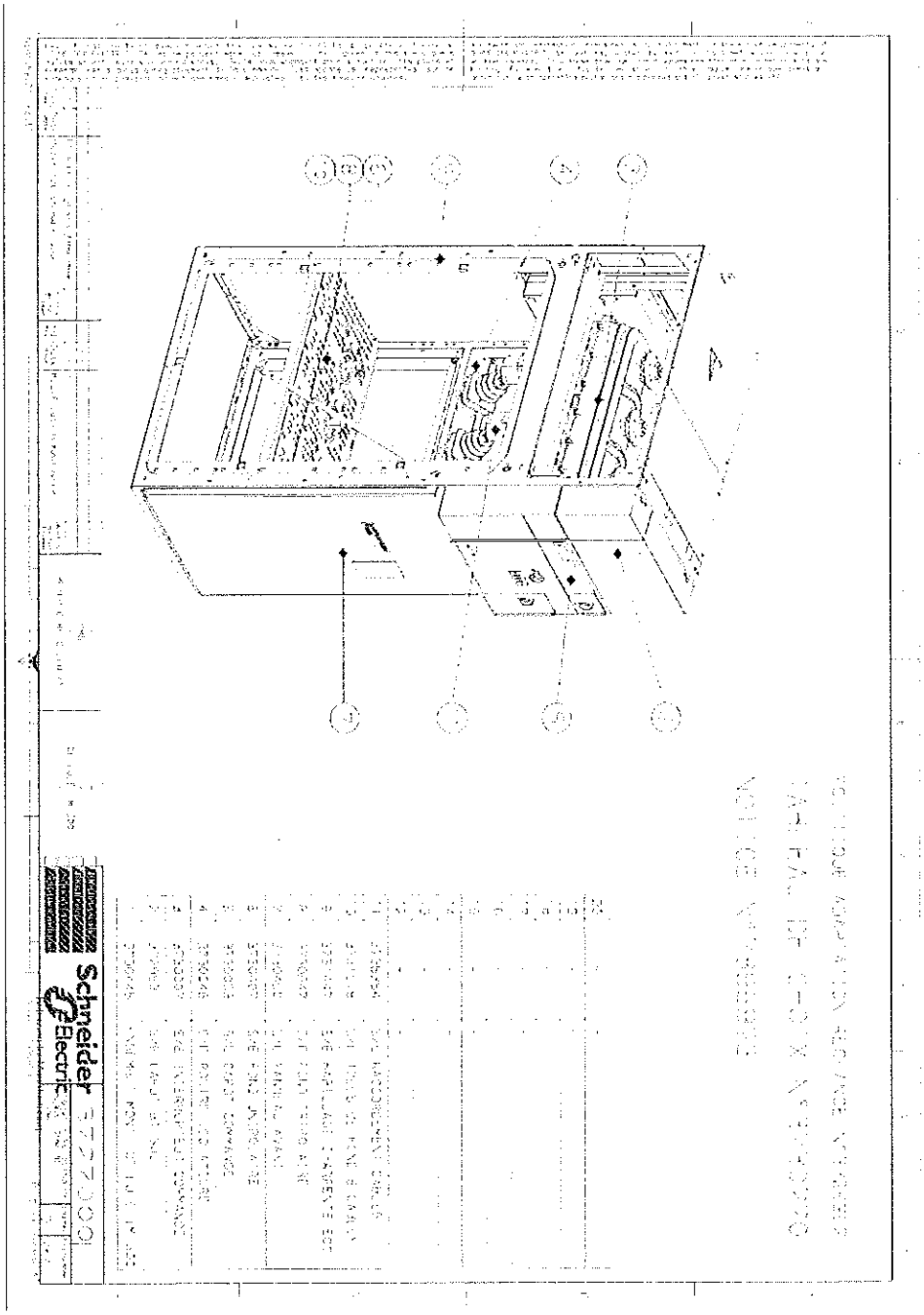
5 DRAWING / *PLAN*



Eu-lab
Power European Laboratory

Laboratoire d'essais moyenne tension
Schneider-Electric Industries SAS
ZAC Champ Saint Ange
F-38760 Varces

Schneider Electric

cofrac ESSAIS

Test Report /*Rapport d'Essais* N° AAA26280A

To / *Pour* : D. CAILLET ST / 38V

Objective / *Objectif*

Test objective / *Objectif de l'essai* :
Environmental testing / *Essais d'environnement*

Test / *Essai*

Started date / *Début des essais* : 13/02/2008 Finished date / *Fin des essais* : 13/02/2008

Test performed / *Détails de l'essai* :
External mechanical impacts tests : 5 joules IK08 / *Essais aux impacts mécaniques : 5 joules IK08*

Standards / *Norme*
IEC 62271-200 / CEI 62271-200
IEC 62262-262 / CEI 6262-262

Apparatus / *Appareil* : Schneider Electric SM6 inclosure / Schneider Electric cellule SM6
Designation / *Désignation* : **IM**
Manufacturer / *Constructeur*: Schneider Electric SA – Rueil Malmaison - FRANCE

Items identification / *Identification de l'appareil*:

- Serial number / *Numéro de série* : 0738182L
- Rated voltage / *Tension assignée* (kV) : 24
- Rated normal current / Courant assigné (A) : 630
- Short-circuit breaking current / *Pouvoir de coupure* (kA) : 20

Samples / *Nombre d'appareil* : 1

Conclusion

Tests are in accordance with the standards IEC 62271-200
Essais conformes à la norme CEI 62271-200

Dept: LEMT 38V	Number of pages :	
Written by : G. RAMI	Date :14/02/2008	
Technical manager : B. VANDENBERGUE	Testing laboratory manager : J.M. ANSELMETTI	

2064

CONTENT / *SOMMAIRE*

Schneider Electric

1 PRODUCT DESCRIPTION / *DESCRIPTION DU PRODUIT*

1.1 Detailed description of the item tested / *Caractéristiques de l'appareil:*

Manufacturer / *Constructeur*		: Schneider Electric Industries SA
Designation / *Désignation*		: Schneider Electric SM6 Circuit breaker
Number of poles / *Nombre de pôles*		: 3
Phase to phase / *Distance entre phases*	mm	: 375
Rated voltage / *Tension assignée*	kV	: 24
Lightning impulse withstand voltage *Tension de tenue aux chocs de foudre*	kV	: 125
Power frequency withstand voltage *Tension de tenue à fréquence industrielle*	kV	: 50
Frequency / *Fréquence*	Hz	: 50/60
Rated normal current *Courant en service continu*	A	: 630
Short time withstand current *Courant de courte durée admissible*	kA	: 20
Peak withstand current *Courant de crête admissible*	kÂ	: 52
Duration of short circuit *Durée de court-circuit*	s	: 1
Short circuit making current *Pouvoir de fermeture en court – circuit*	kÂ	: 52
Short circuit breaking current *Pouvoir de coupure en court – circuit*	kA	: 20
Interrupting medium / *Milieu de coupure*		: SF6
SF6 mass at / *Masse SF6* à 20°C	Kg	: 0.21
Operating mechanism type / *Type de commande*		: CIT
Drawing n° / *Plan n°*		: 3727000 ind H page 6 : 3728886 ind P page 20

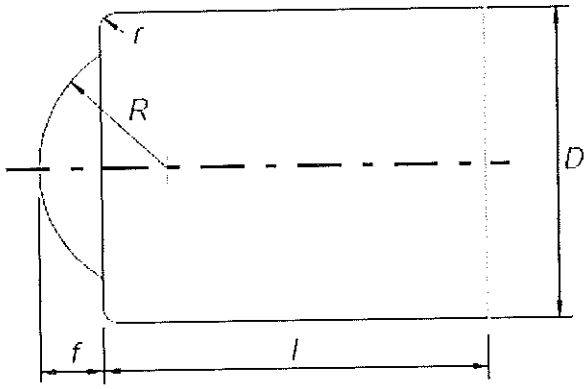
2866

2 TEST DESCRIPTION / *DESCRIPTION DES ESSAIS*

- **Test conditions :**

The test apparatus consists basically of a pendulum rotating at is upper end in such a way as to be kept in a vertical plane. The axis of the pivot is at 1 meter.

Le moyen d'essai consiste essentiellement en un pendule pivotant à son extrémité supérieure, de façon à ne se mouvoir que dans un plan vertical. L'axe du pivot est à 1 mètre au-dessus du point de mesure.



Equivalent mass / *Masse équivalente*	Kg	1.7
Height of fall / *Hauteur de chute*	mm	300

In order to avoid secondary impacts, i.e rebounds, the hammer shall be retained after the initial impact by grasping the striking element whilst avoiding the arm so that distortion is prevented.

Afin d'éviter les impacts secondaires, le marteau doit être retenu en saisissant la pièce de frappe et non le bras pour éviter de le déformer.

Test done / Essais réalisés :

The impact energy is 5 joules / La *valeur d'énergie d'impact est de 5 joules*
The number of impacts is 3 / Le nombre d'impact est de 3

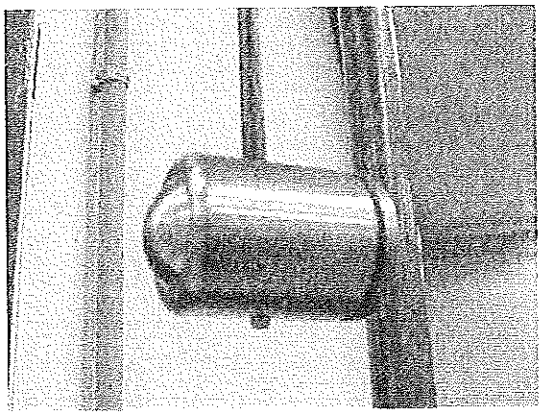
Tested parts

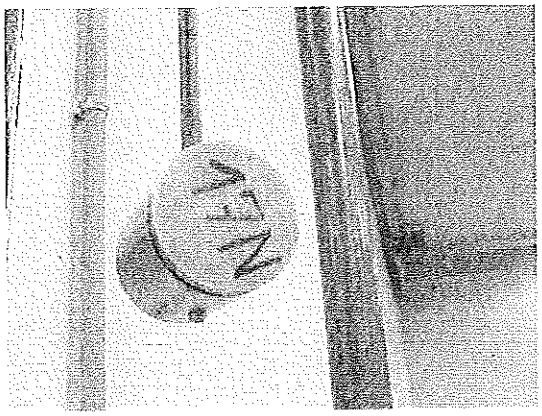
- *On the earth flap of cubicle's cover*
- *On the switch flap of cubicle's cover of*
- *On the windows of the cabble accen panel*
- *On the voltage indicating enclosure*

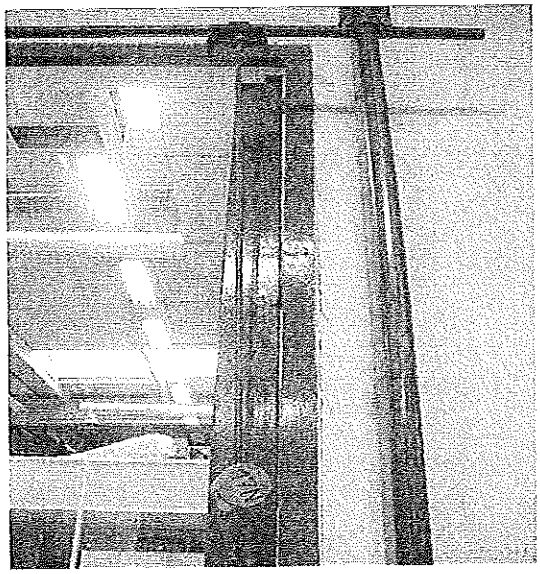
Parties testées :

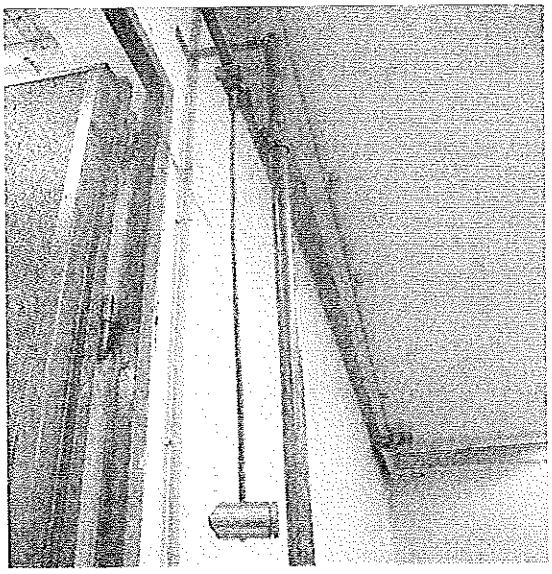
- *Sur le portillon de terre du capot cellule*
- *Sur le portillon interrupteur du capot cellule*
- *Sur le hublot du panneau accès câble*
- *Sur le boitier de présence tension*

- **Test picture** / *Photo de l'essai* :





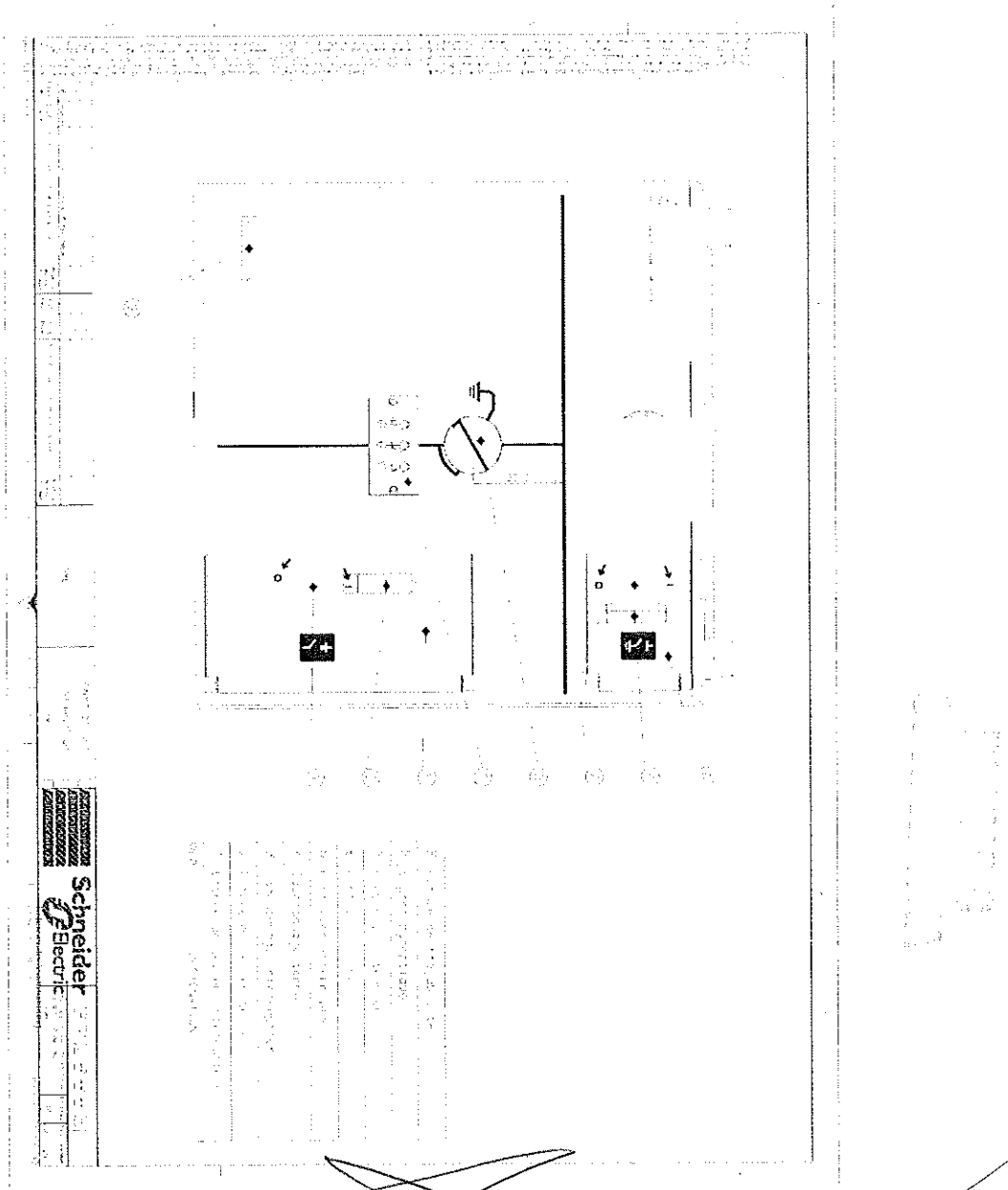




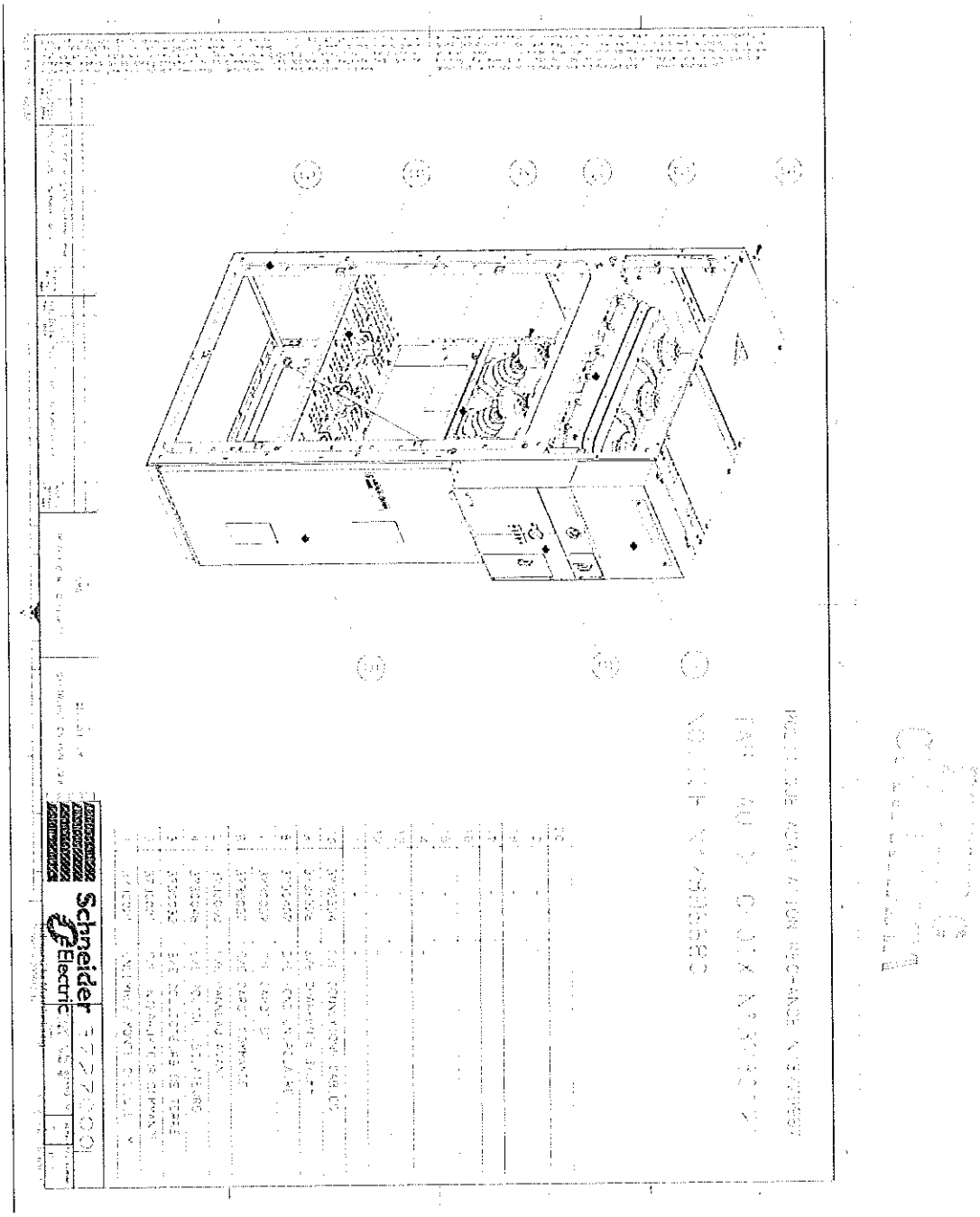
3 RESULTS / *RESULTATS*

Tests are in accordance with the standards IEC 62271-200
Essais conformes à la norme CEI 62271-200

