Power-frequency withstand test on secondary winding

Test voltage level:	**2.7 kV**
Test voltage frequency:	50 Hz
Test duration:	60 s

Result: **CORRECT**, there are neither disruptive discharges nor damage in the insulation.

На основание чл.36а ал.3 от ЗОП

c) Determination of errors after the test

Burden (VA)	% Vn		Voltage error (%)		Displacement (minutes)	
			Measured	± Limit	Measured	± Limit
20 (100%)	120	before	-0.07	±0.1	+6	±5
		after	-0.07		+5	
		difference	+0		-1	
	100	before	-0.02	±0.1	+2	±5
		after	-0.02		+2	
		difference	+0		+0	
	80	before	-0.00	±0.1	+2	±5
		after	-0.00		+2	
		difference	+0		+0	
5 (25%)	120	before	+0.10	±0.1	+5	±5
		after	+0.12		+5	
		difference	+0.02		+0	
	100	before	+0.16	±0.1	+2	±5
		after	+0.17		+2	
		difference	+0.01		+0	
	80	before	+0.17	±0.1	+2	±5
		after	+0.19		+1	
		difference	+0.02		-1	

Result: **CORRECT**, the errors do not differ from those recorded before the test by more than half the limits of error in its accuracy class.

На основание чл.36а ал.3 от ЗОП

5. ROUTINE TESTS

5.1. Verification of terminal markings

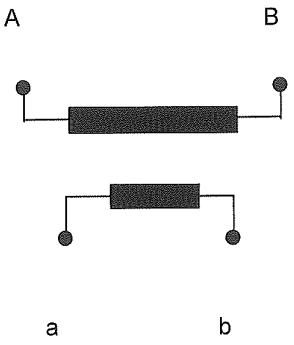
It has been verified that terminal marking is correct.

The capital letters denote the primary-winding terminals and the lower-case letters denote the corresponding secondary-winding terminals.

The letters A and B denote fully insulated terminals.

Terminals are identified according to standard, with the following letters:

Primary: A-B
Secondary: a-b



Terminals having corresponding capital and lower-case markings have the same polarity at the same instant.

Result: **CORRECT.**

На основание чл.36а ал.3 от ЗОП

5.2. Power-frequency withstand test on primary winding

Power-frequency withstand test is performed according to IEC 60060-1.

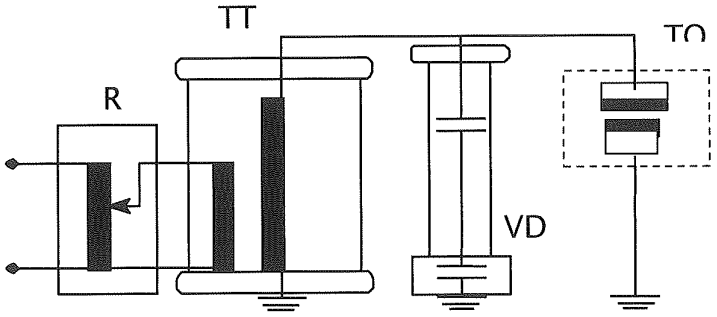
The transformer has been submitted to the following tests:

a) Separate source withstand voltage test

The test voltage is applied between the two primary winding terminals connected together and earth. The frame and the two terminals of the secondary winding are connected together and to earth.

Test voltage level:	**28 kV**
Test voltage frequency:	50 Hz
Test duration:	60 s

Test scheme:



R: Regulator	TT: Test transformer
VD: Voltage divider	TO: Test Object

Result: **CORRECT**, there are neither disruptive discharges nor damage in the insulation.

На основание чл.36а ал.3 от ЗОП

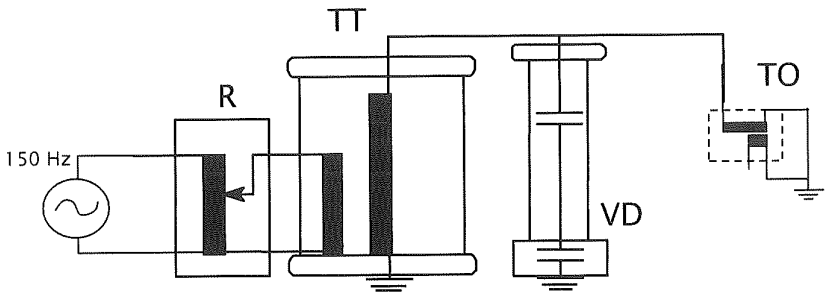
b) Induced voltage withstand test

The test is carried out exciting successively each terminal of the primary winding directly at the specified test voltage. The frame, the other terminal of the primary winding and one terminal of the secondary winding are connected together and to earth. The test voltage is measured at the high voltage side.

The frequency of the test is increased above the rated value to prevent saturation of the core and the duration of the test is reduced from 60 s according to the standard.

Test voltage level:	**28 kV**
Test voltage frequency:	150 Hz
Test duration:	40 s (20 s for each terminal of the primary winding)

Test scheme:



R: Regulator
VD: Voltage divider
TT: Test transformer
TO: Test object

Result: **CORRECT**, there are neither disruptive discharges nor damage in the insulation.

На основание чл.36а ал.3 от ЗОП

5.3. Partial discharge measurement

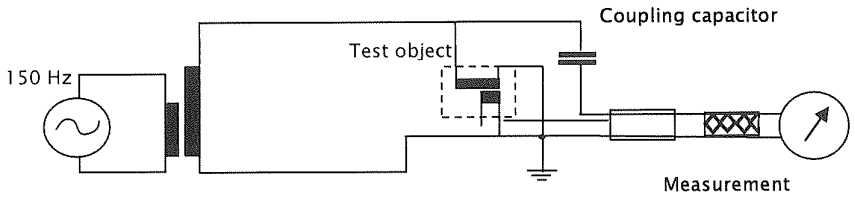
The test circuit and the instrumentation used are in accordance with IEC 60270. The instrument measures the apparent charge q expressed in pC and its calibration is performed in the test circuit.

The test is performed according to procedure A: the partial discharge test voltages are reached while decreasing the voltage after the induced voltage withstand test (28 kV, 20 s for each terminal of the primary winding, 150Hz).

After prestressing, the specified partial discharge test voltage is reached and the corresponding partial discharge levels are measured in a time within 30 s.

Test voltage has been selected for the highest voltage of equipment:
Um = 12 kV

Test scheme:



Test voltage (kV)	t (s)	Measurement (pC)		Limit (pC)
		A	B	
1.2 x Um	30	2	17	20

Background noise: 1 pC

Result: **CORRECT**, the measured partial discharge levels do not exceed the limits specified in standard.

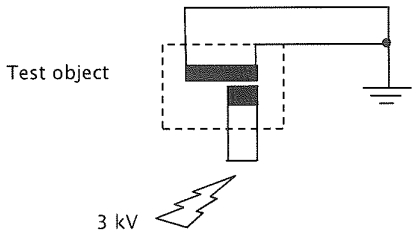
На основание чл.36а ал.3 от ЗОП

5.4. Power-frequency withstand test on secondary winding

The test voltage is applied between the short-circuited terminals of the secondary winding and earth. The frame and the terminals of the primary winding are connected together and to earth.

Test voltage level:	**3 kV**
Test voltage frequency:	50 Hz
Test duration:	60 s

Test scheme:



Result: **CORRECT**, there are neither disruptive discharges nor damage in the insulation.

На основание чл.36а ал.3 от ЗОП

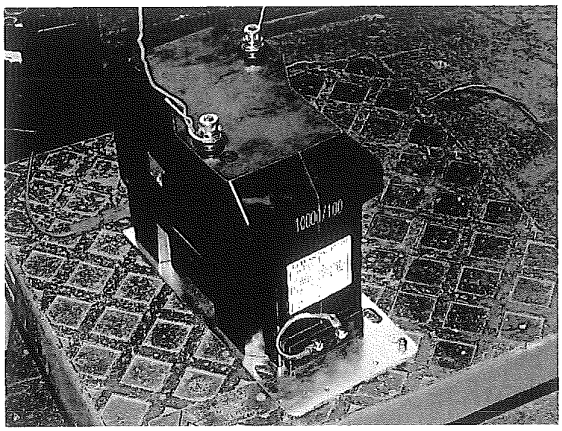
6. SUMMARY OF RESULTS

The tests performed on the transformer without the sticker result has follows:

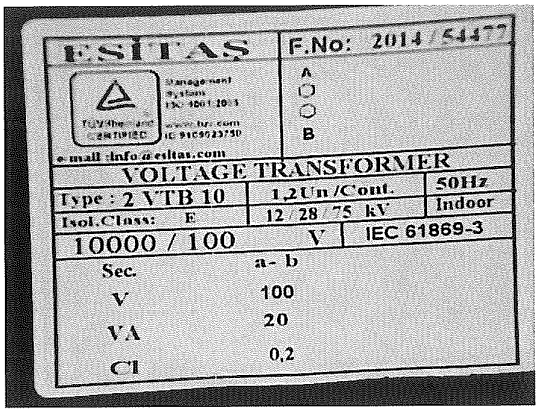
TEST	RESULT
TYPE TESTS	
Short-circuit withstand capability test	CORRECT
Temperature-rise test	CORRECT
Lightning impulse test	CORRECT
Determination of errors	CORRECT
ROUTINE TESTS	
Verification of terminal markings	CORRECT
Power-frequency withstand test on primary winding	CORRECT
Partial discharge measurement	CORRECT
Power-frequency withstand test on secondary winding	CORRECT

На основание чл.36а ал.3 от ЗОП

7. ANNEX

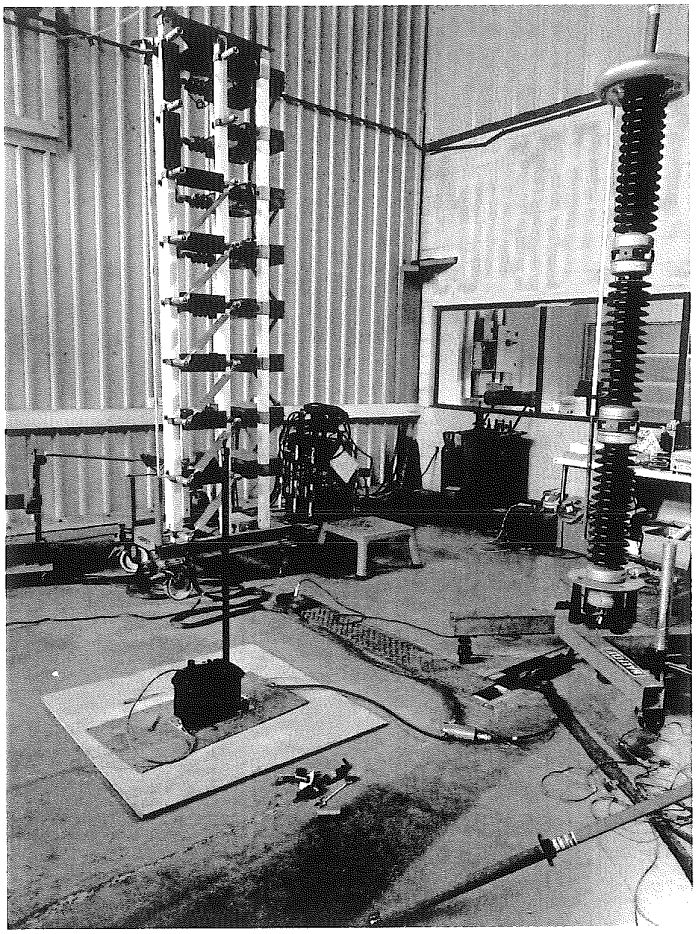


Test object



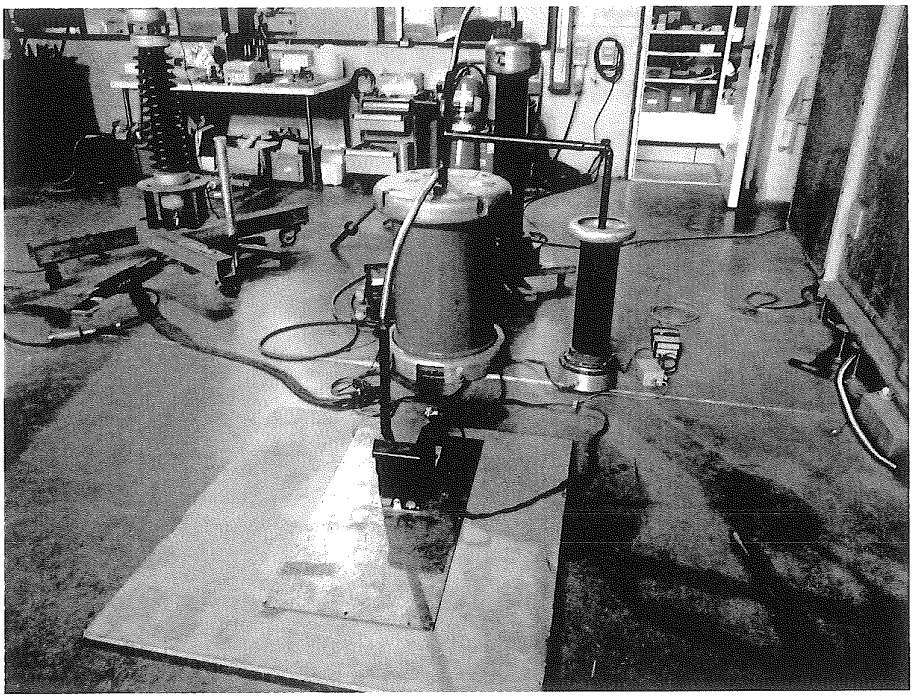
Ratings plate

На основание чл.36а ал.3 от ЗОП

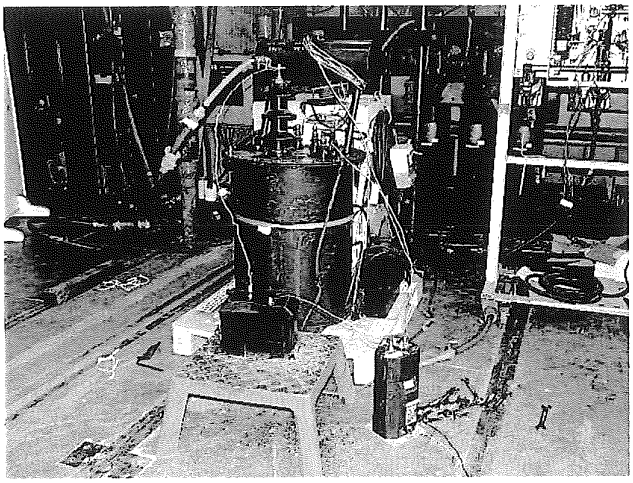


Lightning impulse test

На основание чл.36а ал.3 от ЗОП

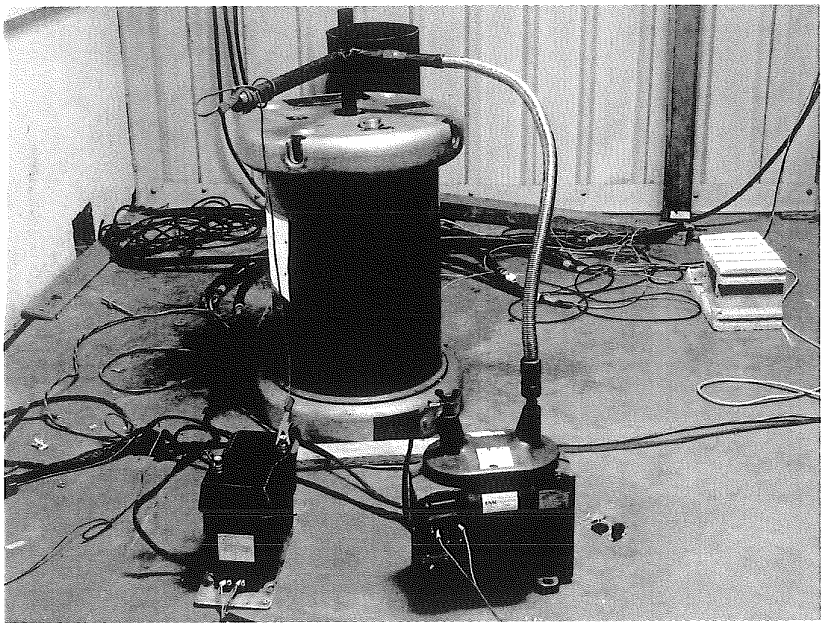


Test layout. Power frequency withstand test on primary winding.



Test layout. Short circuit test.

На основание чл.36а ал.3 от ЗОП



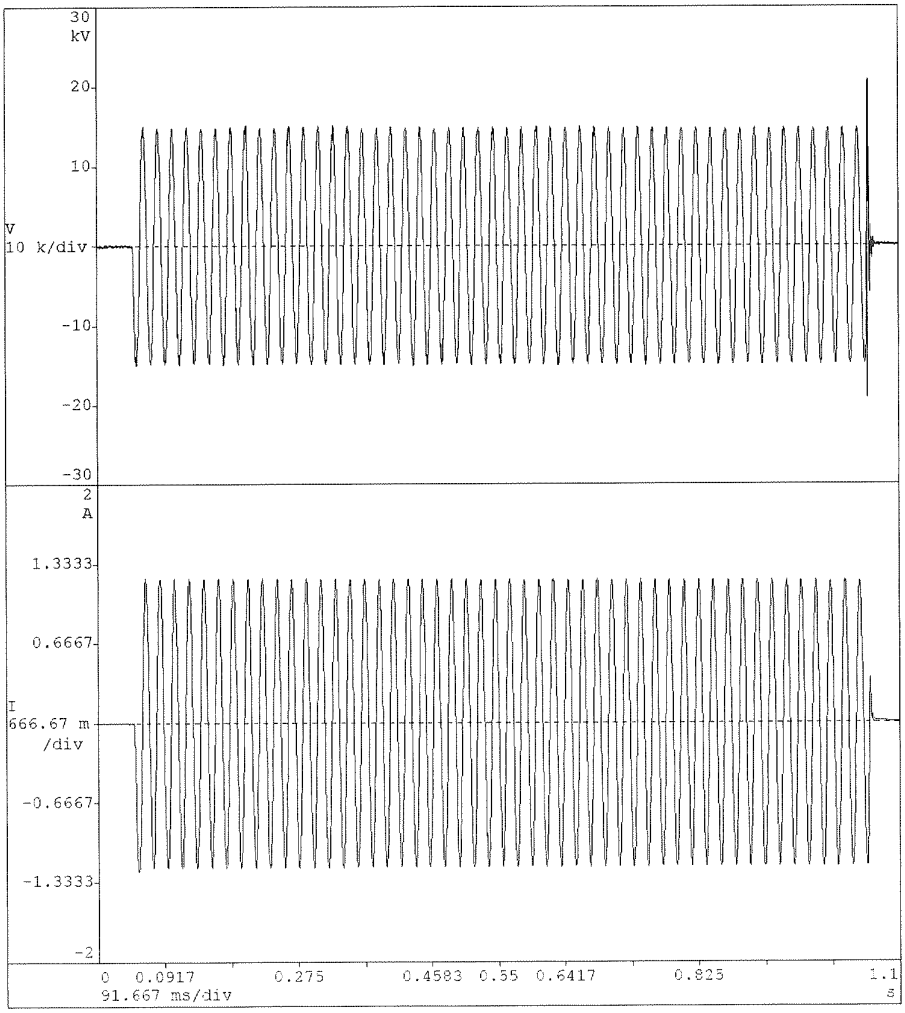
Determination of errors test

$V_{(eficaz/RMS)}$	10489.24 V
$I_{(eficaz/RMS)}$	0.852 A
$I_{(cresta/peak)}$	1.246 A
$I^2.t$	7.33E-01 AAs
t_i	0.049 s
t_e	1.061 s
t_{total} (t_e-t_i)	1.011 s

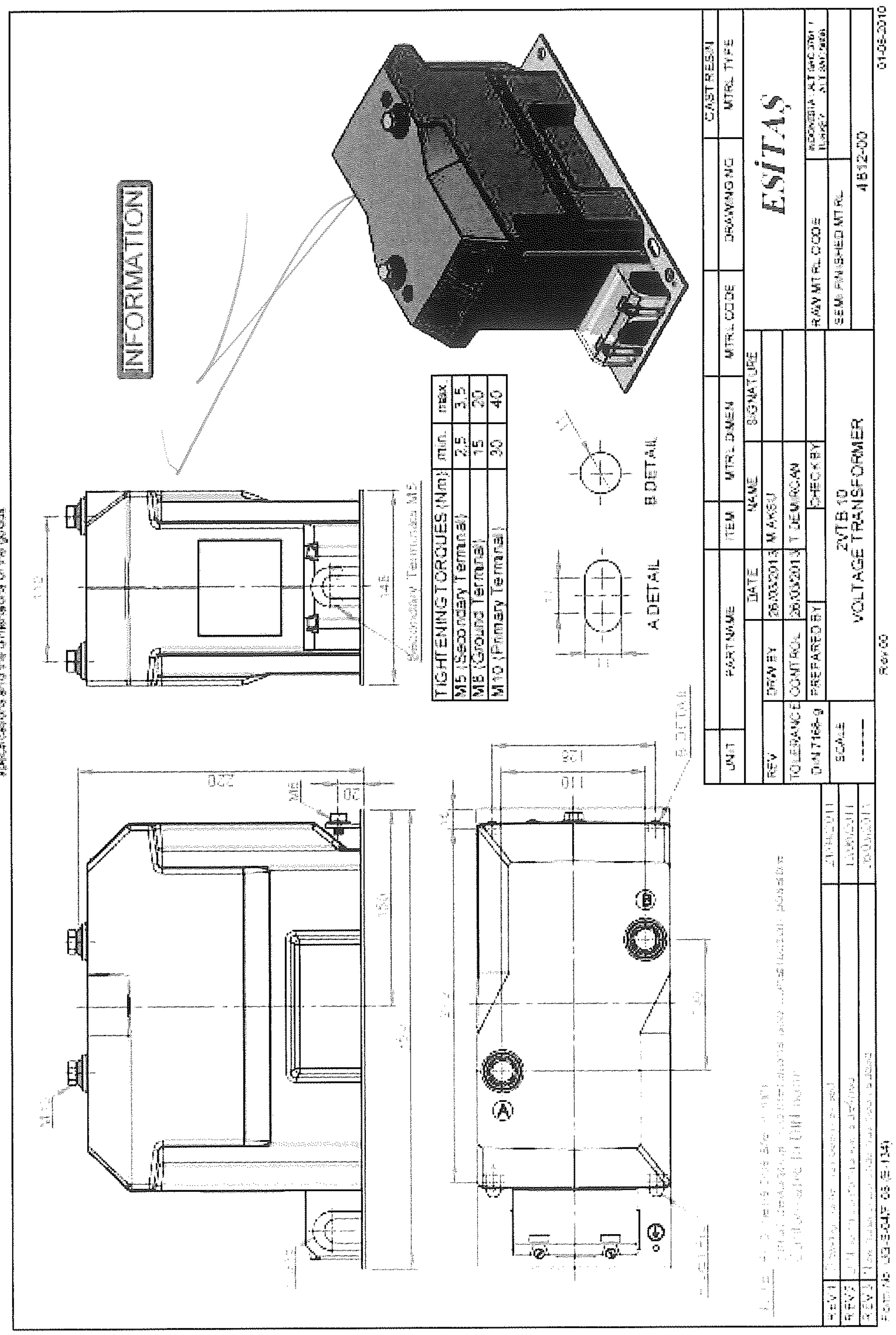
Fecha / Date: 15/07/14

Nº EXPEDIENTE: B26-14-BI

Nº OSCILOGRAMA: 21



На основание чл.36а ал.3 от ЗОП



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На основание чл.36а ал.3 от ЗОП

ПРИЛОЖЕНИЕ 8

На основание чл.36а ал.3 от ЗОП

Este documento es una versión bilingüe español-inglés, realizada por TECNALIA, del anexo técnico original emitido en español (Rev. 22, 24/04/2015) de la acreditación 4/LE148.
This document is an English-Spanish version, prepared by TECNALIA, of the original technical annex issued in Spanish (Rev. 22, 2015/04/24) of the accreditation 4/LE148.

