

CLIMATIC TEST REPORT

SAND AND DUST TEST

According to the standard(s):
RTCA DO160 G (2010) Section 12 Category S

According to the document:
DP074926PQF001_05

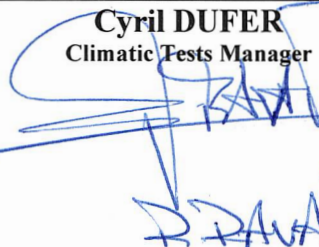
Equipment under test:
MU-NG & SU-NG

Company:
AVANTIX

DISTRIBUTION: Mr. CROUZIER

Company: AVANTIX

Number of pages: 69

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			Name, function and Visa	Name, function and Visa
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EQUIPMENT UNDER TEST:

MU-NG & SU-NG

Serial number (S/N)

: 000001 & 00003

Part number (P/N)

: 119380 & 119884

MANUFACTURER:

AVANTIX

CUSTOMER'S NAME AND ADDRESS:**Company:**

AVANTIX

Address:

655 AVENUE GALILEE

CS 10323

13799 AIX EN PROVENCE CEDEX 3 France

Contact:

M. Alexandre CROUZIER

Person(s) who were present during tests: /**PURCHASE ORDER:**

N° 030-4500240913

TEST DATES:From 30th of June to 9th of July, 2025**TEST LOCATION:**

Environne'Tech

49 Boulevard Pré Pommier

38300 BOURGOIN-JALLIEU

Laboratoire d'essais

TESTER:

Romane MOIROUD

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1. PURPOSE OF TESTS

The purpose of these tests is to validate the behaviour of the equipment in a climatic environment.

2. EQUIPMENT UNDER TEST

Equipment under test:

MU-NG:



photo 1



photo 2



photo 3



photo 4



photo 5



photo 6



photo 7



photo 8



photo 9



photo 10

SU-NG:



photo 11



photo 12



photo 13



photo 14



photo 15



photo 16



photo 17

3. CUSTOMER SPECIFICATIONS SHEET

The tests are to be carried out according to the following document (s), included in the technical offer Environne'Tech *ADESS23H385AVA-00V02*.

3.1. *According to the standard(s):*

RTCA DO160 G (2010) Section 12 Category S

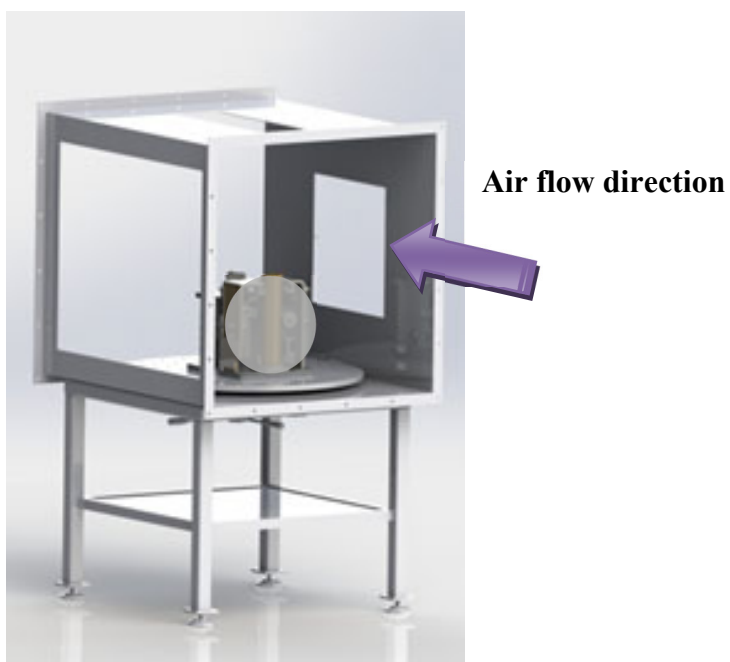
3.2. *According to the document:*

DP074926PQF001_05

3.3. *Reminder of the main test criteria:*

3.3.1. *Test setup:*

Test chamber



3.3.2. Dust test:

3.3.2.1. Test procedure:

First Cycle

With the internal temperature of the test chamber maintained at $+25 \pm 2^{\circ}\text{C}$ and the relative humidity at not more than 30 percent, submit the equipment to a minimum exposure period of one hour along each direction of each major orthogonal axis in succession.

Second Cycle

With the internal temperature of the test chamber raised and stabilized at $+55 \pm 2^{\circ}\text{C}$ and the relative humidity at not more than 30 percent, submit the equipment to a minimum exposure period of one hour along each direction of each major orthogonal axis in succession.

