



ABB AG - Calor Emag Medium Voltage Products • Oberhausener Str. 33 • 40472 Ratingen

To whom it may concern

Person in charge
Ralf Hutmacher

Phone
+49 2102 12- 1968

Fax
+49 2102 12- 1713

E-Mail
ralf.hutmacher@de.abb.com

Our ref. (please quote)
PPMV/LH-HU/RH,

Your reference
-

Your letter dated
-

Date
July 14, 2021

Type tests of metal-enclosed, air-insulated switchgear manufactured by Mazandaran Switchboard Co.

Dear all,

in 2007 several type tests were carried out at the ABB Laboratories Ratingen on various switchgear type manufactured by Mazandaran Switchboard Co.:

- 1) Metal-enclosed, air-insulated switchgear type DISPack 24.12.25 equipped with SF6-circuit-breaker type FP 2425 D
Type tests:
 - Dielectric type test - test report: TZ 255 Z 01
 - Three phase temperature-rise test – test report: XZ 255 E 01
 - Short-time withstand current and peak withstand current test on the main circuit – test report: XZ 255 F 02
- 2) Metal-enclosed, air-insulated switchgear type PowerSet 24.12.25 equipped with vacuum circuit-breaker type VD4 24.12.25
Type tests:
 - Dielectric type test - test report: TZ 255 Z 02
 - Three phase temperature-rise test – test report: XZ 255 E 02
 - Short-time withstand current and peak withstand current test on the main circuit – test report: XZ 255 F 04

ABB AG Calor Emag Medium Voltage Products

Postal Address:
Postfach 10 12 20
40472 Ratingen
Germany

Visiting Address:
Oberhausener Straße 33
40472 Ratingen
Phone: +49 2102 12- 0
Telefax: +49 2102 12- 1777
Internet: www.abb.de/mittelspannung

Head Office: Mannheim
Registry Court: Mannheim
Comm. Register: HRB 4664
VAT: 38180/10046
VAT-Id: DE143840362

Chairman Supervisory Board:
Dipl.-Ing. Bernhard Jucker
Members of the Management Board:
Dipl.-Wirtschaftsing. Peter Smits (Chair.)
Dipl.-Volkswirt Hans-Georg Krabbe
Dr.-Ing. Joachim Schneider
Dipl.-Kfm. Markus Ochsner

Bank Details:
UniCredit Bank AG, München
BIC: 700 202 70
Account-No.: 5 726 700
IBAN: DE34 7002 0270 0005 7267 00
SWIFT: HYVEDEMM

Commerzbank AG, Ratingen
BIC: 300 800 00
Account-No.: 3 020 903
IBAN: DE87 3008 0000 0302 0903 00
SWIFT: DRESDEFF



Page 2 to letter dated July 14, 2021 to

- 3) Metal-enclosed, air-insulated switchgear type PowerSet 12.25.32 equipped with vacuum circuit-breaker type VD4 12.25.32
- Dielectric type test - test report: TZ 255 Z 03
 - Three phase temperature-rise test – test report: XZ 255 E 03
 - Short-time withstand current and peak withstand current test on the main circuit – test report: XZ 255 F 03

Herewith we confirm that the above-mentioned type tests were carried out at the ABB Laboratories Ratingen.



A handwritten signature in blue ink, appearing to read 'i.v.' followed by a stylized signature.

Ralf Hutmacher

High-Voltage Laboratory Manager
Temperature-Rise Laboratory Manager

Test Report

Report No.: TZ 255 Z 02

Copy No.: 1

Contents:

17 Sheets

Test object: Metal-enclosed, air-insulated switchgear with vacuum circuit-breaker in two panel arrangement

Designation: PowerSET 24.12.25 with VD4 24.12.25

Rated voltage: 24 kV

Rated normal current: 1250 A

Rated frequency: 50 Hz

Manufacturer: Mazandaran Switchboard Co., Sari, Iran

Client: Mazandaran Switchboard Co., Tehran 15178, Iran

Date of test: 8th November 2007

Applied test specifications:

IEC 62271-200, 1st Edition, 2003-11 clauses 6.2.1, 6.2.3 – 6.2.6,

IEC 62271-1, Edition 1.0, 2007-10 clauses 6.2.1, 6.2.3 – 6.2.6.

Tests performed:

Dielectric type test.

Standard lightning impulse withstand voltage test at 125 kV and power-frequency withstand voltage test at 50 kV, to earth, between phases and across open circuit-breaker.