ANEXO TÉCNICO
TECHNICAL ANNEX

ACREDITACIÓN Nº 4/LE148
ACCREDITATION No. 4/LE 148

Entidad / *Organization*: FUNDACIÓN TECNALIA RESEARCH & INNOVATION

Sede / *Address* Derio: Parque Científico y Tecnológico de Bizkaia, C/ Geldo, Edificio 700;
48160 Derio (Vizcaya)
Sede / *Address* Zamudio: Parque Científico y Tecnológico de Bizkaia, Laida Bidea, Edificio 413;
48170 Zamudio (Vizcaya)

Norma de referencia / *Standard Reference*: UNE-EN ISO/IEC 17025: 2005 (CGA-ENAC-LEC)

Ensayos en las siguientes áreas / *Tests in the following areas*::

Sede / *Address* Derio

Ensayos ambientales / *Environmental testing*

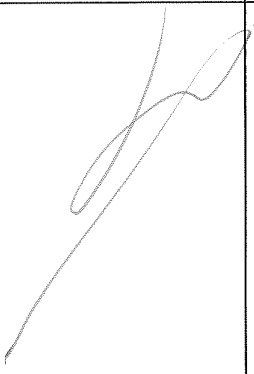
Categoría 0 (Ensayos en el laboratorio permanente) / *Category 0 (Tests in the permanent laboratory)*

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Ensayos ambientales en equipos eléctricos y electrónicos / *Environmental testing in electric and electronic equipment*		
Equipos y componentes eléctrico-electrónicos / *Electrical and electronic equipment and components*	Frío: Ensayos Ab, Ad y Ae. Temperatura mínima: -40°C Volumen máximo del espécimen: 0,6 m^3 *Cold: Tests Ab, Ad and Ae* *Minimum temperature: -40ºC* *Maximum volume of the specime*	UNE-EN 60068-2-1:2007

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
	Calor seco: Ensayos Bb, Bd y Be. Temperatura máxima: 85°C Volumen máximo del espécimen: 0,6 m^3 *Dry heat: Tests Bb, Bd and Be* *Maximum temperature: 85ºC.* *Maximum volume of the specimen:0.6 m^3*	UNE-EN 60068-2-2:2008
	Ensayo cíclico de calor húmedo (ciclos de 12+12 h). Ensayo Db. Volumen máximo del espécimen: 0,6 m^3 *Damp heat, cyclic (12 h + 12 h cycle). Test Db* *Maximum volume of the specimen:0.6 m^3*	UNE-EN 60068-2-30:2006
	Calor húmedo, ensayo continuo. Ensayo Cab Volumen máximo del espécimen: 0,2 m^3 *Damp heat, steady state: Test Cab* *Maximum volume of the specimen:0.2 m^3*	UNE-EN 60068-2-78:2013
	Variación de temperatura, Ensayo Na. Rango de temperaturas: -40°C a 85°C Volumen máximo del espécimen: 0,2 m^3 *Change of temperature Test Na.* *Temperature range: -40°C a 85°C* *Maximum volume of the specimen: 0.2 m^3*	UNE-EN 60068-2-14:2011
	Vibración sinusoidal. Ensayo Fc. Dimensiones del espécimen inferiores a: 0,6x0,6x0,3 m. Peso inferior a 25 kg Aceleraciones hasta 30 g Frecuencias de 1 a 2000 Hz *Vibration (sinusoidal): Test Fc* *Dimensions of the specimen less than 0.6x0.6x0.3 m* *Weight less than 25 kg* *Accelerations up to 30 g* *Frequencies from 1 to 2000 Hz*	UNE-EN 60068-2-6:2008
	Choques. Ensayo Ea Dimensiones del espécimen inferiores a: 0,6x0,6x0,3 m. Peso inferior a 25 kg *Shock: Test Ea* *Dimensions of the specimen less tan 0.6x0.6x0.3 m* *Weight less than 25 kg*	UNE-EN 60068-2-27:2011

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
	Vibración aleatoria de banda ancha. Ensayo Fh Dimensiones del espécimen inferiores a: 0,6x0,6x0,3 m. Peso inferior a 25 kg Aceleraciones RMS hasta 10 m/s^2 Frecuencias de 1 a 2000 Hz *Vibration, broadband random. Test Fh* *Dimensions of the specimen less than 0.6x0.6x0.3 m* *Weight less than 25 kg* *RMS accelerations up to 10 m/s^2* *Frequencies from 1 to 2000 Hz*	UNE-EN 60068-2-64:2009 ETSI EN 300 019-2-2:2013, random vibration
Equipos de medida de la energía eléctrica (c.a.). Contadores de energía activa, destinados a uso residencial, comercial y de industria ligera, para uso en redes eléctricas de 50 Hz (índices de clase A, B y C) *Electricity metering equipment (a.c.) Metering equipment of active energy intended to residential, commercial and light industry for use in 50 Hz electrical networks (class indexes A, B and C)*	Ensayos climáticos: - Humedad relativa - Ensayo de calor seco - Ensayo de frio - Ensayo cíclico de calor húmedo - Ensayo de vibración sinusoidal - Ensayo de choque Excepto el ensayo de protección contra radiación solar (6.3.5) *Climatic testing:* - *Relative humidity* - *Dry heat test* - *Cold test* - *Damp heat cyclic test* - *Sinusoidal vibration test* - *Impact test* *Except the test of protection against solar radiation (6.3.5)*	UNE-EN 50470-1:2007

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de medida de la energía eléctrica (c.a.). Contadores de energía activa, destinados a uso residencial, comercial y de industria ligera, para uso en redes eléctricas de 50 Hz (índices de clase A, B y C) *Electricity metering equipment (a.c.) Metering equipment of active energy intended to residential, commercial and light industry for use in 50 Hz electrical networks (class indexes A, B and C)*	Ensayos climáticos: - Humedad relativa - Ensayo de calor seco - Ensayo de frio - Ensayo cíclico de calor húmedo - Ensayo de vibración sinusoidal - Ensayo de choque Excepto el ensayo de protección contra radiación solar (6.3.5) *Climatic testing:* - *Relative humidity* - *Dry heat test* - *Cold test* - *Damp heat cyclic test* - *Sinusoidal vibration test* - *Impact test* *Except the test of protection against solar radiation (6.3.5)*	UNE-EN 50470-3:2007
Equipos de medida de la energía eléctrica (c.a.). Contadores estáticos o electromecánicos destinados a la medida de energía eléctrica en sistemas de 50Hz y tensión hasta 600V *Electricity metering equipment (a.c.) Static or electromechanics meters and intended to the measuring of electrical energy in 50 Hz systems and voltage up to 600 V.*	Ensayos climáticos: - Humedad relativa - Ensayo de calor seco - Ensayo de frio - Ensayo cíclico de calor húmedo - Ensayo de vibración sinusoidal - Ensayo de choque Excepto el ensayo de protección contra radiación solar (6.3.5) *Climatic testing:* - *Relative humidity* - *Dry heat test* - *Cold test* - *Damp heat cyclic test* - *Sinusoidal vibration test* - *Impact test* *Except the test of protection against solar radiation (6.3.5)*	UNE-EN 62052-11:2004

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de medida de la energía eléctrica (c.a.). Contadores estáticos de energía activa (clases 1 y 2) *Electricity metering equipment (a.c.)* *Static meters for active energy (classes 1 and 2)*	Ensayos climáticos - Humedad relativa - Ensayo de calor seco - Ensayo de frio - Ensayo cíclico de calor húmedo - Ensayo de vibración sinusoidal - Ensayo de choque Excepto el ensayo de protección contra radiación solar (6.3.5) *Climatic testing:* - *Relative humidity* - *Dry heat test* - *Cold test* - *Damp heat cyclic test* - *Sinusoidal vibration test* - *Impact test* *Except the test of protection against solar radiation (6.3.5)*	UNE-EN 62053-21:2003
Equipos de medida de la energía eléctrica (c.a). Contadores estáticos de energía reactiva (clases 2 y 3) *Electricity metering equipment (a.c.)* *Static meters for reactive energy (classes 2 and 3)*	Ensayos climáticos: - Humedad relativa - Ensayo de calor seco - Ensayo de frio - Ensayo cíclico de calor húmedo - Ensayo de vibración sinusoidal - Ensayo de choque Excepto el ensayo de protección contra radiación solar (6.3.5) *Climatic testing:* - *Relative humidity* - *Dry heat test* - *Cold test* - *Damp heat cyclic test* - *Sinusoidal vibration test* - *Impact test* *Except the test of protection against solar radiation (6.3.5)*	UNE-EN 62053-23:2003

Ensayos de compatibilidad electromagnética (EMC) y evaluación de la exposición humana a campos electromagnéticos / *Electromagnetic Compatibility*

Categoría 0 (Ensayos en el laboratorio permanente) / *Category 0 (Tests in the permanent laboratory)*

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos industriales, científicos y médicos (ICM) *Industrial, scientific and medical equipment (ISM)*	Emisión: Medida de las perturbaciones radioeléctricas *Equipos del grupo 1* *Rango de frecuencias hasta 1 GHz* *Emission:* *Measurements of the radioelectric disturbances* *Group 1 equipment* *Frequency range up to 1 GHz*	UNE-EN 55011:2011 UNE-EN 55011/A1:2011
Electrodomésticos, herramientas eléctricas y aparatos análogos *Household appliances, electric tools and similar apparatus*	Emisión: Medida de las perturbaciones radioeléctricas Rango de frecuencias hasta 1GHz *Emission:* *Measurements of the radioelectric disturbances* *Frequency range up to 1 GHz*	UNE-EN 55014-1:2008 UNE-EN 55014-1/A1:2009 UNE-EN 55014-1/A2:2012 UNE-EN 55014-1:ERRATUM:2009
Equipos de la tecnología de la información *Information technology equipment*	Emisión: Medida de las perturbaciones radioeléctricas *Rango de frecuencias hasta 1GHz* *Emission:* *Measurements of the radioelectric disturbances* *Frequency range up to 1 GHz*	UNE-EN 55022: 2011 UNE-EN 55022:AC:2012
Equipos eléctricos y electrónicos con corriente de entrada ≤ 16 A por fase *Electric and electronic products with current input ≤ 16 A per phase*	Emisión: Medida de armónicos de corriente *Emission:* *Measurements of voltage fluctuations and flicker*	UNE-EN 61000-3-2: 2006 UNE-EN 61000-3-2/A1: 2010 UNE-EN 61000-3-2/A2: 2010
Equipos eléctricos y electrónicos con corriente de entrada ≤ 16 A por fase *Electric and electronic products with current input ≤ 16 A per phase*	Emisión: Medida de flicker y fluctuaciones de tensión *Emission:* *Measurements of voltage fluctuations and flicker*	UNE-EN 61000-3-3: 2013

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos eléctricos y electrónicos de entorno residencial, comercial e industria ligera	Emisión: Medida de las perturbaciones radioeléctricas	UNE-EN 61000-6-3:2007 UNE-EN 61000-6-3/A1 : 2012
Equipos eléctricos y electrónicos de entorno industrial *Residential, commercial and light industry environments electric and electronic products*	Emisión: Medida de las perturbaciones radioeléctricas *Emission:* *Measurements of the radioelectric disturbances*	UNE-EN 61000-6-4:2007 UNE-EN 61000-6-4/A1 : 2011 UNE-EN 61000-6-4:ERRATUM:2008
Equipos eléctricos y electrónicos *Industrial environments electric and electronic products*	Inmunidad a descargas electrostáticas *Immunity to electrostatic discharges*	UNE-EN 61000-4-2:2010
	Inmunidad a campos electromagnéticos radiados *Frecuencias entre 80 MHz y 3 GHz* *Intensidad de campo hasta 10 V/m* *Immunity to radiated electromagnetic fields* *Frequencies between 80 MHz and 3 GHz* *Field intensity up to 10 V/m*	UNE-EN 61000-4-3:2007 UNE-EN 61000-4-3/A1:2008 UNE-EN 61000-4-3/A2:2011
	Inmunidad a ráfagas de transitorios rápidos *Immunity to electrical fast transients*	UNE-EN 61000-4-4:2013
	Inmunidad a ondas de choque (surges) *Immunity to surge*	UNE-EN 61000-4-5:2007 UNE-EN 61000-4-5:CORR:2010
	Inmunidad a las perturbaciones conducidas inducidas por los campos de radiofrecuencia *Immunity to conducted disturbances induced by radiofrequency fields*	UNE-EN 61000-4-6:2009
	Inmunidad a campos magnéticos amortiguados *Volumen efectivo 0,6 m x 0,6 m x 0,5 m* *Immunity to damped magnetic fields* *Effective volume: 0.6 m x 0.6 m x 0.5 m*	UNE-EN 61000-4-10:1996 UNE-EN 61000-4-10/A1:2001

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
	Inmunidad a campos magnéticos de frecuencia industrial *Volumen efectivo 0,6 m x 0,6 m x 0,5 m* *Immunity to power frequency magnetic fields* *Effective volume: 0,6 m x 0,6 m x 0,5 m*	UNE-EN 61000-4-8:2011
	Inmunidad a huecos de tensión, interrupciones breves y variaciones de tensión DC *Immunity to DC voltage dips, short interruptions and voltage variations*	UNE-EN 61000-4-29:2002
	Inmunidad a ondas oscilatorias amortiguadas *Frecuencias de 100 kHz y 1 MHz* *Immunity to damped oscillatory waves* *Frequencies of 100 kHz and 1 MHz*	UNE-EN 61000-4-18:2008 UNE-EN 61000-4-18/A1:2011
	Inmunidad a huecos de tensión, interrupciones breves y variaciones de tensión *Immunity to voltage dips, short interruptions and voltage variations*	UNE-EN 61000-4-11:2005
Dispositivos eléctricos y electrónicos para formar esquemas para la protección destinados a funcionar en sistemas eléctricos *Electrical and electronic devices manufactured for configuring schemes for the protection destined to operate in electrical systems*	Medidas de resistencia de aislamiento, rigidez dieléctrica e impulso de tensión *Measurements of insulation resistance, dielectric test and voltage impulse test*	IEC 60255-5:2000 IEC 60255-27:2013 Apto. 10.6.4.2; 10.6.4.3 y 10.6.4.4
Equipos eléctricos y electrónicos de entorno residencial, comercial e industria ligera *Residential, commercial and light industry environments electric and electronic products*	Inmunidad a las perturbaciones electromagnéticas *Immunity to electromagnetic disturbances*	UNE-EN 61000-6-1:2007
Equipos eléctricos y electrónicos de entorno industrial *Industrial environments electric and electronic products*	Inmunidad a las perturbaciones electromagnéticas *Immunity to electromagnetic disturbances*	UNE-EN 61000-6-2:2006 UNE-EN 61000-6-2:ERRATUM:2009

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Transmisión de señales por la red eléctrica de baja tensión en la banda de frecuencias de 3 kHz a 148,5 kHz *Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz*	Requisitos generales, bandas de frecuencia y perturbaciones electromagnéticas *General requirements, frequency bands and electromagnetic disturbances*	UNE-EN 50065-1:2012 Capitulo 6 Tensión de salida del transmisor
Transmisión de señales por la red eléctrica de baja tensión en la banda de frecuencias de 3 kHz a 148,5 kHz destinados para uso en entornos residenciales, comerciales y de insdustria ligera *Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz and intended to residential, commercial and light industry*	Requisitos de inmunidad *Immunity requisites*	UNE-EN 50065-2-1:2004 UNE-EN 50065-2-1:2004+A1:2006
Transmisión de señales por la red eléctrica de baja tensión en la banda de frecuencias de 3 kHz a 148,5 kHz destinados para uso en entornos industriales *Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz destined to industry*	Requisitos de inmunidad *Immunity requisites*	UNE-EN 50065-2-2:2004 UNE-EN 50065-2-2:2004+A1:2006 UNE-EN 50065-2-2:2004/A1:2006/CORR A1:2007

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Transmisión de señales por la red eléctrica de baja tensión en la banda de frecuencias de 3 kHz a 148,5 kHz destinados para uso por los suministradores y distribuidores de electricidad *Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz and intended for use by electricity suppliers and distributors*	Requisitos de inmunidad *Immunity requisites*	UNE-EN 50065-2-3:2004 UNE-EN 50065-2-3:2004/A1: 2006
Transmisión de señales por la red eléctrica de baja tensión en la banda de frecuencias de 3 kHz a 148,5 kHz *Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz*	Medidas de impedancia *Immunity requisites*	UNE-EN 50065-7:2002
Equipos de medida de la energía eléctrica (c.a.). Contadores de energía activa, destinados a uso residencial, comercial y de industria ligera, para uso en redes eléctricas de 50 Hz (índices de clase A, B y C) *Electricity metering equipment (a.c.) Metering equipment of active energy intended to residential, commercial and light industry for use in 50 Hz electrical networks (class indexes A, B and C)*	Emisión: Emisión radiada Emisión conducida *Emission:* *Radiated emission* *Conducted emission*	UNE-EN 50470-1:2007

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
	Ensayos de inmunidad a: - Huecos e interrupciones - Descargas Electrostáticas - Inmunidad Radiada - Transitorios rápidos - Inmunidad Conducida - Surge - Ondas oscilatorias amortiguadas Inmunidad Campo Magnético continuo y externo *Immunity test:* - *Dips and interruptions* - *Electrostatic Discharge* - *Radiated immunity* - *Fast transient* - *Conducted immunity* - *Surge* - *Damped Oscillatory Wave* *Constant and external Magnetic-Field Immunity*	
Equipos de medida de la energía eléctrica (c.a.). Contadores de energía activa, destinados a uso residencial, comercial y de industria ligera, para uso en redes eléctricas de 50 Hz (índices de clase A, B y C) *Electricity metering equipment (a.c.) Metering equipment of active energy intended to residential, commercial and light industry for use in 50 Hz electrical networks (class indexes A, B and C)*	Emisión: Emisión radiada Emisión conducida *Emission:* *Radiated emission* *Conducted emission*	UNE-EN 50470-3:2007
	Ensayos de inmunidad a: - Huecos e interrupciones - Descargas Electrostáticas - Inmunidad Radiada - Transitorios rápidos - Inmunidad Conducida - Surge - Ondas oscilatorias amortiguadas Inmunidad Campo Magnético continuo y externo *Immunity test:* - *Dips and interruptions* - *Electrostatic Discharge* - *Radiated immunity* - *Fast transient* - *Conducted immunity* - *Surge* - *Damped Oscillatory Wave* *Constant and external Magnetic-Field Immunity*	