4 DRAWING / *PLAN*



5 DRAWING / *PLAN*



The test reports document must be requested to the Technical Support Level 3

SM6-24 ADVANC test reports list

last modification : 15 10 2012

Reference	units	Test type	Standard	Date	Un (kV)	In (A)	Ik (kA)	Comments
TER 2011062[illegible]_023	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With bottom exhaust configuration
TER 2011062[illegible]_053	IM500	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With bottom exhaust configuration
TER 2011062[illegible]_063	IM500	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With bottom exhaust configuration
TER 2011062[illegible]_031	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the switch compartment- With bottom exhaust configuration
TER 2011062[illegible]_032	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the switch compartment- With bottom exhaust configuration
TER 2011062[illegible]_035	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With bottom exhaust configuration
TER 2011062[illegible]_043	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With bottom exhaust configuration
TER 2011062[illegible]_037	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the switch compartment- With bottom exhaust configuration
TER 2011062[illegible]_039	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With bottom exhaust configuration
TER 2011062[illegible]_040	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With bottom exhaust configuration
TER 2011062[illegible]_041	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the disconnector compartment- With bottom exhaust configuration
TER 2011062[illegible]_045	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With bottom exhaust configuration
TER 2011062[illegible]_055	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the switch compartment- With bottom exhaust configuration
TER 2011062[illegible]_062	IM	Internal Arc	IEC 62271-200	2011	24	[illegible]	[illegible]	In the switch compartment- With top exhaust configuration
TER 2011062[illegible]_033	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With top exhaust configuration
TER 2011062[illegible]_065	IM500	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With top exhaust configuration
TER 2011062[illegible]_067	IM500	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2011062[illegible]_063	IM500	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2011062[illegible]_071	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With top exhaust configuration
TER 2011062[illegible]_073	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With top exhaust configuration
TER 2011062[illegible]_075	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2011062[illegible]_052	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With bottom exhaust configuration
TER 2011062[illegible]_054	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the switch compartment- With bottom exhaust configuration
TER 2011062[illegible]_055	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With bottom exhaust configuration
TER 2011062[illegible]_056	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With bottom exhaust configuration
TER 2011062[illegible]_112	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the switch compartment- With top exhaust configuration
TER 2011062[illegible]_102	IM500	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the switch compartment- With bottom exhaust configuration
TER 2011062[illegible]_113	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2011062[illegible]_123	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2011062[illegible]_132	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With bottom exhaust configuration
TER 2011062[illegible]_109	IM500	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With bottom exhaust configuration
TER 2011062[illegible]_121	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2011062[illegible]_122	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the switch compartment- With bottom exhaust configuration
TER 2010047[illegible]_031	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With bottom exhaust configuration
TER 2010047[illegible]_032	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cable compartment- With bottom exhaust configuration
TER 2010047[illegible]_035	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With bottom exhaust configuration
TER 2012041[illegible]_031	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With top exhaust configuration
TER 2012041[illegible]_032	IM500	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With top exhaust configuration
TER 2012041[illegible]_034	IM500	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With top exhaust configuration
TER 2012041[illegible]_036	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the switch compartment- With top exhaust configuration
TER 2012041[illegible]_037	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2012041[illegible]_041	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With top exhaust configuration
TER 2012041[illegible]_042	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cable compartment- With top exhaust configuration
TER 2012041[illegible]_043	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cable compartment- With top exhaust configuration
TER 2012041[illegible]_045	DM1-A	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the busbar compartment- With top exhaust configuration
TER 2011062[illegible]_048	GAM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2012071[illegible]_003	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2012071[illegible]_123	IM	Internal Arc	IEC 62271-200	2012	24	[illegible]	[illegible]	In the cables compartment- With top exhaust configuration
TER 2011062[illegible]_152	IM	Mechanical	IEC 62271-200	2012	24	[illegible]	[illegible]	IP3X
TER 2011062[illegible]_153	DM1-A	Mechanical	IEC 62271-200	2012	24	[illegible]	[illegible]	IP3X

2011

LEMT

Schneider Electric

Power European Laboratory

ACCREDITATION N° 1-0259
PORTÉE DISPONIBLE
SUR WWW.COFRAC.FR

Laboratoire Essais Moyenne Tension
Schneider-Electric Industries SAS
ZAC Champ Saint Ange
F-38760 Varces

Test Report

N° TFR_200902405_004

To : Eric Saunier-Payerne

Objective

Temperature rise Test objective : Validation of cubicle **SM6-24 QM arc proof**

Test

Starting date : 25/05/2009 Completed date : 15/06/2009

Test performed : test at 130A three-phase on cubicle SM6-24 QM arc proof coupled with a cubicle SM6-24 DM1W arc proof

Standards : CEI62271-200 -

Items tested

Apparatus : SM6-24 QM ARC PROOF 16kA-1s

Designation : **Schneider Electric SM6-24 QM**

Manufacturer : Schneider Electric SA – Rueil Malmaison - FRANCE
Items identification :

- Serial number : 0913040
- Rated voltage (kV) : 24
- Rated normal current (A) : 200
- Short-circuit breaking current (kA) : 20
- SF6 mass at *(Kg):* 0,210 (switch)
- Drawing n°:373002302 ind 01 / 51238176F002 ind O2

Samples : 1

Conclusion

The tests are in accordance with the standard IEC 62271-200

Dept:	LEMT 38V	Technical manager :
Test leader	**Izzo Pasquale**	
Number of pages :	**11**	
Approval date :	30/06/2009	B. VANDENBERGUE

The performance of the apparatus tested and the results obtained are shown in the tables, oscillograms and photographs enclosed. This document relate only to the items presented for testing.
This test report can only be copied as a photographic facsimile in its entirety.
Accreditation COFRAC attests only competence of the laboratory for the tests alone covered with accreditation.
The COFRAC is signatory of the multilateral agreement of EA (European co-operation for Accreditation) and of ILAC (International Laboratory Accreditation Cooperation) of equivalence recognition of test reports or analysis.

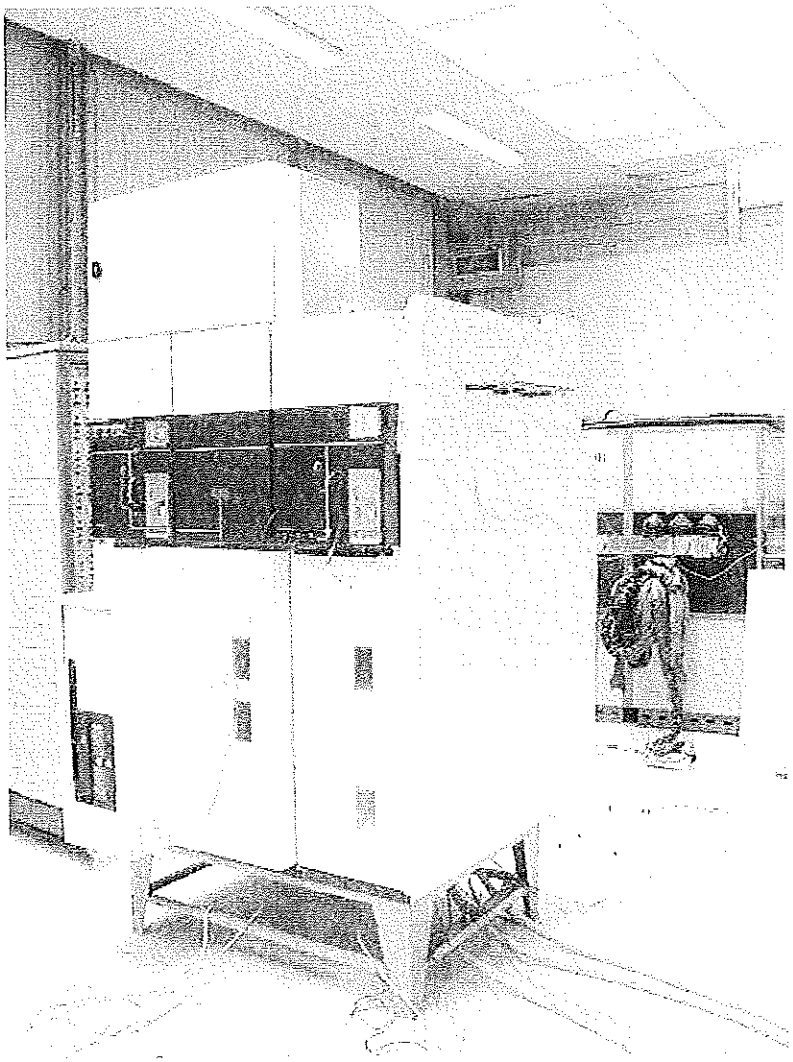
Schneider Electric

CONTENT

Schneider Electric

1 PRODUCT DESCRIPTION

1.1 Sampling :



2024

1.2 Detailed description of the item tested :

SWITCH :

Manufacturer		: Schneider Electric Industries SA
Designation		: Schneider Electric **SM6-24**
Number of poles		: 3
Rated voltage	**kV**	: 24
Lightning impulse withstand voltage	**kV**	: 125
Power frequency withstand voltage	**kV**	: 50
Frequency	**Hz**	: 50/60
Rated normal current	**A**	: 200
Short circuit making current	**kÂ**	: 50
Short circuit breaking current	**kA**	: 20
Interrupting medium		: SF6
SF6 mass at à 20℃	**Kg**	: 0.210
Drawing n°		: 373002302 ind 01 : 51238176F002 ind 02

The cubicle is fitted with :

FUSARC fuses 200 A ref : 757354 CQ

2075

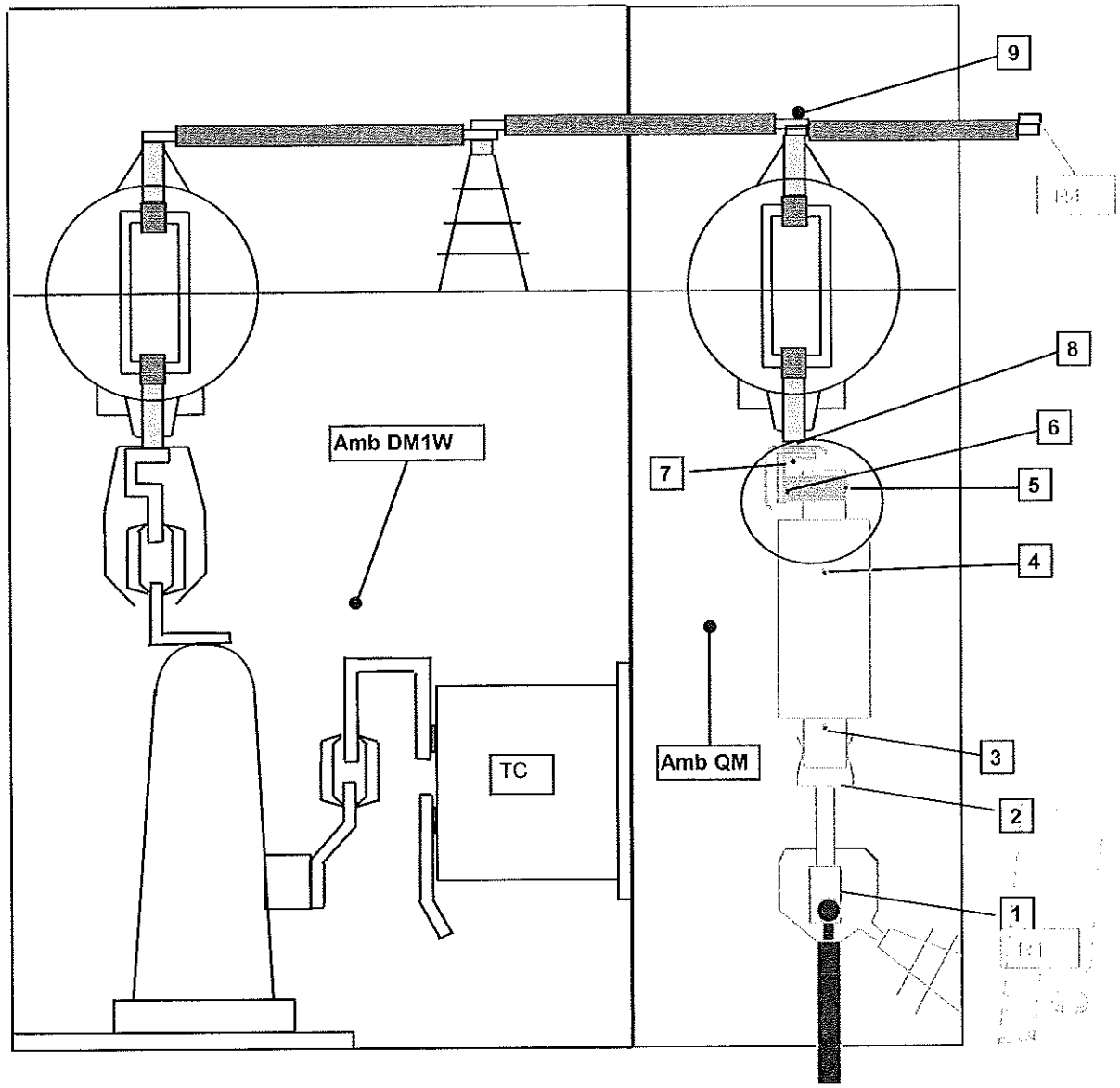
2 TEST DESCRIPTION

2.1 Specific test conditions :

- **The SM6-24 QM arc proof cubicle is coupled with a SM6-24 DM1W arc proof cubicle**
- **The SM6-24 QM arc proof cubicle is connected with 1 aluminium cable of 150 mm² per phase**
- **The side walls are covered with a heat insulation**
- **The ambient temperature rise of SM6-24 DM1W cubicle is simulated by heating resistances (correspondent with a passage of 630 A current in SM6-24 DM1W cubicle internal report N°200902407_004))**
- **The thermocouples used are Copper-Constantan.**
- **Air velocity : 0.1 m/s**

2.2 Detailed description of the tests :

- **Drawing of connections and thermocouples position :**



3 RESULTS

- **Measurement of the circuit resistance (I = 100 Adc) :**

  – **Before temperature-rise test :**

Measurement between	Phase 1 (µΩ)	Phase 2 (µΩ)	Phase 3 (µΩ)
R1 / R4	3050	3250	3010

  – **After temperature-rise test :**

Measurement between	Phase 1 (µΩ)	Phase 2 (µΩ)	Phase 3 (µΩ)
R1 / R4	3049	3252	3014

- **Values of the temperature rise at : 130 A**

  - **Ambient temperature : 25,5 °C**

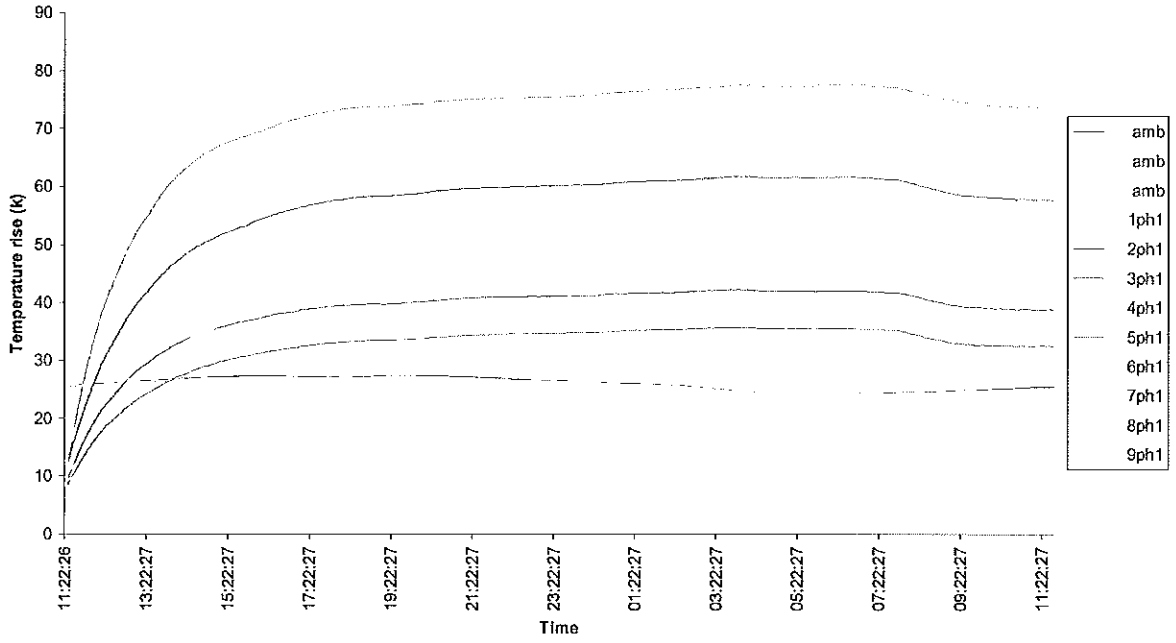
Thermocouple	Nature of the part : material, dielectric	Temperature rise (K)			Maximum Value (*)
		Phase 1	Phase 2	Phase 3	
1	Connection bare-copper in air	27,5	28,3	27,8	50
2	Connection silver-coated in air	32,4	32,8	32,1	75
3	Contact silver-coated in air	38,8	39,4	38,5	65
4	Insulating fuse	73,6	76,0	73,1	140
5	Contact silver coated in air	57,6	62,8	57,9	65
6	Connection silver-coated in air	49,3	52,1	48,4	75
7	Point TG insulated	42,3	44,5	42,3	65
8	Point TG insulated	41,8	43,7	41,8	65
9	Point TG insulated	24,1	24,5	24,1	65
Amb QM	Internal ambient		29,6		/
Amb DM1-W	Internal ambient		20,0		/

