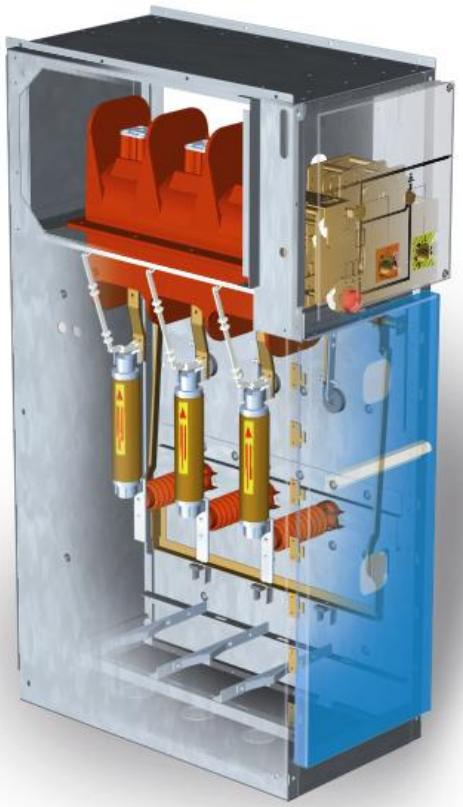
DF-2

MEDIUM VOLTAGE SWITCHGEAR

THE MODULAR CONCEPT



Transport Manual

SGC SwitchGear Company

MEDIUM VOLTAGE SWITCHGEAR, BUILT TO LAST

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PREFACE

About this manual

This document is intended as a reference for qualified and trained operators to transport the medium voltage switchgear in a safe and economical way.

The chapters and sections are numbered. The page numbers (consisting of the chapter number and the page number) and the document code can be found at the bottom of every page.

In the documentation the words “left”, “right”, “front” and “behind” are used to indicate a specific part of the medium voltage switchgear. The starting point of is always the position of the operator, standing in front of the medium voltage switchgear, facing the switchgear.

Pictograms and safety symbols in and on the medium voltage switchgear

Depending on the version, the following pictograms are used on the medium voltage switchgear:

WARNING
High Voltage Danger
Access to this cubicle is only allowed after this cubicle and both the directly adjacent cubicles (previous and next one) are voltage-free.

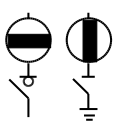
TIP OVER DANGER

Pictograms used in this manual

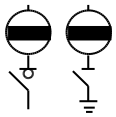
The following pictograms apply to the medium voltage switchgear transport documents:

CAUTION!
A procedure that can, if not carried out with the proper care, result in damage to the medium voltage switchgear, the surrounding area or the environment.

Notes, suggestions and advices



Make this cubicle, the next one and the previous cubicle, voltage free, before carrying out the work described.



Open the load break switch and the earthing switch before carrying out the work described in the manual.

Consult the indicated information sources first.

Protect the medium voltage switchgear from water or damp.

Related documentation

The following technical documentation for medium voltage switchgear is available:

- transport manual
- installation manual
- operation and maintenance manual
- brochure

Service en technical assistance

For information concerning specific settings, maintenance or repair work that is not mentioned here, please contact SGC nv - SwitchGear Company.

- When contacting SGC nv – Switchgear Company, always provide the following information:
  - Cubicle type and voltage
  - Serial number of the cubicle(s)
- See Identification of the cubicles.

Identification of the cubicles

Each medium voltage switchgear cubicle is fitted with a nameplate and a stamped serial number (fig. 0.02).

Range / Type: **Categorie:**		A	DF-2 + / DF-A + AA10 / AA20 / AA35
Serialnumber / **Year of construction:**			58397 / 2011
LBS / Earthing switch:			RV44 / EM20
U_r (U_p): 17,5 (95-110) kV		B	**U_d:** 38 kV
I_r: 800 A	**f_r:** 50 Hz		**Class:** E3
I_k: 25 kA	**I_p:** 63 kÂ		**t_k:** 1s
VDS range: 10-16 kV			**U_a:** 48 VDC
SF_6 bar abs. / m^3 / kg:		C	1,5 / 0,0173 / 0,157
Service continuity: **Type of partion:**			LSC2A PI
IAC:			AFLR-20kA-1s
IEC:			62271-102 62271-103 62271-200 62271-1 61243-5
User manual DF-2 NL/F: **Arc Killer DF-A NL/F:**			AG602101 / AG602201 AG646104 / AG646204

Fig 0.01

Name plate (fig 0.01)

A cubicle type
B voltage
C other technical specifications

Fig 0.02 A

Fig 0.02 B

Fig 0.02 C

Fig 0.02

Serial number

The stamped serial number (fig. 0.02A) is by default available on the front of the sidewall or on the horizontal wall, level with the front panel (fig. 0.02B), or on a label placed on the front side of the panel (fig. 0.02C). Sometimes the serial number is visible only after removing the front panel.

General safety directions and instructions

SGC nv - SwitchGear Company. does not accept any liability for damage or injury caused by not (strictly) following the safety directions and instructions, or by negligence during the transport of the medium voltage switchgear and its (possibly) additional options.
Always wear protection gloves and other specific individual protection means (to prevent possible cuts).
In case of any specific user circumstances, or in case of any additional, fitted options, extra safety instructions may be required. Please contact SGC nv - SwitchGear Company immediately if you encounter a potential danger during the transport of the medium voltage switchgear.

The owner / operator of the medium voltage switchgear is fully responsible at all times for observing the locally applicable safety instructions and guidelines.

Transportation manual

- Anyone who transports the medium voltage switchgear, must be familiar with the contents of the transportation manual, and follow the directions contained within very closely. The owner / operator must educate the users in accordance with the transport manual and he or she must obey all directions and instructions.
- Never change the order of the required actions.
- Always keep the transport manual close to the medium voltage switchgear.

Pictograms and safety symbols

The pictograms, symbols and instructions applied to the medium voltage switchgear are a part of the safety equipment. They may therefore not be covered or removed, and must be present and clearly readable throughout the entire life span of the medium voltage switchgear.

- Replace or repair unreadable or damaged pictograms, symbols and instruction immediately. Contact SGC nv - SwitchGear Company for replacements.

Operators

The execution of the work detailed herein (transport) is strictly reserved for trained and qualified operators, who are familiar with the dangers that may arise from transporting the material.