At the end of this exposure period, the equipment shall be removed from the chamber and cooled to room temperature. Externally accumulated dust only on surfaces of the equipment required to verify proper operation (e.g. displays, connectors, keyboards, test ports etc.) shall be removed by brushing, wiping or shaking with care being taken to avoid introducing additional dust into the equipment. Under no circumstances shall dust be removed by either air blast or vacuum cleaning. After removing the excess dust, manipulate the mechanical moving features of the equipment ten times and check for clogging or binding of movement. DETERMINE COMPLIANCE WITH APPLICABLE EQUIPMENT PERFORMANCE STANDARDS.

3.3.2.2. Test parameters:

Parameters	Values
Dust concentration	3.5 g/m ³ to 8.8 g/m ³
Jet velocity	0.5 m/s to 2.4 m/s
Temperature	Cycle 1 : $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Cycle 2: $+55^{\circ}\text{C} \pm 2^{\circ}\text{C}$
Relative Humidity	< 30 %HR
Number of sides to be tested	6
Duration per sides	1 h

3.3.3. Sand test:

3.3.3.1. Test procedure:

First Cycle

With the internal temperature of the test chamber maintained at $+25 \pm 2$ °C and the relative humidity at not more than 30 percent, submit the equipment to a minimum exposure period of one hour along each direction of each major orthogonal axis in succession.

Second Cycle

With the internal temperature of the test chamber raised and stabilized at $+55 \pm 2$ °C and the relative humidity at not more than 30 percent, submit the equipment to a minimum exposure period of one hour along each direction of each major orthogonal axis in succession.

At the end of this exposure period, the equipment shall be removed from the chamber and cooled to room temperature. Externally accumulated sand only on surfaces of the equipment required to verify proper operation (e.g. displays, connectors, keyboards, test ports etc.) shall be removed by brushing, wiping or shaking with care being taken to avoid introducing additional sand into the equipment. Under no circumstances shall sand be removed by either air blast or vacuum cleaning. After removing the excess sand, manipulate the mechanical moving features of the equipment ten times and check for clogging or binding of movement. DETERMINE COMPLIANCE WITH APPLICABLE EQUIPMENT PERFORMANCE STANDARDS.

3.3.3.2. Test parameters:

Parameters	Values
Sand concentration	1.7 g/m ³ à 2.7 g/m ³
Jet velocity	18 m/s à 29 m/s
Temperature	Cycle 1: +25°C +/-2°C Cycle 2: +55°C +/-2°C
Relative Humidity	< 30 %HR
Number of sides to be tested	6
Duration per sides	1 h

3.4. Control:

Visual inspection before and after test
Functional control to perform according to Qualification Test Plan.
The equipment is functional during the test.

4. EQUIPMENT USED

4.1. Test facilities.

Identity	Designation	Brand and Model	Characteristics
CLIM 363	Sand and dust blowing	EnvironneTech CLIM 363	air velocity: 2-25 m/s; concentration: 0-10g/m3; °C: 20°C-+71°C; humidity < 30% RH
MATE 136	Dust	Particle technology MIL STD 810 F/G/H RTCA DO160 E/F/G	150 microns
MATE 143	Sand	Particle technology MIL STD 810 F/G/H RTCA DO160 G	150 - 850 microns

