall have suitable shape, so as the two bolts of minimum diameter M 10 mm (item 3 in Drawing 2), which go through the supporting base and the back plate, can be adjusted to the following vertical distances between their axes: 120, 135, 140 and 190 mm. The upper holes, both on the base of the surge arrester and the mounting back plate, can be continuous through serrate type opening. All the parts of the surge arrester mounting assembly shall be hot-dip zinc coated in accordance with the Technical Specification XK 11.02/10.03.88 or other equivalent European Standard. In any case, zinc coating thickness shall be the one specified in the text of the above mentioned HEDNO Specification. Other equivalent mounting assemblies may become acceptable, at the absolute discretion of the technical evaluation body.

6. TESTS

For the purposes of the present Technical Description, the tests are distinguished in type tests, routine tests and acceptance tests. All the tests mentioned below, shall be performed according to the requirements of the latest publication of the Standard EN 60099-4.

6.1. Type tests

The type tests, specified in EN 60099-4, shall be performed at the beginning of a contract and they may be repeated, at the absolute discretion of the Corporation, any time during the Contract execution, whenever the design or the production process is modified. At the absolute discretion of the Corporation, certificates issued by an accredited laboratory may be accepted. In addition to the tests described in EN, the dielectric tests on the insulating mounting bracket, specified in paragraph 6.1.13 of the present TD, shall be performed.
Specifically the type tests are the following:

6.1.1. Insulation withstand tests on the arrester housing

As specified in paragraph 10.8.2 of EN 60099-4.

6.1.2. Residual voltage tests

As specified in paragraph 10.8.3 of EN 60099-4.

6.1.3. Test to verify long term stability under continuous operating voltage

As specified in paragraph 10.8.4 of EN 60099-4.

6.1.4. Test to verify the repetitive charge transfer rating (Q_{rs})

As specified in paragraph 10.8.5 of EN 60099-4.

6.1.5. Heat dissipation behavior verification of test sample

As specified in paragraph 10.8.6 of EN 60099-4.

6.1.6. Operating duty tests

As specified in paragraph 10.8.7 of EN 60099-4.

6.1.7. Power frequency voltage-versus-time test

As specified in paragraph 10.8.8 of EN 60099-4.

6.1.8. Tests of arrester disconnector

As specified in paragraph 10.8.9 of EN 60099-4.

6.1.9. Short-circuit tests

As specified in paragraph 10.8.10 of EN 60099-4.

6.1.10. Test of the bending moment

As specified in paragraph 10.8.11 and in ANNEX G of EN 60099-4.

6.1.11. Test to verify the dielectric withstand of the internal components of an arrester

As specified in paragraph 10.8.15 of EN 60099-4.

6.1.12. Weather ageing test

As specified in paragraph 10.8.17 of EN 60099-4.

6.1.13. Tests on the insulating mounting bracket

6.1.13.1. Dielectric test: Power frequency voltage withstand test, 40 kV under wet conditions, for 1 min, as per EN 60060-1.

6.1.13.2. Flammability test, as per par. 6.4.4 of EN 61952 or other equivalent European standard.

6.2. Acceptance tests

6.2.1. Acceptance tests shall be performed according to paragraph 9.2 of EN 60099-4.

6.2.1.1. Measurement of power-frequency voltage at reference current

As specified in par. 9.2.1.a. of EN 60099-4.

6.2.1.2. Lightning impulse residual voltage at nominal discharge current

As specified in par. 9.2.1.b. of EN 60099-4.

6.2.1.3. Internal partial discharge test

As specified in par. 9.2.1.c. of EN 60099-4.

6.2.1.4. In addition to the upper mentioned acceptance tests, visual inspection and dimensional testing will be performed.

6.2.1.5. Steel mounting assembly of the surge arrester

6.2.1.5.1. Visual inspection – dimensional testing

6.2.1.5.2. Protection against corrosion test

The purpose of this test is to verify that all metal parts are sufficiently protected against corrosion. The zinc coating test will be performed in accordance with the Technical Specification XK 11.02/10.03.88.