Test results:

The metal-enclosed, air-insulated switchgear type PowerSET 24.12.25 passed the above mentioned tests successfully. The respective requirements are met.

Ratingen, 3rd February 2009
Ralf Hutmacher
Manager of Laboratory
Gerd Langwieler
Test Engineer

This test report refers exclusively to the object tested.

With the exception of the cover sheet and any subsequent sheets mentioned thereon, this document may not be partly copied without written consent of ABB AG – Calor Emag Medium Voltage Products.

Test Report

Report No.: XZ255E02

Copy No.: 1

Contents: 22 Sheets

Test object: Metal-enclosed, air-insulated switchgear equipped with vacuum circuit-breaker
Designation: PowerSet 24.12 25 with VD4/P 24.12.25
Rated voltage: 24 kV Rated normal current: 1250 A Rated frequency: 50 Hz
Manufacturer: Mazandaran Switchboard Co., Sari, Iran
Client: Mazandaran Switchboard Co., Tehran 15178, Iran
Date of test: December 06th - December 07th, 2007

Applied test specifications:

Test procedure and test parameters were based on:
IEC 62271-1 / Edition 1.0 / 2007-10, clauses 6.4.1, 6.5.1 - 6.5.4 and 6.5.6,
IEC 62271-200, 1st Edition, 2003-11, clauses 6.4.1, 6.5.1 - 6.5.4 and 6.5.6.

Tests performed:

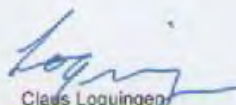
Three-phase temperature-rise test at the rated current of 1250 A at a power frequency of 50 Hz.
Measurement of the resistances of the main circuit before and after the temperature-rise test.

Test results:

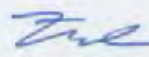
The above mentioned switchboard passed the resistance and temperature-rise test at the rated current.



Ratingen, November 19th, 2008



Claus Loquingen
Manager of Laboratory



Dr. Markus Zmuck
Test Engineer

This test report refers exclusively to the object tested.

With the exception of the cover sheet and any subsequent sheets mentioned thereon, this document June not be partly copied without written consent of ABB AG – Calor Emag Medium Voltage Products.



Test Report

Report No.: XZ 255 F 04

Copy No.: 1

Contents: 24 Sheets

Test object: Vacuum circuit-breaker in metal-enclosed, air-insulated switchgear
Designation: VD4/P 24.12.25 in PowerSet 24.12.25, width 750 mm
Rated voltage: 24 kV Rated normal current: 1250 A Rated frequency: 50 Hz
Manufacturer: Mazandaran Switchboard Co., Sari, Iran (switchboard)
ABB SACE, Dalmine, Italy (circuit-breaker)
Client: Mazandaran Switchboard Co., Tehran, Iran
Date of test: 16th January 2008

Applied test specifications:

The tests have been carried out in accordance with client's instructions based on:

IEC 62271-100 / Ed. 1.2 / 2006-10, Clause 6.6

IEC 62271-200 / 1st Ed. / 2003-11, Clause 6.6

IIEC 62271-1 / Ed. 1.0 / 2007-10, Clause 6.6

Tests performed:

Type tests 'Short-time withstand current and peak withstand current test on the main circuit'.

Three-phase short-time withstand current and peak withstand current test of the main circuit with a peak current of 64.8 kA and a short-time current of 26.3 kA – 3.02 s equivalent to 26.3 kA – 3.00 s at 50 Hz.

No-load operations and measurement of the resistance of the main circuit before and after the tests.

Test results:

The test object passed the tests performed in accordance with the applied test specifications.



Dr. Martin Wember
Manager of Laboratory

Christopher Hackland
Test Engineer

Ratingen, 06th November 2008

This test report refers exclusively to the object tested.

With the exception of the cover sheet and any subsequent sheets mentioned thereon, this document may not be partly copied without written consent of ABB AG – Calor Emag Medium Voltage Products.

Test Report

Report No.: TZ 255 Z 03

Copy No.: 1

Contents:

17 Sheets

Test object: Metal-enclosed, air-insulated switchgear with vacuum circuit-breaker**Designation:** PowerSET 06.25.32 with VD4 12.25.32

Rated voltage: 7.2 kV

Rated normal current: 2500 A

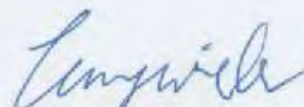
Rated frequency: 50 Hz

Manufacturer: Mazandaran Switchboard Co., Sari, Iran**Client:** Mazandaran Switchboard Co., Tehran 15178, Iran**Date of test:** 9th and 12th November 2007**Applied test specifications:**IEC 62271-200, 1st Edition, 2003-11 clauses 6.2.1, 6.2.3 – 6.2.6,

IEC 62271-1, Edition 1.0, 2007-10 clauses 6.2.1, 6.2.3 – 6.2.6.