(*) : - Maximum value of the temperature rise at ambiant air temperature not exceeding 40°C

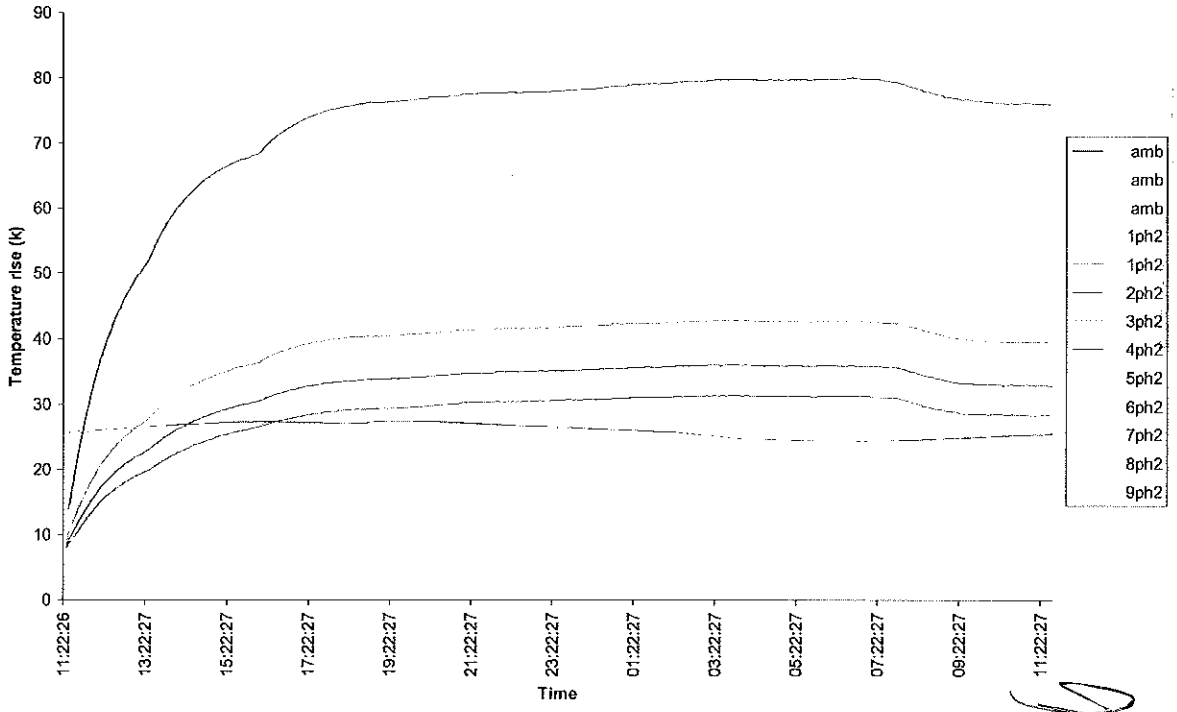
2078

4 OSCILLOGRAM

Phase 1 :

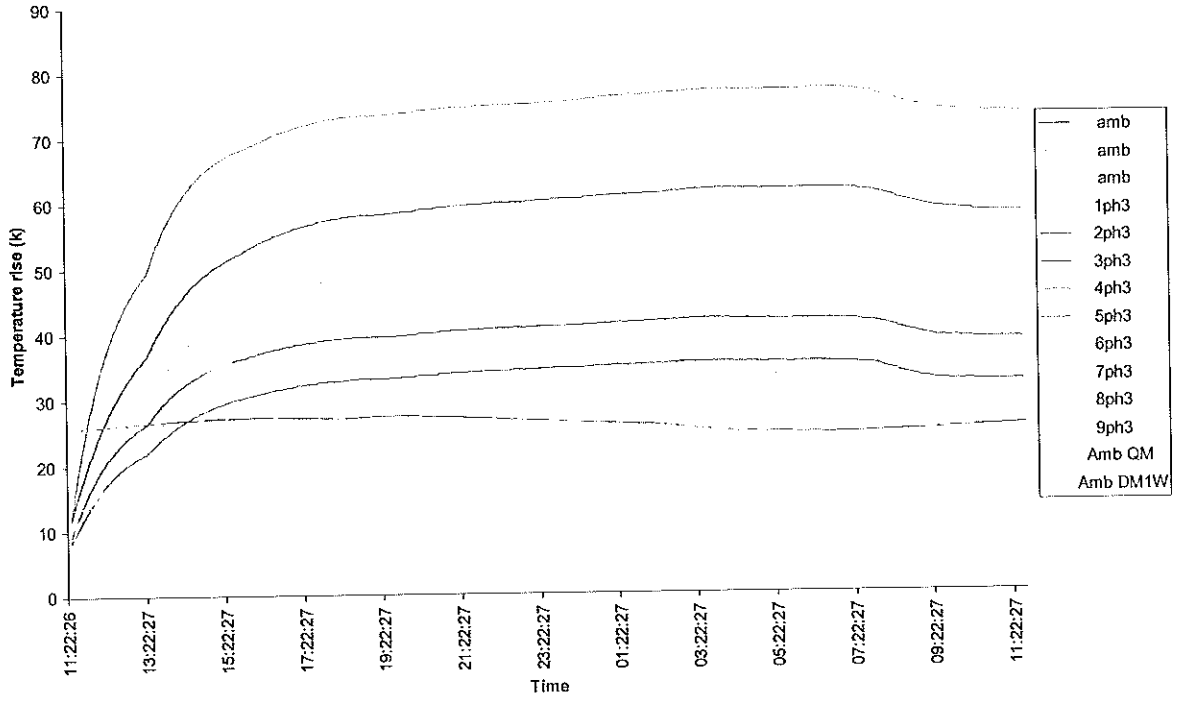


Phase 2



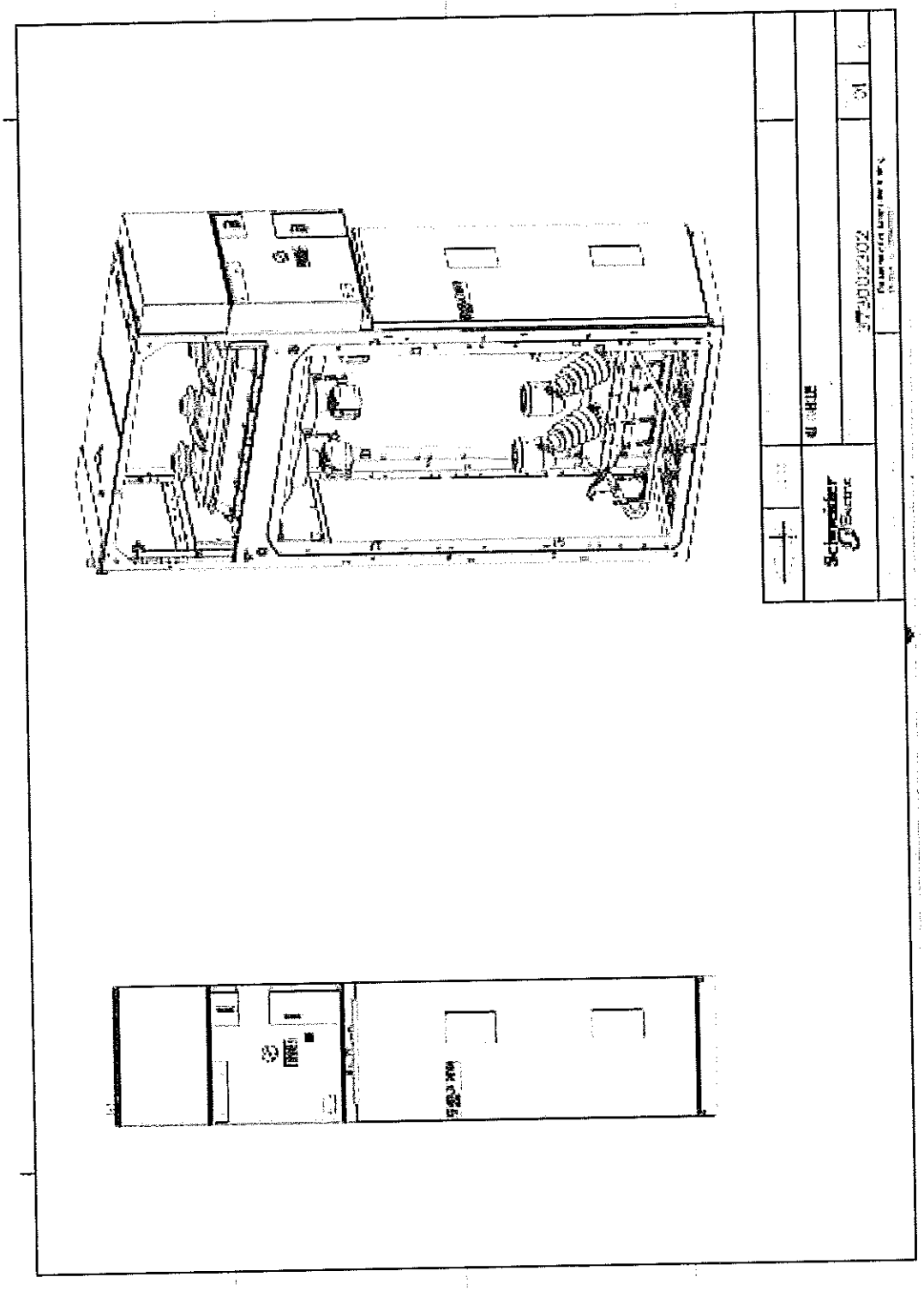
Schneider Electric

Phase 3

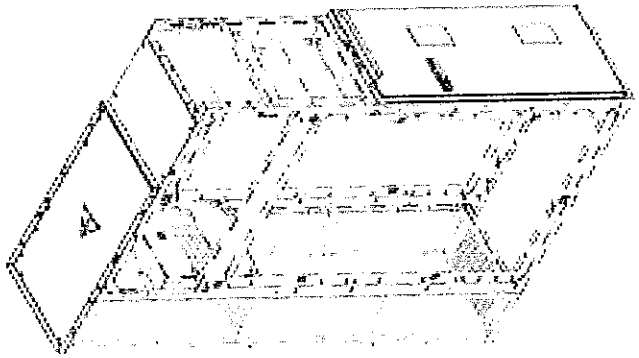


2080

5 DRAWING



Schneider Electric



2082

L2E Volta
Expertise and Testing Laboratory
Functional Laboratory
37, Quai Paul Louis Merlin
F-38050 Grenoble Cedex 9
Tél.: +33 (0)476 579 143
Fax: +33 (0)476 579 938

cofrac
ACCREDITATION N°1-0140 SCOPE COMMUNICATED ON REQUEST
ESSAIS

TEST REPORT

200902678_008

Delivered to	: SCHNEIDER ELECTRIC SCHNEIDER ELECTRIC INDUSTRIES SAS (FRANCE) POWER BUSINESS 31 rue Pierre Mendès-France, Eybens, 38050 GRENOBLE cedex 9
Tested equipment	: **SM6 cubicles IM+QM with big diameter fuses (100 A)**
Reference	: Type - 24 kV - 630 / 200 A - 50 Hz
Manufacturer	: SCHNEIDER ELECTRIC
Purpose of tests	: proving of the dielectric withstand level of the cubicles with new cable repartitors (ref AAV7603302) according to IEC 62271-200 (2003-11)
Tests performed	: according to IEC 60060-1 (1989-11)+corrigendum 1 (1992-03), IEC 62271-1 (2007-10) standard and customers requirements for the following tests : POWER FREQUENCY DRY TEST VOLTAGE IEC 62271-200 (2003-11) Sub-Clause 6.2 TEST WITH LIGHTNING IMPULSE VOLTAGE IEC 62271-200 (2003-11) Sub-Clause 6.2
Site of tests	: VOLTA - FUNCTIONAL LABORATORY
Date of tests	: from 2009/08/25 to 2009/08/28
The report contains	: 16 pages
Date of issued	: 2009/12/15

Testing Manager

STEPHANE GIRAUD

Technical Manager

Françoise

HUGO FRANCOISE

The performance of the apparatus tested and the results obtained are shown in the tables, oscillograms and photographs enclosed.
The responsibility for conformity of any apparatus having the same designation with that tested rests with the manufacturer.
This record of proving test shall only be reproduced in the complete form. The accreditation by the COFRAC Testing Section attests of the laboratory competence in the tests covered by the accreditation.

2083

1. TABLE OF CONTENTS

2. 2. CONCLUSIONS

The SM6 cubicles IM+QM is considered satisfactory according to IEC 62271-200 (2003-11) Sub-Clause 6.2 and to the customer requirement.

Date of receipt of the device : The 2009/08/24

List of people having participated in tests Mr S. GIRAUD — Functional laboratory
Mr

2084

3. RATINGS OF THE SWITCHGEAR

Apparatus	:	**SM6 cubicles IM+QM**
- type	:	**Type 24 kV**
- serial number	:	**0928133L (IM) and 0928163L (QM)**
- manufacturing year	:	**2009**
- number of poles	:	**3**
Manufacturer	:	**Schneider Electric Industries SA**
Rated voltage	:	**24 kV**
power frequency withstand voltage	:	**50 kV**
lightning impulse withstand voltage	:	**125 kV**
Rated frequency	:	**50 Hz**
Rated normal current	:	**630 A**

3.1. SWITCH RATING

Manufacturer		:	Schneider Electric Industries SA
Designation		:	Schneider Electric IM375
Number of poles		:	3
Phase to phase	mm	:	200
Rated voltage	kV	:	24
Lightning impulse withstand voltage	kV	:	125
Power frequency withstand voltage	kV	:	50
Frequency	Hz	:	50/60
Rated normal current	A	:	630
Short circuit making current	kÅ	:	50
Interrupting medium		:	SF6
SF6 mass at 20°C	Kg	:	0,210
Drawing n°		:	373002102 ind.02

3.2. SWITCH / FUSE RATING

Manufacturer		:	Schneider Electric Industries SA
Designation		:	Schneider Electric QM375
Number of poles		:	3
Phase to phase	mm	:	200
Rated voltage	kV	:	24
Lightning impulse withstand voltage	kV	:	125
Power frequency withstand voltage	kV	:	50
Frequency	Hz	:	50/60
Rated normal current	A	:	100A (big fuses)
Short circuit making current	kÂ	:	50
Interrupting medium		:	SF6
SF6 mass at 20°C	Kg	:	0,210
Drawing n°		:	373002302 ind 02

4. MOUNTING ARRANGEMENT

The switchgear is mounted according to the drawings n°373002102 ind.02 and 373002302 ind 02 .

Refer to scheme page n°13 for terminal identificat ion.
Refer to pictures page n°12

5. VALUES TO VERIFY

according to		**IEC 62271-1 (2007-10)**
Rated voltage level		**24 kV**
Power frequency dry test		
To earth	:	50kV 60 s
Across open switching device	:	50kV 60 s
Across isolating distance	:	60kV 60 s
Test with lightning impulse voltage		
To earth	:	125kV 15 impulses ±
Across open switching device	:	125kV 15 impulses ±

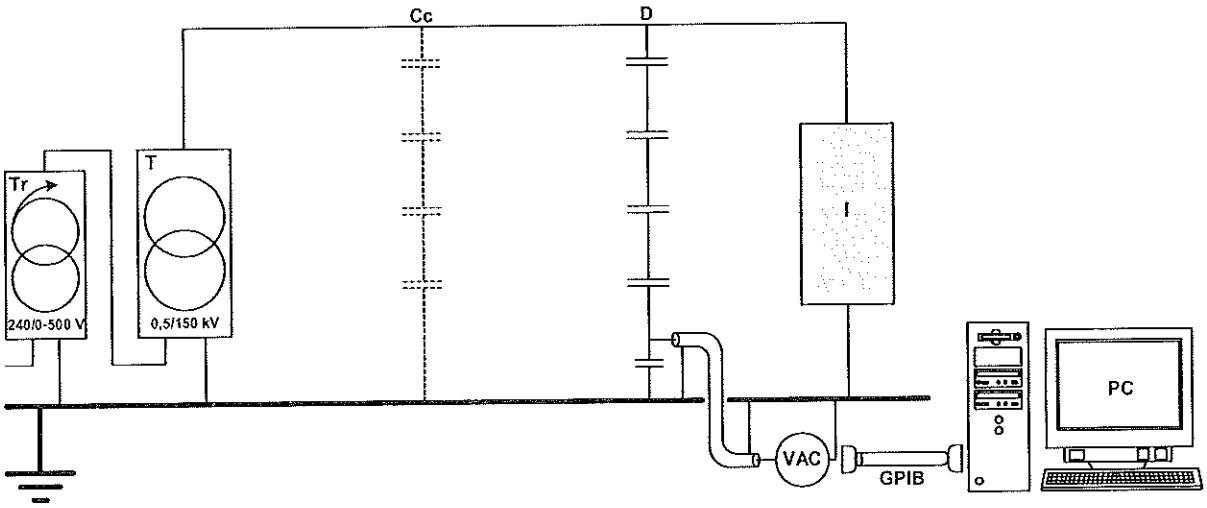
6. ATMOSPHERIC CONDITIONS

The correction factors K are calculated according to IEC 60060-1 (1989-11) Sub-Clause 11 standard.
Atmospheric conditions observed during the test :

date	b : hPa	t : °C	tw : °C	Ub : kV	L : m	Hu : g/m^3	K
25/08/2009	988	24.2	18	55	0.16	12.2	0.962
26/08/2009	992	24.2	18.6	55	0.16	13.1	0.965
26/08/2009	992	24.3	18.7	138	0.16	13.2	0.965
27/08/2009	995	23.8	18	138	0.16	12.4	0.970
27/08/2009	993	24.1	17.7	138	0.16	11.9	0.967
28/08/2009	992	23.8	17.5	138	0.16	11.7	0.967
28/08/2009	992	23.8	17.5	55	0.16	11.7	0.967

7. TESTS CIRCUITS

7.1. POWER FREQUENCY

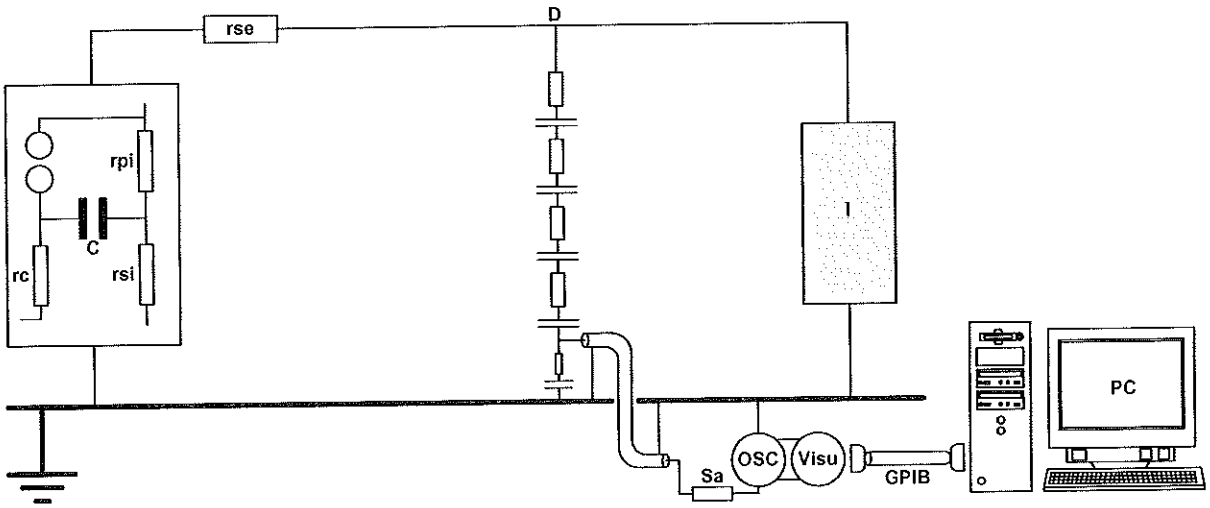


Tr	:	Regulating transformer 240/0-500V B. BONNEFOND 25685
T	:	High voltage step up transformer 0,5/150kV 50kVA HAEFELY WO 283398
D	:	Capacitive divider 50Hz 300kV 440pF HAEFELY WO 573398 n°MTC300
Cc	:	Loading capacitor
VAC	:	Multimeter >5.5D 2001.type AC Position KEITHLEY 0643802 n°KY936
PC	:	Computer + IC card GPIB NI-488-2 type
GPIB	:	Cable link GPIB IEEE-488
I	:	Test object

7.1.1.Uncertainty of measuring chains

Power frequency voltage measured with D :
The uncertainty of the measure is ± 2.7% (estimated confidence level not less than 95%)

7.2. LIGHTNING IMPULSE



Generator 8 stages 800kV 40kJ HAEFELY WO 514470
Values for each stage : C = 1,0µF, rc = 4,8kΩ, rpi = 68Ω, rpi = 12Ω, rse = 350Ω

D	:	Divider 800kV Ct = 670pF, Rt = 226,2Ω HAEFELY WO 514470 n°CS800-670F
OSC + Visu	:	Transient analyser Nicolet type ACCURA 100HV n°IDA0300169
Sa	:	Probe 10x Z = 10MΩ P5102 type TEKTRONIX n°Red
PC	:	Computer + IC card GPIB NI-488-2 type
GPIB	:	Cable link GPIB IEEE-488
I	:	Test object

7.2.1. Uncertainty of measuring chains

The uncertainty of the measure is ± 2.31% (estimated confidence level not less than 95%)Lightning impulse voltage measured with D :

8. TESTS PROCEDURES

8.1. APPLICATION OF TEST VOLTAGE

8.1.1. Switchgear closed

Test to earth and between poles :
Voltage is applied to one pole, the base and the other poles are earthed.