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de medida de la energía eléctrica (c.a.). Contadores estáticos o electromecánicos destinados a la medida de energía eléctrica en sistemas de 50Hz y tensión hasta 600V *Electricity metering equipment (a.c.) Static or electromechanics meters and intended to the measuring of electrical energy in 50 Hz systems and voltage up to 600 V.*	Emisión: Emisión radiada Emisión conducida *Emission:* *Radiated emission* *Conducted emission*	UNE-EN 62052-11:2004
	Ensayos de inmunidad a: - Huecos e interrupciones - Descargas Electrostáticas - Inmunidad Radiada - Transitorios rápidos - Inmunidad Conducida - Surge - Ondas oscilatorias amortiguadas *Immunity test:* - *Dips and interruptions* - *Electrostatic Discharge* - *Radiated immunity* - *Fast transient* - *Conducted immunity* - *Surge* - *Damped Oscillatory Wave*	
Equipos de medida de la energía eléctrica (c.a.). Contadores estáticos de energía activa (clases 1 y 2) *Electricity metering equipment (a.c.) Static meters for active energy (classes 1 and 2)*	Emisión: Emisión radiada Emisión conducida *Emission:* *Radiated emission* *Conducted emission* Ensayos de inmunidad a: - Huecos e interrupciones - Descargas Electrostáticas - Inmunidad Radiada - Transitorios rápidos - Inmunidad Conducida - Surge - Ondas oscilatorias amortiguadas *Immunity test:* - *Dips and interruptions* - *Electrostatic Discharge* - *Radiated immunity* - *Fast transient* - *Conducted immunity* - *Surge* - *Damped Oscillatory Wave*	UNE-EN 62053-21:2003

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de medida de la energía eléctrica (c.a). Contadores estáticos de energía reactiva (clases 2 y 3) *Electricity metering equipment (a.c.)* *Static meters for reactive energy (classes 2 and 3)*	Emisión: Emisión radiada Emisión conducida *Emission:* *Radiated emission* *Conducted emission*	UNE-EN 62053-23:2003

ЕЛЕКТРОЛУКС ПАОВИЦИВ

На основание чл.36а ал.3 от ЗОП

Sede / *Address* Zamudio

Equipos de generación, transporte, distribución y uso de la energía eléctrica, en media y alta tensión / *Equipment for Generation, Transmission, Distribution and use of Electric Power, high and medium voltage*

Categoría 0 (Ensayos en el laboratorio permanente) / *Category 0 (Tests in the permanent laboratory)*

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Transformadores de distribución y transformadores de media potencia *Distribution transformers and medium power transformers*	Ensayos tipo, ensayos individuales y ensayos especiales, excepto: - Medida de las características de transmisión de tensiones - Medida de gases disueltos - Medida del calentamiento del punto caliente - Verificación del recubrimiento externo Límites: - Dieléctricos: hasta 145 kV de tensión más elevada para el material - Determinación del nivel de ruido: método de presión acústica *Type tests, routine tests and special tests, except:* - *Determination of transient voltage transfer characteristics* - *Measurement of dissolved gases* - *Winding hot-spot temperature-rise measurements* - *Check of external coating* *Limits:* - *Dielectric tests: up to 145 kV higher voltage for the material* - *Determination of sound levels: sound pressure method*	UNE-EN 60076-1:1998 UNE-EN 60076-1/A1:2001 UNE-EN 60076-1/A12:2002 IEC 60076-1 :2011 UNE-EN 60076-2:1998 UNE-EN 60076-2:2006 ERRATUM IEC 60076-2 :2011 UNE-EN 60076-3: 2002 UNE-EN 60076-3: 2006 ERRATUM IEC 60076-3:2000 IEC 60076-3:2000 CORRIGENDUM 1 UNE-EN 60076-5:2008 IEC 60076-5:2006 UNE-EN 60076-10:2002 IEC 60076-10:2001 UNE-EN 60076-16:2012 IEC 60076-16:2011
Transformadores de distribución sumergidos en aceite, de 25 kVA a 2500 kVA *Oil-immersed distribution transformers, from 25 up to 2500 kVA*	Todos los de la norma excepto: - Ensayo de fatiga de las cubas de llenado integral - Características de la pintura *All the tests of the standard, except:* - *Endurance test on corrugated tanks of completely oil filled and hermetically sealed distribution transformers* - *Tests of painting characteristics*	UNE 21428-1 :2011 UNE 21428-1-1 :2011 UNE 21428-1-2 :2011 UNE-EN 50464-1:2010 UNE-EN 50464-2-1 :2010 UNE-EN 50464-2-2 :2010 UNE-EN 50464-2-3 :2010 UNE-EN 50464-3:2010
Transformadores de potencia tipo seco *Dry-type power transformers*	Todos los de la norma sobre transformadores de distribución y transformadores de media potencia, excepto: - Ensayos de choque térmico, ambientales y de fuego *All the tests of the standard on distribution and medium power transformers, except:* - *Thermal shock, fire behaviour and environmental tests*	UNE-EN 60076-11:2005 IEC 60076-11:2004 UNE 21538-1: 2007 UNE-EN 50541-1:2012 UNE-EN IEC 600

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Transformadores autoprotegidos sumergidos en líquido *Self-protected liquid-filled transformers*	- Todos los de la norma realizados por referencia a la serie de normas 60076 - Ensayo de descargas parciales (cap. 12) *- All the tests of the standard performed by reference to 60076 series* *- Partial discharges test (chap. 12)*	UNE-EN 60076-13:2008 IEC 60076-13:2006
Transformadores de medida y protección *Instrument transformers*	Todos los de la norma Límites: - Precisión: hasta 5 kA hasta 10 kV; 40 kV desde 10 VA - Dieléctricos: hasta Um ≤ 145 kV *All the tests of the standard* *Limits:* *- Accuracy: up to 5 kA* *up to 10 kV; 40 kV* *from 10 VA* *- Dielectric tests: up to Um ≤ 145 kV*	UNE-EN 60044-1:2000 UNE-EN 60044-1/A1:2001 UNE-EN 60044-1/A2:2004 UNE-EN 60044-2:1999 UNE-EN 60044-2/A1:2001 UNE-EN 60044-2/A2:2004 UNE-EN 60044-3:2004 IEC 60044-3:2002
Transformadores de tensión electrónicos Electronic voltage transformers	Ensayos de tipo: - Dieléctricos: hasta Um ≤ 145 kV - Ensayo de impulso tipo rayo - Ensayo bajo lluvia para tipo exterior - Ensayo de resistencia a la tensión de impulso para componentes de baja tensión - Precisión: hasta 10 kV; 40 kV; 50 Hz desde 10 VA Ensayos individuales y ensayos especiales *Type tests:* *- Dielectric tests: up to Um ≤ 145 kV* *- Lightning impulse test* *- Wet test for outdoor type* *- Impulse voltage withstand test for low-voltage components.* *- Accuracy: up to 10 kV, 40 kV, 50 Hz from 10 VA* *Routine tests and special tests*	UNE-EN 60044-7: 2001 IEC 60044-7:1999

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Transformadores de medida y protección *Instrument transformers*	Todos los de la norma para transformadores de tensión, transformadores de intensidad para medida y transformadores de intensidad para protección de clase P , excepto: - Ensayo de estanquidad de la envolvente en sistemas de gas, a temperatura ambiente (Apdos. 7.2.8 y 7.3.7) y a alta y baja temperatura (Apdo. 7.4.7) - Ensayo de presión sobre la envolvente (Apdos. 7.2.9 y 7.3.8) - Ensayo de impulsos cortados múltiples (Apdo. 7.4.2) - Ensayos mecánicos (Apdo. 7.4.5) - Ensayo de defecto por arco interno (Apdo. 7.4.6) - Ensayo de punto de rocío del gas (Apdo. 7.4.8) - Ensayo de corrosión (Apdo. 7.4.9) - Ensayo de riesgo de incendio (Apdo. 7.4.10) Límites: - Ensayos dieléctricos: hasta: Um ≤ 145 kV - Transformadores de tensión: Precisión: Potencia de precisión rango II. Tensiones primarias asignadas hasta 40 kV *All the tests of the standard for voltage transformers, measuring current transformers and class P current transformers for protection, except:* - *Enclosure tightness test in gas systems, at ambient temperature (7.2.8 and 7.3.7) and at low and high temperatures (7.4.7)* - *Pressure test for the enclosure (7.2.9 and 7.3.8)* - *Multiple chopped impulse test (7.4.2)* - *Mechanical tests (7.4.5)* - *Internal arc fault test (7.4.6)* - *Gas dew point test (7.4.8)* - *Corrosion test (7.4.9)* - *Fire hazard test (7.4.10)* *Limits:* - *Dielectric tests: up to Um ≤ 145 kV* - *Voltage transformers:* *Accuracy: burden range II. Rated primary voltages up to 40 kV*	UNE-EN 61869-1:2010 UNE EN 61869-1:2011 ERRATUM IEC 61869-1:2007 IEC 61869-2:2012 UNE-EN 61869-3:2012 IEC 61869-3:2011

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Aisladores pasantes (pasatapas) *Insulated bushings*	Todos los de la norma, excepto: - Ensayo de presión interna - Ensayo de estanquidad en pasatapas con gas o sumergidos en gas Límites: Um ≤ 145 kV *All the tests of the standard, except:* - *Internal pressure test* - *Tightness test on gas-filled and gas-insulated bushings* *Limits: Um ≤ 145 kV*	UNE-EN 50180:1997 UNE-EN 50180:1999 CORRIGENDUM UNE-EN 50180:2011 UNE-EN 50181:1997 UNE-EN 50181:2011 UNE EN 60137:2011 IEC 60137:2008
Aisladores de apoyo de interior de materia orgánica para instalaciones de tensión nominal superiores a 1 kV e inferiores a 300 kV *Indoor post insulators of organic material for systems with nominal voltages greater than 1kV and below 300 kV*	Todos los de la norma Límites: Um ≤ 145 kV *All the tests of the standard* *Limits: Um ≤ 145 kV*	UNE-EN 60660:2001 IEC 60660:1999
Centros de transformación prefabricados *High voltage/low voltage prefabricated substations*	Todos los de la norma, excepto: Apdo 6.9. Ensayos CEM Límites: Arco interno: 1000 V *All the tests of the standard,* *except:* *- EMC tests (6.9)* *Limits:* *Arcing due to an internal fault: 1000V*	UNE-EN 62271-202:2007 IEC 62271-202:2006

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Conjuntos compactos de aparamenta para centros de transformación (CEADS) *Compact equipment assemblies for distribution substations (CEADS)*	Todos los de la norma, excepto: - Ensayos CEM (apdo. 6.9) - Ensayos de robustez mecánica de cubas herméticas de llenado integral (incluidos en el apdo. 6.201) - Ensayo de estanquidad de la unidad funcional de alta tensión (apdo. 7.4) Límites: Arco interno: 1000 V *All the tests of the standard, except:* *- EMC tests (6.9)* *- Mechanical strength tests of hermetically sealed tanks (included in 6.201)* *- Tightness tests of high voltage functional unit (7.4)* *Limits:* *Arcing due to an internal fault: 1000V*	UNE-EN 50532:2011
Materiales aislantes *Insulating materials*	Rigidez dieléctrica, ensayos a frecuencias industriales, tensión continua e impulsos 1,2/50 sobre materiales en placas y planchas y tubos rígidos Límites: Tensión alterna < 200 kV Tensión continua - 70 kV, sólo polaridad negativa Impulsos hasta 500 kV *Electric strength, tests at power frequencies, direct voltage and 1,2/50 μs impulse tests on boards and sheets materials, and rigid tubes* *Limits:* *Power frequency voltage < 200 kV* *Direct voltage -70 kV, only negative polarity* *Impulses up to 500 kV*	UNE-EN 60243-1:1999 UNE-EN 60243-2:2001 UNE-EN 60243-3:2002 IEC 60243-1:1998 IEC 60243-2:2001 IEC 60243-3:2001

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Materiales aislantes sólidos plásticos *Electrical insulating plastic materials*	Ensayo del hilo incandescente *Glow wire test*	UNE-EN 60695-2-10:2002 UNE-EN 60695-2-11:2001 UNE-EN 60695-2-12:2001 UNE-EN 60695-2-12 :2011 UNE-EN 60695-2-13:2002 UNE-EN 60695-2-13 :2011 IEC 60695-2-10:2000 IEC 60695-2-11:2000 IEC60695-2-11:2001 CORRIGENDUM 1 IEC 60695-2-12:2010 IEC 60695-2-13:2010 IEC 60695-2-13:2012 CORRIGENDUM 1
Alfombras de material aislante para trabajos eléctricos *Electrical insulating matting for live working*	Todos los ensayos de la norma, excepto - Ensayos mecánicos (apdos. 5.5, 5.9 y 5.10) - Ensayo de envejecimiento (Aptdo. 5.7) - Ensayo de llama (apdo. 5.8.1) - Resistencia al ácido (apdo. 5.9) - Resistencia al aceite (apdo. 5.10) *All the tests of the standard, except:* - *Mechanical tests (5.5, 5.9 y 5.10)* - *Aging test (5.7)* - *Flame retardance test (5.8.1)* - *Acid resistance (5.9)* - *Oil resistance (5.10)*	UNE-EN 61111 :2010 IEC 61111:2009
Mantas eléctricas aislantes *Electrical insulating matting for live working*	- Inspección visual y mediciones (apdo. 5.2) - Marcado (apdo. 5.3) - Embalaje e instrucciones de uso (apdo. 5.4) - Ensayos dieléctricos (apdo 5.6) - Ensayo de plegado a baja temperatura (apdo. - 5.8.2) - Categoría A. Resistencia al ácido. Parte eléctrica (apdo. 6.2) - Categoría C: Ensayo de doblado a temperaturas - extremadamente bajas (apdo. 6.6) - *Visual inspection and measurements (5.2)* - *Marking (5.3)* - *Packaging and instructions for use (5.4)* - *Dielectric tests (5.6)* - *Low temperature folding test (5.8.2)* - *Category A: Acid resistance. Electrical part (6.2)* - *Category C: Extremely low temperature folding test (6.6)*	UNE-EN 61112:2010 IEC 61112:2009

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Envolventes de materiales eléctricos *Enclosures for electric material*	Clasificación de los grados de protección proporcionados por las envolventes, códigos IP e IK (excepto IK01) *Degrees of protection provided by enclosures. Code IP and IK (except IK01)*	UNE 20324:1993 UNE 20324/1M:2000 UNE 20324:2004 ERRATUM IEC 60529:1989 IEC 60529/A1:1999 UNE-EN 50102:1996 UNE-EN 50102:2002 CORRIGENDUM UNE-EN 50102/A1:1999 UNE-EN 50102/A1:2002 CORRIGENDUM IEC 62262:2002
Envolventes destinadas a los conjuntos de aparamenta de baja tensión *Empty enclosures for low-voltage switchgear and controlgear assemblies*	Ensayos para las envolventes vacías, todos los de la norma excepto: - Ensayo de resistencia a la radiación ultravioleta (UV) *Tests for empty enclosures , all the tests of the standard except:* - *Resistance to ultra-violet(UV) radiation*	UNE-EN 62208: 2004 UNE-EN 62208:2012 IEC 62208:2011

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Aparamenta de alta tension *High-voltage switchgear and controlgear*	Ensayos de tipo: Todos los de la norma excepto: - Ensayos CEM sobre circuitos auxiliares y de mando (Apdos. 6.9.1.2 , 6.9.2 y 6.9.3) - Aparamenta en gas: estanquidad (Apdo. - 6.8) - Ensayos sísmicos sobre circuitos auxiliares - (Apdo. 6.10.5.6) - Ensayo de rayos X para botellas de vacío - (Apdo. 6.11) - Aparamenta de Um > 245 kV: impulso tipo maniobra - - Aparamenta exterior: contaminación - artificial Límites: Ensayos dieléctricos: Frecuencia industrial hasta 550 kV Impulso tipo rayo hasta 750 kV Tensión de perturbaciones radioeléctricas hasta 300 kV Ensayos individuales: Todos los de la norma excepto estanquidad de aparamenta en gas (Apdo. 7.4) *Type tests:* *All the tests of the standard, except:* - *EMC tests on auxiliary and control circuits (6.9.1.2, 6.9.2 and 6.9.3)* - *Gas insulated switchgear and controlgear: tightness test (6.8)* - *Seismic tests on auxiliary circuits (6.10.5.6)* - *X-radiation test procedure for vacuum interrupters (6.11)* - *Switchgear and controlgear of Um>245 kV: switching impulse voltage test* - *Outdoor switchgear and controlgear: Artificial pollution test* *Limits:* *Dielectric tests:* *Power frequency up to 550 kV* *Lightning impulse up to 750 kV* *Radio interference voltage up to 300 kV* *Routine tests:* *All the tests of the standard, except tightness test in gas insulated switchgear and controlgear (7.4)*	UNE-EN 62271-1:2009 UNE-EN 62271-1/A1:2011 IEC 62271-1:2007 IEC 62271-1/A1:2011

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Aparamenta bajo envolvente metálica para corriente alterna de tensiones asignadas superiores a 1 kV e inferiores o iguales a 52 kV *AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*	Ensayos de tipo: Todos los de la norma, excepto: - Ensayos CEM (Apdo. 6.9.) - Aparamenta en gas: estanquidad (Apdo. 6.8) - Ensayos sísmicos sobre circuitos auxiliares (Apdo. 6.10.5.6) - Ensayo de rayos X para botellas de vacío (Apdo. 6.11) - Aparamenta exterior: contaminación artificial sobre aisladores (Apdo. 6.2.8) Límites: - Ensayos de establecimiento y corte: 200 MVA, 36 kV - Arco interno: 1000 V Ensayos individuales: Todos los de la norma, excepto: - Estanquidad de aparamenta en gas *Type tests:* *All the tests of the standard, except:* *- EMC tests (6.9)* *- Gas insulated switchgear and controlgear: tightness test (6.8)* *- Seismic tests on auxiliary circuits (6.10.5.6)* *- X-radiation test procedure for vacuum interrupters (6.11)* *- Outdoor switchgear and controlgear: artificial pollution test on insulators (6.2.8)* *Limits:* *- Making and breaking tests: 200 MVA, 36 kV* *- Arcing due to an internal fault: 1000V* *Routine tests:* *All the tests of the standard, except tightness test on gas insulated switchgear and controlgear*	UNE-EN 62271-200:2012 (Vcorr:2013) UNE-EN 62271-200:2005 IEC 62271-200: 2011

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Aparamenta bajo envolvente aislante para corriente alterna de tensiones asignadas superiores a 1 kV e inferiores o iguales a 52kV *AC insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*	Ensayos de tipo: Todos los de la norma excepto - Ensayos CEM (Apdo.6.9.) - Aparamenta en gas: estanquidad - Ensayos sísmicos sobre circuitos auxiliares Límites: Ensayos de establecimiento y corte: 200 MVA, 36 kV Arco interno: 1000 V Ensayos individuales: Todos los de la norma excepto estanquidad de aparamenta en gas *Type tests:* *All the tests of the standard, except:* - *EMC tests (6.9)* - *Gas insulated switchgear and controlgear: tightness test* - *Seismic tests on auxiliary circuits* *Limits:* - *Making and breaking tests: 200 MVA, 36 kV* - *Arcing due to an internal fault: 1000V* *Routine tests:* *All the tests of the standard, except tightness test on gas insulated switchgear and controlgear*	UNE-EN 62271-201:2007 IEC 62271-201:2006
Aparamenta de interior bajo envolvente de tensiones asignadas superiores a 1 kV e inferiores o iguales a 52 kV para ser utilizada en condiciones climáticas severas *Indoor enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV to be used in severe climatic conditions*	Todos los de la norma *All the tests of the standard*	IEC/TS 62271-304:2008 IEC/TS 62271-304:2010 CORRIGENDUM 1
Aparamenta bajo envolvente metálica aislada en SF6 hasta 36 Kv *SF6 insulated metal-enclosed switchgear and controlgear up to 36 kV*	Ensayo de inmersión *Immersion test*	Procedimiento interno PE.EE-27 Anđo 5.1 *Intern* *PE.EE*

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Seccionadores y seccionadores de puesta a tierra de corriente alterna para alta tensión *High-voltage alternating current disconnectors and earthing switches*	Ensayos de tipo: Todos los de la norma excepto - Ensayos CEM sobre circuitos auxiliares y de mando (Apdos. 6.9.1.2, 6.9.2 y 6.9.3) - Aparamenta en gas: estanquidad - Ensayos sísmicos sobre circuitos auxiliares - Aparamenta de Um > 245 kV: impulso tipo maniobra - Aparamenta exterior: contaminación artificial operación bajo condiciones severas de hielo Límites: - Ensayos dieléctricos: - Frecuencia industrial hasta 550 kV - Impulso tipo rayo hasta 750 kV - Tensión de perturbaciones radioeléctricas - hasta 300 kV - Ensayos de conexión: 200 MVA, 36 kV Ensayos individuales: Todos los de la norma, excepto: - Estanquidad de aparamenta en gas *Type tests:* *All the tests of the standard, except:* - *EMC tests on auxiliary and control circuits (6.9.1.2, 6.9.2 and 6.9.3)* - *Gas insulated switchgear and controlgear: tightness test* - *Seismic tests on auxiliary circuits* - *Switchgear and controlgear of Um > 245 kV: Switching impulse voltage test* - *Outdoor switchgear and controlgear: Artificial pollution test and operation under severe ice conditions* *Limits:* *Dielectric tests:* - *Power frequency up to 550 kV* - *Lightning impulse up to 750 kV* - *Radio interference voltage up to 300 kV* - *Making tests: 200 MVA, 36 kV* *Routine tests:* *All the tests of the standard, except:* - *Gas insulated switchgear and controlgear: tightness test*	UNE-EN 62271-102:2005 UNE-EN 62271-102:2011 ERRATUM UNE-EN 62271-102/A1:2012 IEC 62271-102:2001 IEC 62271-102:2002 CORRIGENDUM 1 IEC 62271-102:2003 CORRIGENDUM 2 IEC 62271-102:2005 CORRIGENDUM 3 IEC 62271-102/A1:2011 IEC 62271-102/A1:2012 CORRIGENDUM 1 IEC 62271-102/A2:2013

