

CLIENT
Balteau Enertec,
Belgium

Order no. 94309-205

Client's reference: written order S 69302 TTH/OM/CMM dated
90-04-10

Report no. 1138-90

Test report concerning tests on a current transformer, 550 kV


Date and place of test:
April 23, 1990 in the High-Voltage
Laboratory of N.V. KEMA in Arnhem, the
Netherlands

Author: R.C.A.M. Koevoets

SUMMARY AND CONCLUSION

The test programme was specified by the client.
The tests were passed successfully.

N.V. KEMA
DIVISION HIGH-POWER AND HIGH-VOLTAGE LABORATORIES
High-Voltage Laboratory


N. van Schaik

To this report belong:

5 pages
2 appendices
5 figures
1 drawing no. 5350622

- 7 JULI 1990

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MATERIAL TESTED

Current transformer

Manufacture	:	Balteau Enertec, Belgium			
Type	:	CTH 550			
Serial number	:	3141/9001/2			
Year of construction	:	1990			
Insulant	:	oil/paper/porcelain			
Rated voltage	:	550 kV			
Rated frequency	:	60 Hz			
Maximum operating voltage	:	550 kV			
Rated current	:	1000 / 2200 / 2500 / 3000 A			
Rated short-time withstand current	:	40 kA for 1 second			
Rated peak withstand current	:	100 kA			
Transformation ratio	:	1000:5 2200:5 2500:5 3000:5			
Winding indication	:	W1W2	W1W3	W1W4	W1W5
		X1X2	X1X3	X1X4	X1X5
		Y1Y2	Y1Y3	Y1Y4	Y1Y5
		Z1Z2	Z1Z3	Z1Z4	Z1Z5
Power in VA	:	63.75 VA			
		cosB=1			
Class	:	TPY NL			
		2.5	2.5	2.5	2.5
		L300	L800	L1000	L1200
Standard	:	CAN3.C13.M83			
Intended for	:	Balteau R & D			

PURPOSE OF THE TESTS

Purpose of the testing was to verify whether the material complies with the requirements set by the client.

TEST PROGRAMME

The test programme was specified by the client and was as follows:

- 1 Switching impulse voltage withstand tests.
Requirement: 15 x 1175 kV, positive and negative,
250/2500 μ s, wet.
- 2 A.c. applied voltage withstand test.
Requirement: 790 kV, 50 Hz for 72 s, wet.

DATE AND PLACE OF THE TESTS

April 23, 1990 in the High-Voltage Laboratory of the
N.V. KEMA in Arnhem, the Netherlands.

PERSONS ATTENDING THE TESTS

Mr. O. Margreve, Balteau.

THE TESTS WERE CARRIED OUT BY
R.C.A.M. Koevoets.

DESCRIPTION AND RESULTS OF THE TESTS

1 Switching impulse voltage withstand test.

The test object was subjected to a switching impulse voltage withstand test.

The set-up of the test object was in accordance with figure 1.

The test object was placed on a base frame support of 3 m height and under artificial rain.

The characteristics of the artificial rain are represented in appendix 1 page 1.

The test was carried out after a pre-wetting period of 15 minutes.

The waveform of the voltage was determined at approximately 50 per cent of the maximum specified crest voltage.

The recorded front duration and time to half value amounted to 240 μ s and 2450 μ s respectively.

The waveform complies with the specified requirements.

The oscillograms of the test voltage are represented in the figures 3, 4 and 5.

The test consisted of 15 positive impulses with crest values of 1175 kV and 15 negative impulses with crest values of 1175 kV.

The voltage was applied between the high-voltage terminal and the short-circuited secondary windings together with the frame. The voltage-measurement was carried out by means of a capacitive voltage-divider. During the test the atmospheric conditions were not taken into account. The atmospheric conditions during the test are represented in the appendix.

The results are represented in appendix 1 page 1.

Neither flashover nor breakdown occurred.

The specified requirements were met.

The results do not give rise to remarks.

2 A.c. voltage withstand test.

The test object was subjected to an a.c.-voltage withstand test of 790 kV, 50 Hz, for 1.2 minutes.

The set-up of the test object was in accordance with figure 2.

The test object was placed on a base frame support of 3 m height and under artificial rain.

The characteristics of the artificial rain are represented in appendix 2 page 1.