4.2. Measurement Equipment.

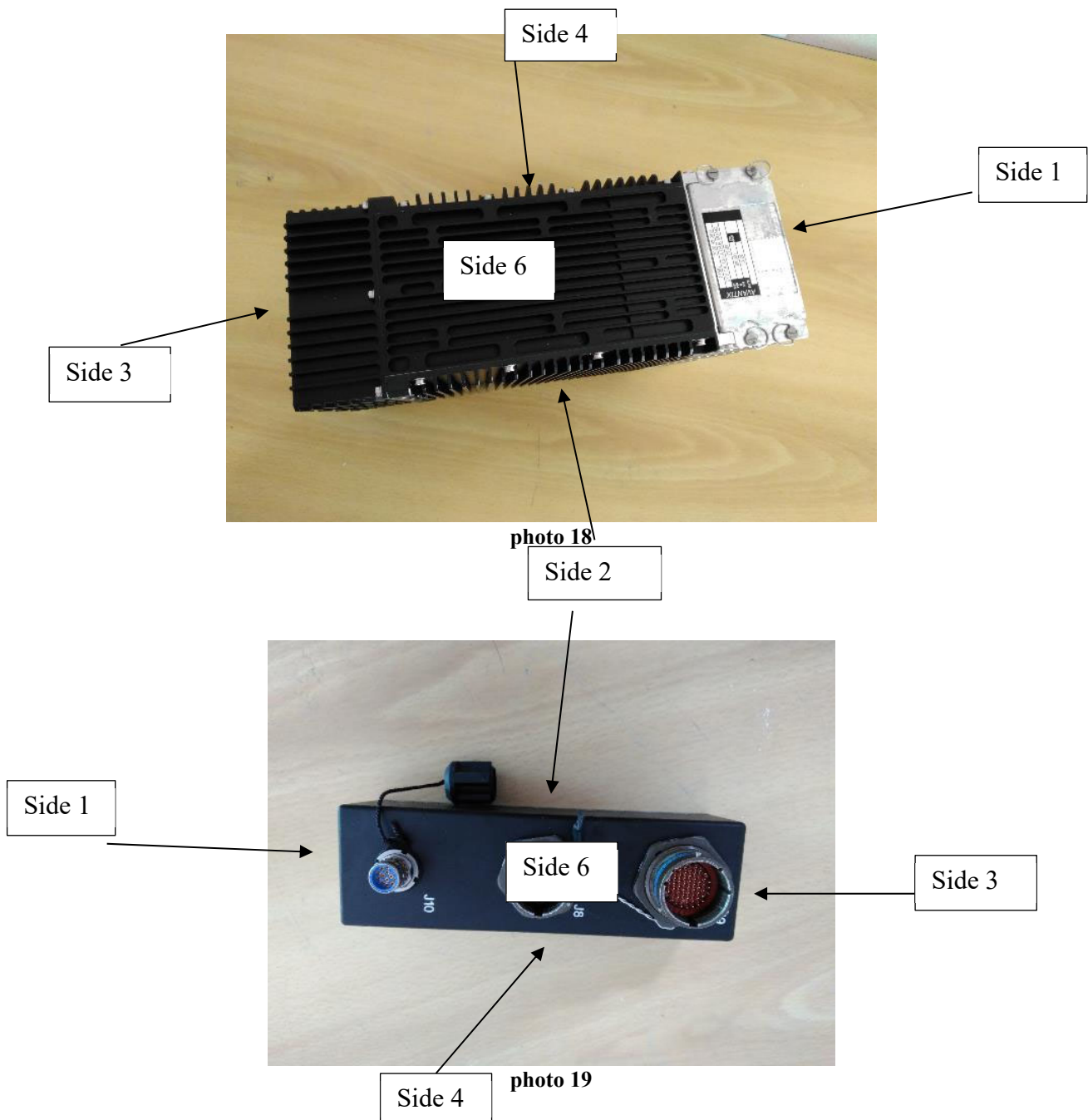
Identity	Designation	Brand and Model	Characteristics	Last validity date	Metrological confirmation valid until
CLIM 363-02	Velocity sensor	KIMO CP303-BOP	velocity measuring range 0-30m/s	16/06/2023	16/08/2026
CLIM 363-03	Concentration sensor	PCME Leak Alert 73	concentration measuring: 0 to 20 g/m3	05/04/2023	05/06/2026
CLIM 363-04	Recorder	Eurotherm Chessel 6100A	4 channels, Vdc: -4 to +10V	16/05/2024	16/07/2026
CLIM 363-08	Thermo-Hygrometer Probe	KIMO TH210 BODI150 R	Humidity probe 0/100% - Temperature -40/+180°C	21/09/2023	21/11/2025

5. TEST LOG

5.1. Variant(s) made during the test with regard to the Specifications:

No variant.

5.2. Side's definition:



Bottom face, side 5.

5.3. *Dust test:*

Note 1: For technical reasons (untimely detachment of clusters of particles deposited on the equipment), equipment was over exposed on - negligible time in comparison of the duration of the test, and have no influence on the final result (functional and visual).

Note 2: Concentration: the time passed under the low tolerance is added at the test duration.