8.1.2. Switchgear open

Test to earth, between poles and across open switching device:
Voltage is applied successively to each terminal; the other terminals and the frame are earthed.

8.2. POWER FREQUENCY TEST

Withstand voltage test :
The specified voltage level is maintained for 60 s.

8.3. TEST WITH LIGHTNING IMPULSE VOLTAGE

Withstand voltage test:
15 impulses with the specified level are applied for both positive and negative polarities

9. TESTS RESULTS:

9.1. POWER FREQUENCY TEST

Test condition	Terminals connected to earth	Voltage applied to	Test voltage kV	Correction factor K	(1)	Results
Im + Qm (both open)						
Both open	F & Im + Qm vABCbc	a	50	0.962	A	Withstood 60 seconds
Both open	F & Im + Qm ABCac	b	50	0.962	A	Withstood 60 seconds
Both open	F & Im + Qm ABCab	c	50	0.962	A	Withstood 60 seconds
Qm open						
Qm open / Im closed	FBCabc	A	50	0.962	A	Withstood 60 seconds
Qm open / Im closed	FACabc	B	50	0.962	A	Withstood 60 seconds
Qm open / Im closed	FABabc	C	50	0.962	A	Withstood 60 seconds
Im open						
Qm closed / Im open	FBCabc	A	50	0.962	A	Withstood 60 seconds
Qm closed / Im open	FACabc	B	50	0.962	A	Withstood 60 seconds
Qm closed / Im open	FABabc	C	50	0.962	A	Withstood 60 seconds
Im + Qm (both closed)						
Both closed	FBbCc	Aa	50	0.962	A	Withstood 60 seconds
Both closed	FAaCc	Bb	50	0.962	A	Withstood 60 seconds
Both closed	FAaBb	Cc	50	0.962	A	Withstood 60 seconds

(1) **A** = The correction factor K has been **A**pplied **NA** = The correction factor K has **N**ot been **A**pplied
AK = The correction factor **K** = 0.950 has been **A**pplied (IEC 62271-1 (2007-10))

9.2. TEST WITH LIGTHTNING IMPULSE VOLTAGE

Test condition	Earth connected to	Voltage applied to	pol.	Voltage applied KV	Correction factor K	(1)	Results	Annex n°
Im + Qm (both closed)								
							Waveform	
Both closed	FBbCc	Aa	pos.	100	0.962	A	1.15/ 47.98 µs	031548
Both closed	FBbCc	Aa	pos.	125	0.962	A	Withstood 15 Impulses	031553
							Waveform	
Both closed	FBbCc	Aa	neg.	100	0.962	A	1.17/ 48.07 µs	031553
Both closed	FBbCc	Aa	neg.	125	0.962	A	Withstood 15 Impulses	031557
							Waveform	
Both closed	FAaCc	Bb	pos.	100	0.965	A	1.18/ 48.04 µs	040835
Both closed	FAaCc	Bb	pos.	125	0.965	A	Withstood 15 Impulses	040841
							Waveform	
Both closed	FAaCc	Bb	neg.	100	0.965	A	1.18/ 48.08 µs	040841
Both closed	FAaCc	Bb	neg.	125	0.965	A	Withstood 15 Impulses	040855
							Waveform	
Both closed	FAaBb	Cc	pos.	100	0.965	A	1.16/ 48.07 µs	040857
Both closed	FAaBb	Cc	pos.	125	0.965	A	Withstood 15 Impulses	040906
							Waveform	
Both closed	FAaBb	Cc	neg.	100	0.965	A	1.17/ 48.19 µs	040907
Both closed	FAaBb	Cc	neg.	125	0.965	A	Withstood 15 Impulses	040912
Im open								
							Waveform	
Im open	FBCabc	A	pos.	100	0.965	A	1.23/ 49.13 µs	040941
Im open	FBCabc	A	pos.	125	0.965	A	Withstood 15 Impulses	040947
							Waveform	
Im open	FBCabc	A	neg.	100	0.965	A	1.23/ 49.14 µs	040947
Im open	FBCabc	A	neg.	125	0.965	A	Withstood 15 Impulses	040952
							Waveform	
Im open	FACabc	B	pos.	100	0.965	A	1.22/ 49.08 µs	041004
Im open	FACabc	B	pos.	125	0.965	A	Withstood 15 Impulses	041011
							Waveform	
Im open	FACabc	B	neg.	100	0.965	A	1.22/ 49.17 µs	041011
Im open	FACabc	B	neg.	125	0.965	A	Withstood 15 Impulses	041017
							Waveform	
Im open	FABabc	C	pos.	100	0.965	A	1.23/ 49.14 µs	041019
Im open	FABabc	C	pos.	125	0.965	A	Withstood 15 Impulses	041025
							Waveform	
Im open	FABabc	C	neg.	100	0.965	A	1.23/ 49.22 µs	041026
Im open	FABabc	C	neg.	125	0.965	A	Withstood 15 Impulses	041031

(1) **A** = The correction factor K has been **A**pplied **NA** = The correction factor K has **N**ot been **A**pplied
AK = The correction factor **K** = 0.950 has been **A**pplied (IEC 62271-1 (2007-10))

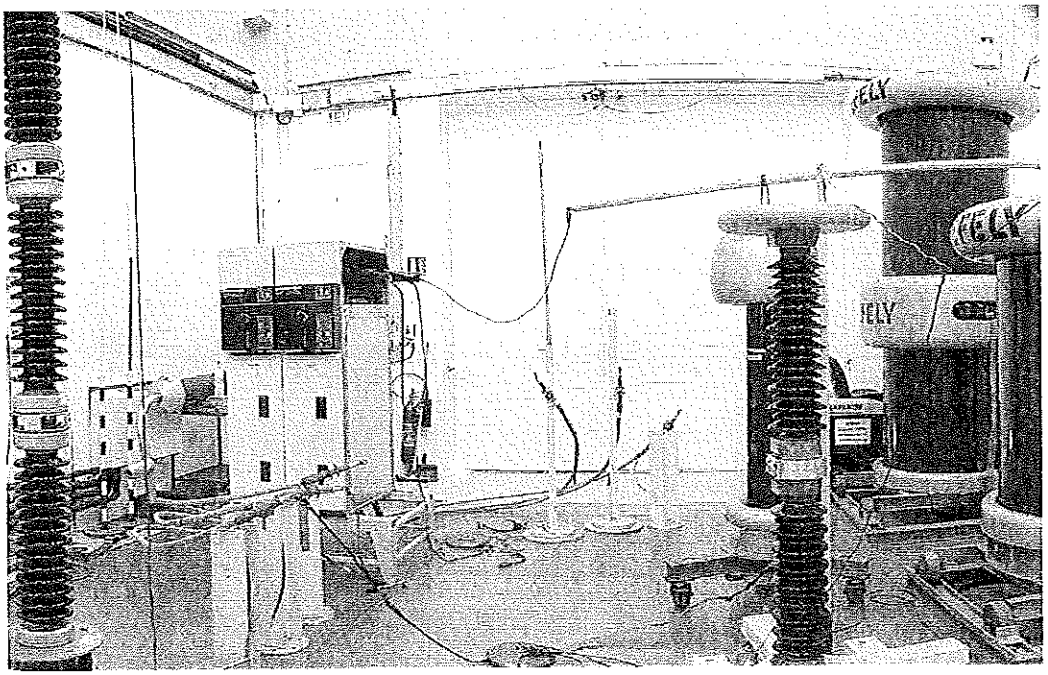
2092

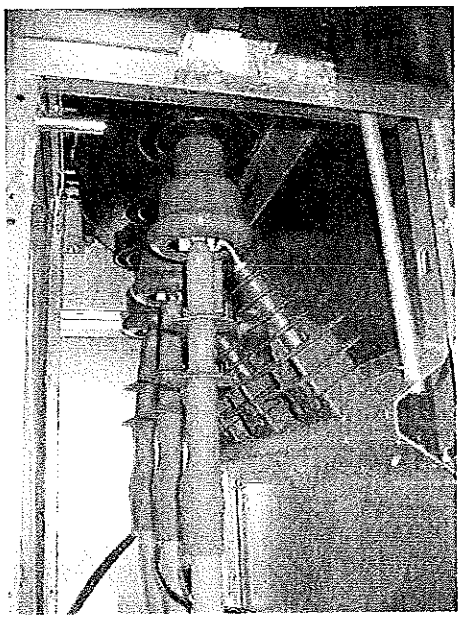
Condition d'essai	Terre reliée à	Tension appliquée à	pol.	tenue appliquée kV	Facteur de correction K	(1)	Résultats	Annexe n°
Qm open								
Qm open	FBCabc	A	pos.	100	0.966	A	Waveform 1.21/ 49.08 µs	041041
Qm open	FBCabc	A	pos.	125	0.966	A	Withstood 15 Impulses	041046
Qm open	FBCabc	A	neg.	100	0.966	A	Waveform 1.20/ 49.17 µs	041047
Qm open	FBCabc	A	neg.	125	0.966	A	Withstood 15 Impulses	041052
Qm open	FACabc	B	pos.	100	0.966	A	Waveform 1.20/ 49.02 µs	041054
Qm open	FACabc	B	pos.	125	0.966	A	Withstood 15 Impulses	041106
Qm open	FACabc	B	neg.	100	0.966	A	Waveform 1.20/ 49.15 µs	041106
Qm open	FACabc	B	neg.	125	0.966	A	Withstood 15 Impulses	041111
Qm open	FABabc	C	pos.	100	0.966	A	Waveform 1.20/ 49.00 µs	041114
Qm open	FABabc	C	pos.	125	0.966	A	Withstood 15 Impulses	041121
Qm open	FABabc	C	neg.	100	0.966	A	Waveform 1.20/ 49.12 µs	041121
Qm open	FABabc	C	neg.	125	0.966	A	Withstood 15 Impulses	041126
Qm open + Im open.								
Both open	F & Im + Qm ABCbc	a	pos.	100	0.965	A	Waveform 1.21/ 49.57 µs	041228
Both open	F & Im + Qm ABCbc	a	pos.	125	0.965	A	Withstood 15 Impulses	041233
Both open	F & Im + Qm ABCbc	a	neg.	100	0.965	A	Waveform 1.22/ 49.74 µs	041234
Both open	F & Im + Qm ABCbc	a	neg.	125	0.965	A	Withstood 15 Impulses	041239
Both open	F & Im + Qm ABCac	b	pos.	100	0.965	A	Waveform 1.22/ 49.70 µs	041241
Both open	F & Im + Qm ABCac	b	pos.	125	0.965	A	Withstood 15 Impulses	041247
Both open	F & Im + Qm ABCac	b	neg.	100	0.965	A	Waveform 1.22/ 49.79 µs	041247
Both open	F & Im + Qm ABCac	b	neg.	125	0.965	A	Withstood 15 Impulses	041252
Both open	F & Im + Qm ABCab	c	pos.	100	0.965	A	Waveform 1.21/ 49.64 µs	041257
Both open	F & Im + Qm ABCab	c	pos.	125	0.965	A	Withstood 15 Impulses	041302
Both open	F & Im + Qm ABCab	c	neg.	100	0.965	A	Waveform 1.21/ 49.82 µs	041302
Both open	F & Im + Qm ABCab	c	neg.	125	0.965	A	Withstood 15 Impulses	041308

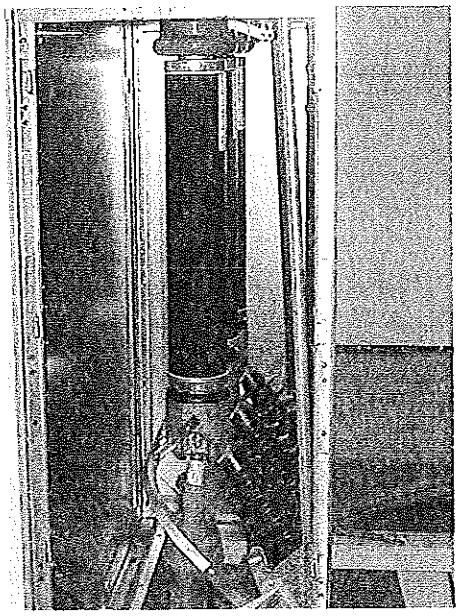
(1) **A** = The correction factor K has been **A**pplied **NA** = The correction factor K has **N**ot been **A**pplied
AK = The correction factor **K** = 0.950 has been **A**pplied (IEC 62271-1 (2007-10))