The test was carried out after a pre-wetting period of 15 minutes.

The voltage was applied between the high-voltage terminal and the short-circuited secondary windings together with the frame. The voltage-measurement was carried out by means of a capacitive voltage-divider. During the test the atmospheric conditions were not taken into account.

The atmospheric conditions during the test are represented in the appendix.

The results are represented in appendix 2 page 1.

Neither flashover nor breakdown occurred.

The specified requirements were met.

The results do not give rise to remarks.

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Test date : april 23, 1990

Appendix: 1
Page no.: 1

Results of the switching impulse voltage withstand test, wet.

Test object : 550 kV current transformer CTH 550
no 3141/9001/2

Atmospheric conditions:

Ambient temperature (t) : 19.5°C
Test object temperature : 19.5°C
Air pressure (p) : 1011 mbar

Artificial rain:

Pre-wetting period : 15 min.
Angle of precipitation : 45 Deg
Resistivity : 100 Ohm.m
Vertical intensity : 1.5 mm/min
Horizontal intensity : 1.5 mm/min
Standard : IEEE 4/1978

Set-up of the test object:

see figure 1 (on a base frame support of 3 m height)

test	number	polarity	figure	results	remarks
	of	and crest	number		
	impulses	value of			
		voltage			
		kV			
1	1	525 neg	3	wave shape	240/2450 μ s
2	15	1175 pos	4a,b,c	passed	none
3	15	1175 neg	5a,b,c	passed	none

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Test date : april 23, 1990

Appendix: 2
Page no.: 1

Results of the a.c. voltage withstand test, wet

Test object : 550 kV current transformer CTH 550
no 3141/9001/2

Atmospheric conditions:

Ambient temperature (t) : 19.5°C
Test object temperature : 19.5°C
Air pressure (p) : 1011 mbar

Artificial rain:

Pre-wetting period : 15 min.
Angle of precipitation : 45 Deg
Resistivity : 100 Ohm.m
Vertical intensity : 1.5 mm/min
Horizontal intensity : 1.5 mm/min
Standard : IEEE 4/1978

Set-up of the test object:

see figure 2 (on a base frame support of 3 m height)

test	voltage		duration	results	remarks
	applied	applied			
	between	voltage			
		kV, 50 Hz	seconds		
4	HV and LV + frame	790	72	passed	none

CLIENT - CUSTOMER - KUNDE **BALTEAU R & D**
KLANT - CLIENTE - CLIENTE

réf. :

Transformateur de mesure - Instrument transformer - Meßwandler :

Meettransformator - Transformador de medición - Trasformatore di misura :

CTH 550 N° 3141/9001/2

ESSAIS INDIVIDUELS - ROUTINE TESTS - STÜCKPRÜFUNGEN - ROUTINE PROEVEN - ENSAYOS DE RUTINA - PROVE DI ACCETTAZIONE

Réception :

Norme - standard - Vorschriften
Norm - norme - norma

CAN3.C13.M83

Freq. : 60 Hz	$K_n = \frac{I_{pn}}{I_{sn}} = \frac{U_{ph}}{U_{sh}}$	1000/5	2200/5	2500/5	3000/5
Bornes - Terminals - Klemmen Klemmen - Bornes - Morsette		W1W2 X1X2 Y1Y2 Z1Z2	W1W3 X1X3 Y1Y3 Z1Z3	W1W4 X1X4 Y1Y4 Z1Z4	W1W5 X1X5 Y1Y5 Z1Z5
Puissance - Rating - Nennleistungen - Nenn-Langzeitstrom Vermogen - Potencia - Potenza					63.75 VA cosB=1
Classe - Class - Klasse Klasse - Clase - Classe		2.5 L 300	2.5 L 800	2.5 L 1000	TPY NL 2.5 L 1200
Résist. second. - Second. résist. - Sekund. Widerstand : Second. weerstand - Resist. second. - Resist. second : °C					
Surtension entre spires - Interturn test - Strw.-Windungsprfg. Windingsproef - Sobretensoion espiras - Sovratensione spire					
Ith - Idyn		40 kArms/1 s - 100 kApeak			
Wt =					

Courant d'échauffement - Contin. thermal current - Therm. Nenn Dauersstrom : 1.0 x In

Facteur de tension nominal - Rated voltage factor - Nennspannungsfaktor :