Tests performed:

Dielectric type test.

Standard lightning impulse withstand voltage test at 60 kV and
power-frequency withstand voltage test at 20 kV, to earth, between phases and
across open circuit-breaker.**Test results:**The metal-enclosed, air-insulated switchgear type PowerSET 06.25.32 passed the above mentioned tests
successfully. The respective requirements are met.Ratingen, 3rd February 2009
Ralf Hutmacher
Manager of Laboratory
Gerd Langwieler
Test Engineer

This test report refers exclusively to the object tested.

With the exception of the cover sheet and any subsequent sheets mentioned thereon, this document may not be partly copied without written consent of
ABB AG – Calor Emag Medium Voltage Products



Test Report

Report No.: XZ255E03

Copy No.: 1

Contents:

17 Sheets

Test object: Metal-enclosed, air-insulated switchgear equipped with vacuum circuit-breaker

Designation: PowerSet 12.25.32 with VD4/P 12.25.32

Rated voltage: 12 kV Rated normal current: 2500 A Rated frequency: 50 Hz

Manufacturer: Mazandaran Switchboard Co., Sari, Iran

Client: Mazandaran Switchboard Co., Tehran 15178, Iran

Date of test: December 13th - December 14th, 2007

Applied test specifications:

Test procedure and test parameters were based on:

IEC 62271-1 / Edition 1.0 / 2007-10, clauses 6.4.1, 6.5.1 - 6.5.4 and 6.5.6,

IEC 62271-200, 1st Edition, 2003-11, clauses 6.4.1, 6.5.1 - 6.5.4 and 6.5.6.

Tests performed:

Three-phase temperature-rise test at a continuous current of 2100 A at a power frequency of 50 Hz.

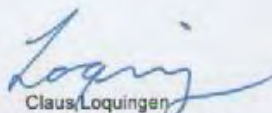
Measurement of the resistances of the main circuit before and after the temperature-rise test.

Test results:

The above mentioned switchboard passed the resistance and temperature-rise test at the tested current of 2100 A and for a maximum ambient temperature of 35°C.



Ratingen, November 18th, 2008


Claus Loquingen

Manager of Laboratory



Dr. Markus Zmeck
Test Engineer

This test report refers exclusively to the object tested.

With the exception of the cover Page and any subsequent Pages mentioned thereon, this document may not be partly copied without written consent of ABB AG – Calor Emag Medium Voltage Products.



Test Report

Report No.: XZ 255 F 03

Copy No.: 1

Contents: 23 Sheets

Test object: Vacuum circuit-breaker in metal-enclosed, air-insulated switchgear
Designation: VD4/P 12.25.32 in PowerSet 12.25.32, width 1000 mm
Rated voltage: 12 kV Rated normal current: 2500 A Rated frequency: 50 Hz
Manufacturer: Mazandaran Switchboard Co., Sari, Iran (switchboard)
ABB SACE, Dalmine, Italy (circuit-breaker)
Client: Mazandaran Switchboard Co., Tehran, Iran
Date of test: 15th January 2008

Applied test specifications:

The tests have been carried out in accordance with client's instructions based on:

IEC 62271-100 / Ed. 1.2 / 2006-10, Clause 6.6

IEC 62271-200 / 1st Ed. / 2003-11, Clause 6.6

IEC 62271-1 / Ed. 1.0 / 2007-10, Clause 6.6

Tests performed:

Type tests 'Short-time withstand current and peak withstand current test on the main circuit'.

Three-phase short-time withstand current and peak withstand current test of the main circuit with a peak current of 82.6 kA and a short-time current of 32.2 kA – 3.01 s equivalent to 32.3 kA – 3.00 s at 50 Hz.

No-load operations and measurement of the resistance of the main circuit before and after the tests.

Test results:

The test object passed the tests performed in accordance with the applied test specifications.