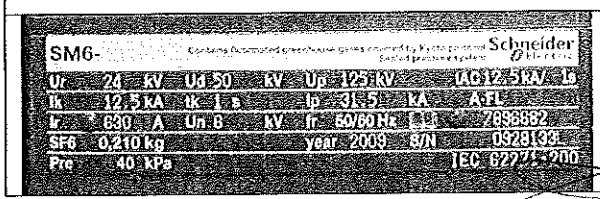
2093

10. TEST PHOTOGRAPHIES





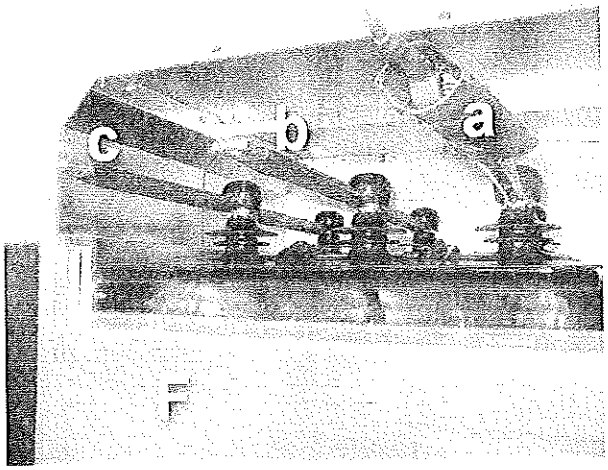


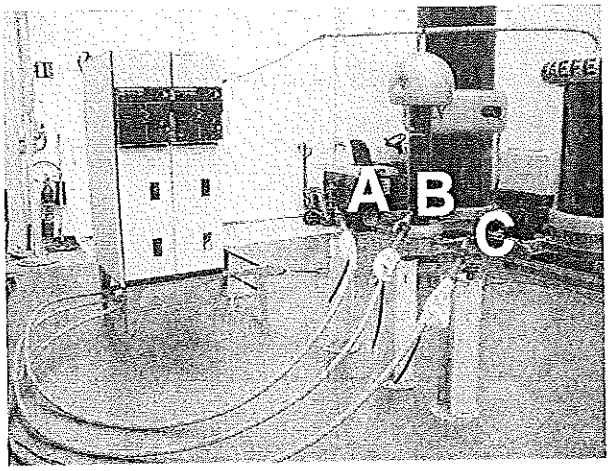


No identification picture available for Qm

2094

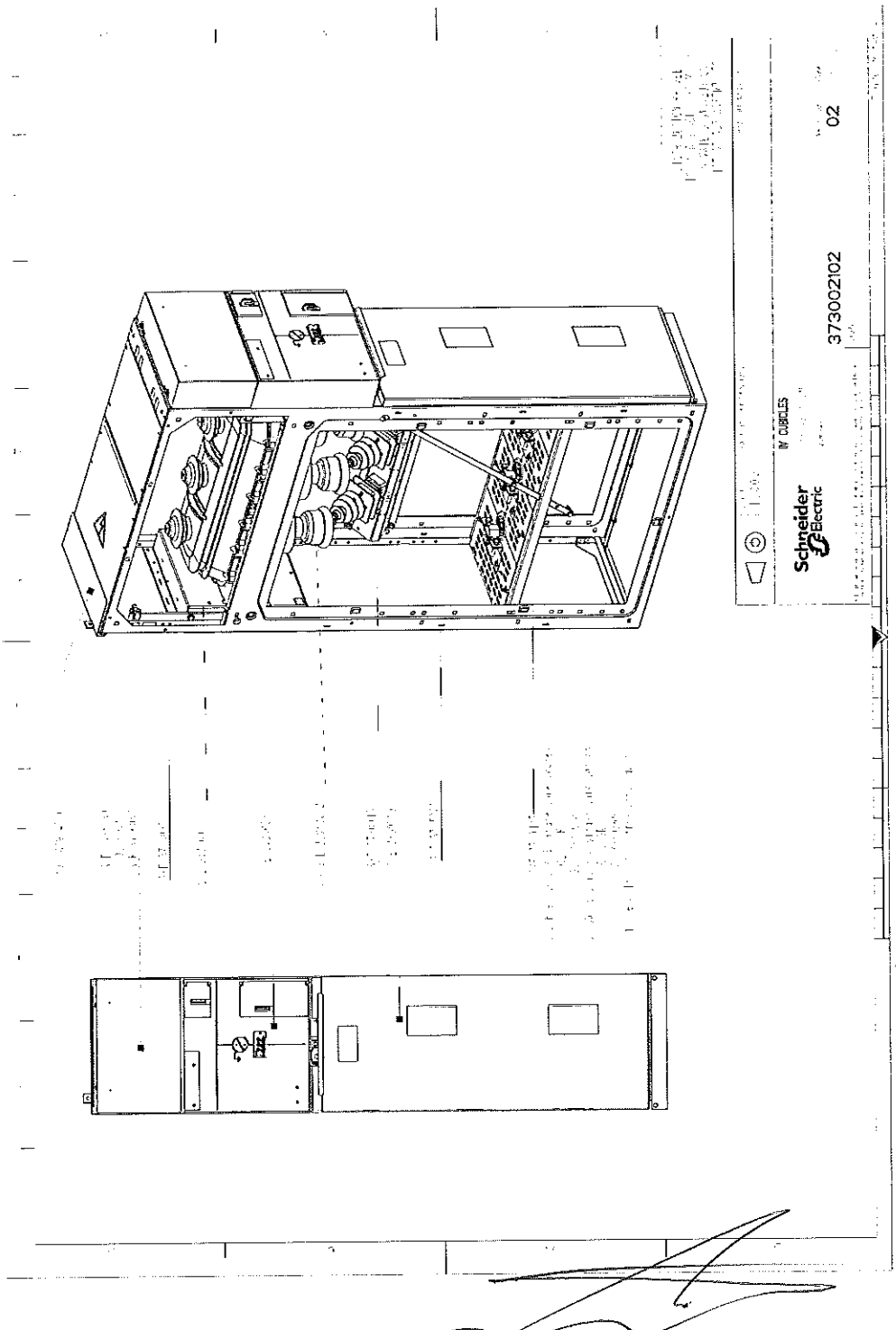
11. TERMINAL IDENTIFICATION





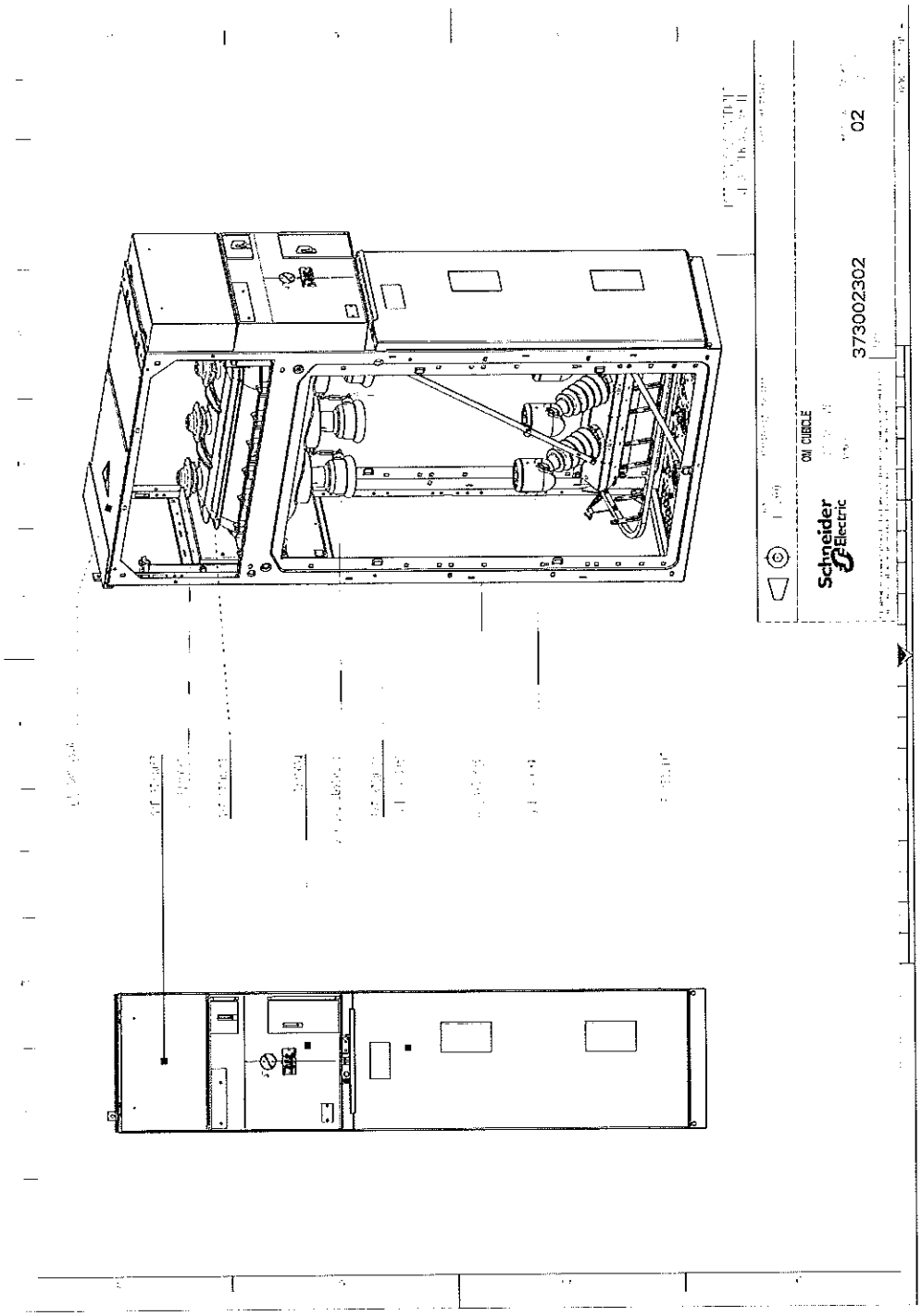
12. DRAWING

12.1. IM

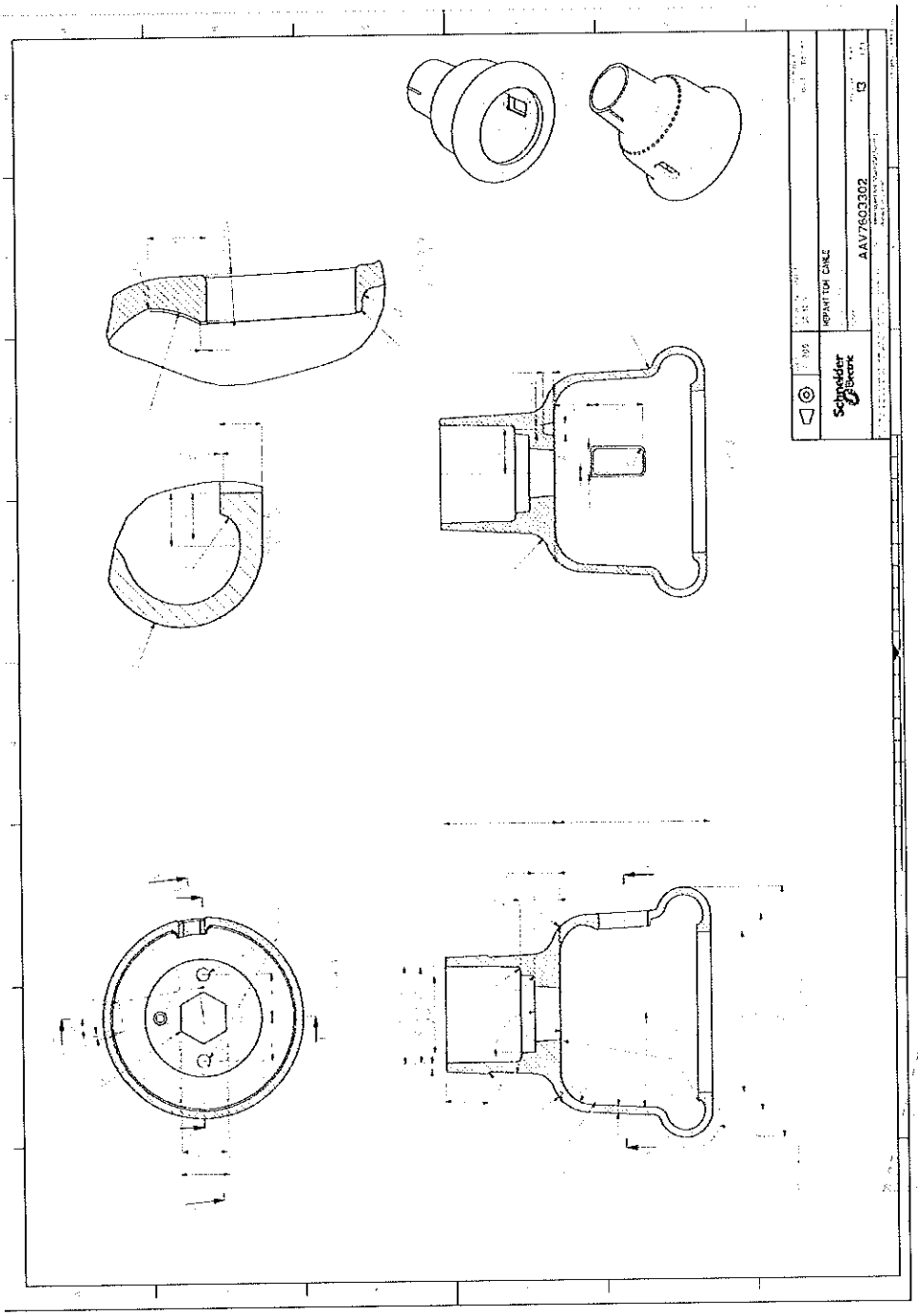


SM6 circuit-breaker IQ

12.2. QM



12.3. REPARTITOR (REF AAV7603302)



L2E Volta
Expertise and Testing Laboratory
Functional Laboratory
37, Quai Paul Louis Merlin
F-38050 Grenoble Cedex 9
Tél.: +33 (0)476 579 143
Fax: +33 (0)476 579 938

cofrac
ACCREDITATION N°1-0140 SCOPE COMMUNICATED ON REQUEST
ESSAIS

TEST REPORT 200902678_015

Delivered to : SCHNEIDER ELECTRIC
SCHNEIDER ELECTRIC INDUSTRIES SAS (FRANCE) POWER BUSINESS
31 rue Pierre Mendès-France, Eybens, 38050 GRENOBLE cedex 9

Tested equipment : **SM6 cubicles IM with two cables per phase**

Reference : Type - 24 kV - 630 A - 50 Hz

Manufacturer : SCHNEIDER ELECTRIC

Purpose of tests : proving of the dielectric withstand level of the cubicles with new cable repartitors (ref AAV7603302)
according to IEC 62271-200 (2003-11)

Tests performed : according to IEC 60060-1 (1989-11)+corrigendum 1 (1992-03), IEC 62271-1 (2007-10) standard and customers requirements for the following tests :

POWER FREQUENCY DRY TEST VOLTAGE	IEC 62271-200 (2003-11) Sub-Clause 6.2
TEST WITH LIGHTNING IMPULSE VOLTAGE	IEC 62271-200 (2003-11) Sub-Clause 6.2

Site of tests : VOLTA - FUNCTIONAL LABORATORY

Date of tests : the 2009/10/05

The report contains : 14 pages

Date of issue : 2010/02/23

Recipient: David Pellissier

Testing Manager

STEPHANE GIRAUD

Technical Manager

HUGO FRANCOISE

The performance of the apparatus tested and the results obtained are shown in the tables, oscillograms and photographs enclosed.
The responsibility for conformity of any apparatus having the same designation with that tested rests with the manufacturer.
This record of proving test shall only be reproduced in the complete form. The accreditation by the COFRAC Testing Section attests of the laboratory competence in the tests covered by the accreditation.

1. TABLE OF CONTENTS

2. CONCLUSIONS

The SM6 cubicles IM is considered satisfactory according to IEC 62271-200 (2003-11) Sub-Clause 6.2 and to the customer requirement.

Date of receipt of the device : The 2009/08/24

List of people having participated in tests Mr S. GIRAUD Functional laboratory
Mr

2100

3. RATINGS OF THE SWITCHGEAR

Apparatus	:	**Apparatus : SM6 cubicles IM with two cables per phase**
- type	:	**IM375 / 24 kV**
- serial number	:	**7896682**
- manufacturing year	:	**2009**
- number of poles	:	**3**
Manufacturer	:	**Schneider Electric Industries SA**
Rated voltage	:	**24 kV**
power frequency withstand voltage	:	**50 kV**
lightning impulse withstand voltage	:	**125 kV**
Rated frequency	:	**50 / 60 Hz**
Rated normal current	:	**630 A**
Drawing		**373002102 ind.02**

4. MOUNTING ARRANGEMENT

The switchgear is mounted according to the drawings n°373002102 ind.02 and 373002302 ind 02.

Refer to scheme page n°12 for terminal identificat ion.
Refer to pictures page n°11

2101

5. VALUES TO VERIFY

according to		**IEC 62271-1 (2007-10)**
Rated voltage level		**24 kV**
Power frequency dry test		
To earth	:	50kV 60 s
Across open switching device	:	50kV 60 s
Test with lightning impulse voltage		
To earth	:	125kV 15 impulses ±
Across open switching device	:	125kV 15 impulses ±

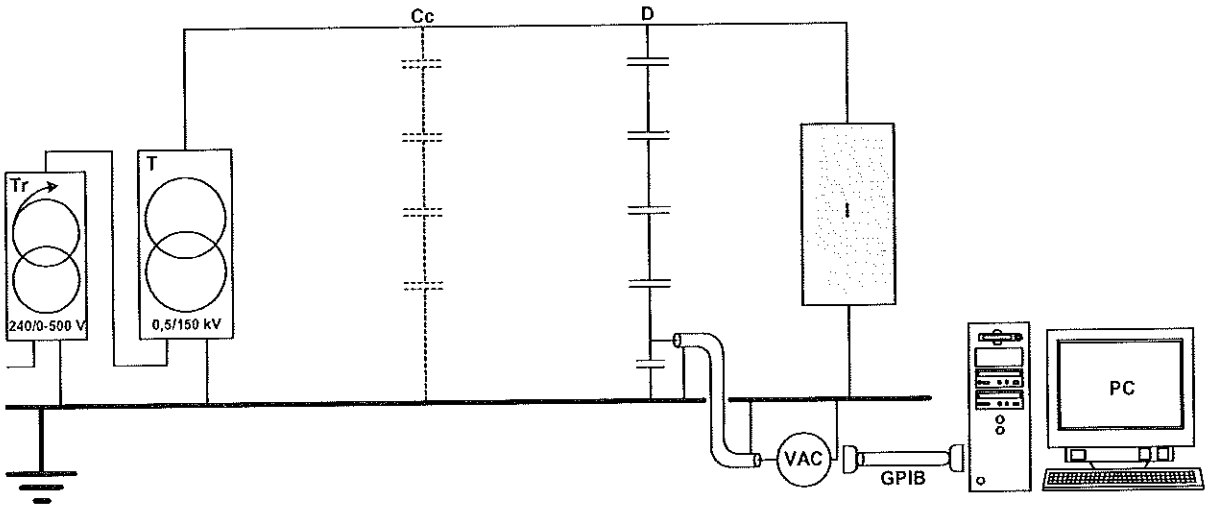
6. ATMOSPHERIC CONDITIONS

The correction factors K are calculated according to IEC 60060-1 (1989-11) Sub-Clause 11 standard.
Atmospheric conditions observed during the test :

date	b : hPa	t : °C	tw : °C	Ub : kV	L : m	Hu : g/m^3	K
05/10/2009	994	21.1	14.2	55	0.15	8.8	0.954
05/10/2009	993	21.2	14.4	138	0.12	9	0.959

7. TESTS CIRCUITS

7.1. POWER FREQUENCY

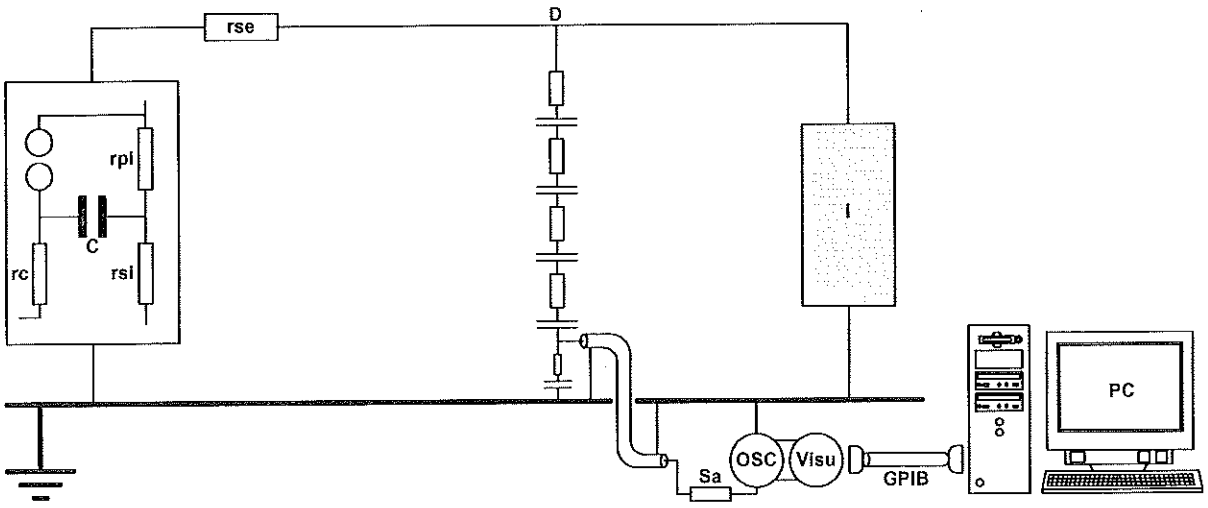


Tr	:	Regulating transformer 240/0-500V B. BONNEFOND 25685
T	:	High voltage step up transformer 0,5/150kV 50kVA HAEFELY WO 283398
D	:	Capacitive divider 50Hz 300kV 440pF HAEFELY WO 573398 n°MTC300
Cc	:	Loading capacitor
VAC	:	Multimeter >5.5D 2001.type AC Position KEITHLEY 0643802 n°KY936
PC	:	Computer + IC card GPIB NI-488-2 type
GPIB	:	Cable link GPIB IEEE-488
I	:	Test object

7.1.1. Uncertainty of measuring chains

Power frequency voltage measured with D :
The uncertainty of the measure is ± 2.7% (estimated confidence level not less than 95%)

7.2. LIGHTNING IMPULSE



Generator 8 stages 800kV 40kJ HAEFELY WO 514470
Values for each stage : C = 1,0µF, rc = 4,8kΩ, rpi = 68Ω, rpi = 12Ω, rse = 350Ω

D	:	Divider 800kV Ct = 670pF, Rt = 226,2Ω HAEFELY WO 514470 n°CS800-670F
OSC + Visu	:	Transient analyser Nicolet type ACCURA 100HV n°IDA0300169
Sa	:	Probe 10x Z = 10MΩ P5102 type TEKTRONIX n°Red
PC	:	Computer + IC card GPIB NI-488-2 type
GPIB	:	Cable link GPIB IEEE-488
I	:	Test object

7.2.1.Uncertainty of measuring chains

The uncertainty of the measure is ± 2.31% (estimated confidence level not less than 95%)Lightning impulse voltage measured with D :

8. TESTS PROCEDURES

8.1. APPLICATION OF TEST VOLTAGE

8.1.1.Switchgear closed

Test to earth and between poles :
Voltage is applied to one pole, the base and the other poles are earthed.