6.3. Routine tests

Routine Tests specified in paragraph 9.1 of EN 60099-4, shall be performed at the manufacturer's factory, during the production procedure of the material, with detailed registration of the data in records, subject to the assessment by the Corporation's material Inspector.

7. MARKING

7.1. Surge arresters

7.1.1. Marking on the surge arrester

The following data shall be clearly and permanently marked (not with stickers) on the metallic part of the surge arrester:
- Manufacturer's Name or Trademark
- Type and identification code (e.g. serial number) of the surge arrester
- Nominal discharge current, in kA
- Continuous operating voltage, in kV
- Rated voltage, in kV
- Contract number
- Year of manufacture

7.1.2. Marking on the packing

The heavy duty wooden crates, in which the surge arresters are packed (see par. 8 of the present TD) shall have suitable metallic nameplates, where the following data shall be embossed and easily readable:
- Manufacturer's Name or Trademark
- Type and identification code (e.g. serial number) of the surge arrester
- Nominal discharge current, in kA
- Continuous operating voltage, in kV

- Rated voltage, in kV
- HEDNO code number
- Number of pieces
- Gross weight in kg
- Contract number
- Year of manufacture

7.2. Steel mounting assembly of the surge arrester

7.2.1. Marking on the mounting assembly

The following data shall be clearly and permanently marked (not with stickers) on the metallic part of the surge arrester:

- Contract number
- Year of manufacture

7.2.2. Marking on the packing

The heavy duty wooden crates, in which the surge arresters are packed (see par. 8 of the present TD) shall have suitable metallic nameplates, where the following data shall be embossed and easily readable:

- Manufacturer's Name or Trademark
- HEDNO code number
- Number of pieces
- Gross weight in kg
- Contract number
- Year of manufacture

8. PACKING

8.1. Surge arresters

The material shall be packed in heavy duty wooden crates and each one shall contain six (6) surge arresters.
The wooden crates shall be delivered packed in wooden EU palettes ("Europalettes"), containing surge arresters and mounting assemblies, the proportion of which shall be defined in the Inquiry (if they are included in the purchase). The total weight of each palette shall not exceed 550 kg. The total height of the materials packed in the palette shall not exceed 1.2 m, but it shall be as close to this dimension as it is possible. The packed wooden crates shall be fastened in the palette with at least two (2) vertical steel foils (lags) in length and two (2) in width (total 4), which shall pass under the palette's woods. Also, if it is necessary, the crates shall be fastened with two (2) horizontal foils. The above steel foils shall be preferably externally plasticized. Plastic foils are not acceptable, due to their fast degradation by solar radiation.

8.2. Steel mounting assembly

The mounting brackets shall be packed in separate heavy duty wooden crates, each one shall contain a number of mounting assemblies multiple of 6 and equal in all heavy duty wooden crates. The weight of each crate containing mounting assemblies will not exceed 25 kg.
The wooden crates shall be delivered packed in wooden EU palettes ("Europalettes") as described in paragraph 8.1 of the present TD.

9. ANNEX-DRAWINGS

9.1. ANNEX 1

Data to be submitted with the offer.

9.2. COMPLIANCE SHEET

- Table A1: Data required by the Inquiry for each offered class of surge arrester
- Table A2: Test certificates
- Table B: Data required by the Technical Description ND-399
    - B.1: Surge arrester 10 kA (DH class)
    - B.2: Surge arrester 5 kA (DM class)
    - B.3: Steel mounting assembly (if it is included in the purchase)

9.3. DRAWING 1

Surge arrester mounting on the transformer tank

9.4. DRAWING 2

Surge arrester mounting assembly on the cross arms

ANNEX 1

(Paragraph 9.1. of the Technical Description HEDNO ND–399)

PART B OF THE TENDER INQUIRY "TECHNICAL OFFER"

Part B "Technical Offer" of the Inquiry contains:

13.2.B.1. Quantity and type of the offered materials. For this purpose, bidders should fill in the Technical Offer Exemplar, according to the corresponding Annex of the Inquiry.

13.2.B.2. Location and factory of manufacture of the offered surge arresters, as well as the inspection location.

