MODEL	TAM

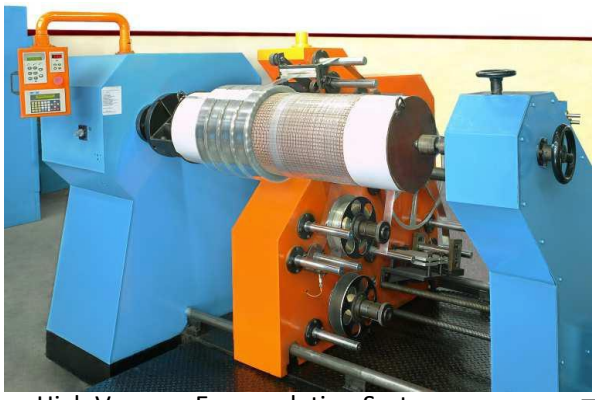
CAST RESIN TRANSFORMERS - TAM TYPE

Epoxy cast resin dry-type transformers are recommended to operate in places that require security, the materials used in its construction are hard to combust and are self-extinguishable in case of a fire, they don't explode or release toxic gases. Its installation is considerably more economic than its similar mineral oil-immersed versions, because they dispense with fire-proof masonry whereas retention tanks for liquid collection still occupy smaller spaces. They can be installed in mobile machines/devices, thus making use of a lesser volume of low tension conductors and reducing the tension shortage with the loss of energy dissipated by the cables.
They're practically maintenance-free and are not affected by humidity. The constructive type assures a high mechanical resistance to short circuits, and a low level of noise as well. They offer high fault resistance and, by means of forced ventilation, they can increase the nominal capacity of up to 40%. They present a low level of partial discharges (practically exempt). They don't offer any kind of environmental restrictions.

They are appropriate for indoor installations in subways, railroads, airports, nuclear and industrial installations, hospitals, laboratories, movie theaters, residential and commercial buildings, shopping malls, etc.

DETAILS OF THE CONSTRUCTION

The cores are built with grain-oriented silicon-iron sheets and assembled in a steplap.
The windings are made of electrolytic aluminum with a purity superior to 99.5%, with the low tension made by sheets of axial dimension to the end coil with F class insulation and high tension with aluminum strips and it is cast in epoxy resin under an F class high vacuum.



High Vacuum Encapsulation System

For the transformer's protection system, it uses a digital temperature indicator wired to a sensor inserted into the low tension winding. This indicator is provided by relay contacts to alarm, disconnection and activation of the forced ventilation system.

These transformers are manufactured with a degree of IP00 protection and they can be optionally provided with a metallic IP20 cabinet or superior.

TYPICAL CHARACTERISTICS:

Standards: NBR 10295

Power: 75; 112.5; 150; 225; 300; 500; 750; 1000; 1500; 2000; 2500; 3000; 5000; 7500; 10.000 and 15.000 kVA, other power ratings upon request

Classes of stress: 7.2; 15; 24.2 and 36.2 kV

Basic impulse level of the class: 15 kV : 95 kV and 110 kV

REGULAR ACCESSORIES:

Terminals for connection of the AT/BT terminals

Grounding terminals

Suspension means for the active part and the casing, when applicable

Bi-directional wheels

OPTIONAL ACCESSORIES:

Forced ventilation system

Protection Cubicle

Electrostatic Armor

Disconnecting Bushings

Protection system and thermal monitoring of the windings

DIFFERENT FEATURES UPON REQUEST:

Ratings, tensions, temperature class and special applications.

TESTS:

The routine trials that are conducted on all production units are the following:

a. Electric resistance of the windings;

b. Stress/Strain relationships;

c. Insulation resistance;

d. Polarity;

e. Angular displacement and sequence of stages;

f. Losses (empty and charge);

g. Chain of excitation;

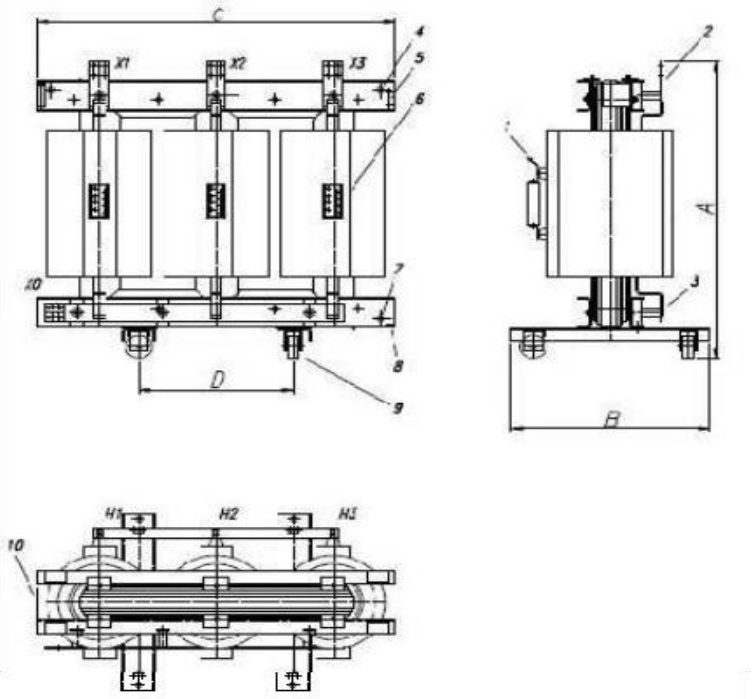
h. Short-circuit impedance;

i. Dielectric tests;