8.1.2.Switchgear open

Test to earth, between poles and across open switching device:
Voltage is applied successively to each terminal; the other terminals and the frame are earthed.

8.2. POWER FREQUENCY TEST

Withstand voltage test:
The specified voltage level is maintained for 60 s.

8.3. TEST WITH LIGHTNING IMPULSE VOLTAGE

Withstand voltage test:
15 impulses with the specified level are applied for both positive and negative polarities

9. TESTS RESULTS:

9.1. POWER FREQUENCY TEST

Test condition	Terminals connected to earth	Voltage applied to	Test voltage kV	Correction factor K	(1)	Results
open	FABCbc	a	50	0.954	A	Withstood 60 seconds
open	FABCac	b	50	0.954	A	Withstood 60 seconds
open	FABCab	c	50	0.954	A	Withstood 60 seconds
open	FBCabc	A	50	0.954	A	Withstood 60 seconds
open	FACabc	B	50	0.954	A	Withstood 60 seconds
open	FABabc	C	50	0.954	A	Withstood 60 seconds
closed	FBbCc	Aa	50	0.954	A	Withstood 60 seconds
closed	FAaCc	Bb	50	0.954	A	Withstood 60 seconds
closed	FAaBb	Cc	50	0.954	A	Withstood 60 seconds

(1) **A** = The correction factor K has been **A**pplied **NA** = The correction factor K has **N**ot been **A**pplied
AK = The correction factor **K** = 0.950 has been **A**pplied (IEC 62271-1 (2007-10))

2106

9.2. TEST WITH LIGTHTNING IMPULSE VOLTAGE

Test condition	Earth connected to	Voltage applied to	pol.	Voltage applied KV	Correction factor K	(1)	Results	Annex n°
							Waveform	
closed	FBbCc	Aa	pos.	100	0.959	A	1.27/ 47.91 µs	051238
closed	FBbCc	Aa	pos.	125	0.959	A	Withstood 15 Impulses	051242
							Waveform	
closed	FBbCc	Aa	neg.	100	0.959	A	1.28/ 48.14 µs	051242
closed	FBbCc	Aa	neg.	125	0.959	A	Withstood 15 Impulses	051246
							Waveform	
closed	FAaCc	Bb	pos.	100	0.959	A	1.29/ 48.02 µs	051251
							Waveform	
closed	FAaCc	Bb	pos.	100	0.959	A	1.27/ 48.02 µs	051258
closed	FAaCc	Bb	pos.	125	0.959	A	Withstood 15 Impulses	051302
							Waveform	
closed	FAaCc	Bb	neg.	100	0.959	A	1.29/ 48.15 µs	051303
closed	FAaCc	Bb	neg.	125	0.959	A	Withstood 15 Impulses	051307
							Waveform	
closed	FAaBb	Cc	pos.	100	0.959	A	1.28/ 48.02 µs	051308
closed	FAaBb	Cc	pos.	125	0.959	A	Withstood 15 Impulses	051316
							Waveform	
closed	FAaBb	Cc	neg.	100	0.959	A	1.28/ 48.19 µs	051317
closed	FAaBb	Cc	neg.	125	0.959	A	Withstood 15 Impulses	051321
							Waveform	
open	FBCabc	A	pos.	100	0.959	A	1.28/ 48.07 µs	051338
open	FBCabc	A	pos.	125	0.959	A	Withstood 15 Impulses	051342
							Waveform	
open	FBCabc	A	neg.	100	0.959	A	1.28/ 48.12 µs	051343
open	FBCabc	A	neg.	125	0.959	A	Withstood 15 Impulses	051347
							Waveform	
open	FACabc	B	pos.	100	0.959	A	1.28/ 47.99 µs	051402
open	FACabc	B	pos.	125	0.959	A	Withstood 15 Impulses	051406
							Waveform	
open	FACabc	B	neg.	100	0.959	A	1.28/ 48.14 µs	051407
open	FACabc	B	neg.	125	0.959	A	Withstood 15 Impulses	051411
							Waveform	
open	FABabc	C	pos.	100	0.959	A	1.27/ 47.98 µs	051421
open	FABabc	C	pos.	125	0.959	A	Withstood 15 Impulses	051425
							Waveform	
open	FABabc	C	neg.	100	0.959	A	1.28/ 48.19 µs	051426
open	FABabc	C	neg.	125	0.959	A	Withstood 15 Impulses	051430

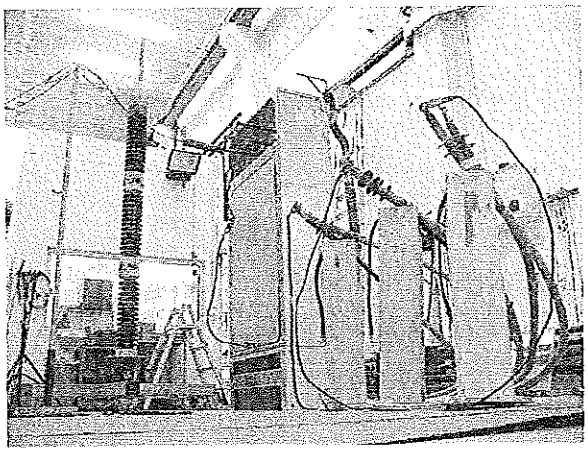
(1) **A** = The correction factor K has been **A**pplied **NA** = The correction factor K has **N**ot been **A**pplied
AK = The correction factor **K** = 0.950 has been **A**pplied (IEC 62271-1 (2007-10))

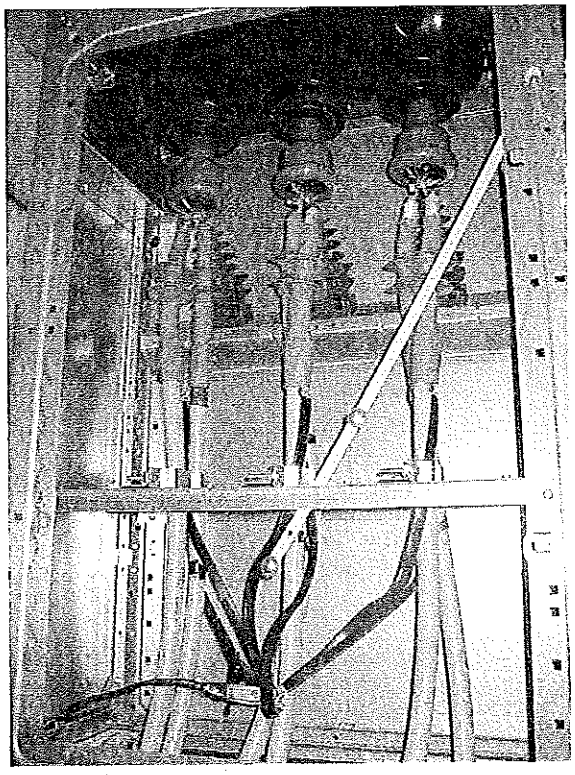
Test condition	Earth connected to	Voltage applied to	pol.	Voltage applied KV	Correction factor K	(1)	Results	Annex n°
							Waveform	
open	FABCbc	a	pos.	100	0.959	A	1.18/ 49.44 µs	051459
open	FABCbc	a	pos.	125	0.959	A	Withstood 15 Impulses	051503
							Waveform	
open	FABCbc	a	neg.	100	0.959	A	1.17/ 49.60 µs	051504
open	FABCbc	a	neg.	125	0.959	A	Withstood 15 Impulses	051508
							Waveform	
open	FABCac	b	pos.	100	0.959	A	1.17/ 49.51 µs	051519
open	FABCac	b	pos.	125	0.959	A	Withstood 15 Impulses	051523
							Waveform	
open	FABCac	b	neg.	100	0.959	A	1.18/ 49.62 µs	051524
open	FABCac	b	neg.	125	0.959	A	Withstood 15 Impulses	051528
							Waveform	
open	FABCab	c	pos.	100	0.959	A	1.18/ 49.67 µs	051530
open	FABCab	c	pos.	125	0.959	A	Withstood 15 Impulses	051534
							Waveform	
open	FABCab	c	neg.	100	0.959	A	1.18/ 49.59 µs	051534
open	FABCab	c	neg.	125	0.959	A	Withstood 15 Impulses	051538

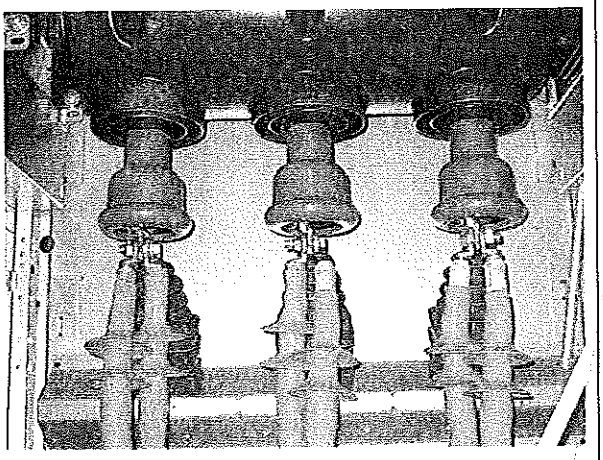
(1) **A** = The correction factor K has been **A**pplied **NA** = The correction factor K has **N**ot been **A**pplied
AK = The correction factor **K** = 0.950 has been **A**pplied (IEC 62271-1 (2007-10))