13.2.B.3. Compliance declaration of the offered surge arresters with the requirements of the present Technical Description.

13.2.B.4. Declaration of the manufacturing factory of the offered surge arresters accompanied with detailed information (mailing address, personnel employed, brief description of facilities, description of ability to perform tests, etc.). The factory shall have sufficient measuring and quality control equipment.

13.2.B.5. ISO 9001 certificate of the manufacturing factory of the offered surge arresters covering the production field of the materials under purchase. It is noticed that the bidder shall submit communication data of the certification body as well as any other relevant data requested during the technical evaluation which shall facilitate the verification of ISO 9001 certification validity.
Furthermore, bidders shall include a declaration that the manufacturer undertakes the responsibility to proceed with all the necessary actions for ensuring the uninterrupted update of ISO 9001 certificate for the manufacturing factory, throughout the duration of any Contract with HEDNO SA.

13.2.B.6. Completed the Table for the implementation of the REACH Regulation of the EU or a declaration that the materials offered do not fall under the provisions of the REACH Regulation in accordance with the corresponding ANNEX of the Inquiry.

13.2.B.7. Declaration of the offered surge arresters type and of the metal oxide discs type and manufacturing factory.

13.2.B.8. Test certificates for all required type tests described in par. 6.1 of the present TD for every offered surge arrester, in accordance to the Standard EN 60099-4. Test certificates shall be issued by test laboratories accredited by an independent private or public authority.
Submission of test certificates is not mandatory for bidders that offer MV surge arresters, which have been installed on the network of HEDNO and operate in a satisfactory manner. Repetition of test types, in case of Contract signing, depends on HEDNO's discretion.

13.2.B.9. Drawings of the manufacturer with the detailed designing of the offered surge arrester, namely fully dimensional drawing and legend with the materials used and their treatments. Additionally, the following documents shall be submitted:

- drawings of the lugs used, including description of them and declaration of their manufacturing material.
- full data of the insulating housing used (type of material, characteristics, etc.)
- detailed drawing of the steel mounting assembly (if it is included in the purchase)

13.2.B.10. Documents verifying the manufacturing factory's experience, such as sales catalogues, reference letters (original or copies), copies of contracts (price units are not necessary to be visible) or any other data proving the ability of the manufacturing factory in manufacturing of surge arresters. The documents shall concern the offered or similar materials.
As similar materials are considered metal oxide surge arresters with composite housing, without gaps of equal or higher rated voltage and of equal or higher nominal discharge current.
The documents shall refer to materials manufactured in the factory, where the offered surge arresters will be manufactured.
Submission of the required documents is not mandatory for manufacturers that offer MV surge arresters, which have been installed on the network of HEDNO and operate in a satisfactory manner.

13.2.B.11. Declaration of the disconnecting device type, description of its operation and submission of its current-time curve, drawn in the same sheet with the current-time curve of the 10T fuse, as it is defined in paragraph 5.3.1 of the present TD.

13.2.B.12. Data (technical brochures, test reports, etc.) proving the long term withstand of the insulating mounting bracket against environmental stress (exposure to sunlight, rain, humidity, etc.)

13.2.B.13. Installation, operation and maintenance instructions for the offered surge arresters. One copy of the above mentioned instructions, in the Greek language, shall be delivered with each packing crate.

13.2.B.14. Guarantee of the materials for a period of **three (3)** years after the date of their delivery at HEDNO's warehouses.

13.2.B.15. Bill of lading of the offered material sample.

13.2.B.16. Any further technical data, at the discretion of the bidder.

13.2.B.17. The below Conformity Sheet filled in for the offered materials. In addition to the filled in Conformity Sheet, the bidder shall submit for the Tables B.1 and B.2, documents (technical brochures, test certificates, etc.) that prove the technical characteristics with No 3, 4, 6, 8 and 12.1-12.9. Simple declaration of the manufacturer is not considered sufficient.
For the rest of the technical characteristics the bidder shall submit declarations or drawings.

COMPLIANCE SHEET

It is noted that filling in all data in the tables below is mandatory and all required information shall be provided.

Table A1: Documents required by the Inquiry for each offered surge arrester class

Surge arrester class .....