Verwarmingstroom - Sobre corriente permanente - Corrente mass. permanente :

Nominale spanningsfactor - Factor de tension - Fattore di tensione nominale :

Tension d'essais - High voltage tests - Spannungsprüfungen :
Proefspanning - Tension de ensayo - Tensione di prova :
60 Sec.
60 Hz

Prim. : 550 kV 860 kV Second. : 2.5 kV

Décharges partielles - Partial discharges - Teilentladungsprfg. :
Ontladingen - Descargas parciales - Scariche parziali :

≤ 5 pC à 550 kVrms

Tang. δ

Opérateur :

Contrôle plaques :

Contrôle final MT :

Ealon :

Vérifié par :

Date :

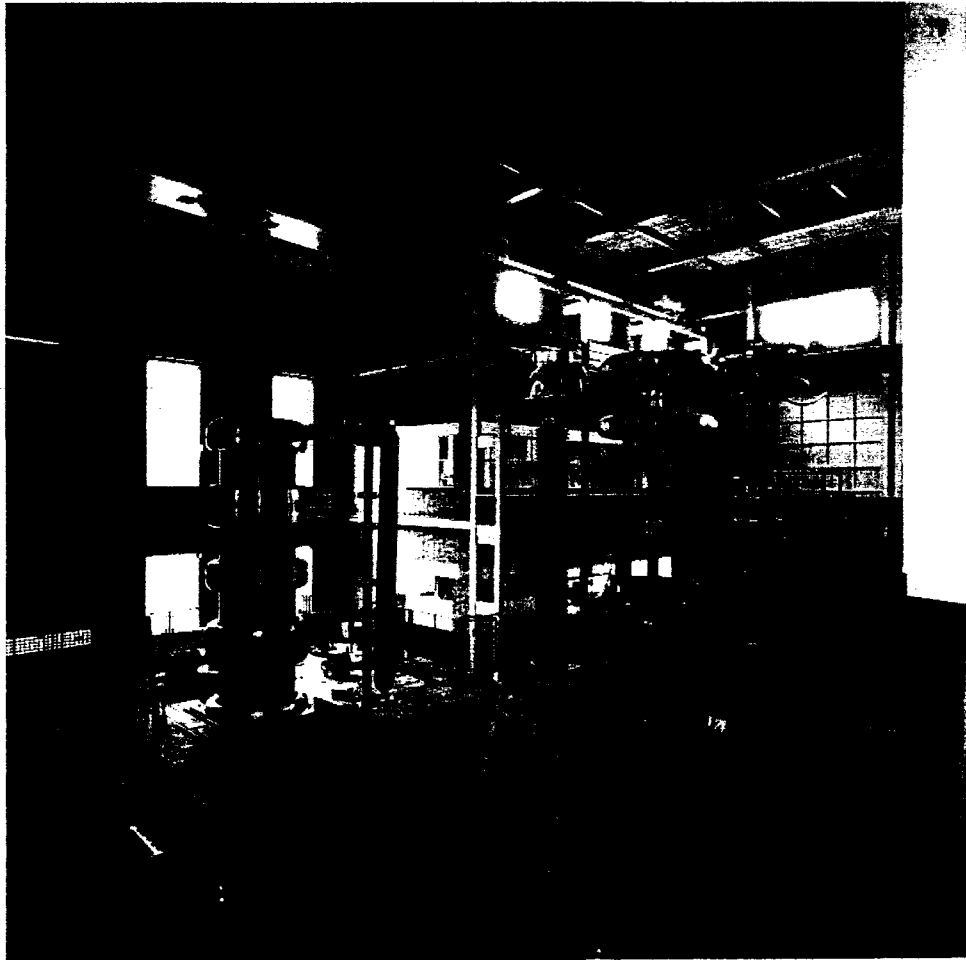


Figure 1
The test object during the switching impulse voltage
withstand test, wet, on april 23, 1990 in the High-Voltage
Laboratory of N.V. KEMA in Arnhem, the Netherlands.
(KEMA photograph no. 902-0139/11)