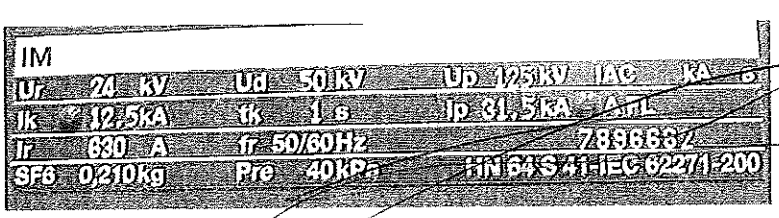
2108

10. TEST PHOTOGRAPHIES

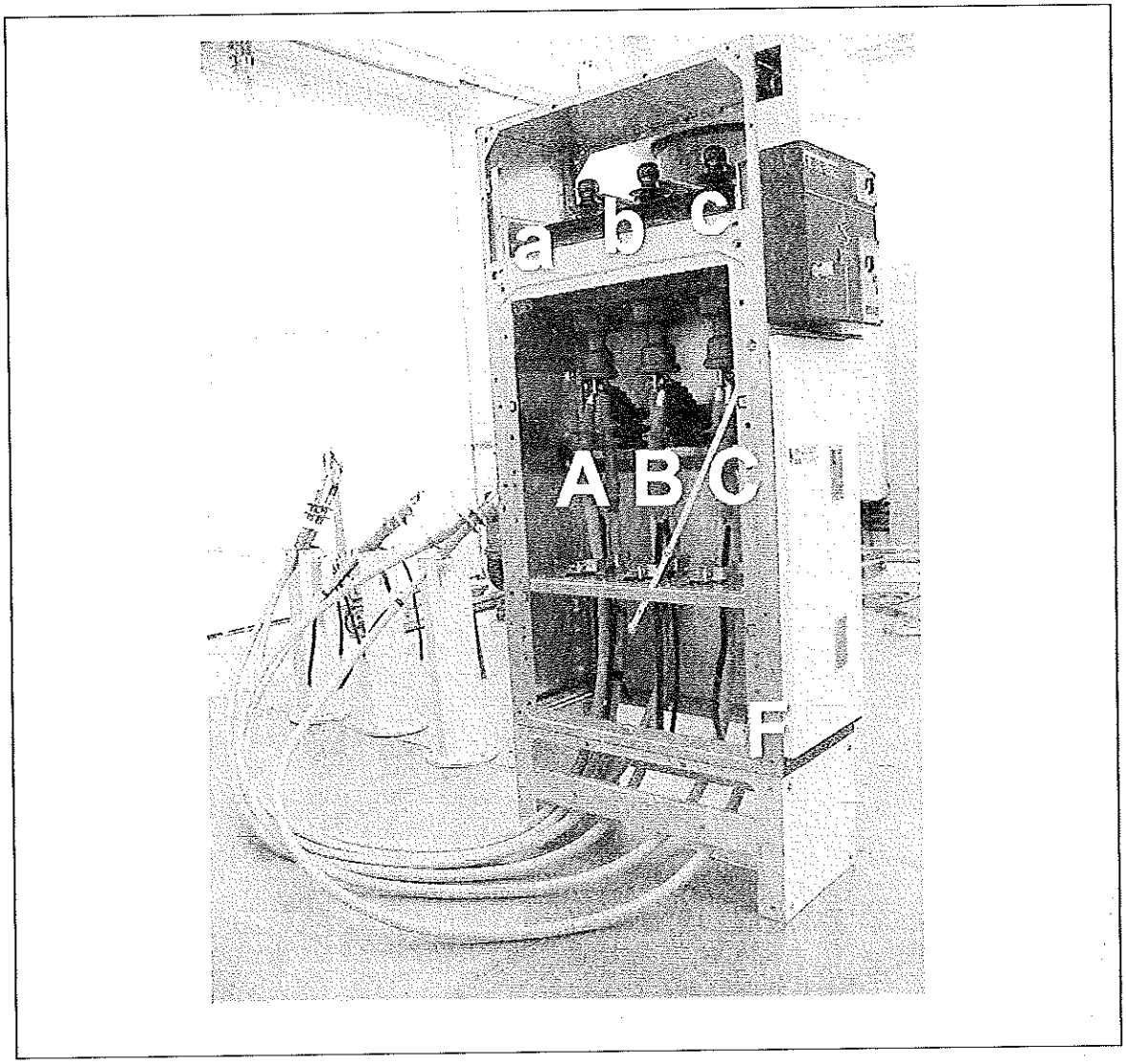






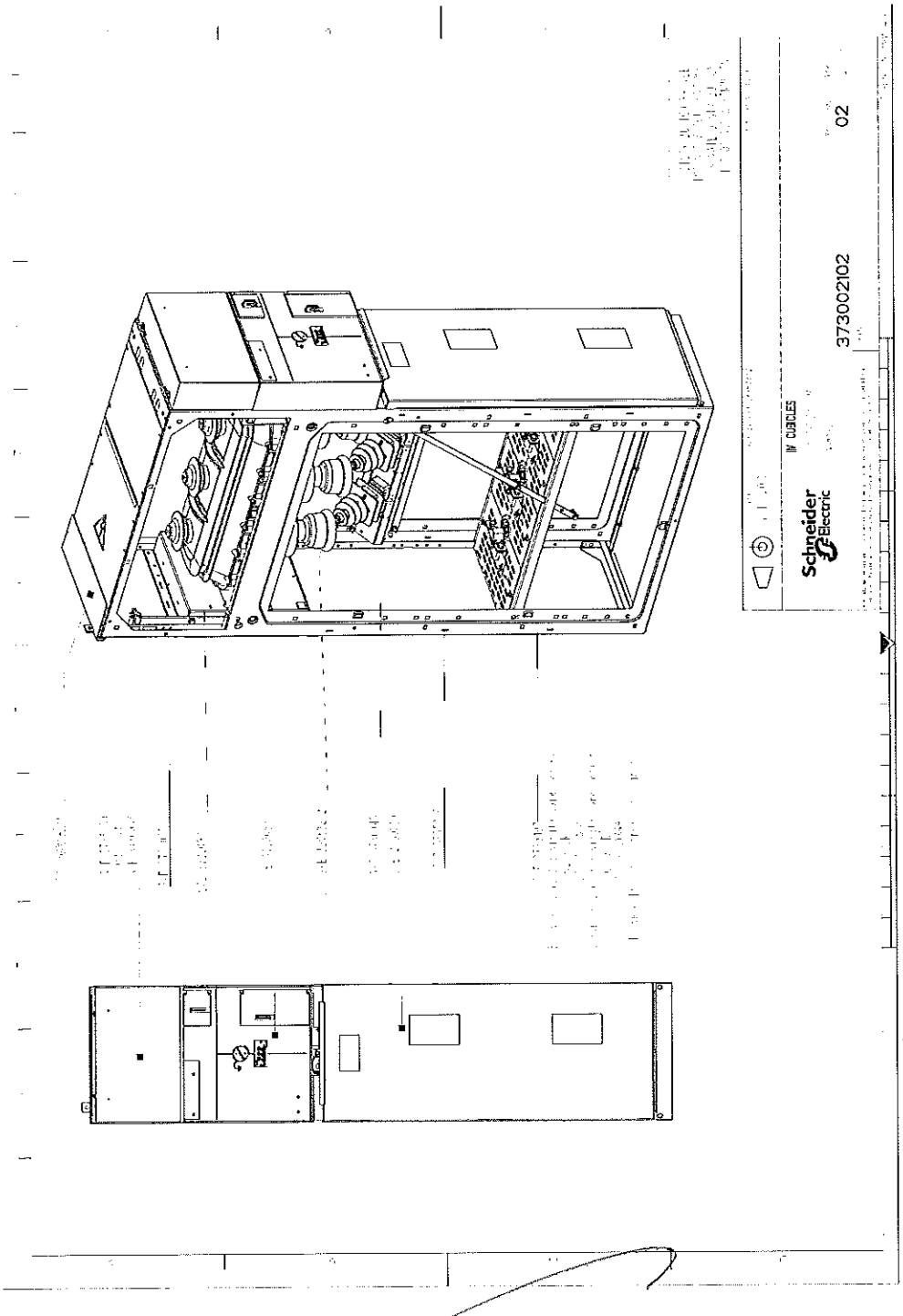


11. TERMINAL IDENTIFICATION

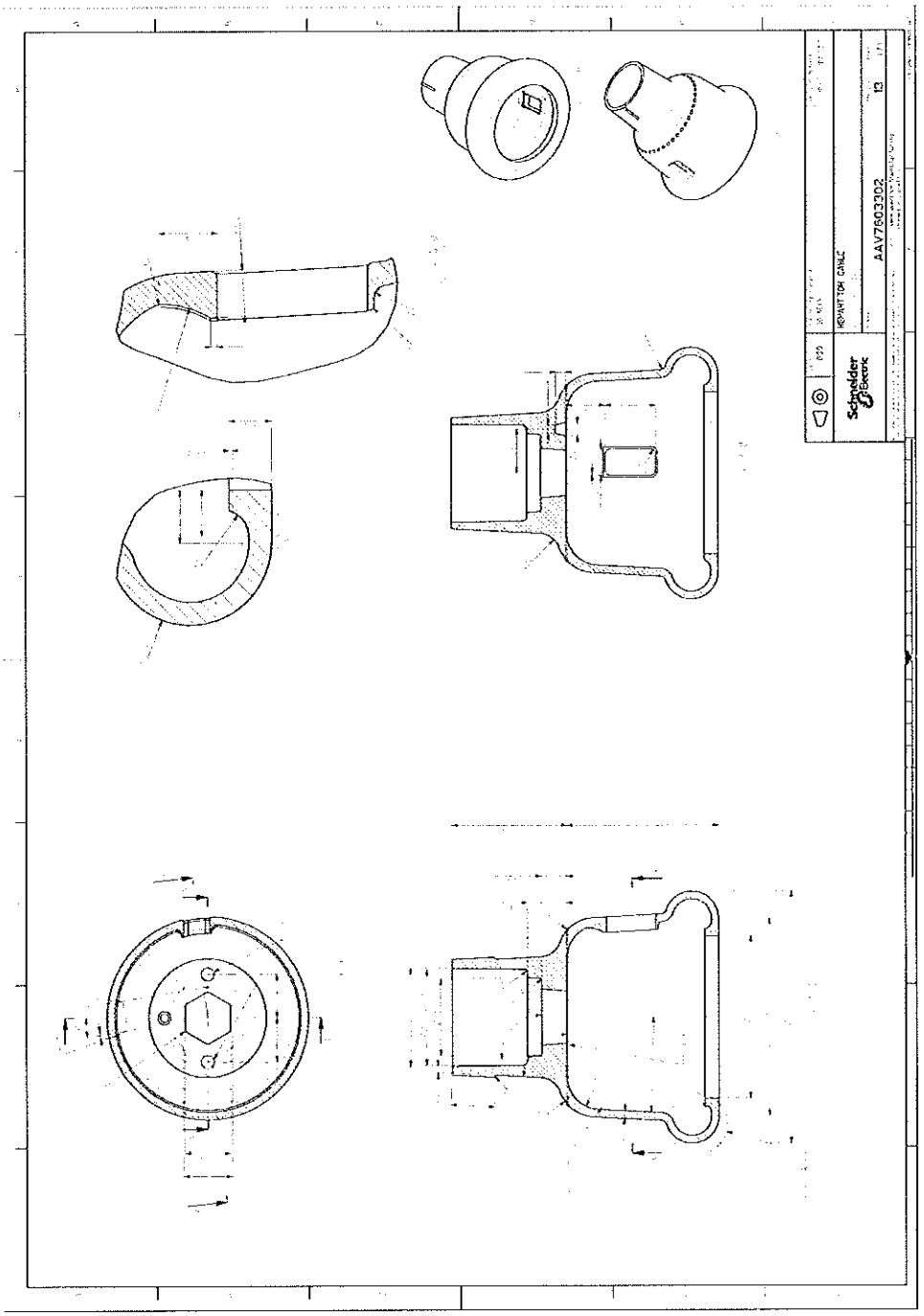


12. DRAWING

12.1. IM CUBICLE



12.2. REPARTITOR (REF AAV7603302)



LEMT

Schneider Electric
Power European Laboratory

cofrac ESSAIS
ACCREDITATION N° 1-0259
PORTÉE DISPONIBLE SUR WWW.COFRAC.FR

Laboratoire Essais Moyenne Tension
Schneider-Electric Industries SAS
ZAC Champ Saint Ange
F-38760 Varces

Test Report

N° TFR_200902678_019

To : David PELLISSIER

Objective

Temperature rise Test objective : Validation of the news deflector

Test

Starting date : 17/05/2010 Completed date : 20/05/2010

Test performed : Temperature rise test at 630 A three-phase 50 Hz

Standards : CEI 62271-200

Items tested

Apparatus : SM6 24 – modulars switchboard 24 KV

Designation : **Schneider Electric** SM6
Manufacturer : Schneider Electric SA – Rueil Malmaison - FRANCE
Items identification :

- Serial number : 0928133L / 0928159L / 0928135L
- Rated voltage (kV) : 24
- Rated normal current (A) : 630
- SF6 mass at *(Kg): 0,210*
- Drawing n°: 373002102 ind 02 / 373002302 ind 02
- AAV7747602 ind 12 / AAV7968502 ind 11

Samples : 1

Conclusion

Tests are in accordance with the standard IEC 62271-200

The performance of the apparatus tested and the results obtained are shown in the tables, oscillograms and photographs enclosed. This document relate only to the items presented for testing.
To declare, or not, the accordance to the specification, the results uncertainties are not taken into account.

Dept:	LEMT 38V	Technical manager :
Test leader	**Izzo Pasquale**	
Number of pages :	12	
Approval date :	26/05/2010	B. VANDENBERGUE

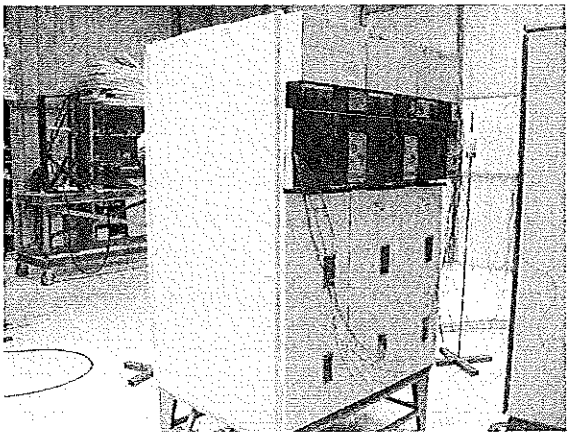
Schneider Electric

CONTENT

Schneider Electric

1 PRODUCT DESCRIPTION

1.1 Sampling :



1.2 Detailed description of the item tested :

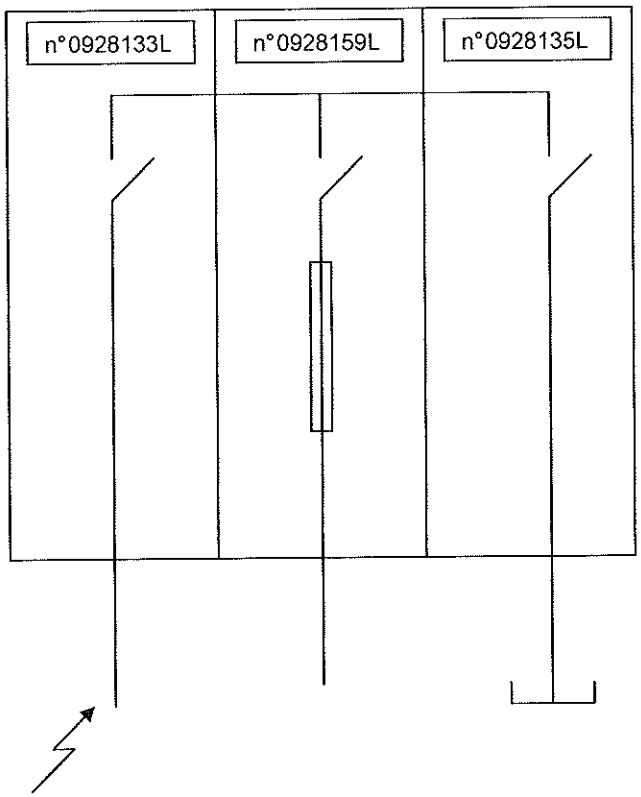
SWICHT:

Manufacturer		:	Schneider Electric Industries SA
Designation		:	Schneider Electric **IM375**
Number of poles		:	3
Phase to phase	**mm**	:	200
Rated voltage	**kV**	:	24
Lightning impulse withstand voltage	**kV**	:	125
Power frequency withstand voltage	**kV**	:	50
Frequency	**Hz**	:	50/60
Rated normal current	**A**	:	630
Short circuit making current	**kÂ**	:	31.5
Interrupting medium		:	SF6
SF6 mass at à 20℃	**Kg**	:	0,210
Drawing n°		:	373002102 ind 02

2 TEST DESCRIPTION

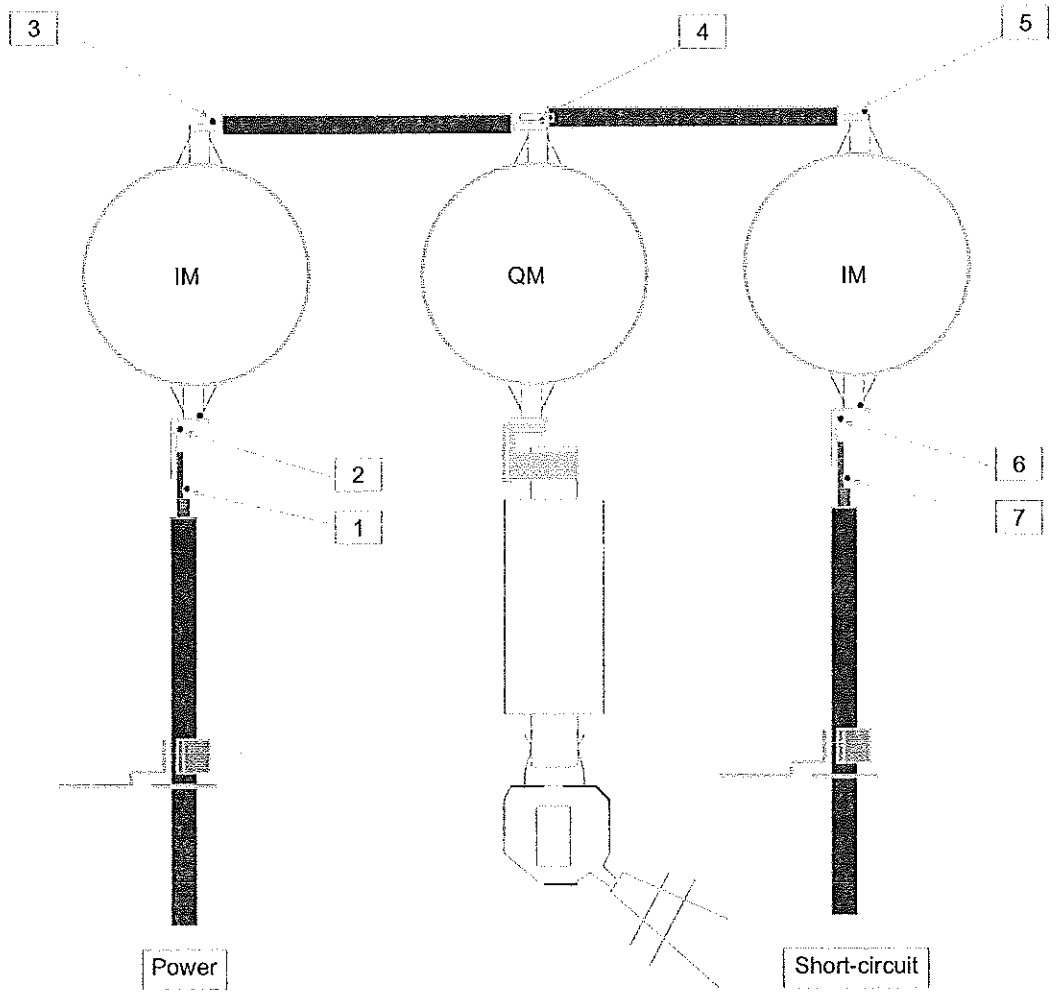
2.1 Specific test conditions :

- **The switchboard is connected with 1 Copper cable of 240 mm² per phase.**
- **A short-circuit is placed in end of the cables**
- **The thermocouples used are Copper-Constantan.**
- **Frequency : 50 Hz**
- **Air velocity : 0.1 m/s**



2.2 Detailed description of the tests :

- **Drawing of connections and thermocouples position :**



Schneider Electric

3 RESULTS

- **Measurement of the circuit resistance (I = 100 Adc) :**

  – **Before temperature-rise test :**

Measurement between	Phase 1 (µΩ)	Phase 2 (µΩ)	Phase 3 (µΩ)
1 / 7	159	166	166

  – **After temperature-rise test :**

Measurement between	Phase 1 (µΩ)	Phase 2 (µΩ)	Phase 3 (µΩ)
1 / 7	156	158	161

- **Values of the temperature rise at : 630 A**

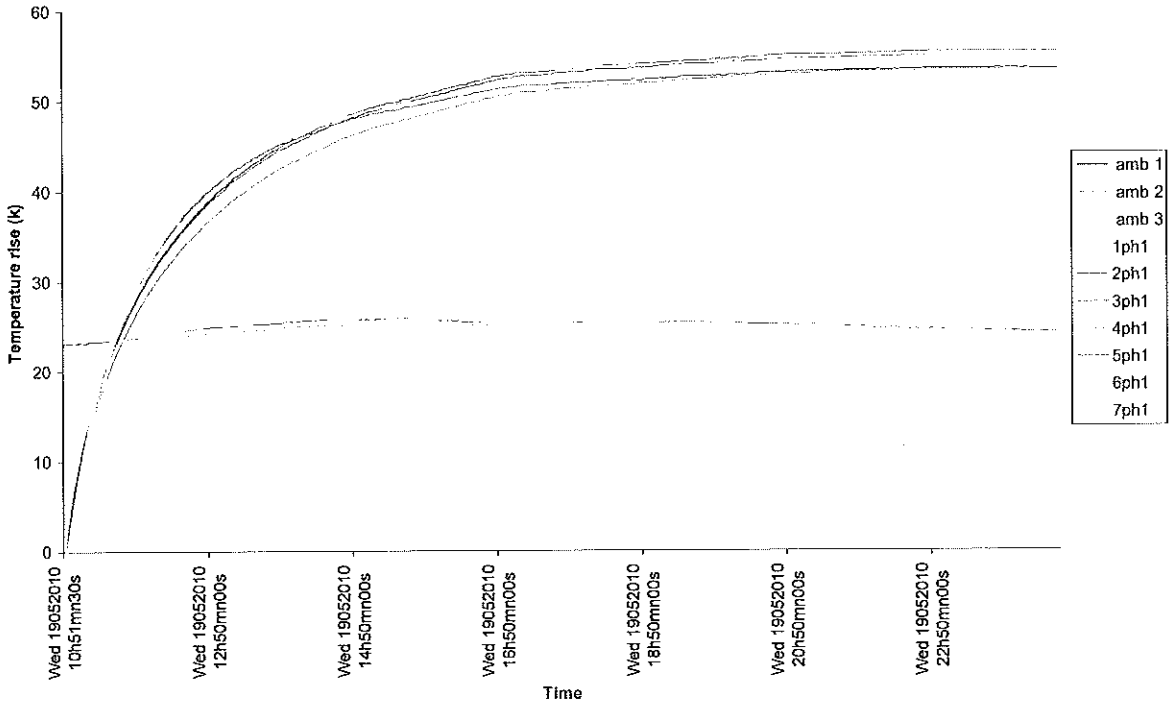
  - **Ambient temperature : 24,2 °C**

Thermocouple	Nature of the part : material, dielectric	Temperature rise (K)			Maximum Value (*)
		Phase 1	Phase 2	Phase 3	
1	Connection tin-coated in air	53.9	53.5	53.6	65
2	Point TG insulated	53.5	53.1	53.1	65
3	Point TG insulated	54.9	56.3	55.8	65
4	Connection tin-coated in air	53.3	54.8	54.5	65
5	Point TG insulated	55.3	56.6	57.4	65
6	Point TG insulated	53.8	56.9	54.9	65
7	Connection tin-coated in air	55	59.6	56.3	65

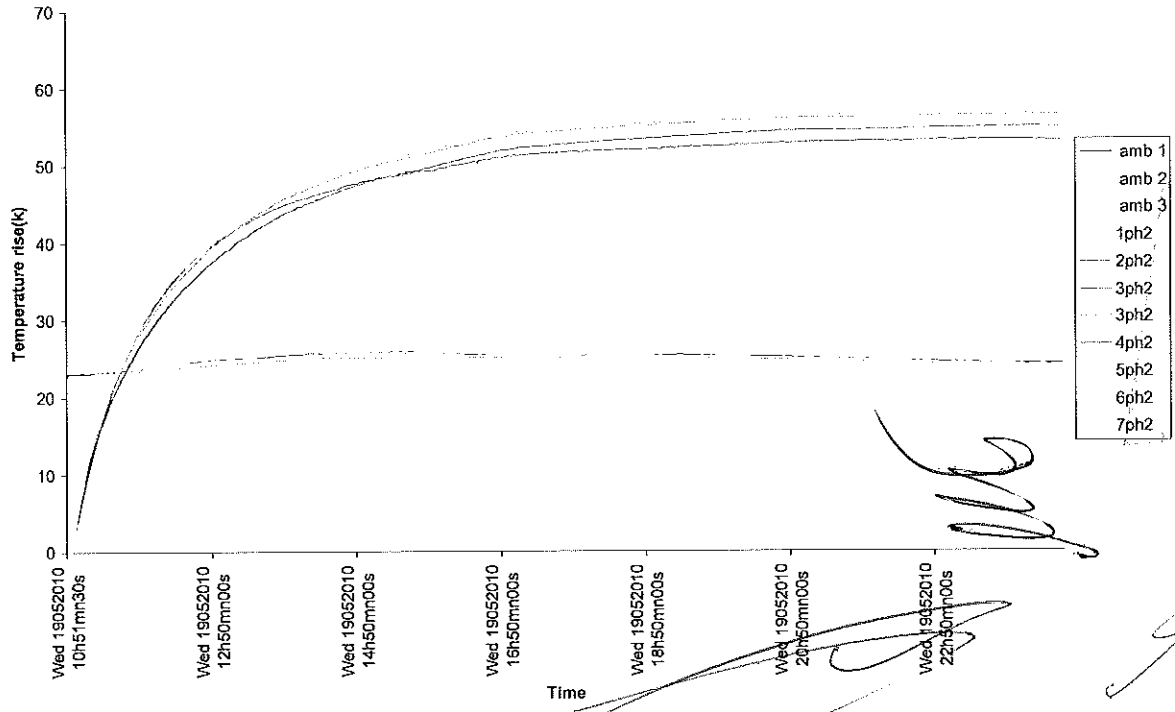
(*) : - Maximum value of the temperature rise at ambient air temperature not exceeding 40°C and for 50 Hz freq uency

4 OSCILLOGRAM

Phase 1 :