No	Paragraph of the Inquiry concerning the required documents	Required document to be submitted with the Technical Offer	Submitted document with the Technical Offer	Location in the Technical Offer, where the required document is found
1	13.2.B.2	Location and factory of manufacture of the offered surge arresters, as well as the inspection location		
2	13.2.B.3	Compliance declaration of the offered surge arresters with the requirements of the present Technical Description		
3	13.2.B.4	Detailed information of the manufacturing factory		
4	13.2.B.4	Description of factory's measurement and quality control equipment		
5	13.2.B.5	ISO 9001 certificate of the manufacturing factory		
6	13.2.B.5	Communication data of the certification body which shall facilitate the verification of ISO 9001 certification validity		
7	13.2.B.5	Declaration of uninterrupted update of ISO 9001		
8	13.2.B.6	Completed the table for the implementation of the REACH Regulation of the EU of the corresponding Annex of the Inquiry or declaration that the REACH EU regulation does not fall under the provisions of the REACH Regulation for each of the offered items		
9	13.2.B.6	Material Safety Data Sheets (MSDS) according to REACH Regulation or a declaration that it is not needed by the above regulation to submit MSDS for the offered material, as well as its individual ingredients, for each of the offered items.		
10	13.2.B.7	Declaration of the offered surge arresters type		
11	13.2.B.7	Declaration of the metal oxide discs type and manufacturing factory		
12	13.2.B.9	Drawings of the manufacturer with the detailed designing of the offered product; fully dimensional drawing and		

		legend with the materials used and their treatments		
13	13.2.B.9	Drawings of the lugs used, including description of them and declaration of their manufacturing material.		
14	13.2.B.9	Full data of the insulating housing used (type of material, characteristics, etc.)		
15	13.2.B.9	Detailed drawing of the mounting assembly (if it is included in the purchase)		
16	13.2.B.10	Documents verifying the manufacturing factory's experience for the offered surge arresters		
17	13.2.B.10	Documents verifying the manufacturing factory's experience for similar materials and data that prove that the documents refer to similar materials		
18	13.2.B.10	Contract copies with HEDNO for the supply of the offered surge arresters, in case of exemption of submission of the required documents		
19	13.2.B.11	Declaration of the disconnecting device type		
20	13.2.B.11	Description of the disconnecting device operation		
21	13.2.B.12	Data (technical brochures, test reports, etc.) which prove the long term withstand of the insulating bracket against environmental stress (exposure to sunlight, rain, humidity, etc.)		
22	13.2.B.13	Installation, operation and maintenance instructions		
23	13.2.B.13	Declaration that one copy of the above mentioned instructions, in the Greek language, will be delivered with each packing crate		
24	13.2.B.14	3 years guarantee		
25	13.2.B.15	Sample bill of lading		
26	13.2.B.16	Any further technical data		

Table A2: Test certificates

No	Paragraph of the Inquiry concerning the required data	Required test certificate to be submitted	Number and issue date of the test certificates / Name of test laboratory that issued the test certificate	Manufacturing factory name and material type subjected to the test (as mentioned on the test certificate)	Location (paragraph) of test certificate, where the test procedure is described	Data that prove that the test laboratory that issued the certificate is accredited by an independent private or public authority
25	13.2.B.8	Tests on the surge arrester				
		Contract copies with HEDNO for the supply of the offered surge arresters, in case of exemption of submission of test certificates				
25.1	6.1.1	Insulation withstand tests on the arrester housing				
25.2	6.1.2	Residual voltage tests				
25.3	6.1.3	Test to verify long term stability under continuous operating voltage				
25.4	6.1.4	Test to verify the repeptitive charge transfer rating (Q_{rs})				
25.5	6.1.5	Heat dissipation behavior verification of test sample				
25.6	6.1.6	Operating duty tests				
25.7	6.1.7	Power frequency voltage versus time characteristics				
25.4	6.1.8	Tests of arrester disconnector				
25.5	6.1.9	Short-circuit tests				
25.6	6.1.10	Test of the bending moment				
25.7	6.1.11	Tests to verify the dielectric withstand of the internal components of an arrester				
25.8	6.1.12	Weather ageing test				
26	6.1.13	Tests on the insulated mounting bracket				
26.1	6.1.13.1	Dielectric test				
26.2	6.1.13.2	Flammability test				

Table B: Data required by the Technical Description ND-399

B.1. Surge arrester 10 kA (DH class)

Bidders, in addition to the filled in Table B, shall submit:

- Documents (technical brochures, test reports, etc.) that prove the technical characteristics with No 3, 4, 6, 8 and 12.1-12.9.
- Declarations or drawings that prove the rest of the technical characteristics.