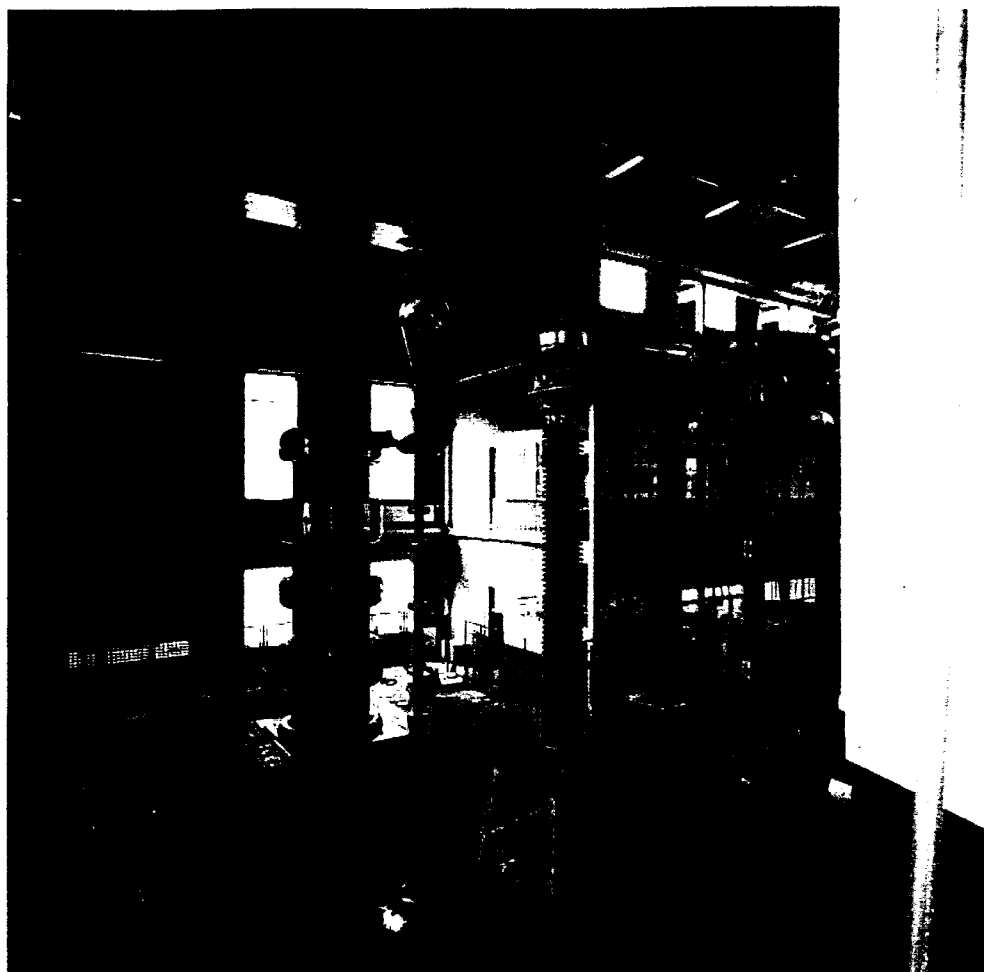


Figure 2
The test object during the power frequency voltage
withstand test, wet, on april 23, 1990 in the High-Voltage
Laboratory of N.V. KEMA in Arnhem, the Netherlands.
(KEMA photograph no. 902-0139/18)

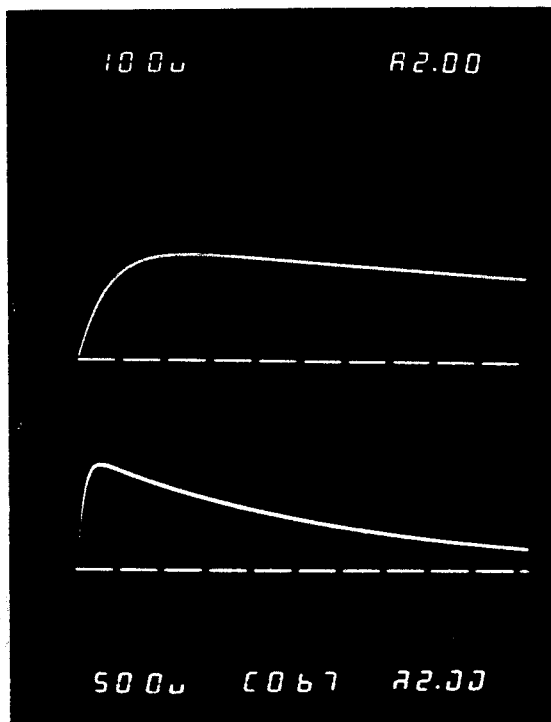


Figure 3
Wave shape of the switching
impulse voltage 240/2450 μ s
Time base:
upper beam 100 μ s/div
lower beam 500 μ s/div