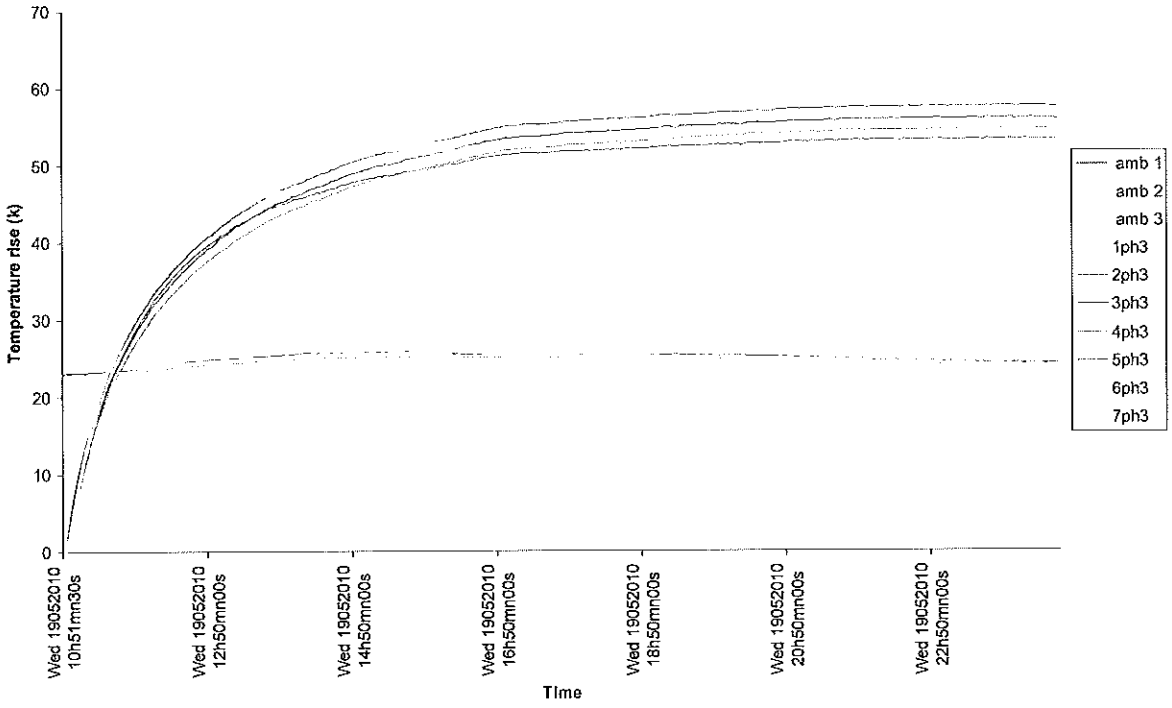


Phase 2 :

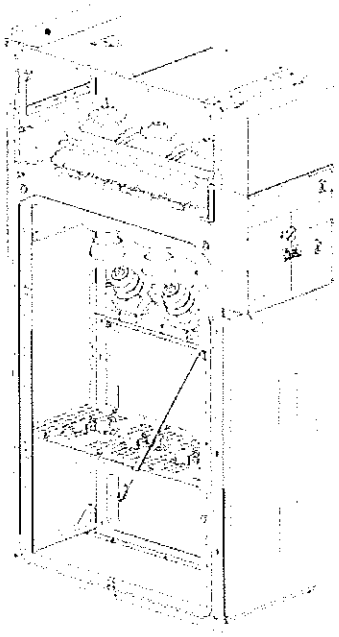


Schneider Electric

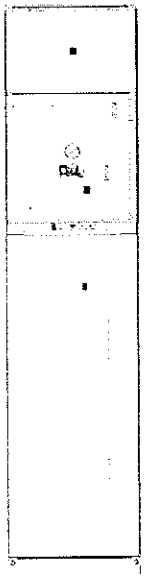
Phase 3 :

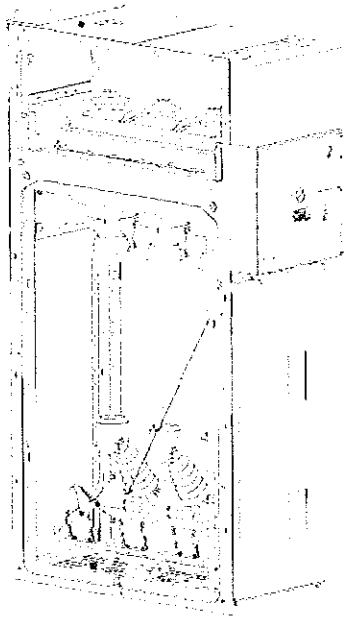


5 DRAWING

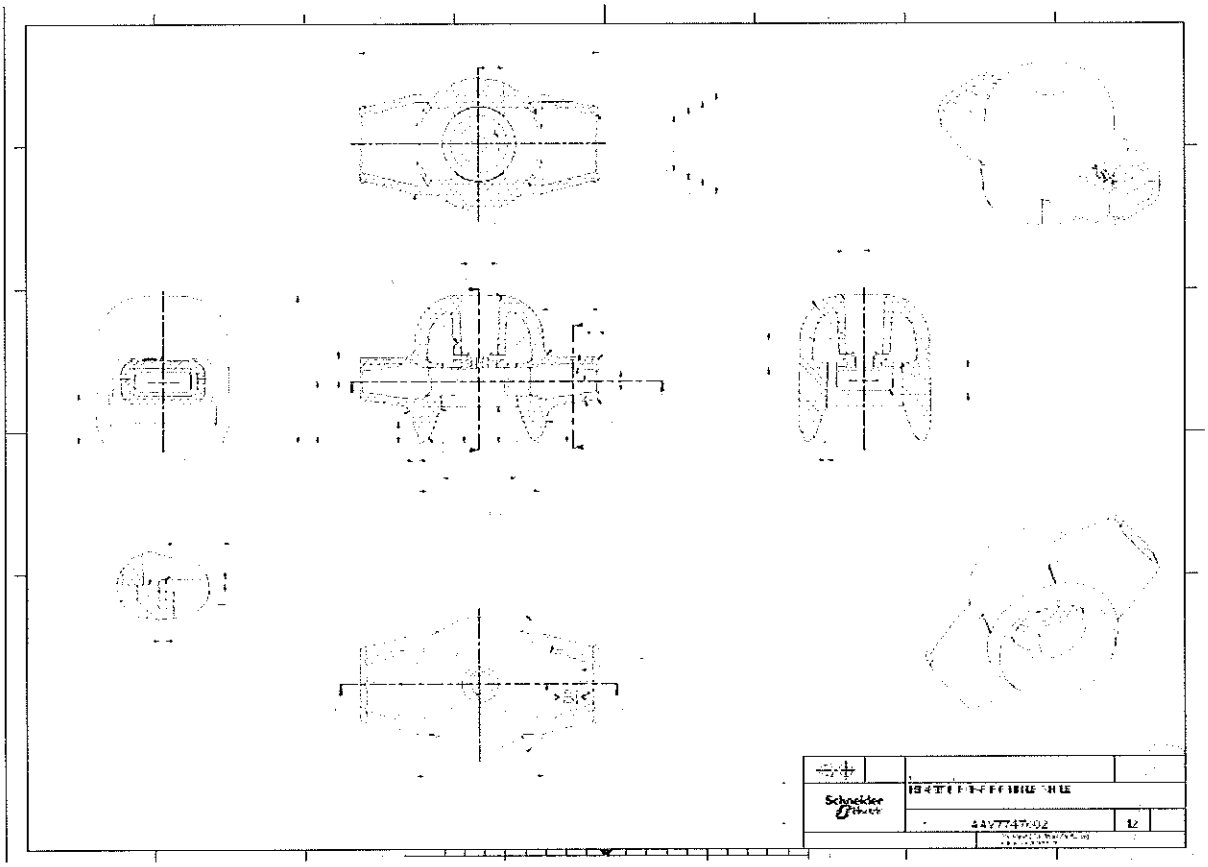


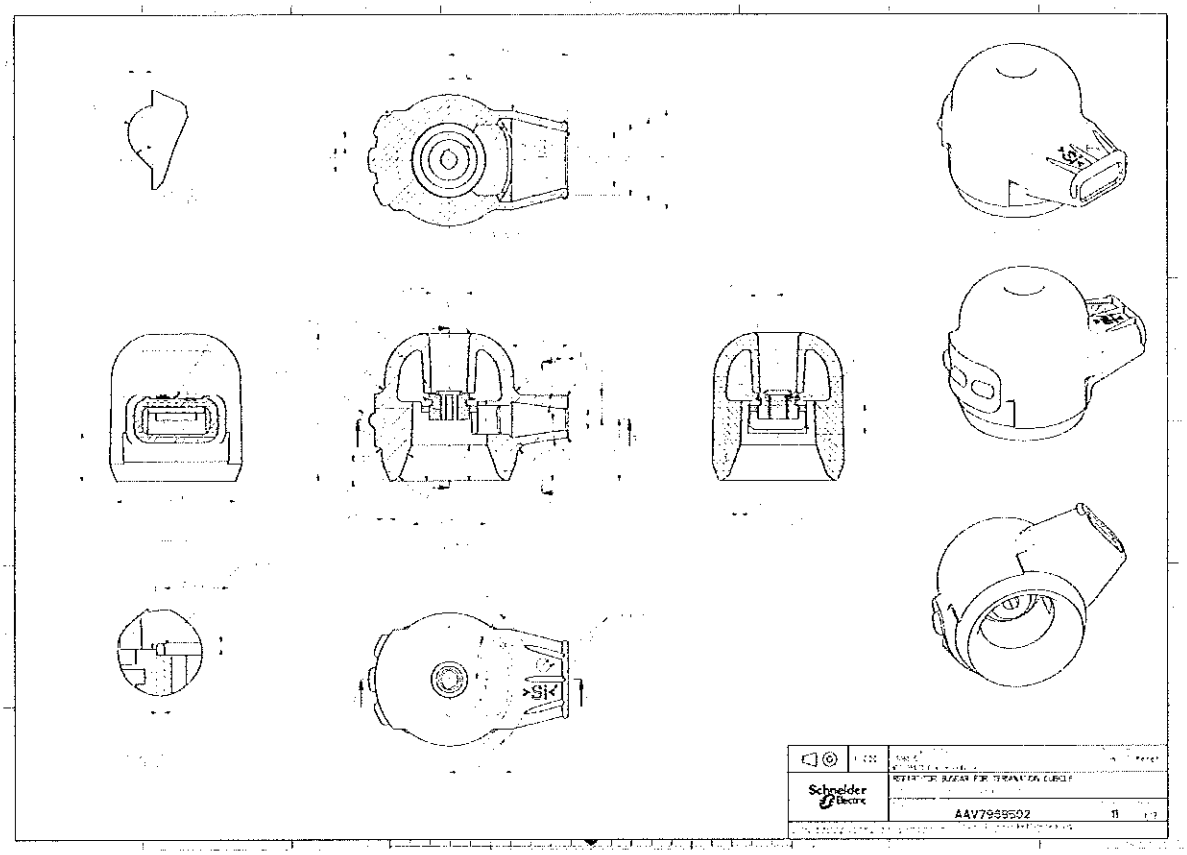
373002102 02





373002302 02




AAV79985O2

LEMT

Schneider Electric

Power European Laboratory

Laboratoire Essais Moyenne Tension
Schneider-Electric Industries SAS
ZAC Champ Saint Ange
F-38760 Varces

Test Report

N° TFR_20090903156_003

To : Serge PONS

Objective Dielectric test of the upper bus bar on a 6 enclosures combination.

Test

Starting date : 21/09/2009 Completed date : 24/09/2009

Test performed :
Power frequency : 65kV / 50 Hz 1min
Lightning impulse : 125kV

Standards : IEC 62271-200

Items tested

Apparatus : SM6

Designation : **Schneider Electric** SM6 electric panel composed by 6 functions :
IM – QM - DM1-A - DM1-A – IMB - GBC-A

Manufacturer : Schneider Electric SA – Rueil Malmaison - FRANCE
Items identification :

- Identification number : SM6386
- Rated voltage (kV) : 24
- Rated normal current (A) : 630
- Short-circuit breaking current (kA) : 25
- SF6 mass at *(Kg): 0,210*
- Drawing N°: 373002102 rev 01 – 373002302 rev 01 – 373121602 rev 01 373110602 rev 01 372984002 rev 01

Samples : 6

Conclusion **The upper bus bar dielectric test is conforme**

Dept:	LEMT 38V	Technical manager :
Test leader	**Pascal MARTIN**	
Number of pages :	**18**	
Approval date :	25/02/2010	B. VANDENBERGUE

The performance of the apparatus tested and the results obtained are shown in the tables, oscillograms and photographs enclosed. This document relate only to the items presented for testing.
This test report can only be copied as a photographic facsimile in its entirety.

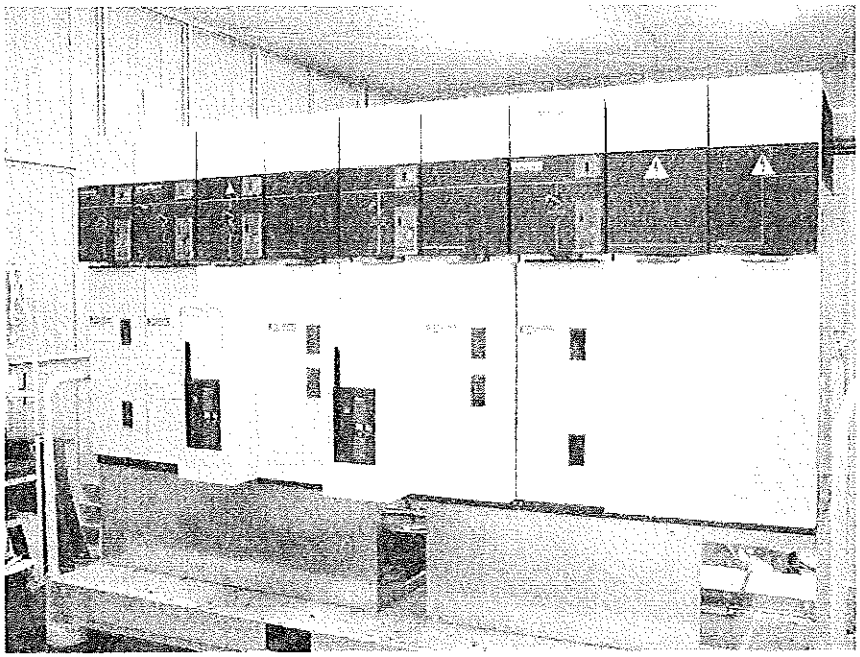
425

Schneider Electric

CONTENT

1 PRODUCT DESCRIPTION

1.1 Sampling :



1.2 Detailed description of the item tested :

Switch

Manufacturer		: Schneider Electric Industries SA
Designation		: Schneider Electric **SM6 IM - IMB**
Number of poles		: 3
Phase to phase	**mm**	: 200
Rated voltage	**kV**	: 24
Lightning impulse withstand voltage	**kV**	: 125
Power frequency withstand voltage	**kV**	: 65
Frequency	**Hz**	: 50/60Hz
Rated normal current	**A**	: 630
Short time withstand current	**kA**	: 25
Peak withstand current	**kÂ**	: 65
Duration of short circuit	**s**	: 1
Short circuit making current	**kÂ**	: 52
Interrupting medium		: SF6
SF6 mass at à 20°C	**Kg**	: 0,21
Operating mechanism type		: /
Degree of protection		: IP3X
Drawing n°		: IM: 373002102rev01 IMB: 373121602rev01

Switch

Manufacturer		: Schneider Electric Industries SA
Designation		: Schneider Electric **SM6 QM**
Number of poles		: 3
Phase to phase	**mm**	: 200
Rated voltage	**kV**	: 24
Lightning impulse withstand voltage	**kV**	: 125
Power frequency withstand voltage	**kV**	: 65
Frequency	**Hz**	: 50/60Hz
Rated normal current	**A**	: 200
Short time withstand current	**kA**	: 25
Peak withstand current	**kÂ**	: 65
Duration of short circuit	**s**	: 1
Short circuit making current	**kÂ**	: 52
Interrupting medium		: SF6
SF6 mass at à 20℃	**Kg**	: 0,21
Operating mechanism type		: /
Degree of protection		: IP3X
Drawing n°		: QM: 373002302rev01

2129

Disconnector :

Manufacturer		: Schneider Electric Industries SA
Designation		: Schneider Electric **IM – IMB - QM**
Number of poles		: 3
Phase to phase	**mm**	: 200
Rated voltage	**kV**	: 24
Lightning impulse withstand voltage		
- **To earth and between poles**	**kV**	: 125
- **Accross the isolating distance**	**kV**	: 145
Power frequency withstand voltage		
- **To earth and between poles**	**kV**	: 65
- **Accross the isolating distance**	**kV**	: 79
Frequency	**Hz**	: 50/60Hz
Rated normal current	**A**	: 630
Short time withstand current	**kA**	: 25
Peak withstand current	**kÂ**	: 65
Duration of short circuit	**s**	: 1
Short circuit making current	**kÂ**	: 52
Interrupting medium		: SF6
SF6 mass at à 20°C	**Kg**	: 0,21
Drawing n°		: IM: 373002102rev01
		QM: 373002302rev01
		IMB: 373121602 rev 01

2130

Disconnector :

Manufacturer		: Schneider Electric Industries SA
Designation		: Schneider Electric **DM1A**
Number of poles		: 3
Phase to phase	**mm**	: 200
Rated voltage	**kV**	: 24
Lightning impulse withstand voltage		
- **To earth and between poles**	**kV**	: 125
- **Accross the isolating distance**	**kV**	: 145
Power frequency withstand voltage		
- **To earth and between poles**	**kV**	: 65
- **Accross the isolating distance**	**kV**	: 79
Frequency	**Hz**	: 50/60Hz
Rated normal current	**A**	: 630
Short time withstand current	**kA**	: 25
Peak withstand current	**kÂ**	: 65
Duration of short circuit	**s**	: 1
Interrupting medium		: SF6
SF6 mass at à 20℃	**Kg**	: 0,21
Drawing n°		: DM1A: 372984002rev01

Dowstream earthing switch :

Manufacturer		: Schneider Electric Industries SA
Designation		: Schneider Electric **SM6 QM – DM1A**
Number of poles		: 3
Phase to phase	**mm**	: 200
Rated voltage	**kV**	: 24
Lightning impulse withstand voltage		
- **To earth and between poles**	**kV**	: 125
Power frequency withstand voltage	**kV**	: 65
Frequency	**Hz**	: 50/60Hz
Short time withstand current	**kA**	: 2
Peak withstand current	**kÂ**	: 5
Duration of short circuit	**s**	: 1
Short circuit making current	**kÂ**	: 5
Short circuit breaking current	**kÂ**	: 2
Drawing n°		: QM: 373002302rev01 DM1-A: 372984002rev01

Circuit breaker :

Manufacturer		: Schneider Electric Industries SA
Designation		: Schneider Electric **SM6 DM1-A**
Number of poles		: 3
Phase to phase	**mm**	: 250
Rated voltage	**kV**	: 24
Lightning impulse withstand voltage	**kV**	: 125
Power frequency withstand voltage	**kV**	: 65
Frequency	**Hz**	: 50/60Hz
Rated normal current	**A**	: 630
Short time withstand current	**kA**	: 25
Peak withstand current	**kÂ**	: 65
Duration of short circuit	**s**	: 1
Short circuit making current	**kÂ**	: 65
Short circuit breaking current	**kA**	: 25
Operating sequence		
C - 3mn - CO - 3mn – CO		: Yes
O - 0.3s - CO - 3mn - CO		: Yes
O - 0.3s - CO - 15s - CO		: Yes
Interrupting medium		: SF6
SF6 mass at à 20°C	**Kg**	: 0,336
Operating mechanism type		: RI
Supply Voltage		
- **Motor**	**V**	: 220
- **Opening**	**V**	: 220
- **Closing**	**V**	: 220
Drawing n°		: DM1A: 372984002rev01

2/33