Surge arrester type: .....

No	Technical characteristic or required data	Paragraph of the Technical Description ND-399	Specified value of technical characteristic or technical requirement	Technical characteristic of offered material	Submited document proving the correspondent technical characteristic	Location in the Technical Offer, where the required document is found
1	Standards - Specifications	4	To be filled in			
2	Operating conditions	3.1				
	Maximum ambient air temperature		+40 ° C			
	Minimum ambient air temperature		- 40 ° C			
	Maximum mean value of the ambient air temperature measured at a period of 24 hours		+35 ° C			
	Direct exposure to sun, rain, snow and wind		YES			
	Minimum duration of direct exposure to sunlight		2800 h			
3	Housing material	5.2	Silicon rubber			
4	Creepage distance	5.2	670 mm min			
5	Overcoated insulator	5.2	NO			
6	Minimum cantilever strength	5.3.1.5				
	SSL (Specified short-term load)		100 Nm			
	SLL (Specified long-term load)		100 Nm			
7	Disconnecting device	5.3.1.1	YES			
8	Current-time curve of the disconnecting device	5.3.1.1	YES lower than the current-time curve of the 10T fuse (as per ANSI			

			C 37.43), when both curves are plotted on the same logarithmic chart			
9	Lugs	5.3.1.2				
	Type		To be filled in			
	Material		Stainless			
10	Metallic parts	5.3.1.3				
	Material		Stainless steel or tin plated bronze			
	Tin-plating thickness		15 µm min			
11	Insulating bracket	5.3.1.4	YES			
	Distance between the axes of the holes		13 cm min			
12	**Electrical characteristics**	5.1				
12.1	Rated voltage	5.1	21 kV			
12.2	Continuous operating voltage (Vc), minimum value	5.1	16 kV			
12.3	Nominal discharge current, 8/20 µs	5.1	10 kA			
12.4	Maximum residual voltage:	5.1				
	• At nominal discharge current		65 kV			
	• At steel current impulse 1/10 µs		65 kV			
12.5	High current impulse 4/10 µs	5.1	100 kA			
12.6	Repetitive charge transfer rating (Qrs)	5.1	≥0.4 C			
12.7	Thermal charge transfer rating (Q_{th})	5.1	≥1.1 C			
12.8	Insulation withstand of the arrester housing at lightning impulse voltage 1.2/50 µs	5.1	125 kV			
12.9	Insulation withstand of the arrester housing at power frequency voltage under wet conditions, 1 min	5.1	54 kV			
12.10	Reference current and reference voltage at		To be filled in			

	environmental temperature					
13	Tinned copper flexible stranded wire (or braid of circular cross-section) at the disconnecting device	5.3.1.6	YES			
	Minimum cross section		16 mm^2			
	Length		0,70 m min			
	Carries lug with hole		YES			
	Hole diameter		13 mm min			
	The other edge shall be free for the connection with the earthing conductor of pole through a brass split bolt connector		YES			
14	Marking on the surge arrester	7.1.1	• Manufacturer's Name or Trademark • Type and identification code (e.g. serial number) of the surge arrester • Nominal discharge current, in kA • Continuous operating voltage, in kV • Rated voltage, in kV • Contract number • Year of manufacture			
15	Marking on the packing	7.1.2	• Manufacturer's Name or Trademark • Type and identification code (e.g. serial number) of the surge arrester • Nominal discharge current, in kA • Continuous operating voltage, in kV • Rated voltage, in kV • HEDNO code number • Number of pieces • Gross weight in kg • Contract number			