- Nominal supportable stress to the industrial frequency (applied stress);

- Induced stress;

j. Checking of the functions of the accessories;



1 - A.T. Terminal

2 - B.T. Terminal

3 - Neutral

4 – Lug for suspension

5 - Posts of the temperature sensor

6 – Derivation panel

7 – Traction lug

8 – Grounding terminal

9 - Bi-directional wheels

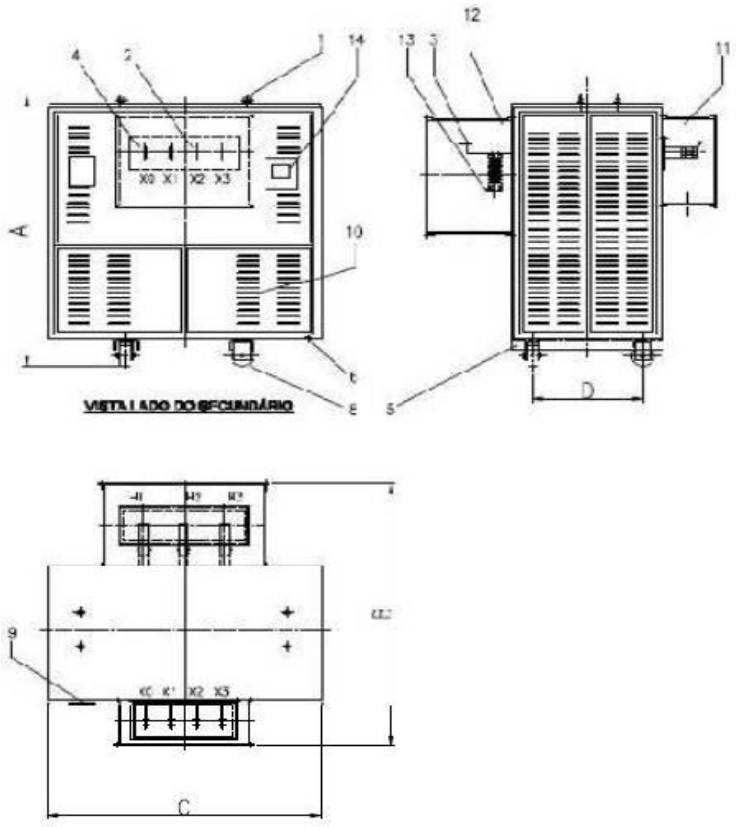
10 – Identification plate

ACCESSORIES INCLUDED	OPTIONAL ACCESSORIES
Bi-directional smooth wheels	Electrostatic Armor
Traction holes	AT and BT connectors
Temperature sensor	Bushings AT 15 kV plug-in type
Grounding Connector	Forced ventilation
	IP20 Circuit Breaker Box
	Digital temperature indicator with contacts
	Wheels for rail

DIMENSIONS AND APPROXIMATE WEIGHT

High Tension up to 15kV and Low Tension shorter than 4000 A

Power Ratings	Length.	Width	Distance of Wheels	Height	Weight
kVA	L - mm	W - mm	D - mm	H - mm	kg
300	1300	820	630	1450	1190
500	1470	850	650	1590	1580
750	1490	850	650	1780	1850
1000	1600	1000	820	1850	2350
1500	1780	1100	900	1900	3100
2000	1900	1250	1000	2100	4100
2500	1950	1250	1000	2180	5000
3000	2050	1360	1100	2300	5900



1 – Lug for lifting/suspension of the complete transformer

2 - B.T. Output Terminal - Mater.: Aluminum

3 - A.T. Output Terminal - Mater.: Copper

4 – Neutral Terminal - Mater.: Aluminum

5 – Traction lug

6 – Grounding terminals

7 – Access to derivation panel

8 – Bi-directional wheels

9 – Identification plate

10 – Ventilation air ducts

11 - B.T. Flange

12 - A.T. Flange

13 - A.T. Wall Bushing - Mater.: Epoxy

14 – Case with temperature thermometer

ACCESSORIES INCLUDED	OPTIONAL ACCESSORIES
Bi-directional smooth wheels	Electrostatic Armor
Traction holes	AT and BT connectors
Temperature sensor	Bushings AT 15 kV plug-in type
Grounding Connector	Forced ventilation
	IP20 Circuit Breaker Box
	Digital temperature indicator with contacts
	Wheels for rail