Technical specifications

- The technical specifications must not be changed.
- Modification of the medium voltage switchgear (or parts thereof) is not permitted.

Environmental conditions

The DF-2 cubicles have been designed for **indoor** installation if the following environmental conditions are met:

description	values
environmental temperature	min. -15°C / max. +45°C
relative air humidity (%)	min. 10% / max. 70% (without condensation)
installation altitude (m.a.s.l.)	max. 1000 m above sea level.

Consequently:

- Avoid storage in dusty rooms
- Avoid storage in rooms with a high level of relative air humidity
- Avoid storage in environment sensible to lightning
- Avoid storage in places where cubicles may be exposed to corrosive gases or fluids

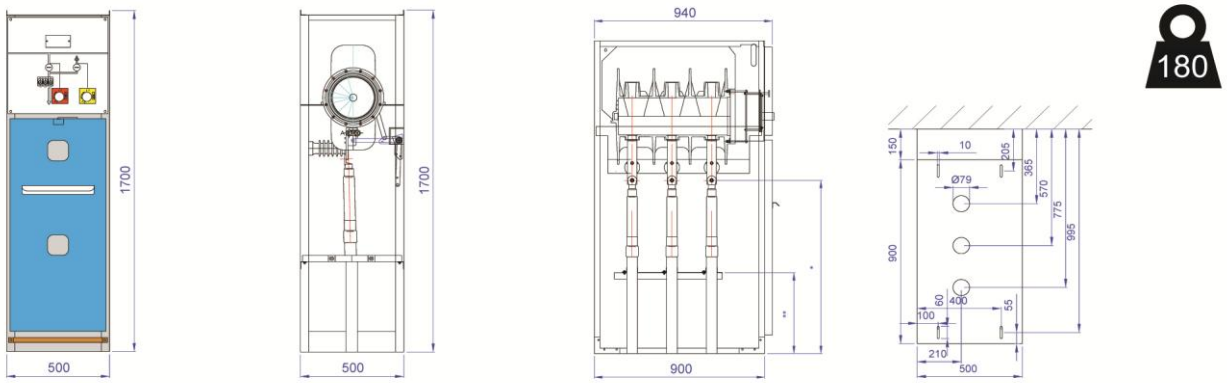
Contact SGC nv - SwitchGear Company if the cubicles need to be stored or installed in places where the required environmental conditions cannot be guaranteed.

Notes:

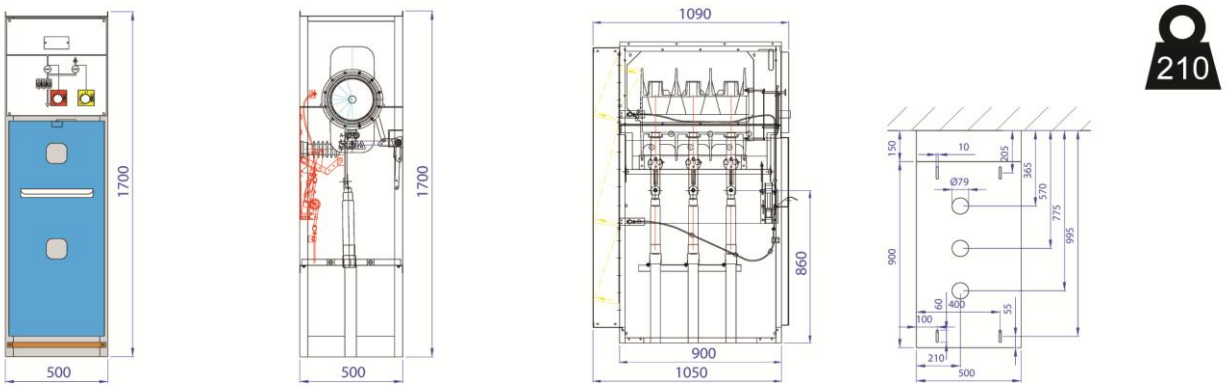
1 DIMENSIONS AND WEIGHTS

(All dimensions in mm, all weight specifications in kg.)

1.1 DF-A Cubicles



1.2 DF-A^{+} Cubicles



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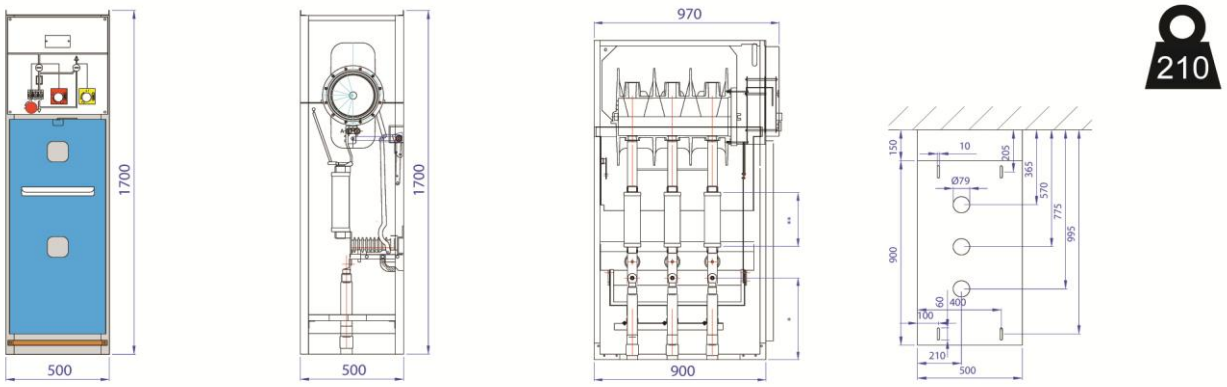
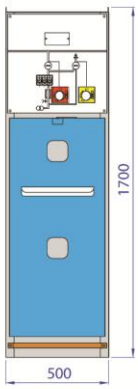
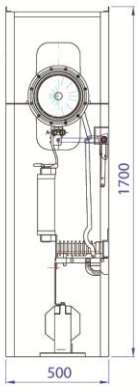
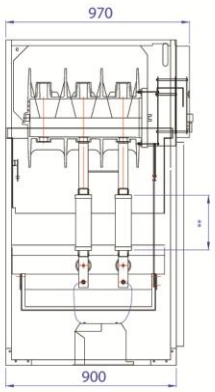
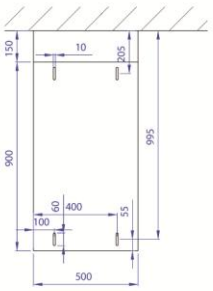