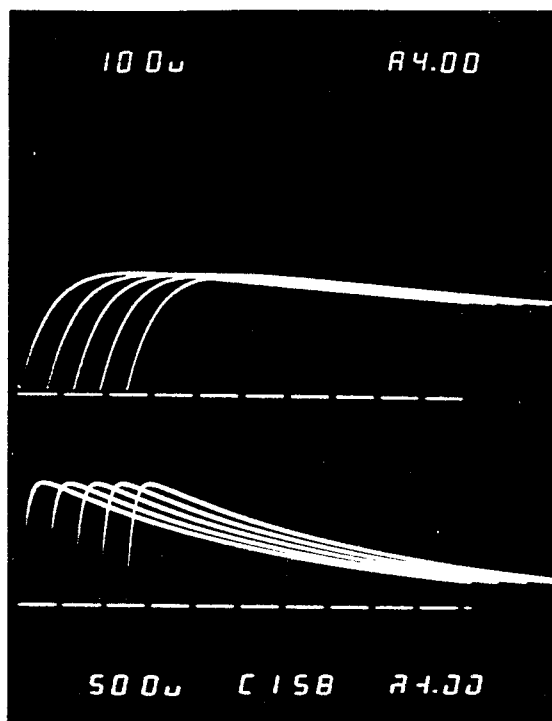


Fig. 4a

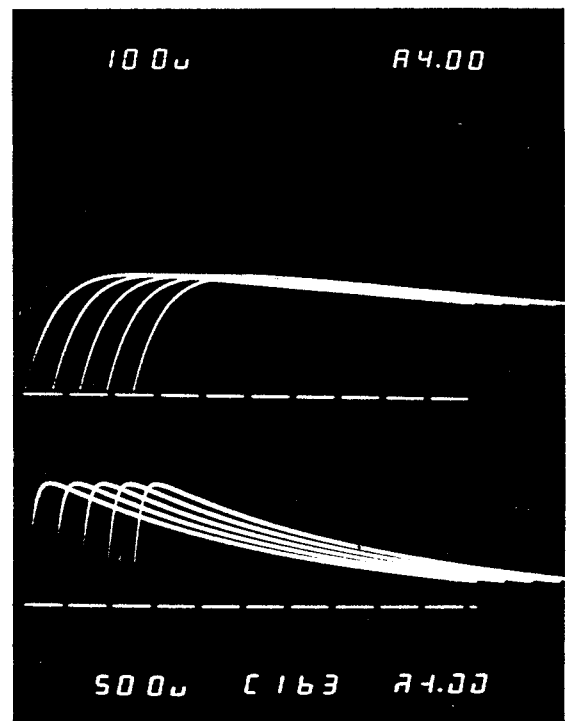


Fig. 4b

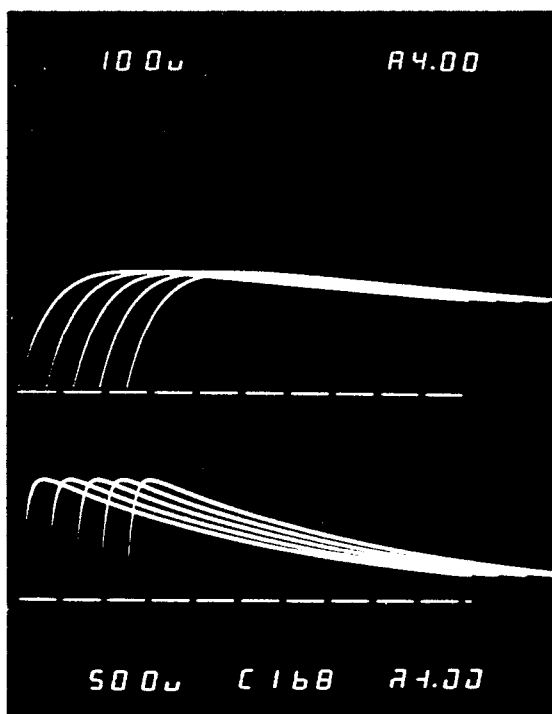


Fig. 4c

Fig. 4a, b, c
 15 switching voltage
 impulses 1175 kV
 positive, wet
 Time base:
 upper beam: 100 μ s/div
 lower beam: 500 μ s/div