			• Year of manufacture			
16	Packing	8.1	• Wooden crates with 6 surge arresters • Wooden crates in EU pallettes of total weight ≤ 550 kg • The packed wooden crates shall be fastened in the palette with externally plasticised steel foils (lags): at least two (2) vertical in length and two (2) in width (total 4), which shall pass under the palette's woods. Also, if it is necessary, the crates shall be fastened with two (2) horizontal foils			

B.2. Surge arrester 5 kA (DM class)

Bidders, in addition to the filled in Table B, shall submit:

- Documents (technical brochures, test reports, etc.) that prove the technical characteristics with No 3, 4, 6, 8 and 12.1-12.9.
- Declarations or drawings that prove the rest of the technical characteristics.

Surge arrester type: .....

No	Technical characteristic or required data	Paragraph of the Technical Description ND-399	Specified value of technical characteristic or technical requirement	Technical characteristic of offered material	Submited document proving the correspondent technical characteristic	Location in the Technical Offer, where the required document is found
1	Standards - Specifications	4	To be filled in			
2	Operating conditions	3.1				
	Maximum ambient air temperature		+40 ° C			
	Minimum ambient air temperature		- 40 ° C			
	Maximum mean value of the ambient air temperature measured at a		+35 ° C			

	period of 24 hours					
	Direct exposure to sun, rain, snow and wind		YES			
	Minimum duration of direct exposure to sunlight		2800 h			
3	Housing material	5.2	Silicon rubber			
4	Creepage distance	5.2	670 mm min			
5	Overcoated insulator	5.2	NO			
6	Minimum cantilever strength	5.3.1.5				
	SSL (Specified short-term load)		100 Nm			
	SLL (Specified long-term load)		100 Nm			
7	Disconnecting device	5.3.1.1	YES			
8	Current-time curve of the disconnecting device	5.3.1.1	YES lower than the current-time curve of the 10T fuse (as per ANSI C 37.43), when both curves are plotted on the same logarithmic chart			
9	Lugs	5.3.1.2				
	Type		To be filled in			
	Material		Stainless			
10	Metallic parts	5.3.1.3				
	Material		Stainless steel or tin plated bronze			
	Tin-plating thickness		15 µm min			
11	Insulating bracket	5.3.1.4	YES			
	Distance between the axes of the holes		13 cm min			
12	**Electrical characteristics**	5.1				
12.1	Rated voltage	5.1	21 kV			
12.2	Continuous operating voltage (Vc), minimum value	5.1	16 kV			
12.3	Nominal discharge current, 8/20 µs	5.1	5 kA			
12.4	Maximum residual voltage:	5.1				

	• At nominal discharge current		65 kV			
	• At steel current impulse 1/10 µs		65 kV			
12.5	High current impulse 4/10 µs	5.1	65 kA			
12.6	Repetitive charge transfer rating (Qrs)	5.1	≥0.2 C			
12.7	Thermal charge transfer rating (Q_{th})	5.1	≥0.7 C			
12.8	Insulation withstand of the arrester housing at lightning impulse voltage 1.2/50 µs	5.1	125 kV			
12.9	Insulation withstand of the arrester housing at power frequency voltage under wet conditions, 1 min	5.1	43 kV			
12.10	Reference current and reference voltage at environmental temperature		To be filled in			
13	Tinned copper flexible stranded wire (or braid of circular cross-section) at the disconnecting device	5.3.1.6	YES			
	Minimum cross section		16 mm^2			
	Length		0,70 m min			
	Carries lug with hole		YES			
	Hole diameter		13 mm min			
	The other edge shall be free for the connection with the earthing conductor of pole through a brass split bolt connector		YES			
14	Marking on the surge arrester	7.1.1	• Manufacturer's Name or Trademark • Type and identification code (e.g. serial number) of the surge arrester • Nominal discharge current, in kA			