Ratingen, 06th November 2008

Dr. Martin Wember
Manager of Laboratory

Christopher Hackland
Test Engineer

Test Report

Report No.: TZ 255 Z 01

Copy No.: 1

Contents: 21 Sheets

Test object: Metal-enclosed, air-insulated switchgear equipped with SF₆ circuit-breaker in two panel arrangement

Designation: DISPack 24.12.25 with FP 2425 D

Rated voltage: 24 kV

Rated normal current: 1250 A

Rated frequency: 50 Hz

Manufacturer: Mazandaran Switchboard Co., Sari, Iran

Client: Mazandaran Switchboard Co., Tehran 15178, Iran

Date of test: 7th and 28th November 2007

Applied test specifications:

IEC 62271-200, 1st Edition, 2003-11 clauses 6.2.1, 6.2.3 – 6.2.6,

IEC 62271-1, Edition 1.0, 2007-10 clauses 6.2.1, 6.2.3 – 6.2.6.

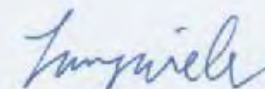
Tests performed:

Dielectric type test.

Standard lightning impulse withstand voltage test at 125 kV and power-frequency withstand voltage test at 50 kV, to earth, between phases and across open circuit-breaker.

Test results:

The metal-enclosed, air-insulated switchgear type DISPack 24.12.25 passed the above mentioned tests successfully. The respective requirements are met.

Ratingen, 3rd February 2009
Ralf Hutmacher
Manager of Laboratory
Gerd Langwieler
Test Engineer

This test report refers exclusively to the object tested.

With the exception of the cover sheet and any subsequent sheets mentioned thereon, this document may not be partly copied without written consent of ABB AG – Calor Emag Medium Voltage Products.



Test Report

Report No.: XZ255E01

Copy No.: 1

Contents:

21 Sheets

Test object: Metal-enclosed, air-insulated switchgear equipped with SF6 circuit-breaker
Designation: DisPack 24.12.25 with FP 2425 D
Rated voltage: 24 kV Rated normal current: 1250 A Rated frequency: 50 Hz
Manufacturer: Mazandaran Switchboard Co., Sari, Iran
Client: Mazandaran Switchboard Co., Tehran 15178, Iran
Date of test: November 16th – November 17th, 2007

Applied test specifications:

The tests have been carried out in accordance with the client's instructions.
Test procedure and test parameters were based on:
IEC 62271-1 / Edition 1.0 / 2007-10, clauses 6.4.1, 6.5.1 – 6.5.4 and 6.5.6,
IEC 62271-200, 1st Edition, 2003-11, clauses 6.4.1, 6.5.1 – 6.5.4 and 6.5.6.

Tests performed:

Three-phase temperature-rise test at the rated current of 1250 A at a power frequency of 50 Hz.
Measurement of the resistances of the main circuit before and after the temperature-rise test.

Test results:

The above mentioned switchboard passed the resistance and temperature-rise test at the rated current and for a maximum ambient temperature of 35°C.



Ratingen, November 19th, 2008

Claus Loquingen
Manager of Laboratory

Dr. Markus Zmeck
Test Engineer



Test Report

Report No.: XZ 255 F 02

Copy No.: 1

Contents: 24 Sheets

Test object: Metal-enclosed, air-insulated switchgear equipped with SF6 circuit-breaker
Designation: DisPack 24.12.25 with FP 2425 D
Rated voltage: 24 kV Rated normal current: 1250 A Rated frequency: 50 Hz
Manufacturer: Mazandaran Switchboard Co., Sari, Iran
Client: Mazandaran Switchboard Co., Tehran, Iran
Date of test: 28th and 29th November 2007

Applied test specifications:

The tests have been carried out in accordance with:

IEC 62271-100 / Ed. 1.2 / 2006-10, Clause 6.6

IEC 62271-200 / 1st Ed. / 2003-11, Clause 6.6

IEC 62271-1 / Ed. 1.0 / 2007-10, Clause 6.6

Tests performed:

Type tests 'Short-time withstand current and peak withstand current test on the main circuit'.

Three-phase short-time withstand current and peak withstand current test of the main circuit with a peak current of 63.1 kA and a short-time current of 25.8 kA – 1.02 s equivalent to 26.0 kA – 1.00 s at 50 Hz.

No-load operations and measurement of the resistance of the main circuit before and after the tests.

Test results:

The test object passed the tests performed in accordance with the applied test specifications.



Dr. Martin Wember
Manager of Laboratory

Sebastian Martinek
Test Engineer

Ratingen, 06th November 2008
Rev 01, Ratingen, 25th November 2008

This test report refers exclusively to the object tested.

With the exception of the cover sheet and any subsequent sheets mentioned thereon, this document may not be partly copied without written consent of ABB AG – Calor Emag Medium Voltage Products.