1.4 DF-AV Cubicles

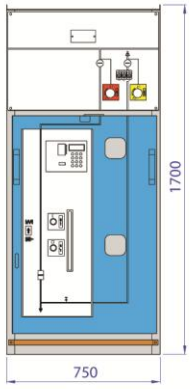


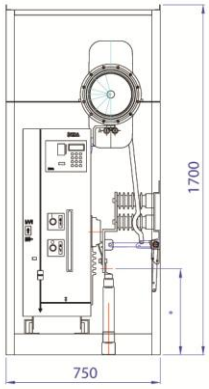


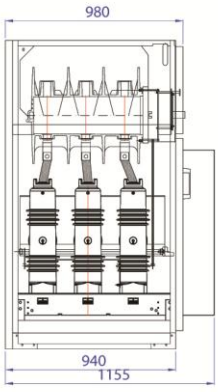


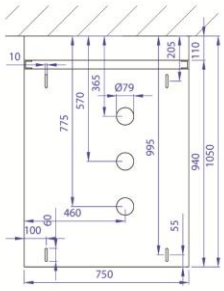


1.5 DF-D Cubicles

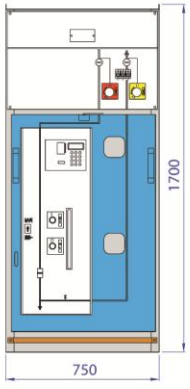


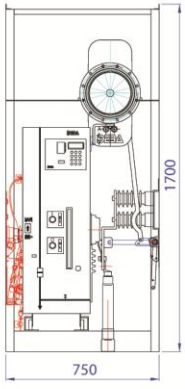


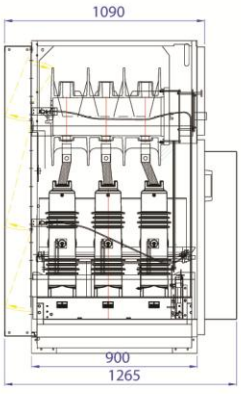


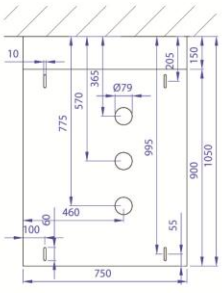


1.6 DF-D+ Cubicles









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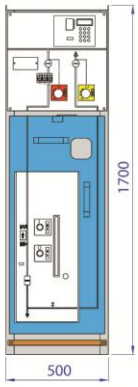
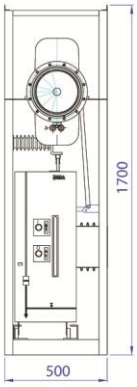
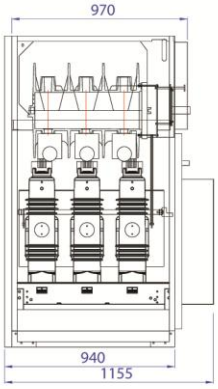
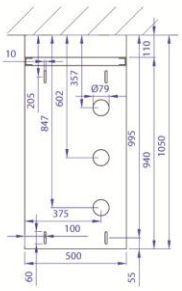
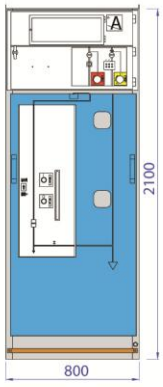


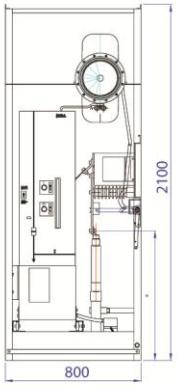


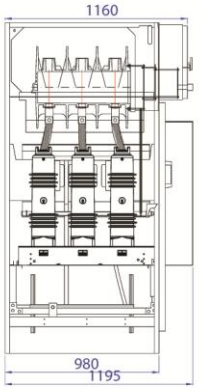


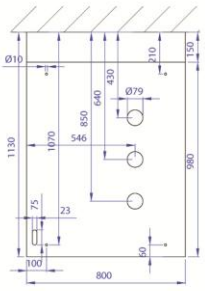


1.8 DF-EDN-D Cubicles

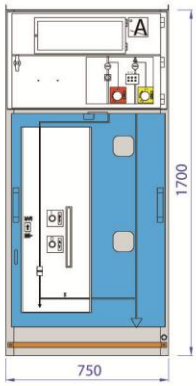


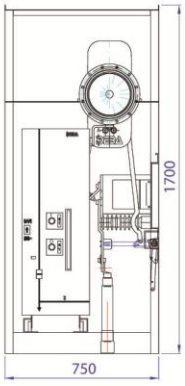


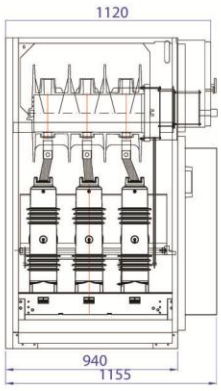


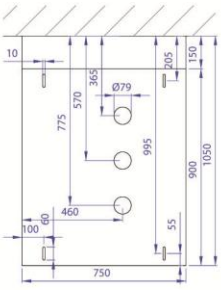


1.9 DF-D/EDN Cubicles









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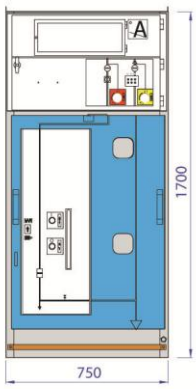
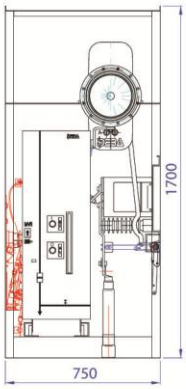
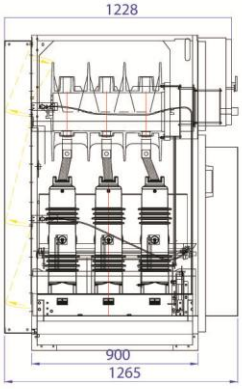
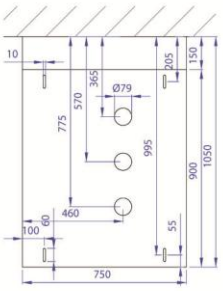
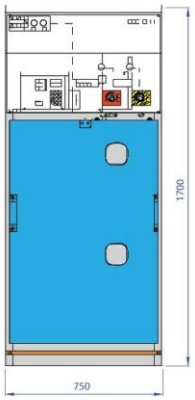