			• Continuous operating voltage, in kV • Rated voltage, in kV • Contract number • Year of manufacture			
15	Marking on the packing	7.1.2	• Manufacturer's Name or Trademark • Type and identification code (e.g. serial number) of the surge arrester • Nominal discharge current, in kA • Continuous operating voltage, in kV • Rated voltage, in kV • HEDNO code number • Number of pieces • Gross weight in kg • Contract number • Year of manufacture			
16	Packing	8	• Wooden crates with 6 surge arresters • Wooden crates in EU palettes of total weight ≤ 550 kg • The packed wooden crates shall be fastened in the palette with externally plasticised steel foils (lags): at least two (2) vertical in length and two (2) in width (total 4), which shall pass under the palette's woods. Also, if it is necessary, the crates shall be fastened with two (2) horizontal foils			

B.3. Steel mounting assembly (if it is included in the purchase)

No	Technical characteristic or required data	Paragraph of the Technical Description ND-399	Specified value of technical characteristic or technical requirement	Technical characteristic of offered material	Submited document proving the correspondent technical characteristic	Location in the Technical Offer, where the required document is found
1	Standards specifications	4	To be filled in			
2	Mounting assembly	5.3.2	In accordance with par. 5.3.2			
3	Marking on the steel mounting assembly	7.2.1	• Contract number • Year of manufacture			
4	Marking on the packing	7.2.2	• Manufacturer's Name or Trademark • HEDNO code number • Number of pieces • Gross weight in kg • Contract number • Year of manufacture			
5	Packing	8.2	• Wooden crates with a number of mounting assemblies multiple of 6 • Maximum weight of crate 25 kg • Wooden crates in EU palettes of total weight ≤ 550 kg • The packed wooden crates shall be fastened in the palette with externally plasticised steel foils (lags): at least two (2) vertical in length and two (2) in width (total 4), which shall pass under the palette's woods. Also, if it is necessary, the crates shall be fastened with two (2) horizontal foils			

HEDNO TECHNICAL DESCRIPTION
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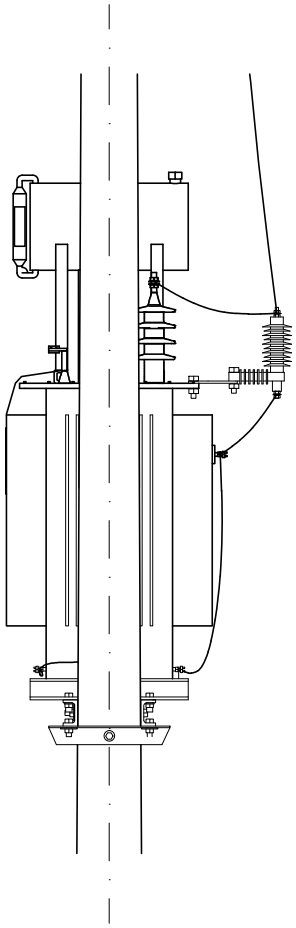
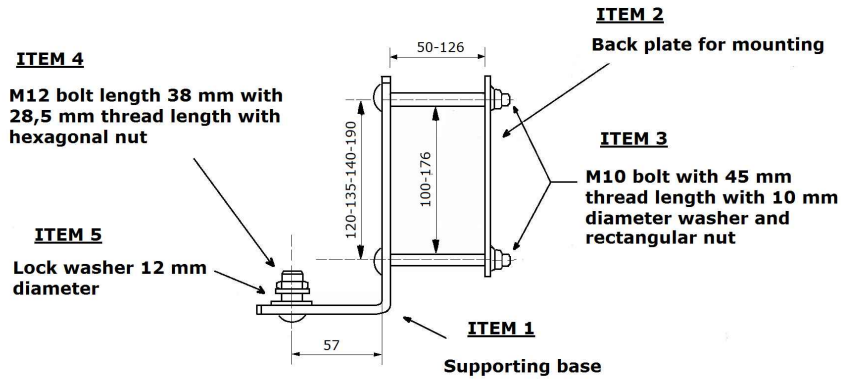


DRAWING TITLE	DRAWING No
Surge Arrester Mounting on the Transformer Tank	1

MOUNTING ASSEMBLY



NOTES

All the dimensions are in mm

DRAWING TITLE	DRAWING No
Surge Arrester Mounting Assembly on the cross arms	2