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Interruptores automáticos de corriente alterna para alta tensión *High-voltage alternating-current circuit-breakers*	Ensayos de tipo: Todos los de la norma, excepto: - Ensayos CEM sobre circuitos auxiliares y de mando - (Apdos. 6.9.1.2, 6.9.2 y 6.9.3) - Aparamenta en gas: estanquidad - Ensayos sísmicos sobre circuitos auxiliares - Ensayos de corte - Aparamenta de Um > 245 kV: impulso tipo maniobra - Aparamenta exterior: contaminación artificial y operación bajo condiciones severas de hielo Límites: - Ensayos dieléctricos: - Frecuencia industrial hasta 550 kV - Impulso tipo rayo hasta 750 kV - Tensión de perturbaciones radioeléctricas hasta 300 kV - Ensayos de conexión: 200 MVA, 36 kV Ensayos individuales: Todos los de la norma, excepto: - Estanquidad de aparamenta en gas *Type tests:* *All the tests of the standard, except:* - *EMC tests on auxiliary and control circuits (6.9.1.2, 6.9.2 and 6.9.3)* - *Gas insulated switchgear and controlgear: Tightness test* - *Seismic tests on auxiliary circuits* - *Breaking tests* - *Switchgear and controlgear of Um > 245 kV: Switching impulse voltage test* - *Outdoor switchgear and controlgear: Artificial pollution test and operation under severe ice conditions* *Limits:* *Dielectric tests:* - *Power frequency up to 550 kV* - *Lightning impulse up to 750 kV* - *Radio interference voltage up to 300 kV* - *Making tests: 200 MVA, 36 kV* *Routine tests:* *All the tests of the standard, except:* - *Gas insulated switchgear and controlgear: tightness test*	UNE-EN 62271-100:2011 IEC 62271-100:2008 IEC 62271-100/A1:2012 IEC 62271-100/A1:2012 CORRIGENDUM 1

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Interruptores de alta tensión para tensiones asignadas superiores a 1 kV e inferiores a 52 kV *High voltage switches for rated voltages above 1 kV and less than 52 kV*	Ensayos de tipo: Todos los de la norma, excepto: - Ensayos CEM (Apdo. 6.9) - Aparamenta en gas: estanquidad - Ensayos sísmicos sobre circuitos auxiliares - Aparamenta exterior: contaminación - artificial y operación bajo condiciones severas de hielo Límites: - Ensayos de establecimiento y corte: 200 - MVA, 36 kV Ensayos individuales: Todos los de la norma, excepto: - Estanquidad de aparamenta en gas *Type tests:* *All the tests of the standard, except:* - *EMC tests (6.9)* - *Gas insulated switchgear and controlgear: Tightness test* - *Seismic tests on auxiliary circuits* - *Outdoor switchgear and controlgear: Artificial pollution test and operation under severe ice conditions.* *Limits:* *Making and breaking tests: 200 MVA, 36 kV* *Routine tests:* *All the tests of the standard, except:* - *Gas insulated switchgear and controlgear: Tightness test*	UNE-EN 60265-1:1999 UNE-EN 60265-1:2005 CORRIGENDUM UNE-EN 62271-103:2012 IEC 62271-103:2011

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos y materiales de alta tensión *High voltage equipment and materials*	Ensayos de alta tensión: Ensayos en seco y bajo lluvia Ensayos con tensión alterna Ensayos con tensión continua Ensayos con impulsos tipo rayo Límites: - Tensión alterna hasta 550 kV - Tensión continua hasta 100 Kv - Impulsos tipo rayo hasta 750 kV *High voltage tests:* *Dry and Wet tests* *Tests with Alternating Voltage* *Tests with Direct Voltage* *Lightning impulse voltage tests* *Limits:* *- Alternating voltage up to 550 kV* *- Direct voltage up to 100 kV* *- Lightning impulse voltage up to 750 kV*	UNE 21308-1:1994 UNE-EN 60060-1:2012 IEC 60060-1:2010
	Medida de las descargas parciales Límite : Tensión de ensayo ≤ 550 k V *Partial discharges measurement* *Limit: Test voltage ≤ 550 kV*	UNE-EN 60270:2002 IEC 60270:2000 IEC 60270:2001 CORRIGENDUM 1
Pértigas aislantes de maniobra para alta tensión *Insulating poles (insulating sticks) for electrical purposes on high-voltage installations*	Ensayos eléctricos: corriente de fugas (Apdo. 8.2.2) Ensayos mecánicos: ensayo de flexión (Adpo. 8.4.1) *Dielectric tests: leakage current (8.2.2)* *Mechanical tests : bending test (8.4.1)*	UNE 204003:2003 UNE 204003:2004 ERRATUM
Detectores de tipo capacitivo para utilización con tensiones superiores a 1 kV en corriente alterna *Capacitive type detectors to be used for voltages exceeding 1 kV a.c.*	Ensayos funcionales (apdo. 6.2) Ensayos dieléctricos (apdo. 6.3) Ensayos mecánicos (apdo. 6.4) Ensayos específicos (cap. 7) Límites: Vdc ≤ 100 kV Vac ≤ 550 kV *Function tests (6.2)* *Dielectric tests (6.3)* *Mechanical tests (6.4)* *Specific tests (7)* *Limits:* *Vdc ≤ 100 kV* *Vac ≤ 550 kV*	UNE-EN 61243-1:2006 UNE-EN 61243-1/A1:2011 IEC 61243-1:2003 IEC 61243-1:2005 CORRIGENDUM 1 IEC 61243-1/A1:2009

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Detectores de tensión tipo bipolar para baja tensión *Two-pole low-voltage type voltage detectors*	Ensayos para requisitos funcionales (apdo. 5.3), excepto: Dependencia de la frecuencia (apdo 5.3.5) Dependencia del rizado para detectores de tensión con CC (apdo. 5.3.6) Ensayos de requisitos eléctricos (apdo. 5.4), excepto: Protección contra sobretensiones transitorias (apdo. 5.4.5.1) Ensayos de requisitos mecánicos (apdo. 5.5), excepto: Ensayo de vibraciones (apdo. 5.5.4) Resistencia al calor (apdo. 5.5.9) Buena adherencia del aislamiento de la parte aislada del electrodo de contacto (apdo. 5.5.10.3) Ensayos del cable (apdo. 5.5.11) Marcas (apdo. 5.6) Mal uso de la tensión CA/CC (apdo. 5.8.1) *Tests for general requirements (5.3), except:* *Frequency dependency (5.3.5)* *Ripple dependency for d.c. voltage detector (5.3.6)* *Tests for electrical requirements (5.4), except:* *Protection against transient overvoltages (5.4.5.1)* *Tests for mechanical requirements (5.5), except:* *Vibration resistance (5.5.4)* *Heat resistance (5.5.9)* *Close adhesion of insulation of the insulated part of the contact electrode (5.5.10.3)* *Lead tests (5.5.11)* *Marking (5.6)* *AC/DC voltage misuse (5.8.1)*	UNE-EN 61243-3:2011 IEC 61243-3:2009
Aparamenta de baja tensión *Low voltage switchgear and controlgear*	Todos los de la norma, excepto: - Inflamabilidad: ensayos de ignición al hilo caliente y de ignición al arco (Apdo. - 8.2.1.1.2) - Ensayos CEM (Apdo. 8.4) *All the tests of the standard, except:* - *Flammability: hot wire ignition and arc ignition tests (8.2.1.1.2)* - *EMC tests (8.4)*	UNE-EN 60947-1 :2008 UNE-EN 60947-1/A1:2011 IEC 60947-1:2007 IEC 60947-1/A1:2010

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Interruptores automáticos de baja tensión *Low voltage circuit-breakers*	Todos los de la norma, excepto: - Inflamabilidad: ensayos de ignición al hilo caliente y de ignición al arco (Apdo. 8.2.1.1.2) - Ensayos del anexo B - Anexo J: CEM *All the tests of the standard, except:* - *Flammability: hot wire ignition and arc ignition tests (8.2.1.1.2)* - *Tests of annex B* - *Annex J: EMC*	UNE-EN 60947-2:2007 UNE-EN 60947-2/A1:2011 IEC 60947-2:2006 IEC 60947-2/A1:2009 IEC 60947-2/A2 :2013
Interruptores, seccionadores, interruptores-seccionadores y combinados fusibles de baja tensión *Low voltage switches, disconnectors, switch-disconnectors and fuse-combination units*	Todos los de la norma, excepto: - Inflamabilidad: ensayos de ignición al hilo caliente y de ignición al arco (Apdo. 8.2.1.1.2) - Ensayos CEM (Apdo. 8.4) *All the tests of the standard, except:* - *Flammability: hot wire ignition and arc ignition tests (8.2.1.1.2)* - *EMC tests (8.4)*	UNE-EN 60947-3:2000 UNE-EN 60947-3/A1:2002 UNE-EN 60947-3/A2:2006 UNE-EN 60947-3:2009 UNE-EN 60947-3:2010 ERRATUM IEC 60947-3:2008 IEC 60947-3/A1:2012 IEC 60947-3/Corr1:2012
Contactores y arrancadores electromecánicos de baja tensión *Low voltage electromechanical contactors and motor starters*	Todos los de la norma, excepto: - Inflamabilidad: ensayos de ignición al hilo caliente y de ignición al arco (Apdo. 8.2.1.1.2) - Ensayos CEM (Apdo. 9.4) *All the tests of the standard, except:* - *Flammability: hot wire ignition and arc ignition tests (8.2.1.1.2)* - *EMC tests (9.4)*	UNE-EN 60947-4-1:2002 UNE-EN 60947-4-1:2002 ERRATUM UNE-EN 60947-4-1/A1:2003 UNE-EN 60947-4-1/A2:2006 IEC 60947-4-1:2009 IEC 61947-4-1/A1:2012
Controladores y arrancadores semiconductores de motores de corriente alterna de baja tensión *Low voltage contactors and motor starters – AC semiconductor motor controllers and starters*	Todos los de la norma, excepto: - Inflamabilidad: ensayos de ignición al hilo caliente y de ignición al arco (Apdo. 8.2.1.1.2) - Ensayos CEM (Apdo. 9.3.5) *All the tests of the standard, except:* - *Flammability: hot wire ignition and arc ignition tests (8.2.1.1.2)* - *EMC tests (9.3.5)*	UNE-EN 60947-4-2:2002 UNE-EN 60947-4-2:2008 ERRATUM UNE-EN 60947-4-2/A1:2003 UNE-EN 60947-4-2/A2:2007 IEC 60947-4-2:2011 IEC 60947-4-2/CORR1:2012

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Conjuntos de serie y conjuntos derivados de serie de aparamenta de baja tensión *Low voltage switchgear and controlgear assemblies. Type-tested and partially type-tested assemblies*	Todos los de la norma, excepto: - Ensayos CEM (Apdo. 8.2.8) *All the tests of the standard, except:* - *EMC tests (8.2.8)*	UNE-EN 60439-1:2001 UNE-EN 60439-1/A1:2005
Conjuntos de aparamenta de baja tensión *Low voltage switchgear and controlgear assemblies*	Todos los de la norma, excepto: - Ensayo de radiación ultravioleta (Apdo. 10.2.4) - Ensayos CEM (Apdo. 10.6.2. y anexo J) *All the tests of the standard, except:* - *Resistance to ultra-violet (UV) radiation (10.2.4)* - *EMC tests (10.6.2 and annex J)*	IEC 61439-1:2011 UNE-EN 61439-1:2011 UNE-EN 61439-1:2012 IEC/TR 61439-0:2010
Conjuntos de aparamenta de potencia de baja tensión *Low voltage power switchgear and controlgear assemblies*	Todos los de la norma, excepto: - Ensayo de radiación ultravioleta (Apdo. 10.2.4) - Ensayos CEM (Apdo. 10.6.2. y Anexo J) *All the tests of the standard, except:* - *Resistance to ultra-violet (UV) radiation (10.2.4)* - *EMC tests (Apdo. 10.6.2. y anexo J)*	IEC 61439-2:2011 UNE-EN 61439-2:2011 UNE-EN 61439-2:2012
Canalizaciones prefabricadas de baja tensión *Low voltage busbar trunking systems (busways)*	Todos los de la norma, excepto: - Ensayos CEM (Apdo. 8.2.8) - Resistencia a la propagación de la llama - Características cortafuegos *All the tests of the standard, except:* - *EMC tests (8.2.8)* - *Resistance to flame propagation* - *Fire barrier characteristics*	UNE-EN 60439-2:2001 UNE-EN 60439-2/A1:2006
Conjuntos de aparamenta de baja tensión destinados a estar instalados en lugares accesibles al personal no cualificado durante su utilización. Cuadros de distribución *Low voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use. Distribution boards.*	Todos los de la norma, excepto: - Ensayos CEM (Apdo. 8.2.8) *All the tests of the standard, except:* - *EMC tests (8.2.8)*	UNE-EN 60439-3:1994 UNE-EN 60439-3:2010 CORRIGENDUM UNE-EN 60439-3/A1:1997 UNE-EN 60439-3/A2:2002

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Conjuntos de aparamenta de baja tensión destinados a ser utilizados por personas comunes *Low-voltage distribution boards intended to be operated by ordinary persons*	Todos los de la norma, excepto: - Ensayo de radiación ultravioleta (Apdo. 10.2.4) - Ensayos CEM (Apdo. 10.6.2. y anexo J) *All the tests of the standard, except:* - *Resistance to ultra-violet (UV) radiation (10.2.4)* - *EMC tests (10.6.2. and Annex J)*	UNE-EN 61439-3:2012 IEC 61439-3:2012
Conjuntos de aparamenta de baja tensión: conjuntos para obras (CO). *Low voltage switchgear and controlgear assemblies: assemblies for construction sites (ACS)*	Todos los de la norma, excepto: - Ensayos de choque (Apdo. 8.2.101.3) - Ensayos de verificación de la resistencia a la corrosión en atmósferas fuertemente contaminadas (Apdo. 8.2.102.2.) - Ensayos CEM (Apdo. 8.2.8) *All the tests of the standard, except:* - *Shock test (8.2.101.3)* - *Verification of resistance to corrosion in heavily polluted atmosphere (8.2.102.2)* - *EMC tests (8.2.8)*	UNE-EN 60439-4:2005 UNE 201008 IN:2012
Conjuntos de aparamenta de baja tensión destinados a ser instalados al exterior en lugares públicos. Conjuntos de aparamenta para redes de distribución (CRD) *Low voltage switchgear and controlgear assemblies intended to be installed outdoors in public places. Cable distribution cabinets (CDCS) for power distribution networks*	Todos los de la norma, excepto: - Verificación de la resistencia a la corrosión y al envejecimiento (Apdos. 8.2.103.2 y 8.2.103.3) - Ensayos CEM (Apdo. 8.2.8) *All the tests of the standard, except:* - *Verification of corrosion and ageing resistance (8.2.103.2 and 8.2.103.3)* - *EMC tests (8.2.8)*	UNE-EN 60439-5:2007

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Conjuntos de aparamenta de baja tensión: conjuntos para obras (CO). *Low voltage switchgear and controlgear assemblies: assemblies for construction sites (ACS)*	Todos los de la norma, excepto: - Ensayo de verificación de la resistencia a la corrosión en atmósferas fuertemente contaminadas (Apdo. 10.2.2.101) - Ensayo de radiación ultravioleta (Apdo. 10.2.4) - Ensayo de choque (Apdo. 10.2.6.3) - Ensayos CEM (Apdo. 10.6.2. y anexo J) *All the tests of the standard, except:* - *Verification of resistance to corrosion in heavily polluted atmospheres (10.2.2.101)* - *Resistance to ultra-violet (UV) radiation (10.2.4)* - *Shock test (10.2.6.3)* - *EMC tests (10.6.2 and Annex J)*	IEC 61439-4:2012
Conjuntos de aparamenta de baja tensión para redes de distribución pública *Low voltage switchgear and controlgear assemblies for power distribution in networks*	Todos los de la norma, excepto: - Ensayo de radiación ultravioleta (Apdo. - 10.2.4) - Ensayos CEM (Apdo. 10.6.2 y Anexo J) - Verificación de categoría de inflamabilidad - (Apdo. 10.2.3.102) *All the tests of the standard, except:* - *Resistance to ultra-violet (UV) radiation (10.2.4)* - *EMC tests (10.6.2 and Annex J)* - *Verification of category of flammability (10.2.3.102)*	IEC 61439-5:2010 UNE-EN 61439-5:2011
Conjuntos de aparamenta de baja tensión: Canalizaciones prefabricadas *Low-voltage switchgear and controlgear assemblies: Busbar trunking systems*	Todos los de la norma, excepto: - Ensayo de radiación ultravioleta (Apdo. - 10.2.4) - Ensayos CEM (Apdo. 10.6.2. y anexo J) - Resistencia a la propagación de la llama - (Apdo. 10.101) - Características cortafuegos (Apdo. 10.102) *All the tests of the standard, except:* - *Resistance to ultra-violet (UV) radiation (10.2.4)* - *EMC tests (10.6.2 and Annex J)* - *Resistance to flame- propagation (10.101)* - *Fire resistance in building penetrations (10.102)*	IEC 61439-6:2012

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PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Conjuntos de aparamenta de baja tensión bajo envolvente *Enclosed low-voltage switchgear and controlgear assemblies*	Ensayo en condiciones de arco debidas a un fallo interno *Test under conditions of arcing due to internal fault*	UNE-IEC/TR 61641 IN:2011 IEC/TR3 61641:2008
Fusibles de baja tensión destinados a ser utilizados por personas autorizadas (usos principalmente industriales) *Low-voltage fuses for use by authorized persons (fuses mainly for industrial applications)*	Todos los de las normas para las secciones A, B, C, D y F, excepto para la sección A: - Ensayo de corrosión del Apdo. 8.11.2.3 - Ensayo de resistencia a la formación de caminos conductores del Apdo. 8.2.5 *All the tests of the standards for fuse systems A, B, C, D and F, except for fuse system A:* - *Verification of resistance to rusting (8.11.2.3)* - *Resistance to tracking (8.2.5)*	UNE-EN 60269-1:2008 UNE-EN 60269-1/A1:2010 HD 60269-2:2007 UNE-HD 60269-2:2011 IEC 60269-1:2006 IEC 60269-1/A1:2009 IEC 60269-2:2010
	Todos los de la norma para las Secciones I y III, excepto los ensayos de resistencia a la formación de caminos conductores (Apdo. 8.2.6.), de corrosión (Apdo. 8.11.2.3), para la sección I *All the tests of the standards for the sections I to III, except resistance to tracking (8.2.6) and resistance to rusting (8.11.2.3) for section I*	UNE-EN 60269-2:1996 UNE-EN 60269-2/A1:1999 UNE-EN 60269-2/A2:2002 UNE-EN 60269-2:2005 CORRIGENDUM
Inversores Solares (Monofásicos y Trifásicos) y Sistemas Compensadores de Huecos (FACTS) de potencia asignada máxima de 300 kW *Solar inverters (single-phase and three-phase) and voltage dips compensation systems (FACTS) of rated power up to 300 kW*	Medida y evaluación de la respuesta de los Sistemas de Conversión Fotovoltaicos (SCFV) ante huecos de tensión, conforme a las condiciones establecidas en el apdo. 5 Anexo III del documento "Procedimientos de Verificación, Validación y Certificación de los requisitos del PO 12.3. sobre la respuesta de las instalaciones eólicas y fotovoltaicas ante huecos de tensión" versión 10 de 26 de enero de 2012 de la Asociación Empresarial Eólica (AEE) *Measurement and assessment of the response of photovoltaic conversion systems (PVCS) in the event of voltage dips, according to conditions of subclause 5 Annex III of document "Procedure for verification, validation and certification of the requirements of the P.O. 12.3 on the response of wind and solar farms in the event of voltage dips" version 10 of 26th january 2012 of the Spanish Wind Energy Association (AEE)*	Procedimiento interno PE.EE-88-E *Internal procedure* *PE.EE-88-E*