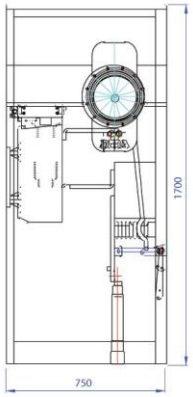


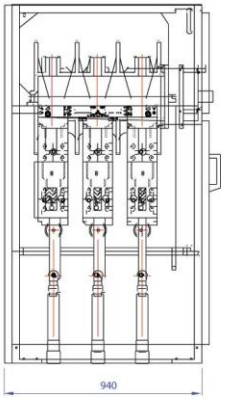


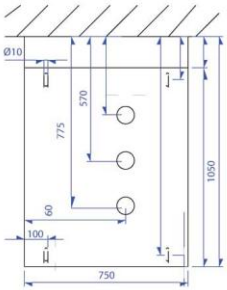


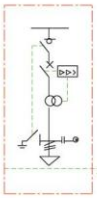
1.11 DF-DT Cubicles



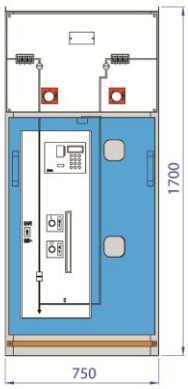


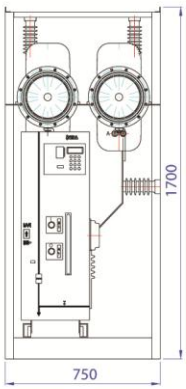


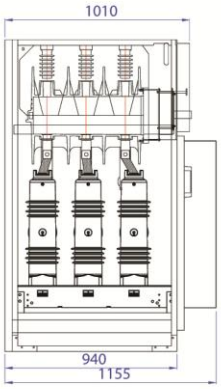


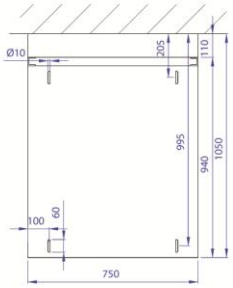


1.12 DF-AAD Cubicles









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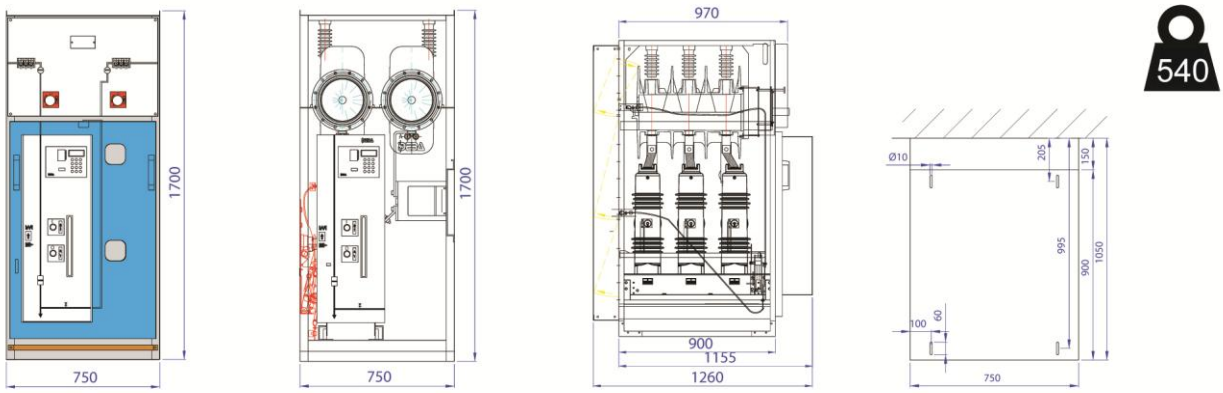
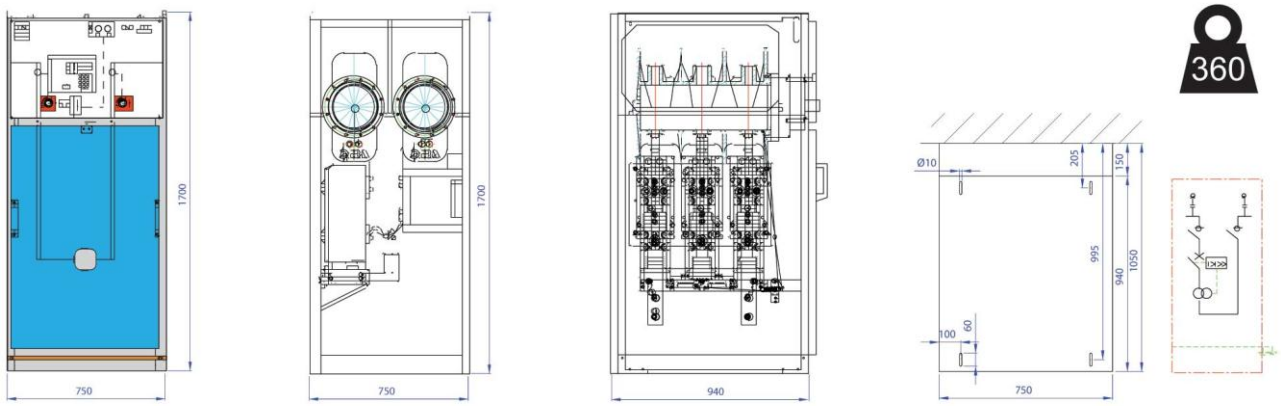
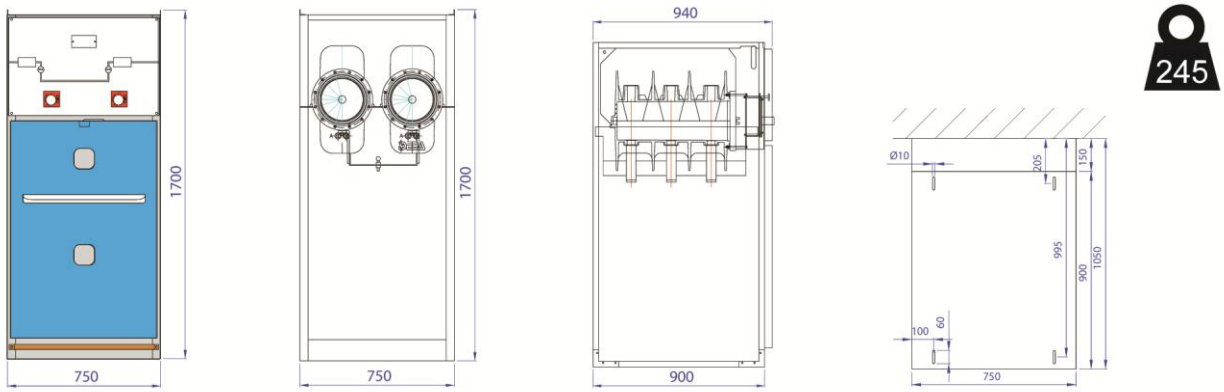