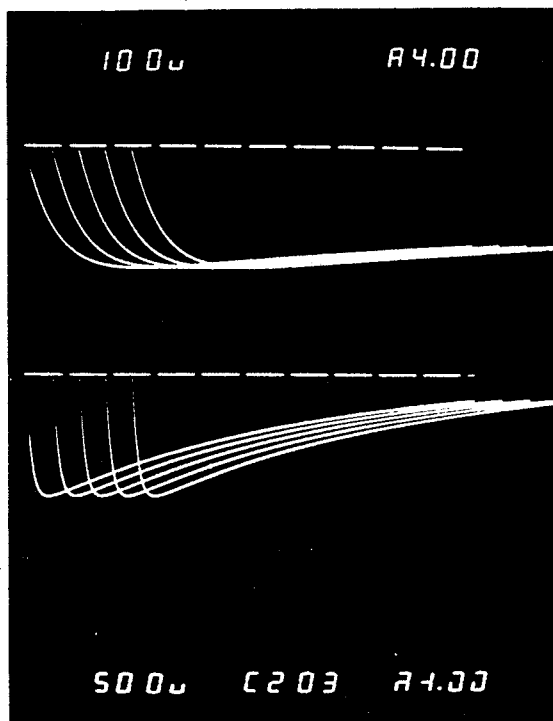


Fig. 5a

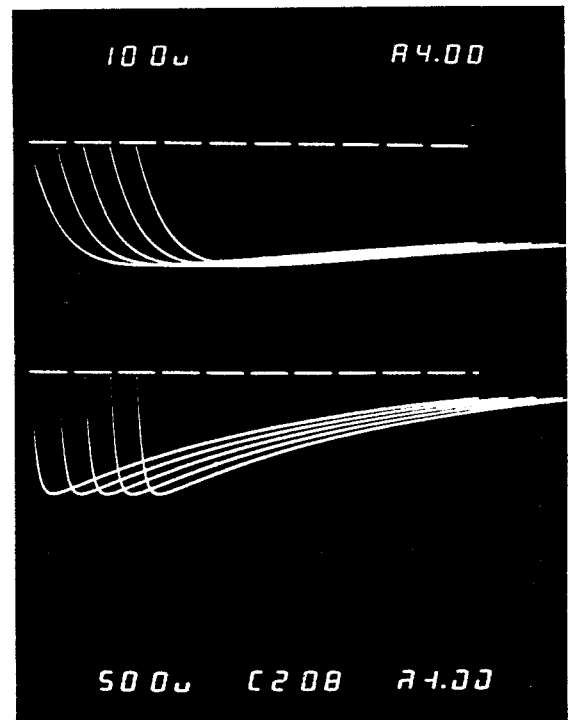


Fig. 5b

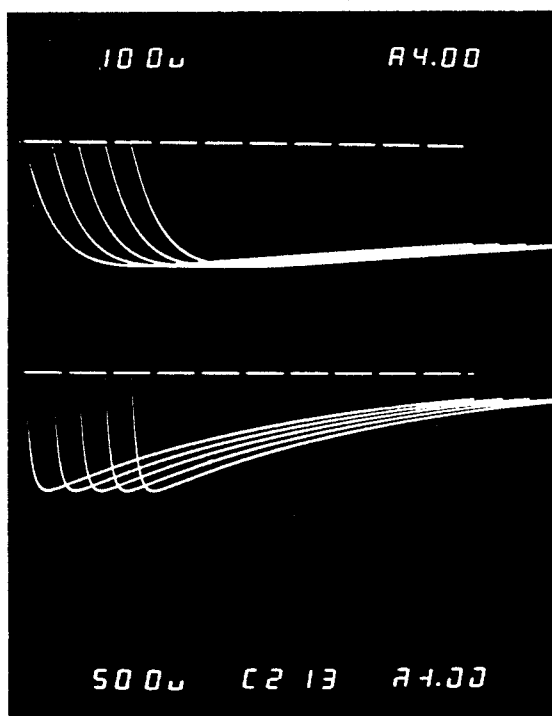
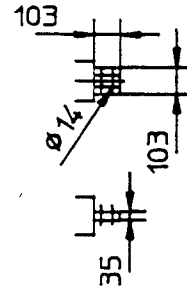