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipo electrónico para uso en instalaciones de potencia Electronic equipment for use in power installations	Todos los de la norma, excepto: - Ensayos de estanquidad para EE refrigerado por líquido (Apdo. 9.4.3.3.) - Ensayo de conveniencia del barniz o del recubrimiento (Apdo. 9.4.4.4.) - Ensayo de descarga parcial (Apdo. 9.4.5.3.) - Ensayos CEM (Apdos. 9.4.6.1. y 9.4.6.2.) *All the tests of the standard, except:* - *Seal test for liquid-cooled EE (9.4.3.3)* - *Suitability test of varnish or coating (9.4.4.4)* - *Partial discharge test (9.4.5.3)* - *EMC tests (9.4.6.1 and 9.4.6.2)*	UNE-EN 50178:1998
Equipos generadores en paralelo con redes generales de distribución en baja tensión (requisitos de conexión) *Micro-generators in parallel with public low-voltage distribution networks (requirements for the connection)*	Todos los de las normas para equipos de hasta 300 kVA, excepto: UNE-EN 50438:2008 - Ensayos de compatibilidad electromagnética - (Apdo. 5.1) - Ensayo LoM para Austria (última fila de tabla para Austria en Anexo A) *All the tests of the standards, for equipment up to 300 kVA, except:* *UNE-EN 50438:2008* - *EMC tests (5.1)* - *LoM test for Austria (last row in table of annex A for Austria)*	UNE-EN 50438:2008 DIN V VDE V 0126 -1-1:2006 DIN V VDE V 0126 -1-1/A1:2012 RD 1663/2000, de 29 de septiembre *Spanish regulation RD 1663/2000, of September 29th*
Inversores y dispositivos anti-isla *Inverters and islanding prevention devices*	Ensayo de prevención de funcionamiento en isla *Test of islanding prevention measures*	IEC 62116:2008

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de tratamiento de la información, incluyendo los equipos eléctricos de oficina y equipos conectables a la red de telecomunicación (excluyendo Destructoras personales hogar/oficina de documentos multimedia) *Information technology equipment including office electrical equipment and telecommunications networks equipment*	Seguridad eléctrica *Electrical safety*	UNE-EN 60950-1:2007 UNE-EN 60950-1:2007 CORRIGENDUM UNE-EN 60950-1/A11:2009 UNE-EN 60950-1/A1:2011 UNE-EN 60950-1/A12:2011 Apdos 1.6.2, 1.6.3, 1.7.1, 1.7.2.2, 1.7.2.3, 1.7.2.4, 1.7.2.5, 1.7.3, 1.7.4, 1.7.5, 1.7.6, 1.7.7, 1.7.8, 1.7.9, 1.7.10, 1.7.11, 1.7.12, 1.7.13, 1.7.14, 2.1.1.1, 2.1.1.6, 2.1.1.7, 2.1.2, 2.1.3, 2.3.2, 2.3.3, 2.3.4, 2.6.3.4, 2.6.3.5, 3.1.2, 3.1.3, 3.1.6, 3.1.7, 3.1.8, 3.1.10, 3.2.1, 3.2.2, 3.2.4, 3.2.6, 3.4.1, 3.4.2, 3.4.3, 3.4.4, 3.4.5, 3.4.6, 3.4.7, 3.4.8, 3.4.9, 3.4.10, 3.4.11, 3.5.1, 3.5.2, 3.5.3, 4.1, 4.2.3, 4.2.4, 4.3.1, 4.3.3, 4.3.4, 4.3.5, 4.3.7, 4.4, 4.4.1, 4.4.2, 4.4.3, 4.4.4, 4.5.2, 4.6.1, 4.6.2, 4.6.3, 4.6.4, 5.1, 5.2 y 6.2.
Generadores de potencia conectados a redes de BT, sistemas de protección de interfaz e inversores *Power generators connected to low voltage grids, interface protection systems and inverters*	Todos los de la norma salvo ensayos CEM *All the tests of the standard except EMC tests*	CEI 0-21:2012 (Regola técnica di riferimento per la connessione di utenti attivi e posivi ale neti BT delle emprese distribitici di energia electtrica)

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de medida de la energía eléctrica (c.a.). Contadores de energía activa, destinados a uso residencial, comercial y de industria ligera, para uso en redes eléctricas de 50 Hz (índices de clase A, B y C) *Electricity metering equipment (a.c.) Metering equipment of active energy intended to residential, commercial and light industry for use in 50 Hz electrical networks (class indexes A, B and C)*	Seguridad eléctrica , mecánicos y funcionales - Ensayo de tensión de impulso - Ensayos con tensión alterna - Potencia absorbida - Ensayo de calentamiento - Ventana - Tapa de bornes - Distancias en el aire y líneas de fuga - Contador con envolvente. Aislante clase II - Ensayo de martillo de resorte (Eh) - Protección contra penetración de polvo y agua - Resistencia al calor y al fuego Ensayos de precision *Electrical, mechanical and functional safety* - *Impulse voltage test* - *AC voltage test* - *Absorbed power* - *Heating* - *Window* - *Terminal cover* - *Clearance and creepage distances* - *Insulating encased meter of protective class II* - *Hammer tests (Eh)* - *Resistance to heat and fire* - *Protection against penetration of dust and water* *Precision tests*	UNE-EN 50470-1:2007 Excepto apdo. 5.4

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de medida de la energía eléctrica (c.a.). Contadores de energía activa, destinados a uso residencial, comercial y de industria ligera, para uso en redes eléctricas de 50 Hz (índices de clase A, B y C) *Electricity metering equipment (a.c.) Metering equipment of active energy intended to residential, commercial and light industry for use in 50 Hz electrical networks (class indexes A, B and C)*	Seguridad eléctrica , mecánicos y funcionales - Ensayo de tensión de impulso - Ensayos con tensión alterna - Potencia absorbida - Ensayo de calentamiento - Ventana - Tapa de bornes - Distancias en el aire y líneas de fuga - Contador con envolvente. Aislante clase II - Ensayo de martillo de resorte (Eh) - Protección contra penetración de polvo y agua - Resistencia al calor y al fuego Ensayos de precision *Electrical, mechanical and functional safety* - *Impulse voltage test* - *AC voltage test* - *Absorbed power* - *Heating* - *Window* - *Terminal cover* - *Clearance and creepage distances* - *Insulating encased meter of protective class II* - *Hammer tests (Eh)* - *Resistance to heat and fire* - *Protection against penetration of dust and water* *Precision tests*	UNE-EN 50470-3:2007 Excepto apdo. 5.4

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de medida de la energía eléctrica (c.a.). Contadores estáticos o electromecánicos destinados a la medida de energía eléctrica en sistemas de 50Hz y tensión hasta 600V *Electricity metering equipment (a.c.)* *Static or electromechanics meters and intended to the measuring of electrical energy in 50 Hz systems and voltage up to 600 V.*	Seguridad eléctrica , mecánicos y funcionales - Ensayo de tensión de impulso - Ensayos con tensión alterna - Potencia absorbida - Ensayo de calentamiento - Ventana - Tapa de bornes - Distancias en el aire y líneas de fuga - Contador con envolvente. Aislante clase II - Ensayo de martillo de resorte (Eh) - Protección contra penetración de polvo y agua - Resistencia al calor y al fuego Ensayos de precision *Electrical, mechanical and functional safety* - *Impulse voltage test* - *AC voltage test* - *Absorbed power* - *Heating* - *Window* - *Terminal cover* - *Clearance and creepage distances* - *Insulating encased meter of protective class II* - *Hammer tests (Eh)* - *Resistance to heat and fire* - *Protection against penetration of dust and water* *Precision tests*	UNE-EN 62052-11:2004 Excepto apdo. 5.4

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de medida de la energía eléctrica (c.a.). Contadores estáticos de energía activa (clases 1 y 2) *Electricity metering equipment (a.c.) Static meters for active energy (classes 1 and 2)*	Seguridad eléctrica , mecánicos y funcionales - Ensayo de tensión de impulso - Ensayos con tensión alterna - Potencia absorbida - Ensayo de calentamiento - Ventana - Tapa de bornes - Distancias en el aire y líneas de fuga - Contador con envolvente. Aislante clase II - Ensayo de martillo de resorte (Eh) - Protección contra penetración de polvo y agua - Resistencia al calor y al fuego Ensayos de precision *Electrical, mechanical and functional safety* - *Impulse voltage test* - *AC voltage test* - *Absorbed power* - *Heating* - *Window* - *Terminal cover* - *Clearance and creepage distances* - *Insulating encased meter of protective class II* - *Hammer tests (Eh)* - *Resistance to heat and fire* - *Protection against penetration of dust and water* *Precision tests*	UNE-EN 62053-21:2003 Excepto apdo. 5.4

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Equipos de medida de la energía eléctrica (c.a). Contadores estáticos de energía reactiva (clases 2 y 3) *Electricity metering equipment (a.c.)* *Static meters for reactive energy (classes 2 and 3)*	Seguridad eléctrica , mecánicos y funcionales - Ensayo de tensión de impulso - Ensayos con tensión alterna - Potencia absorbida - Ensayo de calentamiento - Ventana - Tapa de bornes - Distancias en el aire y líneas de fuga - Contador con envolvente. Aislante clase II - Ensayo de martillo de resorte (Eh) - Protección contra penetración de polvo y agua - Resistencia al calor y al fuego Ensayos de precision *Electrical, mechanical and functional safety* - *Impulse voltage test* - *AC voltage test* - *Absorbed power* - *Heating* - *Window* - *Terminal cover* - *Clearance and creepage distances* - *Insulating encased meter of protective class II* - *Hammer tests (Eh)* - *Resistance to heat and fire* - *Protection against penetration of dust and water* *Precision tests*	UNE-EN 62053-23:2003 Excepto apdo. 5.4

Categoría I (Ensayos "in situ") / *Category I (on-site tests)*

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Cables de potencia con aislamiento extruido y sus accesorios, de tensión asignada superior a 150 kV (Um = 170 kV) hasta 500 kV (Um = 550 kV) *Power cables with extruded insulation and their accessories for rated voltages above 150 kV (Um = 170 kV) up to 500 kV (Um = 550 kV)*	Ensayos eléctricos después de la instalación (cap. 16): - Ensayo de tensión continua de la cubierta - exterior (Apdo. 16.2) - Ensayo de tensión en corriente alterna del aislamiento (Apdo. 16.3) *Electrical tests after installation (chap. 16):* - *DC voltage test of the oversheath (16.2)* - *-AC voltage test of the insulation (16.3)*	IEC 62067:2011
Cables de potencia con aislamiento extruido y sus accesorios, de tensión asignada superior a 150 kV (Um = 170 kV) hasta 400 kV (Um = 420 kV) *Power cables with extruded insulation and their accessories for rated voltages above 150 kV (Um = 170 kV) up to 400 kV (Um = 420 kV)*	Ensayos eléctricos después de la instalación (cap. 16): - Ensayos de comprobación del aislamiento principal: Método 1: Ensayo de tensión soportada a frecuencia industrial. - Ensayo de comprobación de la cubierta - Ensayo de continuidad y resistencia de las pantallas - Ensayo de continuidad y resistencia de los - conductores - Medida de descargas parciales del sistema nuevo de cable *Electrical tests after installation (clause 16):* - *Tests to verify the main insulation: Method 1: Power frequency withstand test.* - *Test to verify the oversheath* - *Continuity and resistance measurement test of screens* - *Continuity and resistance measurement test of conductors* - *Partial discharges measurement on the new cable system*	UNE 211067-1:2012

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Cables de energía con aislamiento extruido y sus accesorios para tensiones asignadas superiores a 36 kV (Um = 42 kV) hasta 150 kV (Um = 170 kV) *Power cables with extruded insulation and their accessories for rated voltages above 36 kV (Um = 42 kV) hasta 150 kV (Um = 170 kV)*	Ensayos eléctricos después de la instalación: Parte 1. - 15.1: ensayo de tensión dc sobre cubierta - 15.2: ensayo de tensión ac sobre el aislamiento. Parte 2. - 8.1 Ensayo eléctrico sobre la "sobrecubierta" (oversheath) 2 Ensayos eléctricos sobre los accesorios - 8.3.1. Ensayo de tensión ac sobre el aislamiento con equipo resonante - 8.4 Ensayo eléctrico después de la instalación, cubierta no metálica - 8.8 Ensayo dc de resistencia del conductor Partes 3 a 11: ensayos realizados por referencia a los de las partes 1 y 2, dentro de los rangos siguientes para los ensayos sobre cubiertas y sobre el aislamiento: - Ensayos sobre cubierta: 25 kV dc - Ensayos sobre aislamiento: 260 kV, 20 Hz a 300 Hz *Electrical tests after installation:* *Part 1.* *- 15.1:DC voltage test of the oversheath* *- 15.2: AC voltage test of the insulation.* *Part 2.* *- 8.1 Electrical test on oversheath* *- 8.2 Electrical tests on accessories* *- 8.3.1 AC voltage test on the insulation with resonant system* *- 8.4 Electrical test after installation, non-metallic sheath* *- 8.8 DC conductor resistance test* *Parts 3 to 11: tests performed by reference to those of parts 1 and 2, in the following ranges for the tests of sheaths and of insulation:* *- Tests of sheaths: 25 kV dc* *- Tests of insulation: 260 kV, 20 Hz to 300 Hz*	HD 632 S2:2008

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Cables de energía con aislamiento extruido y sus accesorios para tensiones asignadas superiores a 36 kV (Um = 42 kV) hasta 150 kV (Um = 170 kV) *Power cables with extruded insulation and their accessories for rated voltages above 36 kV (Um=42 kV) up to 150 kV (Um=170 kV)*	Ensayos eléctricos después de la instalación (cap. 16): - Ensayo de tensión continua de la cubierta exterior (Apdo. 16.2) - Ensayo de tensión en corriente alterna del aislamiento (Apdo. 16.3) *Electrical tests after installation (chap. 16):* - *DC voltage test of the oversheath (16.2)* - *AC voltage test of the insulation (16.3)*	IEC 60840:2011
Cables de energía con aislamiento extruido y sus accesorios para tensiones asignadas superiores a 36 kV (Um = 42 kV) hasta 150 kV (Um = 170 kV) *Power cables with extruded insulation and their accessories for rated voltages above 36 kV (Um=42 kV) up to 150 kV (Um=170 kV)*	Ensayos eléctricos después de la instalación (cap. 16): - Ensayos de comprobación del aislamiento principal. Método 1: Ensayo de tensión soportada a frecuencia industrial. Método 4: Medida de descargas parciales - Ensayo de comprobación de la cubierta - Ensayo de continuidad y resistencia de las pantallas - Ensayo de continuidad y resistencia de los - conductores - Medida de descargas parciales del sistema nuevo de cable *Electrical tests after installation (chap. 16):* - *Tests to verify the main insulation: Method 1: Power frequency withstand test. Method 4: Partial discharges measurement.* - *Test to verify the oversheath* - *Continuity and resistance measurement test of screens* - *Continuity and resistance measurement test of conductors* - *Partial discharges measurement on the new cable system*	UNE 211632-1:2012

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Sistemas de cables eléctricos de alta tensión en corriente alterna *High voltage AC cable systems*	Ensayos previos a la puesta en servicio del sistema nuevo de cable de alta tensión (cap. 4): Sistemas nuevos de cables de tensión asignada superior a 0,6/1 kV e inferior o igual a 87/150 (170 kV) (Apdo. 4.1): - Ensayos de comprobación del aislamiento principal (Apdo. 4.1.1). Método 1: Ensayo de tensión soportada a frecuencia industrial. Método 4: Medida de descargas parciales - Ensayo de comprobación de la cubierta (Apdo. 4.1.2) - Ensayo de continuidad y resistencia de las pantallas (Apdo. 4.1.3) - Ensayo de continuidad y resistencia de los conductores (Apdo. 4.1.4) *Electrical tests after installation of a new high voltage cable system (clause 4): New cable systems of rated voltages above 0.6/1 kV up to 87/150 (170 kV) (4.1):* - *Tests of the insulation (4.1.1). Method 1: Power frequency withstand voltage test. Method 4: Partial discharge measurement* - *Test of the oversheath (4.1.2)* - *Continuity and resistance measurement test of screens (4.1.3)* - *Continuity and resistance measurement test of conductors (4.1.4)*	UNE 211006:2010

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Sistemas de cables eléctricos de alta tensión en corriente alterna *High voltage AC cable systems*	Sistemas nuevos de cables de tensión asignada superior a 87/150 (170 kV) hasta 220/400 (420 kV) (Apdo. 4.2): - Ensayos de comprobación del aislamiento principal (Apdo. 4.2.1): Método 1: Ensayo de tensión soportada a frecuencia industrial. - Ensayo de comprobación de la cubierta (Apdo. 4.2.2) - Ensayo de continuidad y resistencia de las pantallas (Apdo. 4.2.3) - Ensayo de continuidad y resistencia de los conductores (Apdo. 4.2.4) Medida de descargas parciales del sistema nuevo de cable (cap. 5) Ensayo de continuidad y resistencia eléctrica de la pantalla y los conductores de los sistemas nuevos de cable (cap. 6): *New cable systems of rated voltages above 87/150 (170 kV) up to 220/400 (420 kV) (4.2):* - *Tests of the insulation (4.2.1): Method 1: Power frequency withstand voltage test* - *Test of the oversheath (4.2.2)* - *Continuity and resistance measurement test of screens (4.2.3)* - *Continuity and resistance measurement test of conductors (4.2.4).* *Partial discharge measurement of a new cable system (chap. 5)* *Continuity and resistance measurement test of screens and conductors of new cable systems (chap. 6)*	UNE 211006:2010
Líneas eléctricas de alta tensión *High voltage power lines*	Medida de impedancia de línea *Line impedance measurement*	Procedimiento interno PE.EE-90-E *Internal procedure PE.EE-90-E*
Equipos y materiales de alta tensión *High voltage equipment and materials*	Ensayos de alta tensión con tensión alterna Límites: - 260 kV, 20 Hz a 300 Hz *High voltage test with alternating voltage* *Limits:* *- 260 kV, 20 Hz to 300 Hz*	UNE-EN 60060-3:2006 UNE-EN 60060-3:2007 CORRIGENDUM IEC 60060-3:2006

На основание чл.36а ал.3 от ЗОП

PRODUCTO/MATERIAL A ENSAYAR / *PRODUCT/MATERIAL TO TEST*	ENSAYO *TEST*	NORMA/PROCEDIMIENTO DE ENSAYO *STANDARD/TEST PROCEDURE*
Cables de energía para material rodante en aplicaciones ferroviarias *Power cables of rolling stock for railway applications*	Propiedades dieléctricas: Ensayos de rutina (Apdo. 9.3.3.3) *Dielectric properties: Routine tests (9.3.3.3)*	IEC 60077-1:1999

ПРИЛОЖЕНИЕ 9

На основание чл.36а ал.3 от ЗОП

ESİTAŞ
Elektrik Sanayi ve Ticaret A.Ş.

HİLAL MAH.PAŞAKÖY CAD.NO:31
SANCAKTEPE / İSTANBUL
34791 İSTANBUL / TÜRKİYE
Tel: +90 216 304 32 70 Pbx
Faks: +90 216 304 32 82
E-mail:info@esitas.com
Sultanbeyli V.D. 380 034 3395

ИНСТРУКЦИЯ ЗА ТРАНСПОРТ,СЪХРАНЕНИЕ,МОНТАЖ И ЕКСПЛОАТАЦИЯ НА НАПРЕЖЕНОВИ ТРАНСФОРМАТОРИ ЗА ЗАКРИТ МОНТАЖ

Съхранение:

- Тип за закрит монтаж, трябва да се съхранява в затворени помещения;
- Съхранявайте при температурни нива, отбелязани на етикета на дървената опаковка.

Транспорт:

- Транспортна опаковка съгласно международните стандарти и практики;
- За последващ транспорт не изваждайте от оригиналната опаковка или обезопасете внимателно;
- Следвайте инструкциите за товарене върху етикетите на дървените каси.

Товарене:

- Тежки обекти- използвайте транспалетни колички или мотокар за товарене;
- Не поставяйте върху по-крехки обекти;
- Не поставяйте повече от два сандъка един върху друг;
- Следвайте инструкциите за товарене върху етикетите на дървените каси

Инсталиране:

- Следвайте инструкциите на Esitas, доставени с Вашия трансформатор;
- Инсталацията трябва да се извърши само от обучен персонал;
- Винаги заземявайте стоманената основна плоча;
- Винаги заземявайте края на вторичните клеми;
- Никога не свързвайте вторичните намотки на късо.

Поддръжка:

- Животът на продукта се удължава, ако се използва при нормални условия на системата без проблеми;
- Почиствайте всяка година, ако съществува натрупване на прах върху изолираните части на трансформатора. (Не забравяйте да изключите захранването преди почистване).

ESİTAŞ
Elektrik Sanayi ve Ticaret A.Ş.