DIMENSIONS AND APPROXIMATE WEIGHT

High Tension up to 15kV and Low Tension less than 4000 A

Ratings	Length.	Width	Wheel Distance	Height	Weight
kVA	L - mm	W - mm	D - mm	H - mm	kg
300	1700	1000	630	1870	1400
500	1850	1100	650	2000	1900
750	1900	1200	650	2150	2250
1000	2000	1300	820	2200	2800
1500	2180	1300	900	2300	3650
2000	2300	1400	1000	2500	4700
2500	2400	1400	1000	2600	5700
3000	2500	1600	1100	2750	6700

1st NUMERAL CHARACTERISTIC: DEGREE OF PROTECTION AGAINST UNIDENTIFIED SOLID OBJECTS	2nd NUMERAL CHARACTERISTIC: DEGREE OF PROTECTION AGAINST PENETRATION OF WATER WITH HARMFUL EFFECTS						
	0	1	2	3	4	5	8
	Non-protected	Protected against water drops falling vertically	Protected against water drops falling vertically when the case is angled up to 15°	Protected against water spraying	Protected against water projection	Protected against water jets	Protected against the effects of continuous immersion in water
Non-protected	0	IP-00	IP-01	IP-02	--	--	--	--
Protected against unidentified solid objects from Ø 50 mm and larger	1	IP-10	IP-11	IP-12	IP-13	--	--	--
Protected against unidentified solid objects from Ø 12.5 mm and larger	2	IP-20	IP-21	IP-22	IP-23	--	--	--
Protected against unidentified solid objects from Ø 2.5 mm and larger	3	IP-30	IP-31	IP-32	IP-33	IP-34	--	--
Protected against unidentified solid objects from Ø 1 mm and larger	4	IP-40	IP-41	IP-42	IP-43	IP-44	IP-45	--
Protected against deposits of dust inside the equipment	5	IP-50	IP-51	IP-52	IP-53	IP-54	IP-55	--
Absolute protection against penetration of dust in the equipment	6	IP-60	IP-61	IP-62	IP-63	IP-64	IP-65	--

MININUM EXTERNAL SPACING FOR DRY-TYPE TRANSFORMERS

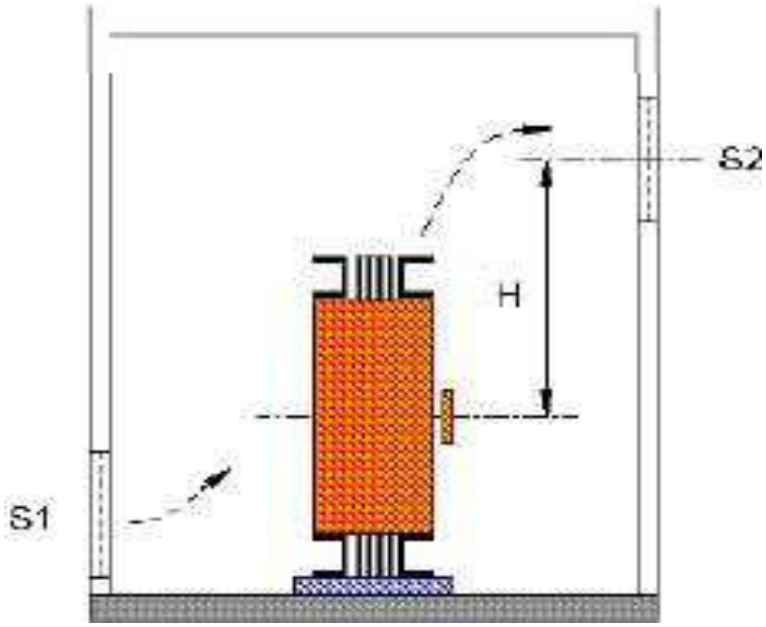
Class of Equipment Stress (kV) Effective	Class of Atmospheric Impulse (kV)	Minimum Spacing PHASE-GROUND (mm)	Minimum Spacing PHASE-PHASE (mm)
0.6	--	25	25
1.2	--	25	25
7.2	40	45	60
	60	65	90
15	95	130	160
	110	150	200
24.2	125	170	220
	150	200	280
36.2	150	200	280
	170	240	320
	200	300	380

INSTALLATION

They dispense with explosion-proof and fire-resistant walls, the transformers and their cables must be installed considering the minimum distances required and expected in the standards according to the class of stress.

VENTILATION

In order to project the ventilation of the room where the transformer was installed, it's important to take its total losses into consideration, which are expressed in the form of heat, which in turn increases the room temperature, which must be sufficiently spacious to allow the exit of hot air, in most cases it is possible to adopt a simple solution with one air entrance.
Cold in the lower part and a hot air exit in the upper part, according to the following scheme, the use of filters is recommended in order to limit the entrance of dust.



Obs.: for further information and details, it's necessary to refer to the installation manual that comes with the transformer.