Fig. 5c

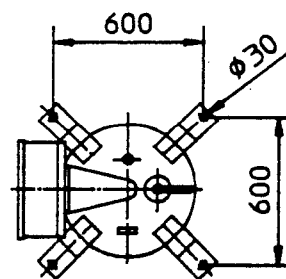
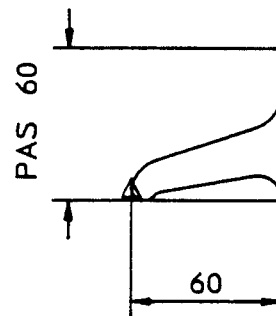
Fig. 5a, b, c
15 switching voltage
impulses 1175 kV
negative, wet
Time base:
upper beam: 100 μ s/div
lower beam: 500 μ s/div

PRIMARY CONNECTIONS

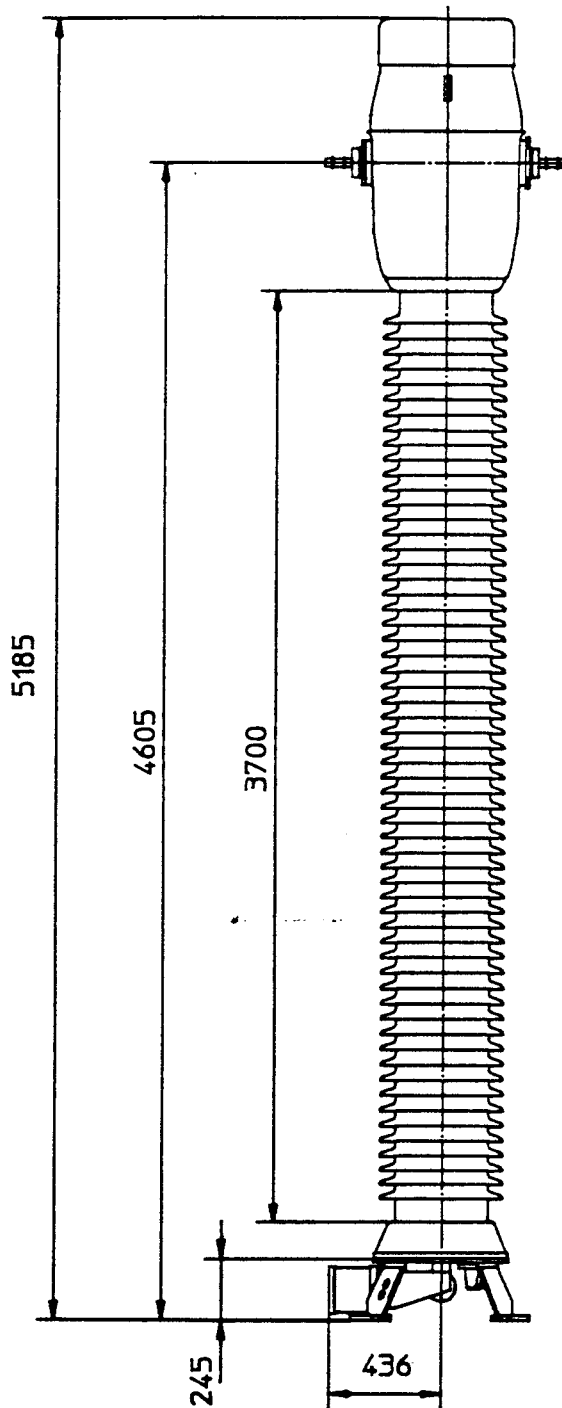


NUMBER OF SHEDS : 60


PROFIL A



VIEW BELOW BASE



ARCING DISTANCE : 3700mm
CREEPAGE DISTANCE : 9900mm

 BALTEAU ENERTEC		CURRENT TRANSFORMER CTH 550				DEMANDE	NOMENC
REPERTOIRE : CTH		MCN	APP	QC	ITM	MH	ARC
Beyne-Hausy BELGIQUE	ECHELLE 1/30	DESSINE CP	VU	DATE 12.4.90.	REMPLECE	REMPLECE PAR	PLAN N° 5350622