HİLAL MAH.PAŞAKÖY CAD.NO:31
SANCAKTEPE / İSTANBUL
34791 İSTANBUL / TÜRKİYE
Tel: +90 216 304 32 70 Pbx
Faks: +90 216 304 32 82
E-mail:info@esitas.com
Sultanbeyli V.D. 380 034 3395

INSTRUCTIONS FOR TRANSPORT, STORAGE, INSTALLATION AND EXPLOITATION FOR VOLTAGE TRANSFORMERS INDOOR

Storage:

- Indoor type, should be stored in closed area
- Keep in the temperature level mentioned on the wooden case labels

Transport:

- Export packaging according to international standards and practices
- For following shipments, please do not remove from the wooden box, or secure carefully
- Please follow the handling instructions on the wooden case labels

Handling:

- Heavy object, please use transpalet or forklift to carry
- Do not place over weaker items
- Do not place more than 2 boxes on top of one another
- Please follow the handling instructions on the wooden case labels

Installation:

- Follow the Esitas Instructions sheet delivered with your VT
- Installation should be made by skilled pesonell
- Always ground the steel base plate
- Always ground one end of the secondary terminals
- Never short circuit the secondary terminals

Maintenance:

- Longer product life if used under normal system conditions without problems
- Please clean if exists the dust accumulating on the insulated parts of the CT in every 1 year
- (Please do not forget to cut the system energy before cleaning)

На основание чл.36а ал.3 от ЗОП

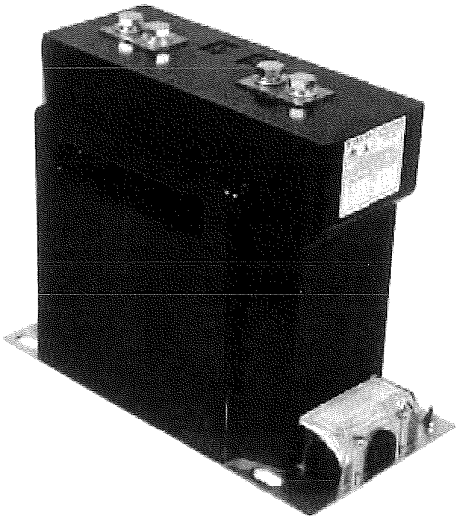
ПРИЛОЖЕНИЕ 10

На основание чл.36а ал.3 от ЗОП

INDOOR SUPPORT TYPE CAST RESIN INSULATED CURRENT TRANSFORMERS
(Um=3,6kV ..... 12kV, 17,5 ..... 24kV NEW BLOCK TYPES)

Types: ATB 10-BS
ATB 20-BS

- Up to 3 cores*
- On request with capacitive layer.
- On request with barrier.



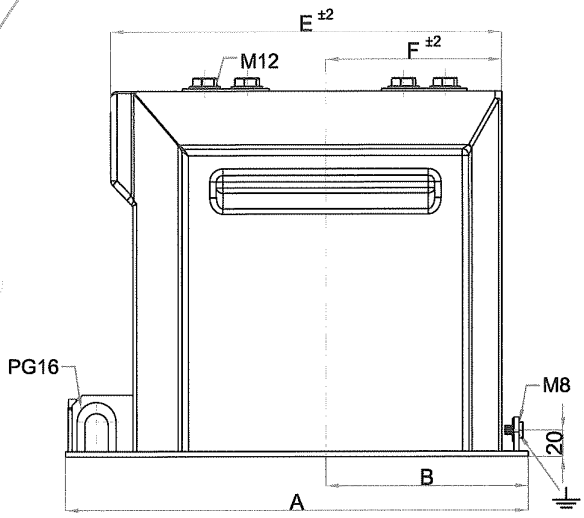
Technical Data

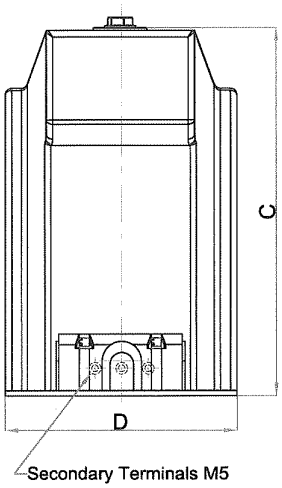
TYPES	ATB 10-BS			ATB 20-BS	
Operating voltage. Um (kV)	3.6	7.2	12 **	17.5	24
Rated power-frequency withstand voltage (1 minute) (kV)	10	20	28	38	50
Rated impulse test voltage (1.2/50 μs) full wave (kV)	40	60	75	95	125
Rated frequency (Hz)	50-60				
Primary rated current (A)	5 - 2500 (On request 3000A 1.0xIn / Cont. & Insulation class B)				
Primary reconnection (A)	2 x 5 - 2 x 600				
Secondary rated current (A)	1-5				
Metering classes	0.2 - 0.2S - 0.5 - 0.5S - 1 - 3 - 5 Acc. to IEC 60044-1				
Protection classes	5P- 10P, Cl.PX Acc. to IEC 60044-1				
Rated short-time thermal current (Ith) (1s) (kA)	max. 1000 x In				
Rated dynamic current (Idyn) (kA)	2.5 x Ith				
Short-time load (mechanical) (N)	5000				
Insulation class	E				
Ambient temperature (°C)	-25 +40***				
Altitude (m)	1000				
Standard	According to the custo				
Weight (approx.) (kg)	20 - 25				

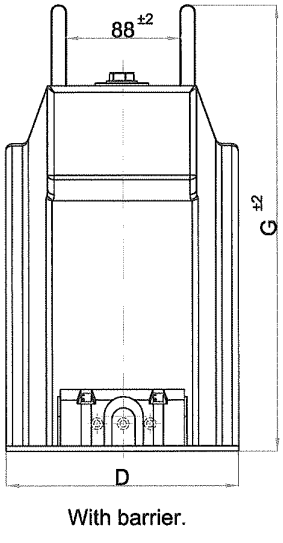
* For more cores plea
** On request ATB 10-BS op
*** It can be produced according to customer's specified ambient temperature.Plea

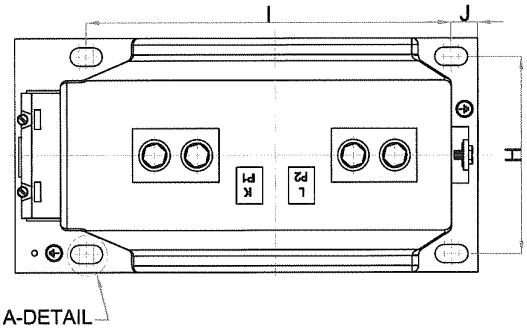
www.esitas.com

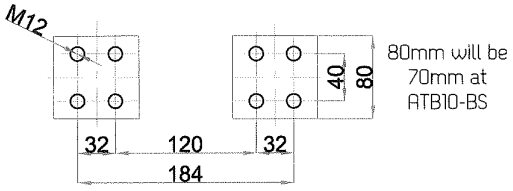
INDOOR SUPPORT TYPE CAST RESIN INSULATED C.T.'S TECHNICAL DRAWING
(Um=3,6kV ..... 12kV, 17,5 ..... 24kV NEW BLOCK TYPES)

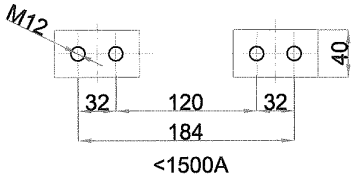


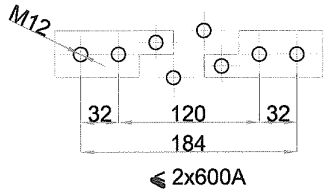


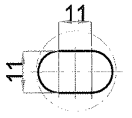




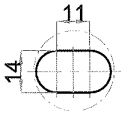








ATB 10-BS
A-DETAIL



ATB 20-BS
A-DETAIL

TYPES	A	B	C	D	E	F	G	H	I	J
ATB 10-BS	355	155	220	148	299	135	-	125	270	20
ATB 20-BS	355	155	280	178	300	135	340	150	280	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2,5	3,5
M8 (Ground Te		
M12 (Primary T		

- All dimensions are in mm.
- Tolerances are according to DIN 7168-g when not specified.
- Esitas reserves the right to change the specifications and the dimensions of the goods. Please ask for updated
- Customer designed products are also available

ПРИЛОЖЕНИЕ 11

На основание чл.36а ал.3 от ЗОП

БЪЛГАРСКИ ИНСТИТУТ ПО МЕТРОЛОГИЯ

Главна дирекция МЕРКИ И ИЗМЕРВАТЕЛНИ УРЕДИ

ДО
"Контрагент 35" ЕООД,
6000 – гр. Стара Загора,
ул. „Индустриална", ПК 177

ОТНОСНО: Одобряване на тип АТВ 10/20/30 на токови измервателни трансформатори, *(по Заявление, вх. № АУ-ОТСИ-33/30.04.2013 г.)*

УВАЖАЕМИ ГОСПОДА,

Уведомяваме Ви, че в регистъра на одобрените за използване типове средства за измерване под ***№ 5007*** са вписани ***токови измервателни трансформатори тип АТВ 10/20/30,*** с метрологични характеристики съгласно Удостоверение № 13.06.5007.

Фирма – производител: ESITAS Elektrik Sanayi ve Ticaret A.S., Турция

Срокът на валидност на одобряване на типа е: ***03.06.2023 г.***

Измервателните трансформатори, подлежат на задължителна първоначална проверка.

Производителят/вносителят на средството за измерване от одобрен тип се задължава да постави знак за одобрен тип в съответствие с чл. 35 от Закона за измерванията (ДВ, бр. 46 от 2002 г.).

На основание чл.36а ал.3 от ЗОП

1040 София,
бул."д-р. Г. М. Димитров" № 52Б
E-mail: GD_MIU@bim.government.bg

Телефон На основание чл.36а ал.3 от ЗОП

С 06 73

РЕПУБЛИКА БЪЛГАРИЯ
Български институт по метрология

REPUBLIC OF BULGARIA
Bulgarian Institute of Metrology

УДОСТОВЕРЕНИЕ
ЗА ОДОБРЕН ТИП СРЕДСТВО ЗА ИЗМЕРВАНЕ
Measuring Instrument Type-approval Certificate

№ 13.06.5007

Издадено на производител:
Issued to manufacturer:
ESITAS Elektrik Sanayi ve Ticaret A.S., Турция

На основание на:
In Accordance with:
чл. 32, ал. 1 от Закона за измерванията (ДВ, бр. 46 от 2002 г., изм. бр. 88 от 05 г., изм. и доп. бр. 95 от 2005 г.)

Относно:
In Respect of:
токови измервателни трансформатори тип АТВ 10/20/30

Знак за одобрен тип:
Type Approval Mark:
BG 13
5007

Технически и метрологични характеристики:
Technical and metrological characteristics:
приложение, неразделна част от настоящото удостоверение за одобрен тип средство за измерване

Срок на валидност:
Valid until:
03.06.2023 г.

Вписва се в регистъра на одобрените за използване типове средства за измерване под №:
Reference №:
5007

Дата на издаване на удостоверението за одобрен тип:
Date:
03.06.2013 г.

И.Д. ПРЕДСЕДАТЕЛ: На основание чл.36а ал.3 от ЗОП

Приложение към удостоверение за одобрен тип № 13.06.5007

Издадено на производител: ESITAS Elektrik Sanayi ve Ticaret A.S., Турция

Относно: токови измервателни трансформатори тип АТВ 10/20/30

1. Описание на типа:

Токовите измервателни трансформатори тип АТВ 10/20/30 са предназначени за измерване и релейна защита в комплектни разпределителни устройства за средно напрежение. Максималното работно напрежение е 3,6; 7,2; 12; 17,5; 24 и 36 kV.

Първичните и вторичните намотки са положени върху лентови магнитопроводи и след това заляти с епоксидна смола. Вторичните изводи са изведени навън като изолирани съединителни проводници през формованото тяло на трансформатора и фабрично са присъединени към вторичните клеми. Вторичните клеми на трансформатора са разположени в отделна изолирана клемна кутия и са обозначени със стандартни маркировки на изводите.

Външната изолация е от епоксидна смола, с което се постига необходимата изолационна и механична здравина.

2. Технически и метрологични характеристики:

Тип на трансформатора	**АТВ 10/20/30**
Максимално работно напрежение, kV	3,6; 7,2; 12; 17,5; 24; 36
Номинален първичен ток, А	5 - 3000
Превключване на първичната намотка	2x5 – 2x600
Номинален вторичен ток, А	1; 5
Номинална честота, Hz	50 - 60
Клас на точност - намотки за измерване - намотки за защита	0,2 S; 0,2; 0,5 S; 0,5; 1; 3; 5 5P, 10P, PX

3. Типово означение: тип **АТВ 10/20/30**

4. Описание на местата, предназначени за поставяне на знаци от метрологичен контрол:

- Знакът за одобрен тип се нанася до табелката с технически данни.
- Знакът за първоначална проверка (марка за залепване) се поставя до знака за одобрен тип.

На основание чл.36а ал.3 от ЗОП

БЪЛГАРСКИ ИНСТИТУТ ПО МЕТРОЛОГИЯ

Главна дирекция МЕРКИ И ИЗМЕРВАТЕЛНИ УРЕДИ

ДО
„КОНТРАГЕНТ 35" ЕООД
6000 ГР. СТАРА ЗАГОРА
УЛ. „ИНДУСТРИАЛНА" П.К. № 177
ТЕЛ.: 042/600 032, ФАКС: 042/600 129

Български институт по метрология
София ул. „Проф. Цветан Лазаров" № 52Б
АУ-000029 № 16902
София 07 07 2015 г.

Относно: Издаване на допълнение № 15.07.5007.1 към удостоверение за одобрен тип № 13.06.5007 на токов измервателн трансформатор тип ATB 10/20/30.
(по Заявление, вх. № АУ-000029-16902/26.06.2015 г.)

УВАЖАЕМИ ГОСПОДА,

Уведомяваме Ви, че е издадено допълнение **№ 15.07.5007.1** към удостоверение № 13.06.5007 за одобрен и вписан под **№ 5007** в регистъра на одобрените за използване типове средства за измерване **– токов измервателн трансформатор тип ATB 10/20/30** с метрологични характеристики съгласно горепосоченото допълнение.

- Фирма–производител: ESITAŞ Elektrik Sanayi ve Ticaret A.Ş., Турция
  Hilal Mahallesi Paşaköy Caddesi No: 31 Sancaktepe
  İSTANBUL / TÜRKİYE;
- Срокът на валидност на одобряване на типа е: **03.06.2023 г.**

Измервателните трансформатори подлежат на задължителна първоначална проверка.

Производителят/вносителят на средството за измерване от одобрен тип се задължава да постави знак за одобрен тип в съответствие с чл. 35 от Закона за измерванията (ДВ, бр. 46 от 2002 г.).

На основание чл.36а ал.3 от ЗОП

1040-София
бул."д-р. Г. М. Димитров" № 52Б
e-mail: GD_MIU@bim.government.bg

На основание чл.36а ал.3 от ЗОП

РЕПУБЛИКА БЪЛГАРИЯ
Български институт по метрология

REPUBLIC OF BULGARIA
Bulgarian Institute of Metrology

ДОПЪЛНЕНИЕ № 15.07.5007.1

КЪМ УДОСТОВЕРЕНИЕ ЗА ОДОБРЕН ТИП СРЕДСТВО ЗА ИЗМЕРВАНЕ № 13.06.5007

Measuring Instrument Type-approval Certificate-Revision 1

Издадено на производител: *Issued to manufacturer:*	ESITAŞ Elektrik Sanayi ve Ticaret A.Ş., Турция Hilal Mahallesi Paşaköy Caddesi No:31 Sancaktepe İSTANBUL / TÜRKİYE
На основание на: *In Accordance with:*	чл. 32, ал. 1 от Закона за измерванията (ДВ, бр. 46 от 2002 г., изм. бр. 88 от 05 г., изм. и доп. бр. 95 от 2005 г.)
Относно: *In Respect of:*	токов измервателен трансформатор тип АТВ 10/20/30
Технически и метрологични характеристики: *Technical and metrological characteristics*:	приложение, неразделна част от настоящото удостоверение за одобрен тип средство за измерване
Срок на валидност: *Valid until:*	03.06.2023 г.
Средството за измерване е вписано в регистъра на одобрените за използване типове средства за измерване под №: *Reference №:*	5007
Дата на издаване на допълнението към удостоверението за одобрен тип: *Date:*	06.07.2015 г.

На основание чл.36а ал.3 от ЗОП

Приложение към Допълнение № 15.07.5007.1 към удостоверение № 13.06.5007

Издадено на производител: ESITAŞ Elektrik Sanayi ve Ticaret A.Ş., Турция
Hilal Mahallesi Paşaköy Caddesi No: 31 Sancaktepe
İSTANBUL / TÜRKİYE

Относно: токов измервателен трансформатор тип АТВ 10/20/30

Описание на допълнението към удостоверение за одобрен тип № 13.06.5007

• В т. 2. **Технически и метрологични характеристики:**

Номинален първичен ток, А „5-3000" да се промени на: „от 5 до 3000";
Превключване на първичната намотка, А „2x5 - 2x600" да се промени на „от 2x5 до 2x600";

• Към т.3. **Типово означение да се допълни:**
„XX" към типовото означение АТВ 10/20/30: АТВ 10-XX/20-XX/30-XX, където:

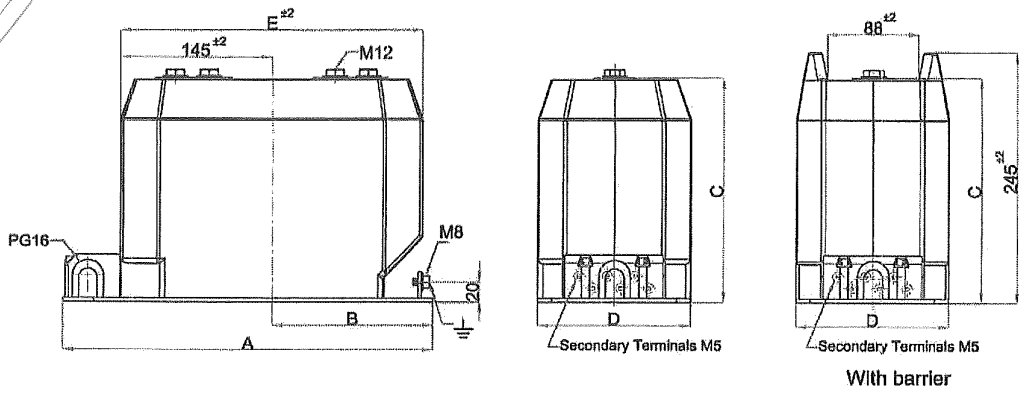
XX е цифрово-буквена комбинация, състояща се от една цифра и/или буква или от две цифри и/или букви, обозначаваща следното значение:

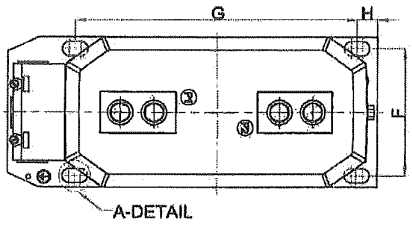
B	-	размер на корпус АТВ10-B	(Чертеж № 1)
	-	размер на корпус АТВ20-B	(Чертеж № 4)
B2	-	размер на корпус АТВ10-B2	(Чертеж № 1)
	-	размер на корпус АТВ20-B2	(Чертеж №4)
B3	-	размер на корпус АТВ10-B3	(Чертеж № 1)
B4	-	размер на корпус АТВ20-B4	(Чертеж № 4)
BS	-	размер на корпус АТВ10-BS	(Чертеж № 2)
	-	размер на корпус АТВ20-BS	(Чертеж № 2)
S	-	размер на корпус АТВ30-S	(Чертеж № 7)
S1	-	размер на корпус АТВ30-S1	(Чертеж № 7)
1	-	размер на корпус АТВ30-1	(Чертеж № 7)
2	-	размер на корпус АТВ10-2	(Чертеж № 1)
	-	размер на корпус АТВ30-2	(Чертеж № 7)
3	-	размер на корпус АТВ20-3	(Чертеж № 4)
	-	размер на корпус АТВ30-3	(Чертеж № 7)
4	-	размер на корпус АТВ30-4	(Чертеж № 8)
5	-	размер на корпус АТВ30-5	(Чертеж № 8)
10	-	размер на корпус АТВ10-10	(Чертеж № 3)
	-	размер на корпус АТВ20-10	(Чертеж № 6)
	-	размер на корпус АТВ30-10	(Чертеж № 8)
15	-	размер на корпус АТВ10-15	(Чертеж № 3)
	-	размер на корпус АТВ20-15	(Чертеж № 6)
	-	размер на корпус АТВ30-15	(Чертеж № 8)
3A	-	размер на корпус АТВ20-3A	(Чертеж № 5)
3B	-	размер на корпус АТВ20-3B	(Чертеж № 5)
3K	-	размер на корпус АТВ20-3K	(Чертеж № 4)

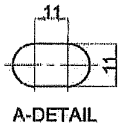
На основание чл.36а ал.3 от ЗОП

ЧЕРТЕЖ № 1

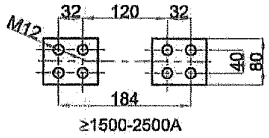
ТРАНСФОРМАТОР ТОКОВ, ОПОРЕН ТИП, С ИЗОЛАЦИЯ ОТ ЛЯТА СМОЛА, ЗА ЗАКРИТ МОНТАЖ (Um=3,6kV, 12kV BLOCK TYPES)



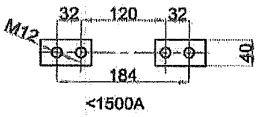




Primary Connection Bars



≥1500-2500A



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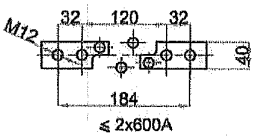


≤ 2x600A

TYPES	A	B	C	D	E	F	G	H
ATB 10-B	355	155	220	148	290	125	270	20
ATB 10-B2	395	195	220	148	330	125	310	20
ATB 10-B3	455	255	220	148	390	125	370	20
ATB 10-2	355	155	220	175	290	150	270	20