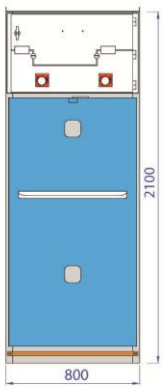
1.14 DF-AADT Cubicles

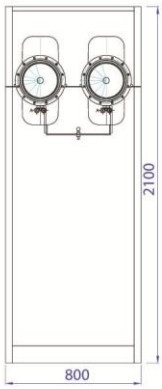


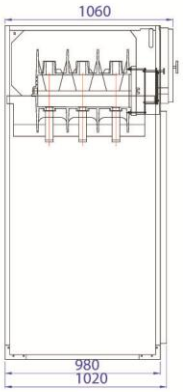
1.15 DF-LK Cubicles

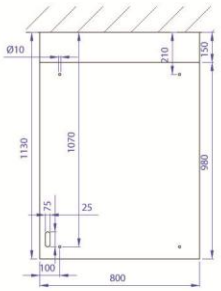


1.16 DF-EDN-LK Cubicles

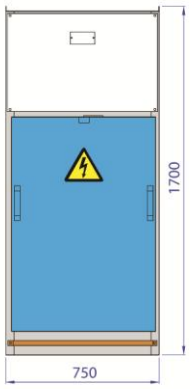


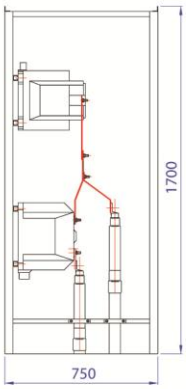


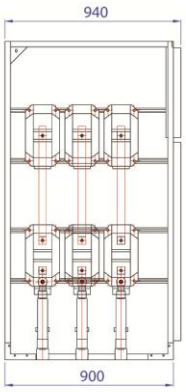


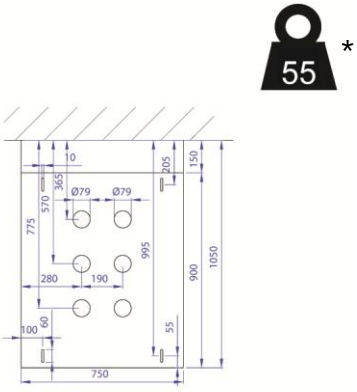


1.17 DF-C-750 Cubicles

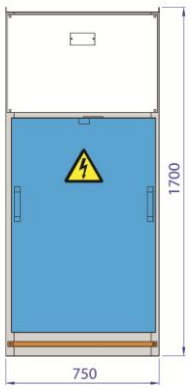


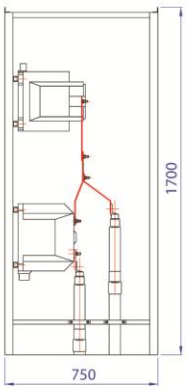


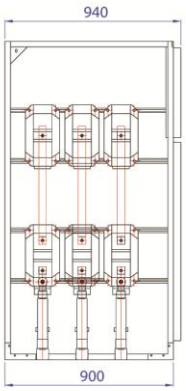


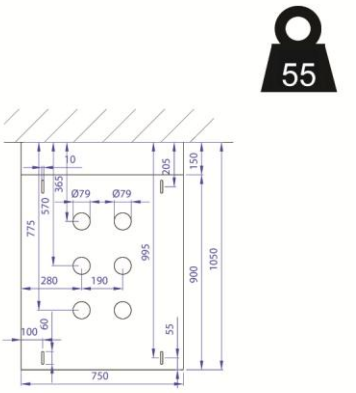


* The provided weight specification applies to a cell without equipment (power of voltage transformers).

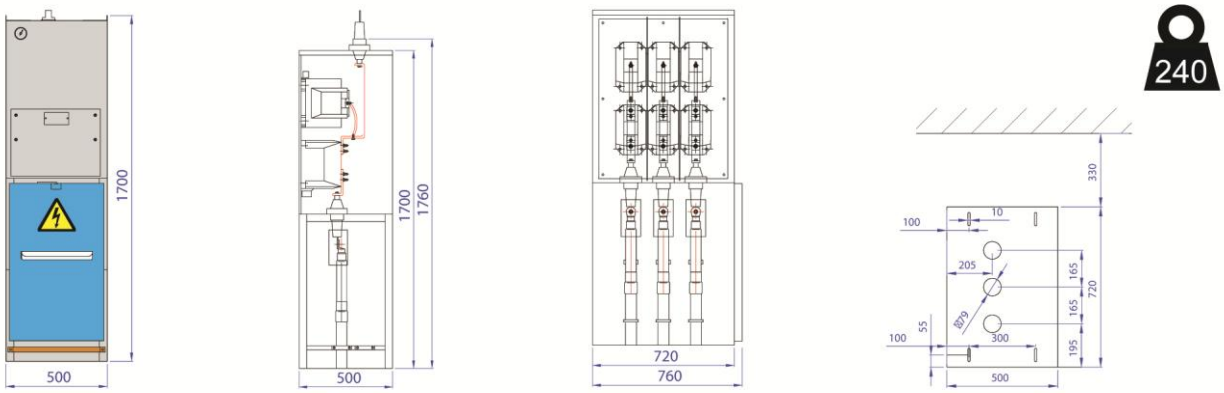


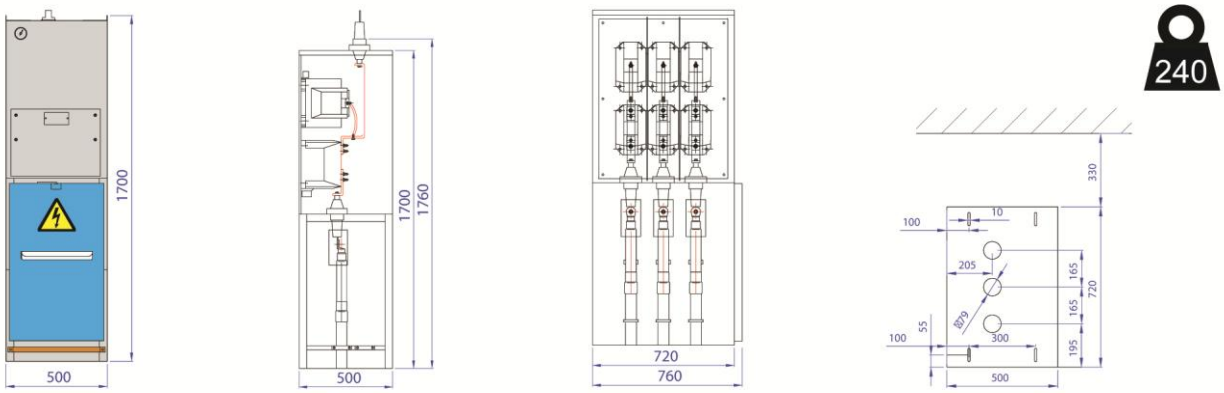




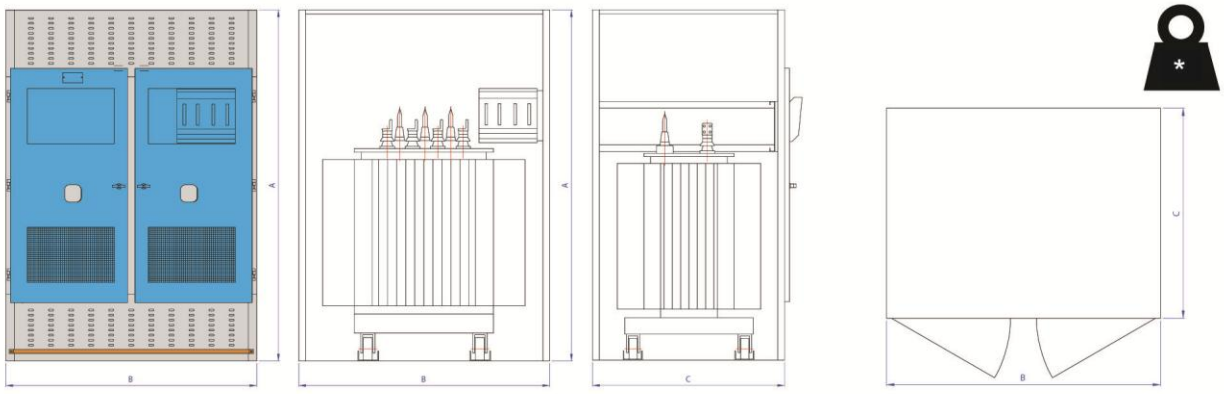


1.18 DF-C-500 Cubicles

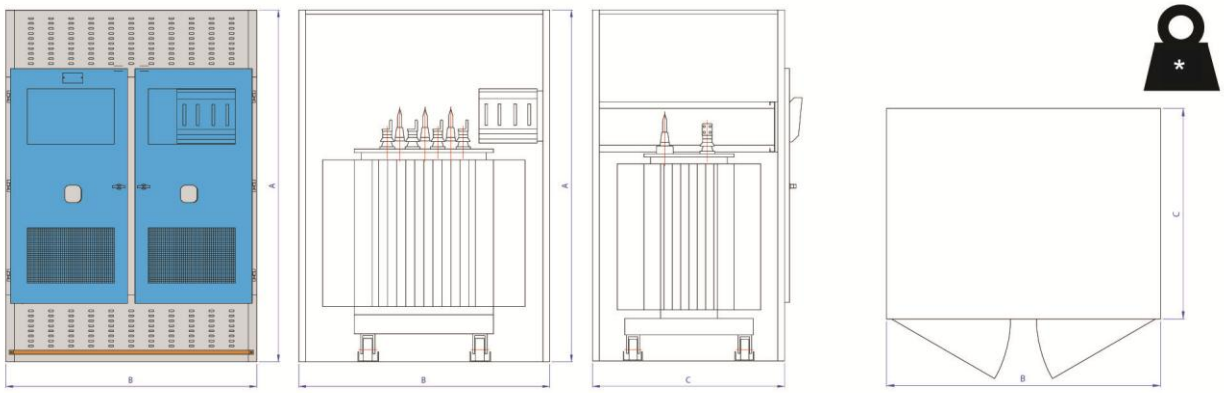




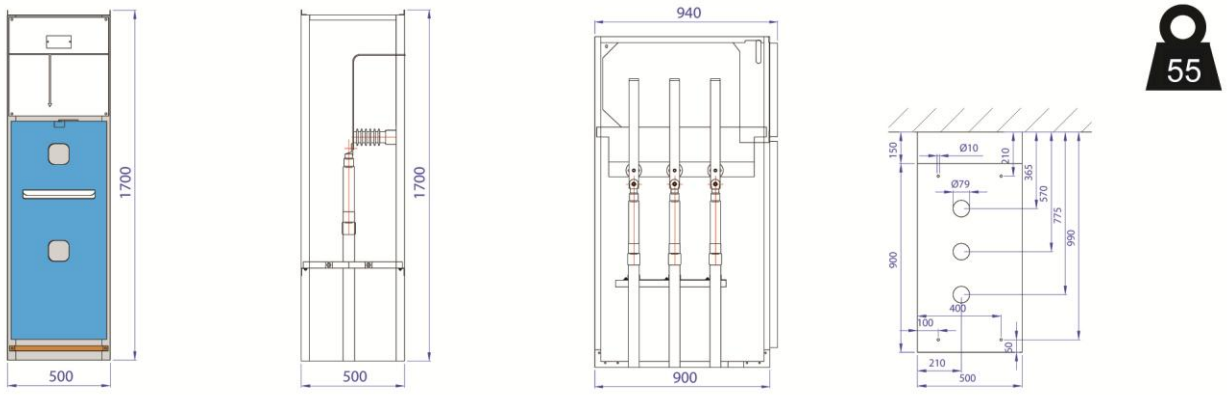
1.19 DF-T Cubicles



* Gewicht afhankelijk van de afmetingen van de transfo



1.20 DF-K Cubicles



2 PACKING – TRANSPORT – STORAGE

2.1 Packing

By default, every cubicle is fastened to a euro pallet, protected by a plastic protection foil and fixed by two fixing strips (fig. 2.1.1 to 2.1.4).