TIGHTENING TORQUE (Nm)	min.	max.
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

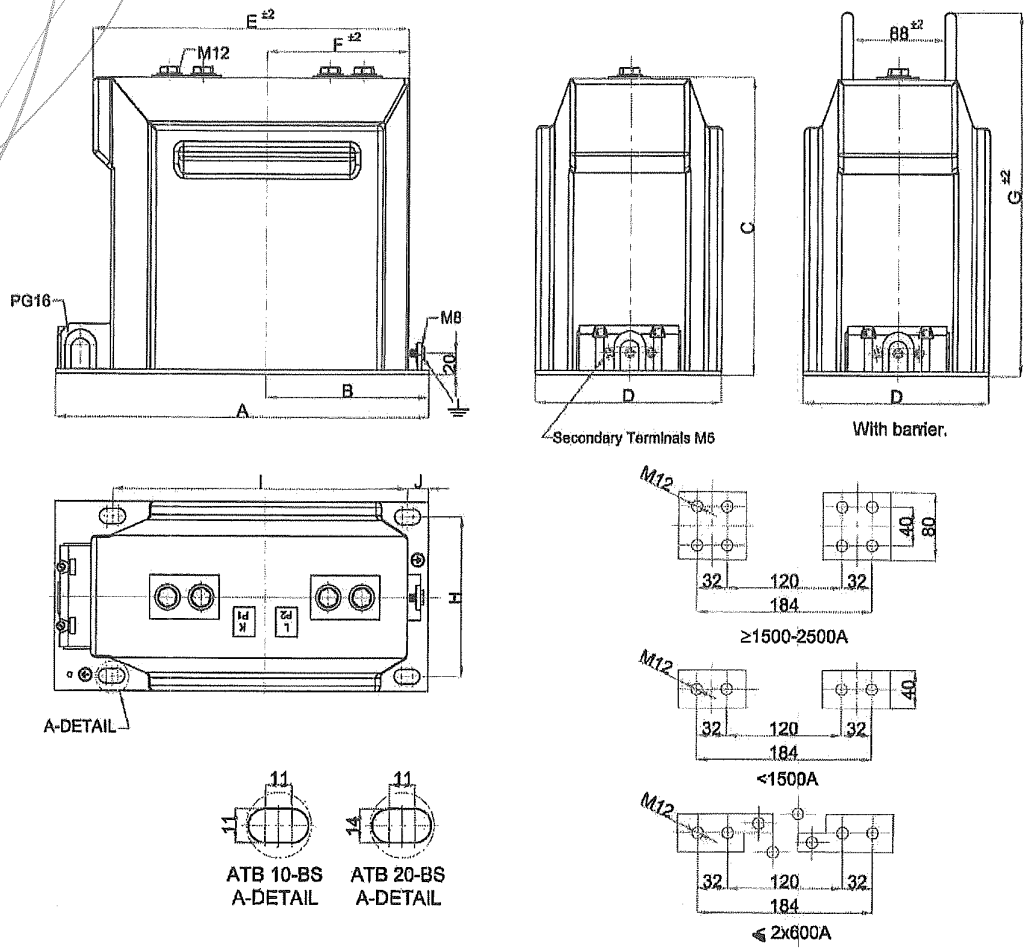
Всички размери са в милиметри. Допустимите отклонения са съгласно DIN 7168-g.

ЕЛЕКТРОЛУКС

На основание чл.36а ал.3 от ЗОП

ЧЕРТЕЖ No 2

ТРАНСФОРМАТОР ТОКОВ, ОПОРЕН ТИП, С ИЗОЛАЦИЯ ОТ ЛЯТА СМОЛА, ЗА ЗАКРИТ МОНТАЖ (Um=3,6kV; 12kV; 17,5....24kV NEW BLOCK TYPES)



TYPES	A	B	C	D	E	F	G	H	I	J
ATB 10-BS	355	155	220	148	299	135	-	125	270	20
ATB 20-BS	355	155	280	178	300	135	340	150	280	20

TIGHTENING TORQUE (Nm)	min.	max.
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

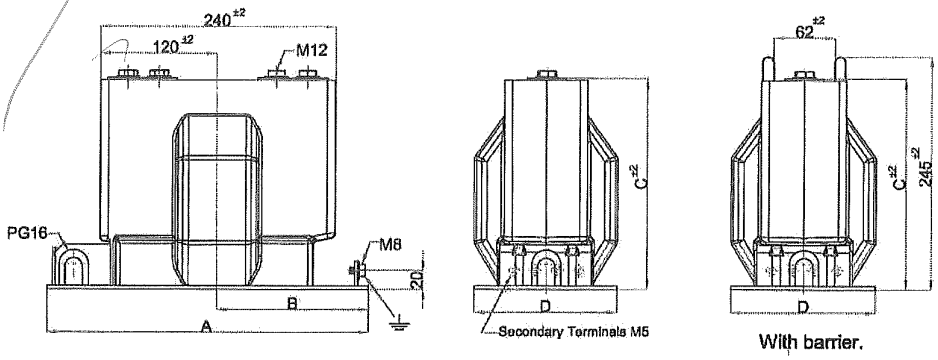
Всички размери са в милиметри. Допустимите отклонения са съгласно DIN 7168-g.

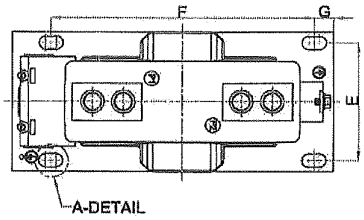
ЕЛЕКТРОЛУЧ ПАЗАРДЖИК

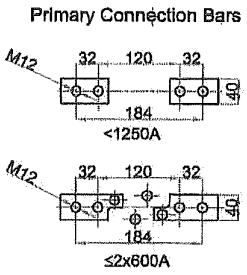
На основание чл.36а ал.3 от ЗОП

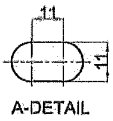
ЧЕРТЕЖ № 3

ТРАНСФОРМАТОР ТОКОВ, ОПОРЕН ТИП, С ИЗОЛАЦИЯ ОТ ЛЯТА СМОЛА, ЗА ЗАКРИТ МОНТАЖ (Um=3,6kV 12kV NARROW BLOCK TYPES)









TYPES	A	B	C	D	E	F	G
ATB 10-10	330	155	220	148	125	270	20
ATB 10-15	330	155	220	148	125	270	20

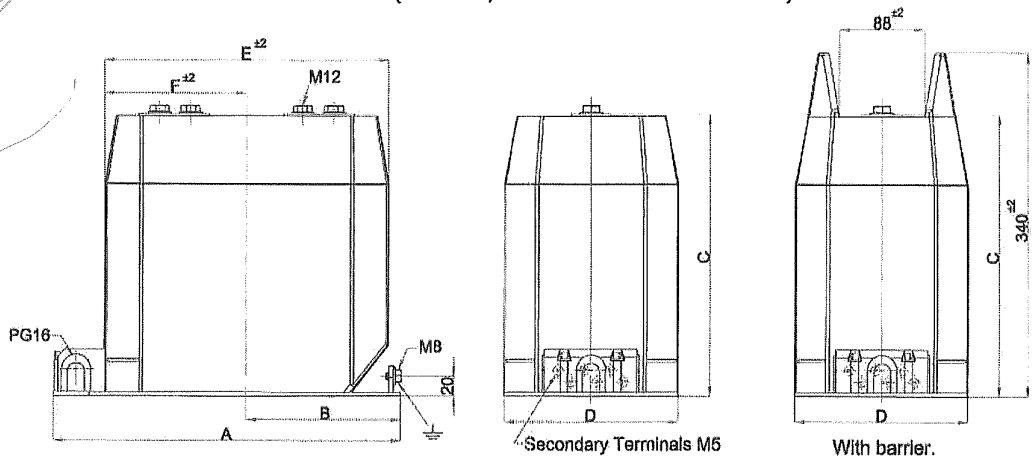
TIGHTENING TORQUE (Nm)	min.	max.
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

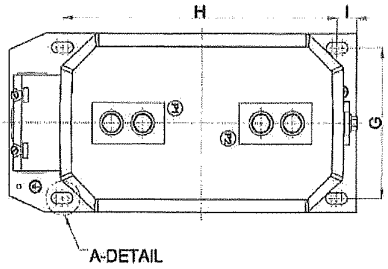
Всички размери са в милиметри. Допустимите отклонения са съгласно DIN 7168-g.

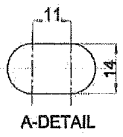
На основание чл.36а ал.3 от ЗОП

ЧЕРТЕЖ № 4

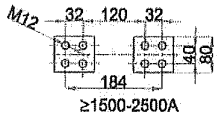
ТРАНСФОРМАТОР ТОКОВ, ОПОРЕН ТИП, С ИЗОЛАЦИЯ ОТ ЛЯТА СМОЛА, ЗА ЗАКРИТ МОНТАЖ (Um=17,5kV...24kV BLOCK TYPES)



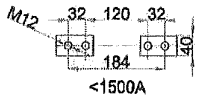




Primary Connection Bars



≥1500-2500A



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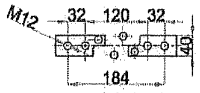


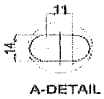
≤ 2x600A

TYPES	A	B	C	D	E	F	G	H	I
ATB 20-B	355	155	280	178	290	145	150	280	20
ATB 20-B2	355	155	280	205	290	145	180	280	17
ATB 20-B4	355	155	280	218	290	145	190	280	17
ATB 20-3	455	197	280	178	390	195	150	375	22
ATB 20-3B	455	197	280	205	390	195	180	375	22
ATB 20-3K	455	197	280	218	390	195	190	375	22

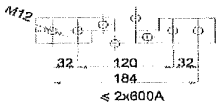
TIGHTENING TORQUE (Nm)	min.	max.
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

Всички размери са в милиметри. Допустимите отклонения са съгласно DIN 7168-g.

На основание чл.36а ал.3 от ЗОП



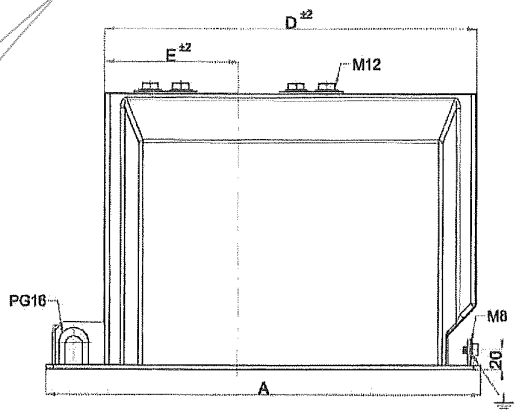
A-DETAIL

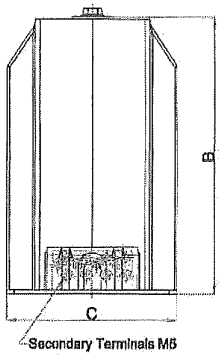


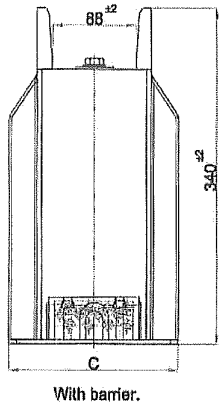
≤ 2x600A

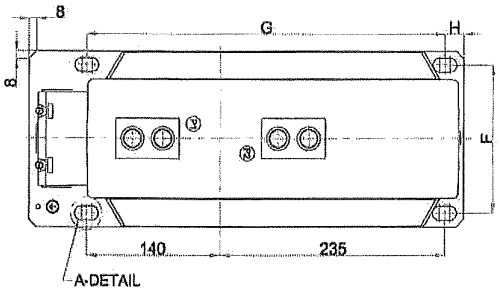
TYPES	A	B	C	D	E	F	G	H
ATB 20-3A	455	280	178	390	140	150	375	20
ATB 20-3B	455	280	205	390	140	180	375	20

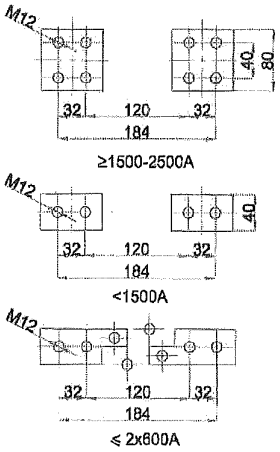
TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

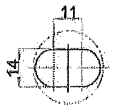












A-DETAIL

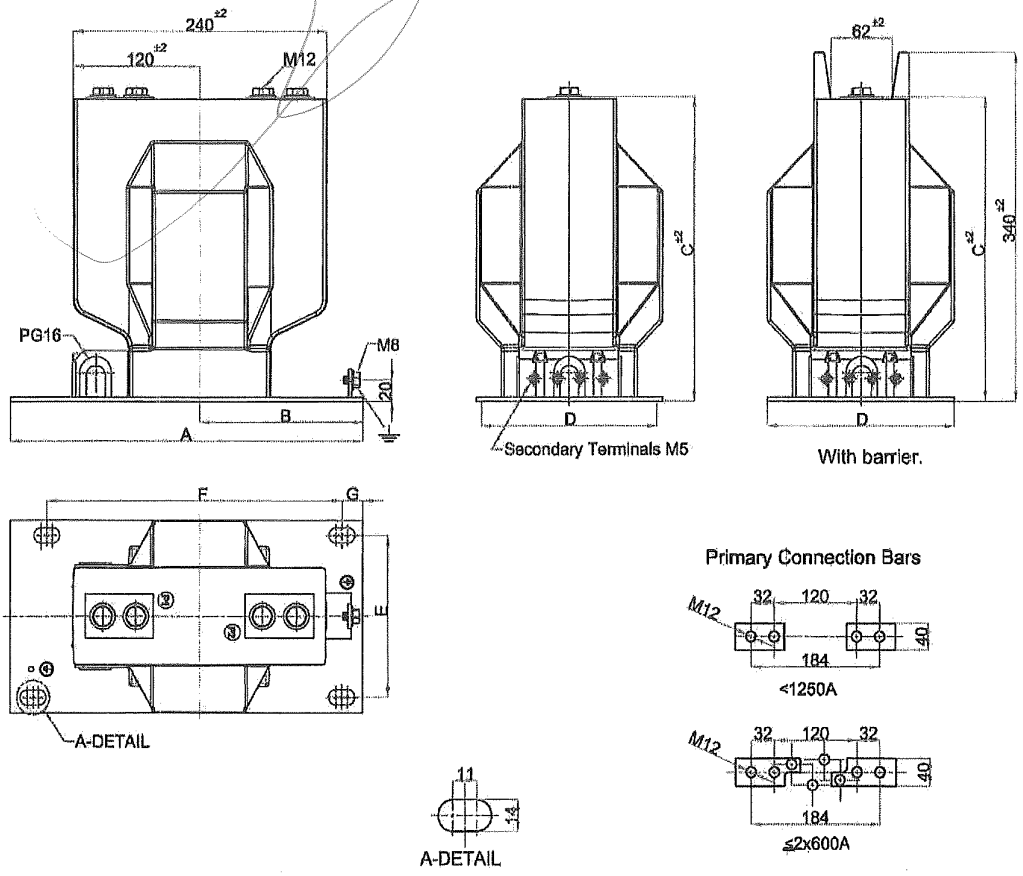
TYPES	A	B	C	D	E	F	G	H
ATB 20-3A	455	280	178	390	140	150	375	20
ATB 20-3B	455	280	205	390	140	180	375	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

Всички размери са в милиметри. Допустимите отклонения са съгласно DIN 7168-g.

ЧЕРТЕЖ № 6

ТРАНСФОРМАТОР ТОКОВ, ОПОРЕН ТИП, С ИЗОЛАЦИЯ ОТ ЛЯТА СМОЛА, ЗА ЗАКРИТ МОНТАЖ (Um=17,5kV 24kV NARROW BLOCK TYPES)



TYPES	A	B	C	D	E	F	G
ATB 20-10	335	155	280	178	150	280	20
ATB 20-15	335	155	280	178	150	280	20

TIGHTENING TORQUE (Nm)	min.	max.
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

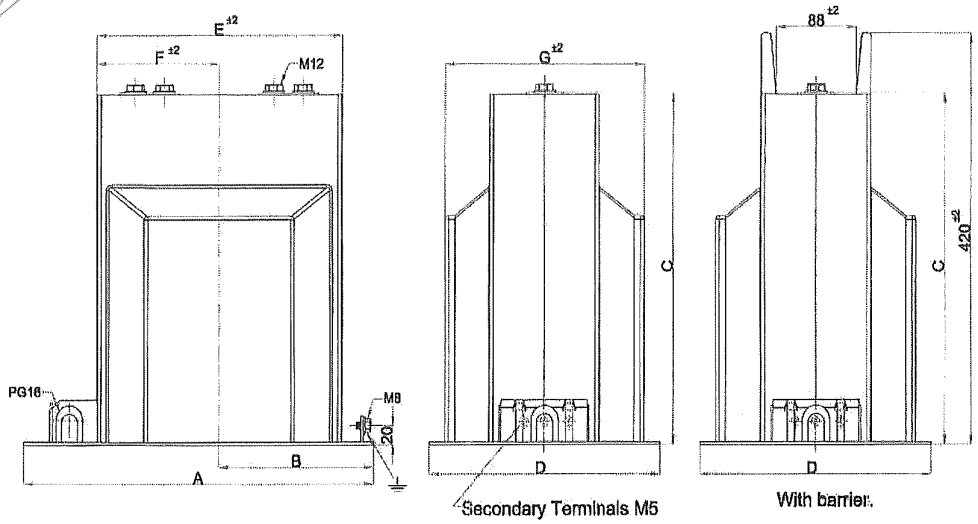
Всички размери са в милиметри. Допустимите отклонения са съгласно DIN 7168-g.

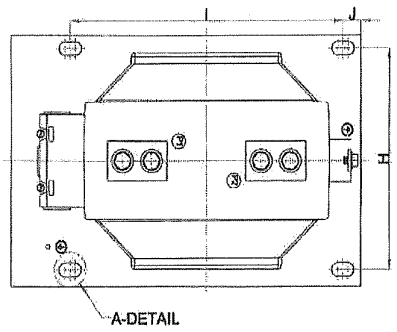
ЕЛЕКТРОЛУКС ПЛОВДИВ

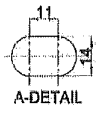
ВЯРНО С ОРИГИНАЛА
Георги Табаков
Упълномощен

ЧЕРТЕЖ № 7

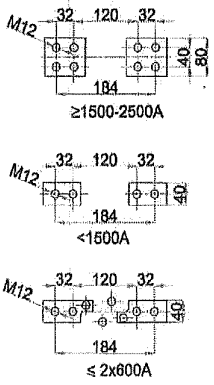
ТРАНСФОРМАТОР ТОКОВ, ОПОРЕН ТИП, С ИЗОЛАЦИЯ ОТ ЛЯТА СМОЛА, ЗА ЗАКРИТ МОНТАЖ (Um=36kV BLOCK TYPES)







Primary Connection Bars



TYPES	A	B	C	D	E	F	G	H	I	J
ATB 30-S	385	170	360	255	250	125	210	225	300	20
ATB 30-S1	385	170	360	255	270	135	220	225	300	20
ATB 30-1	385	170	360	255	270	135	220	225	300	20
ATB 30-2	385	170	360	255	310	155	240	225	300	20
ATB 30-3	455	210	360	255	389	195	249	225	375	20

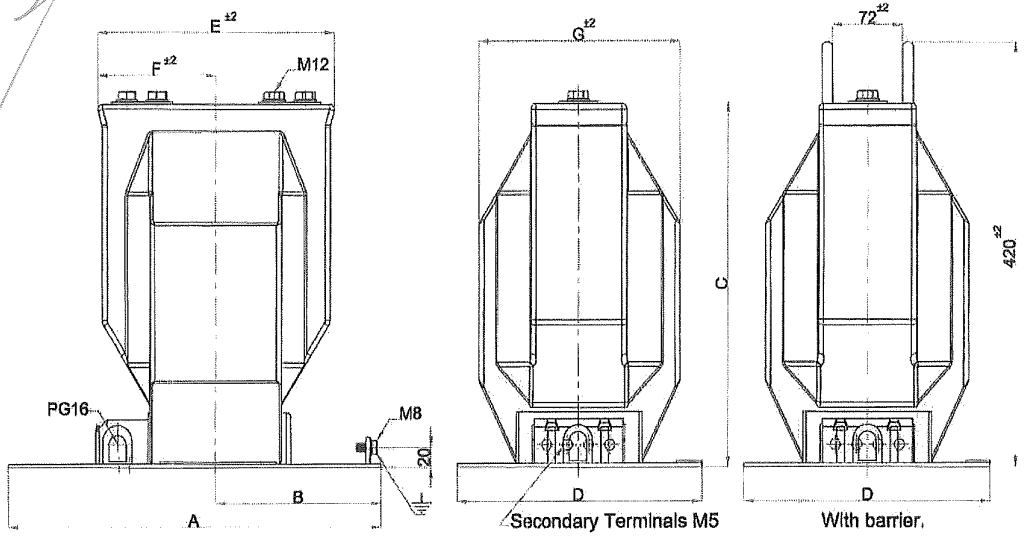
TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M12 (Primary Terminal)	60	70

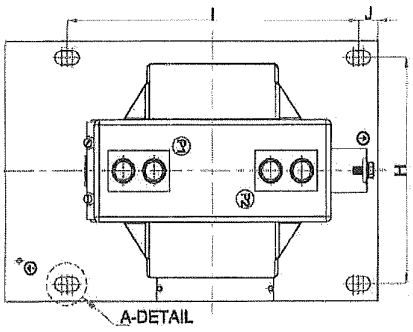
Всички размери са в милиметри. Допустимите отклонения са съгласно DIN 7168-g.

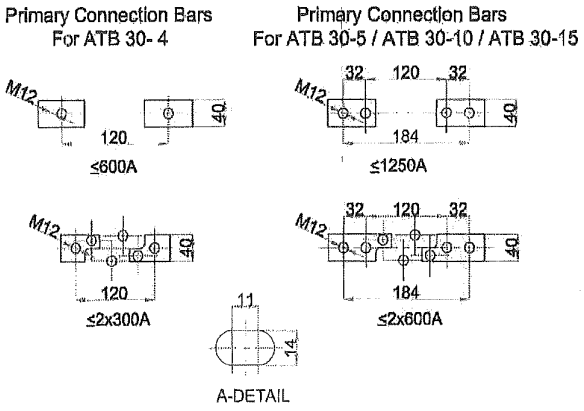
На основание чл.36а ал.3 от ЗОП

ЧЕРТЕЖ № 8

ТРАНСФОРМАТОР ТОКОВ, ОПОРЕН ТИП, С ИЗОЛАЦИЯ ОТ ЛЯТА СМОЛА, ЗА ЗАКРИТ МОНТАЖ (Um=36kV NARROW BLOCK TYPES)







TYPES	A	B	C	D	E	F	G	H	I	J
ATB 30-4	385	170	360	255	200	100	180	225	300	20
ATB 30-5	385	170	360	255	250	125	210	225	300	20
ATB 30-10	385	170	360	255	250	125	210	225	300	20
ATB 30-15	385	170	360	255	250	125	210	225	300	20

TIGHTENING TORQUE (Nm)	min	max
M5 (Secondary Terminal)	2.5	3.5
M8 (Ground Terminal)	15	20
M 12 (Primary Terminal)	60	70

Всички размери са в милиметри. Допустимите отклонения са съгласно DIN 7168-g.

На основание чл.36а ал.3 от ЗОП

ПРИЛОЖЕНИЕ 12

На основание чл.36а ал.3 от ЗОП

Test Report

Nº B26-14-BI-07E

ENAC ENSAYOS Nº 4/LE148

Type and routine tests

TEST OBJECT	Current transformer
DESIGNATION	ATB 10-BS
MANUFACTURER	ESITAS INSTRUMENT TRANSFORMERS
CUSTOMER	ESITAS INSTRUMENT TRANSFORMERS
	Hilal Mah. Paşaköy Cad. No:31.34791 Sancaktepe/Istanbul. Turkey
STANDARD	IEC 61869-2:2012
RECEPTION DATE	June 4th, 2014
TEST DATE	June 4th – 17thth, 2014
ISSUE DATE	July 22nd, 2014

Test chief	Head of Electrical Equipment Laboratory
Estíbaliz Montes	Luis Martínez

SERVICIOS TECNOLÓGICOS tecnalia TECHNOLOGICAL SERVICES

TECNALIA RESEARCH & INNOVATION
Parque Científico y Tecnológico de Bizkaia
C/Geldo Edif 700
E-48160 Derio Bizkaia
T 902 760 000
T +34 946 430 850 (International calls)

На основание чл.36а ал.3 от ЗОП

ÍNDEX

На основание чл.36а ал.3 от ЗОП

1. IDENTIFICATION OF THE TEST OBJECT

CURRENT TRANSFORMER.

The characteristics of the test object, provided by the manufacturer, are the following:

Manufacturer:	ESITAS	
Type	ATB 10-BS	
Serial No.:	2014/6304	
Ratio:	300/ 5 A – 5 A	
Primary terminal markings:	P1-P2	
Rated primary current, Ipn:	300 A	
Secondary terminal markings:	1S1-1S2	2S1-2S2
Rated secondary current, Isn:	5 A	5 A
Rated output:	15 VA	15 VA
Accuracy class:	0.5	10 P
Security factor:	5	10
Rated insulation level:	12/28/75 kV	
Rated short-time thermal current, Ith:	31.5 kA - 3 s	
Rated dynamic current, Idyn:	2.5xIth kA	
Rated frequency:	50 Hz	

See photographs of the test object and its rating plate in the annex.

На основание чл.36а ал.3 от ЗОП

2. TESTS PERFORMED. STANDARD

Type and routine tests on the transformer have been performed.

The tests have been carried out according to the standard:

- **IEC 61869-2:2012, "Instrument transformers. Part 2: Additional requirements for current transformers".**

Referred standard:

- IEC 60060-1:2010, "High-voltage test techniques - Part 1: General definitions and test requirements".
- IEC 60270: 2000, "High-voltage test techniques - Partial discharge measurements".
- IEC 61869-1:2007, "Instrument transformers. Part 1:General requirements"

The calculation of the uncertainties of the measurements is available.

На основание чл.36а ал.3 от ЗОП

3. TYPE TESTS

3.1. Determination of errors

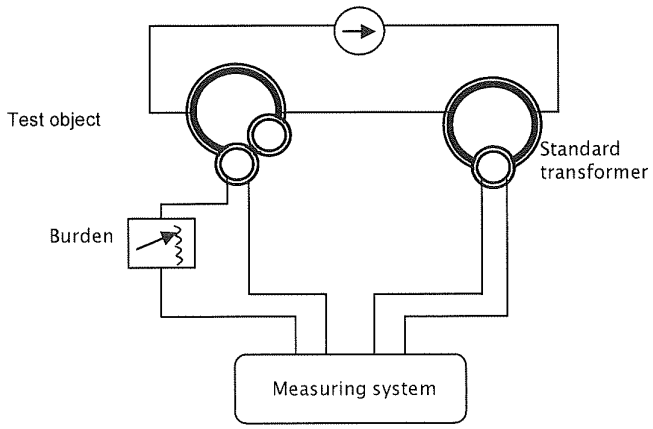
3.1.1. Current error and phase displacement of measuring and protective current transformers

For class 0.5 the current error and phase displacement of current transformers at rated frequency shall not exceed the values given in table 201 of the standard when the secondary burden is any value from 25% to 100% of the rated burden.

For class 10P transformers at rated burden and at rated frequency, current error and displacement shall not exceed values given in Table 205.

The secondary burden used for test purposes shall have a power-factor of 0.8 lagging except that when the burden is less than 5 VA, in this case a power-factor of 1 shall be used. In no case shall the test burden be less than 1 VA.

Test scheme:



Results:

RATIO 300/5-5 A

Secondary (Measurement)	Burden (VA)	In (%)	RATIO 300/5-5 A			
			Current error (%)		Phase displacement	
			Measured	Limit	Measured	Limit
1s1-1s2 (Class 0.5)	3.75 (25%)	120	+0.29	± 0.5	+7	±30
		100	+0.29	± 0.5	+6	±30
		20	+0.29	± 0.75	+5	±45
		5	+0.30	± 1.5	+7	±90
	15 (100%)	120	+0.03	± 0.5	+6	±30
		100	+0.09	± 0.5	+4	±30
		20	+0.04	± 0.75	+2	±45
		5	-0.09	± 1.5	+9	±90
2s1-2s2 (Class 10P)	15 (100 %)	100	+0.45	± 3	+4	-

Result: **CORRECT**. The current error and phase displacement do not exceed the limits established in the standard.

3.1.2. Composite error

For current transformers having substantially continuous ring cores, uniformly distributed secondary windings and having either a centrally located primary conductor(s) or a uniformly distributed primary winding, the direct test may be replaced by the following indirect test provided that the effect of the return primary conductor(s) is negligible.

With the primary winding open-circuited the secondary winding are energized at rated frequency by a substantially sinusoidal voltage having an r.m.s. equal to the secondary limiting e.m.f.. The secondary limiting e.m.f. is the product of the accuracy limit factor, the rated secondary current and the vectorial sum of the rated burden and the impedance of the secondary winding (corrected to 75 °C).

The resulting exciting current, expressed as a percentage of the rated secondary current (5 A) multiplied by the accuracy limit factor must not exceed the limit of composite error in table 205 of standard (10%):

(Iexc / Isn FLP) x 100 ≤ 10

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Secondary 2S1-2S2

R (75 ºC) = 0.1081 Ω Isn =5 A, Class 10P10 , Burden = 15 VA Iexc ≤5 A

Secondary (Protection)	e.m.f. limit (V)	I excitation limit (A)	Iexc measured (I)for e.m.f.= e.m.f limit (A)
2S1-2S2	34.476	5	0.195

Result: **CORRECT**. The exciting current does not exceed the limit of composite error.

3.1.3. Security factor

With the primary winding open-circuited, the secondary winding is energized at rated frequency by a substantially sinusoidal voltage. The voltage is increased until the exciting current Ie reaches IsrxFSx 10%. The rms value of the obtained terminal voltage shall be less than the secondary limiting e.m.f.

Secondary 1s1-1s2

R (75 ºC) = 0.0759Ω Isn =5 A, Class 0.5 , Burden = 15 VA Iexc ≤5 A

Secondary (Measurement)	e.m.f. limit (V)	I excitation (A)	e.m.f measured
1s1-1s2	16.557	2.5	13

Result: **CORRECT**. The measured voltage value is under the e.m.f limit.

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3.2. Lightning impulse test on primary winding

3.2.1. Test method

The impulse test is performed in accordance with the Standard IEC 60060-1.

The voltage test is applied between the terminals of the primary winding connected together and earth. The frame and the terminals of secondary windings are connected to earth.

The impulse tests consist of voltage application at reference and rated voltage levels. The reference impulse voltage is between 50 % and 75 % of the rated impulse withstand voltage. The peak value and the waveshape of the impulse are recorded. Evidence of insulation failure due to the test may be given by variation in the waveshape at both reference and rated withstand voltage.

The test voltage has the appropriate value depending on the highest voltage for equipment and the specified insulation level.

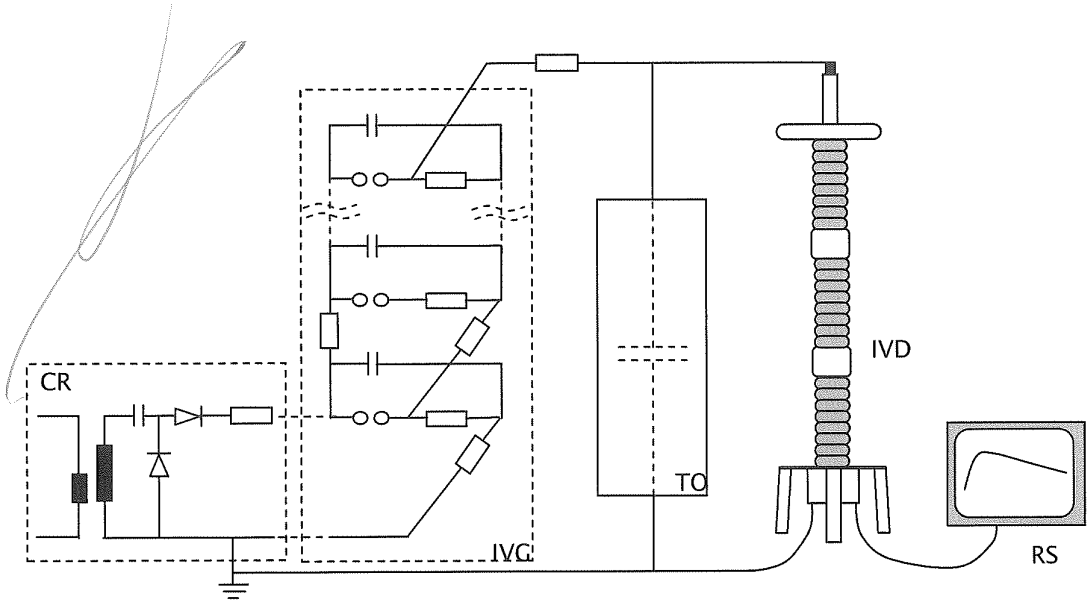
The test is performed with both positive and negative polarities. Fifteen consecutive impulses of each polarity, not corrected for atmospheric conditions, are applied.

Value of test voltage: **75 kV**

Ambient air conditions during the test:

Temperature:	20 ºC
Pressure:	100.9 kPa
Relative humidity:	47 %

The scheme of the test is the following:



CR: Charging rectifier
IVG: Impulse voltage generator
TO: Test object
IVD: Impulse voltage divider
RS: Recording system

3.2.2. Result

Result: **CORRECT**. For each polarity:

- no disruptive discharge occurs in the non-self-restoring internal insulation;
- no flashovers occur along the non-self-restoring external insulation;
- no flashovers occur along the self-restoring external insulation;
- no other evidence of insulation failure is detected (e.g. variations in the waveshape of the recorded quantities).

3.3. Temperature rise test

3.3.1. Test method

The test is made to prove compliance with the requirements of the standard. For the purpose of this test, current transformer is deemed to have attained a steady temperature when the rate of temperature rise does not exceed 1 K per hour.

The temperature rise of a current transformer when carrying a primary current equal to the rated continuous thermal current, with a unity power-factor burden corresponding to the rated output, shall not exceed the appropriate value given in table 5 of IEC 61869-1 standard. These values are based on the normal service conditions.

The test-site ambient temperature shall be between 10 ºC and 30 ºC.

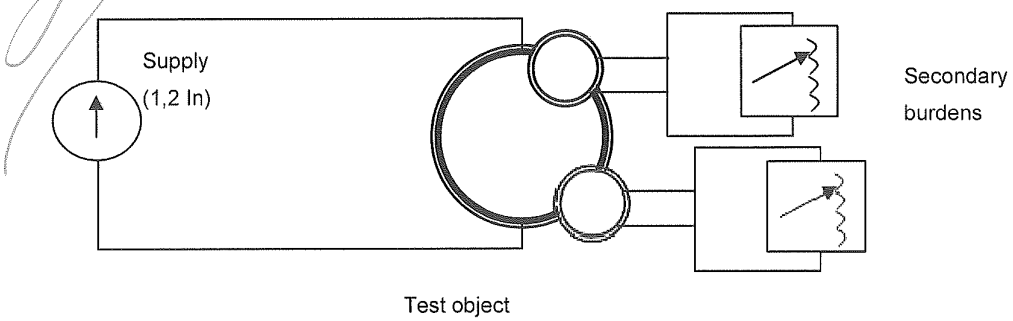
The temperature rise of windings is measured by the increase in resistance method. The temperature rise of parts other than windings have been measured by thermocouples.

It is not possible to measure the temperature rise on the external surface of the core and other metallic parts where in contact with, or adjacent to. The temperature rise at the top of the housing is measured.

Current for temperature-rise test = extended current rating = 1.2 × 300 A = 360 A.

Test-site ambient temperature during the test: 21 ºC.

Test scheme:



3.3.2. Result

The obtained results are the following:

Test I	Measurements	Temperature-rise (K)	Limit (K)
360 A (120 % In)	Primary winding	8	75
	Secondary winding 1S1-1S2	9	
	Secondary winding 2S1-2S2	9	

The temperature rise at the top of the housing is 27 ºC.

Result: **CORRECT**. The measured temperature-rise values do not exceed the limits specified in the standard for insulation class E declared by manufacturer.

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3.4. Short-time current test

3.4.1. Test method

For the thermal short-time current I_{th} test the transformer must initially be at a temperature between 10 ºC and 40 ºC.

This test is made with the secondary winding(s) short-circuited and the primary winding in series, at a current *I* for a time *t*, so that (I^2t) is not less than (I^2th), and provided *t* has a value between 0.5 s and 5 s.

The dynamic test is made with secondary winding(s) short-circuited and the primary winding in series. The peak value of primary current is not less than the rated dynamic current (I_{dyn}) for at least one peak.

The dynamic test is combined with the thermal test, provided the first major peak current of that test is not less than the rated dynamic current (I_{dyn}).

Rated values for the test are the following:

Rated short-time thermal current. I_{th}:	31,5 kA - 3 s
Rated dynamic current. I_{dyn}:	78.75 kA

See oscilogram in the annex of the report.

The transformer is deemed to have passed these tests if, after cooling to ambient temperature (between 10 ºC and 40 ºC), it satisfies the following requirements:

a) it is not visible damaged;
b) it withstands the dielectric tests specified in the standard , but with the test voltages or currents reduced to 90 % of those given;
c) its errors after demagnetization do not differ from those recorded before the tests by more than half the limits of error appropriate to its accuracy class according to the standard.

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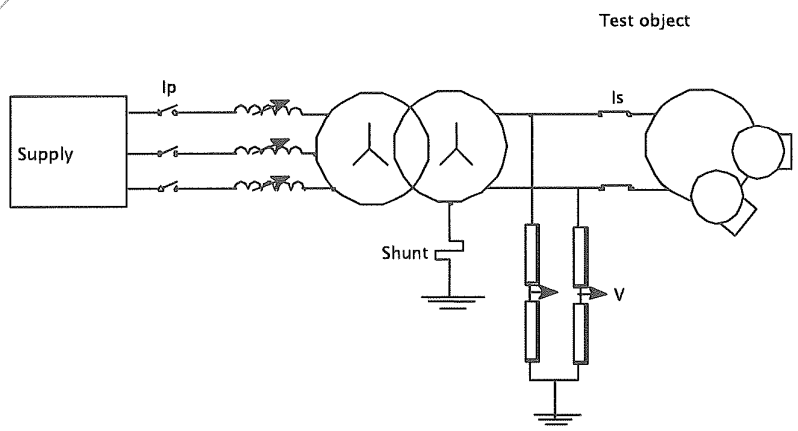
3.4.2. Test circuit



3.4.3. Results

Registered values

Oscillogram No.	13
Short-time r.m.s. current Ith (kA)	32.07
Short-time peak value current. Idyn (kA)	82.42
Duration (s)	3.015
Joule integral I^2t (AAs.10^9)	3.15.10^9
Frequency (Hz)	50
Temperature (ºC)	25

Result: **CORRECT**. According to the following verifications:

3.4.4. Verifications

a) Visual check of the transformer

Result: **CORRECT**. The transformer is not visibly damaged and the insulation next to the surface of the conductor does not show significant deterioration.

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b) Dielectric tests with the test voltages or currents reduced to 90 %

Power-frequency withstand test on the primary winding

The voltage test is applied between the terminals of the primary winding connected together and earth. The frame and the terminals of secondary windings are connected to earth.

Test voltage value:	**25.2 kV**
Test voltage frequency:	50 Hz
Test duration:	60 s

Result: **CORRECT**. There are neither disruptive discharges nor damage in the insulation.

Power-frequency withstand test on the secondary windings

The test voltage is applied successively between the terminals of each secondary winding connected together and earth. The frame, the primary winding and the other secondary winding are connected to earth.

Test voltage value:	**2.7 kV**
Test voltage frequency:	50 Hz
Test duration:	60 s

Result: **CORRECT**. There are neither disruptive discharges nor damage in the insulation.

Partial discharge measurement

The partial discharge test voltages are reached while decreasing the voltage after the power-frequency withstand test (25.2 kV, 60 s).

Test voltage (r.m.s.) (kV)		Duration (s)	Measurement (pC)	Permissible level (pC)
1.2·Um	14.4	30	2	50
1.2·Um/√3	8.47	30	Noise	20

Background noise: 1.3 pC

Result: **CORRECT**, the measured partial discharge levels do not exceed the limits specified in the standard.

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Inter-turn overvoltage test

The test is performed according to procedure B: with the primary winding open-circuited, the prescribed test voltage (at some suitable frequency) is applied successively to the terminals of each secondary windings for 60 s, providing that the r.m.s. value of the secondary current does not exceed the rated extended current.

The value of the test frequency shall not be greater than 400 Hz. In this case test values have been:

Test frequency	400 Hz
Test duration	15 s

At this frequency, if the voltage value achieved at the rated extended secondary current (5.4 A) is lower than 4.05 kV peak (90% of 4.5 kV). The obtained voltage is to be regarded as the test voltage.

Result: **CORRECT**. There are neither disruptive discharges nor damage in the insulation.

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c) Repetition of determination of current error and phase displacement

Burden (VA)	In (%)		1S1-1S2 120% Class 0.5			
			Current error (%)		Displacement (min)	
			Measured	Limit	Measured	Limit
3.75 (25%)	120	before	+0.29	±0.25	+7	±15
		after	+0.29		+3	
		difference	+0		-4	
	100	before	+0.29	±0.25	+6	±15
		after	+0.29		+3	
		difference	+0		-3	
	20	before	+0.29	±0.375	+5	±22.5
		after	+0.29		+5	
		difference	+0		+0	
	5	before	+0.3	±0.75	+7	±45
		after	+0.32		+7	
		difference	+0.02		+0	
15 (100%)	120	before	+0.03	±0.25	+6	±15
		after	+0.07		+6	
		difference	+0.04		+0	
	100	before	+0.09	±0.25	+4	±15
		after	+0.12		+3	
		difference	+0.03		-1	
	20	before	+0.04	±0.375	+2	±22.5
		after	+0.04		+3	
		difference	+0		+1	
	5	before	-0.09	±0.75	+9	±45
		after	-0.07		+9	
		difference	-0.02		+0	

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