Fig 2.1 1

Fig 2.1 2

Fig 2.1 3

Fig 2.1 4

On the outside of the cubicle, a label " Tip over danger " is affixed.

Fig 2.1 5

Additionally, a “**ShockWatch®** ” is attached to the plastic foil.

If the “ShockWatch ” indicator is red upon delivery,, it must be returned to the factory for inspection immediately. Even in case of doubt, the cubicle needs to be returned for inspection.

Fig 2.1 6

Fig 2.1 7

2.2 Loading the cubicles onto a truck

Based on acceleration tests, the cubicles are categorized as “ stable in form ” up to an acceleration of 0.8 g, but they are not stable against tipping over. This means that the pallets have to be moved side by side, against a sufficiently resistant wall to avoid any displacement. Alternatively, antiskid carpets can be placed underneath the pallets.

In order to prevent toppling, fasten a fixing strip on top of the cubicles, along the width of the truck. Tighten it but avoid any exaggerated force to avoid the distortion of the cubicles. Alternatively, a horizontal bending strip can be fixed to the side wall of the truck.

The cubicles must always be loaded onto the truck **with the front plate facing the driver seat**.

This provides two advantages:
- the pallets to the side edges of the cubicles
- The maximum tip over force (e.g. braking suddenly) in the driving direction is best counteracted if the pallets face the length of the vehicle, and if the centre of gravity is situated at the back.

2.3 Required information for the truck driver

Every delivery note contains the following instructions, which are to be printed, shown, and submitted to the truck driver:

- Product is sensible to shocks! The acceleration of the truck must not, at any time, exceed 25 g.
- Horizontal displacements can be prevented by placing the pallets against each other and against a wall / pallet edge, that is sufficiently resistant. If needed, antiskid carpets can be placed underneath the pallets.
- Caution, tip over risks! Fasten a fixing belt on top of the cubicles to prevent them from tipping over. Tighten the belt, but avoid exerting too much force on the load.
- A copy of the acceleration type test certificate is handed to the driver. (This may be required if the driver is stopped by the police.)
- The delivery notes mention the weight of the cubicles / of the load per pallet.
- Load the cubicles onto the truck with the front plate in the opposite direction (facing the driver seat).
- Cubicles can be lifted using the small levers, optionally available, affixed to each upper corner of the cubicle.
- Additional option: if there's a danger that the cubicles may tip over or bump into one another, or bump into the wall of the truck, it will be necessary to mount spacers between the cubicles (see fig. 2.3.1)

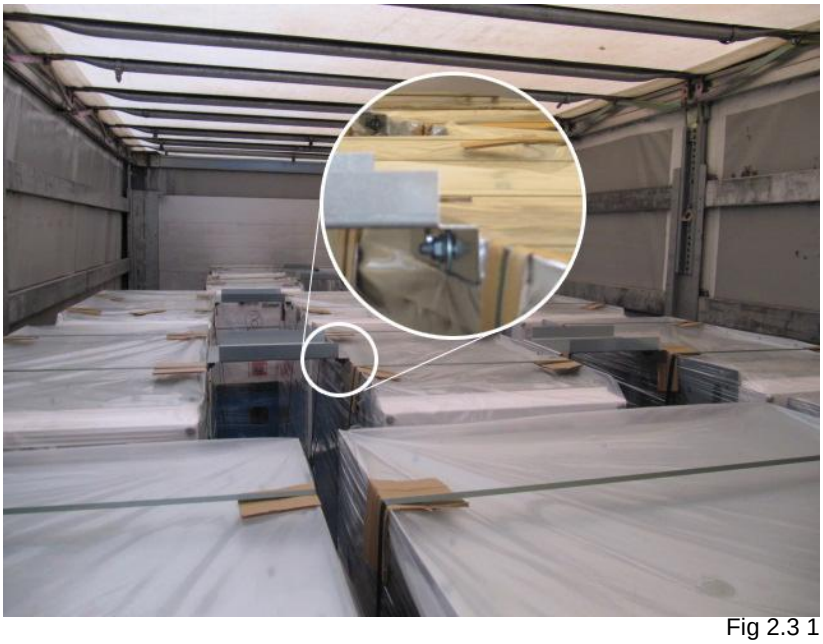


Fig 2.3 1

2.4 Transport

Transport of the medium voltage cubicles (and cells) is restricted to trained and competent operators, taking into account the instructions and the applicable safety rules and regulations.

The transport of the cubicles can only happen according to the following guidelines:

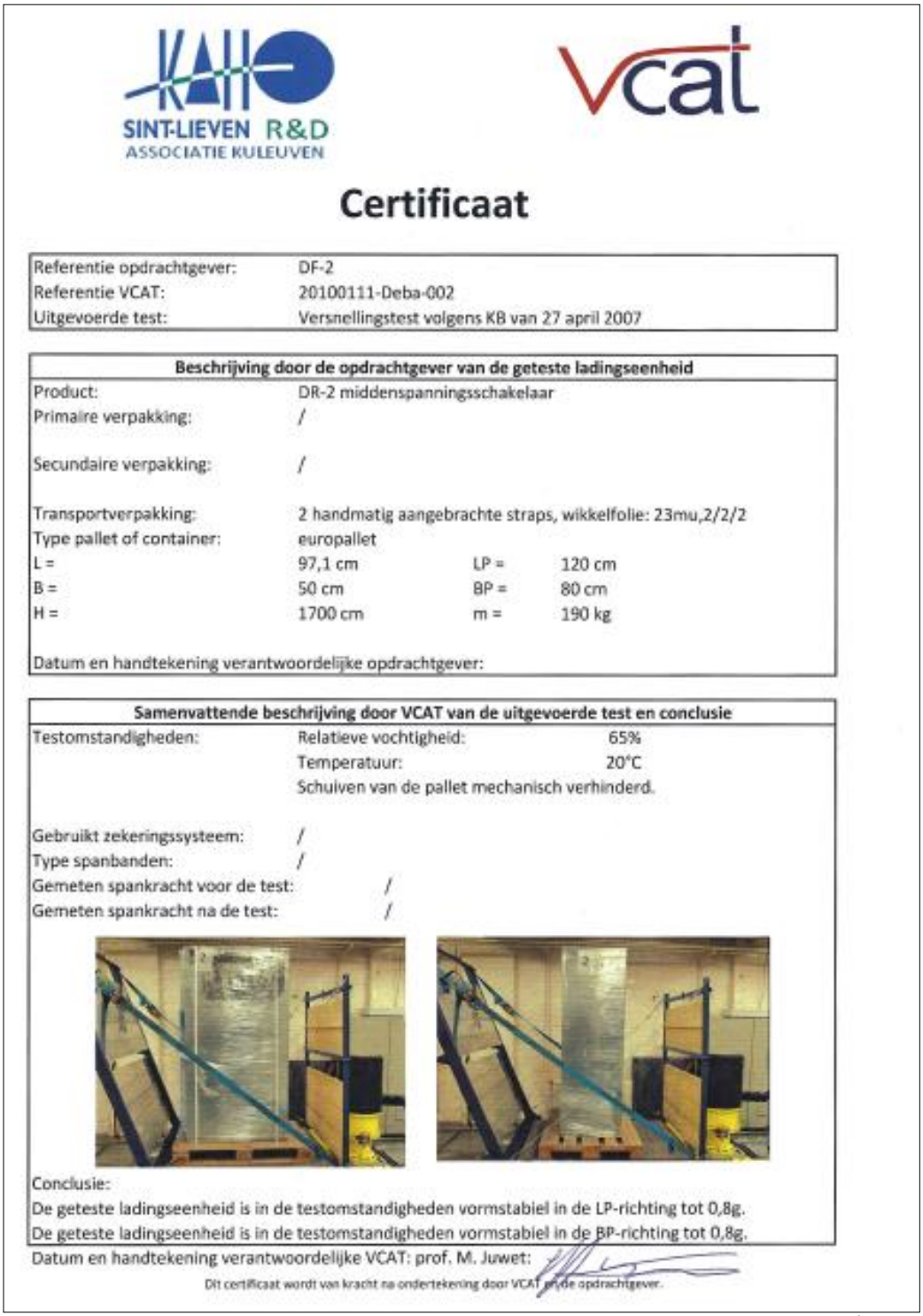
- Every cubicle, fixed on a pallet can only be transported in horizontal or vertical position. They cannot be tipped over.
- The transporter is required to place and fix the cubicles in accordance with the latest applicable legislation.
- Nothing can be placed or stacked on top of the cubicle(s).
- It is prohibited to walk on top of the cubicles.
- Protect the cubicles against water and humidity.
- Cubicles that have fallen over or have been damaged during the transport must always be returned to SGC nv - SwitchGear Company for a complete review, before they are put into use.
- See also: “General safety directions and instructions”

2.5 Storage

- The material should always be stored in its original packaging
- Respect the environmental conditions.
- Store the cubicles in a dry and dust free room.
- It is prohibited to walk on top of the cubicles.
- When storing for a long period, regularly check the protection foil.

2.6 Appendix

2.6.1 Acceleration test certificate for DF-2



SINT-LIEVEN R&D
ASSOCIATIE KULEUVEN

vcat

Certificaat

Referentie opdrachtgever:	DF-2
Referentie VCAT:	20100111-Deba-002
Uitgevoerde test:	Versnellingstest volgens KB van 27 april 2007

Beschrijving door de opdrachtgever van de geteste ladingseenheid

Product:	DR-2 middenspanningsschakelaar		
Primaire verpakking:	/		
Secundaire verpakking:	/		
Transportverpakking:	2 handmatig aangebrachte straps, wikkelfolie: 23mu,2/2/2		
Type pallet of container:	europallet		
L =	97,1 cm	LP =	120 cm
B =	50 cm	BP =	80 cm
H =	1700 cm	m =	190 kg

Datum en handtekening verantwoordelijke opdrachtgever:

Samenvattende beschrijving door VCAT van de uitgevoerde test en conclusie

Testomstandigheden:	Relatieve vochtigheid:	65%
	Temperatuur:	20°C
	Schuiven van de pallet mechanisch verhinderd.	
Gebruikt zekeringssysteem:	/	
Type spanbanden:	/	
Gemeten spankracht voor de test:	/	
Gemeten spankracht na de test:	/	

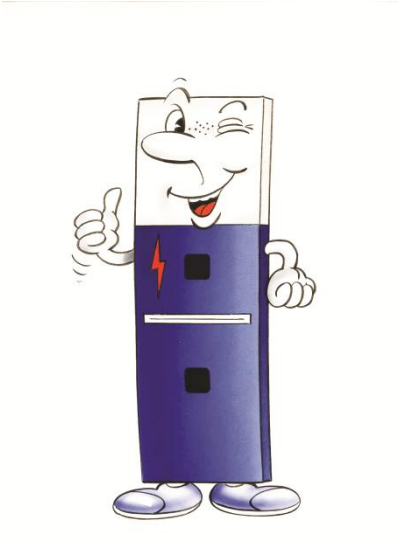
Conclusie:
De geteste ladingseenheid is in de testomstandigheden vormstabiel in de LP-richting tot 0,8g.
De geteste ladingseenheid is in de testomstandigheden vormstabiel in de BP-richting tot 0,8g.

Datum en handtekening verantwoordelijke VCAT: prof. M. Juwet:

Dit certificaat wordt van kracht na ondertekening door VCAT en de opdrachtgever.

Fig 2.6 1

Notes:



SGC
SwitchGear Company

MEDIUM VOLTAGE SWITCHGEAR, BUILT TO LAST