5.3.1. *Dust test at +25°C:*

5.3.1.1. Side 1:

Pictures before test at +25°C:

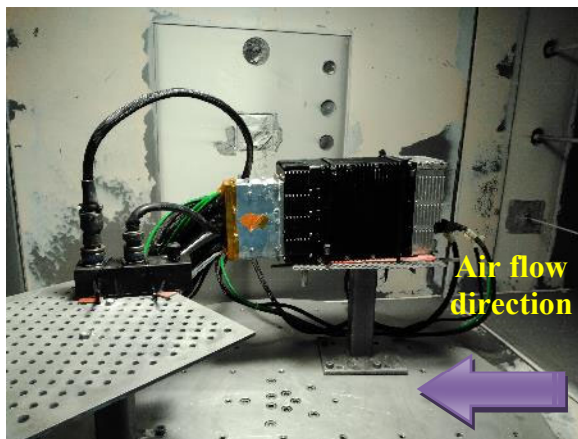


photo 20

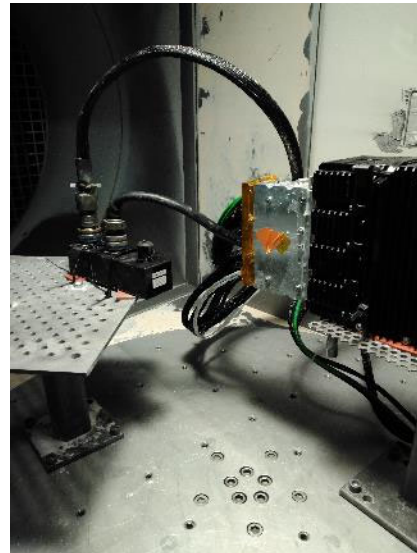
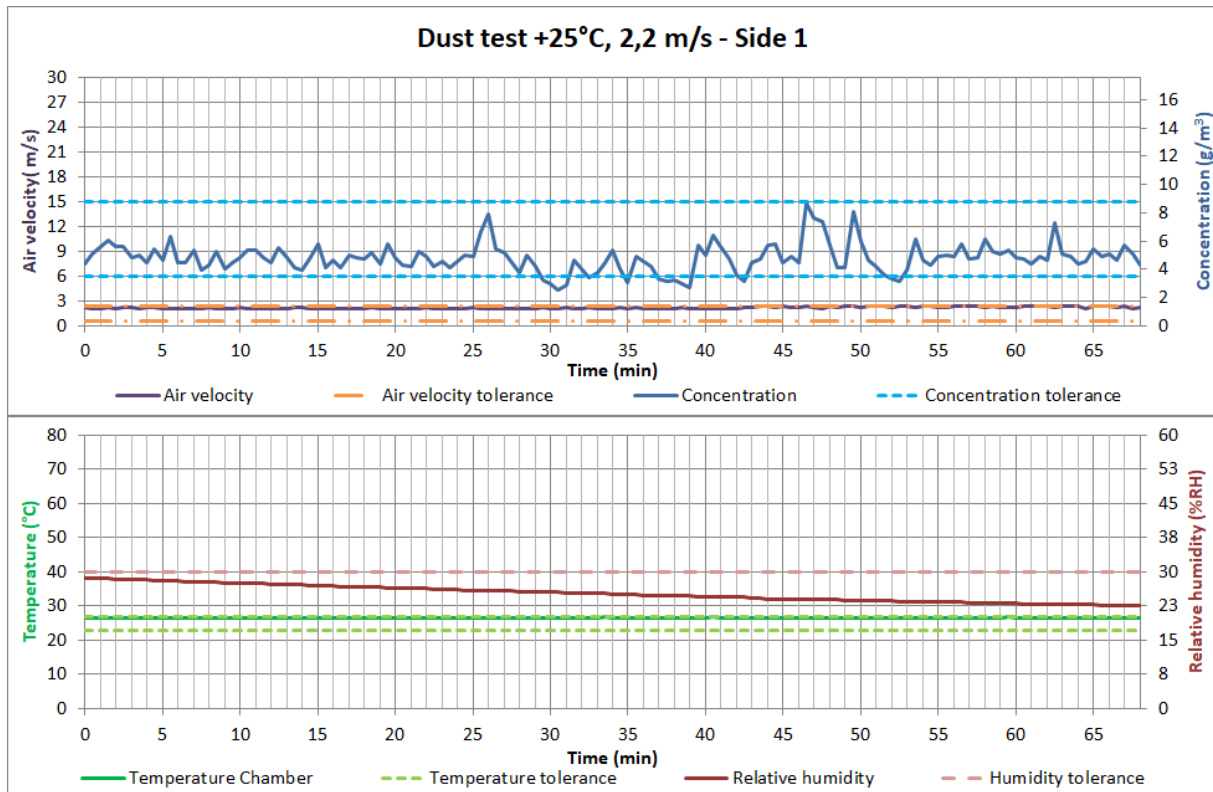


photo 21

Test was started after having set all parameters.



curve 1

Pictures after test at +25°C:



photo 22

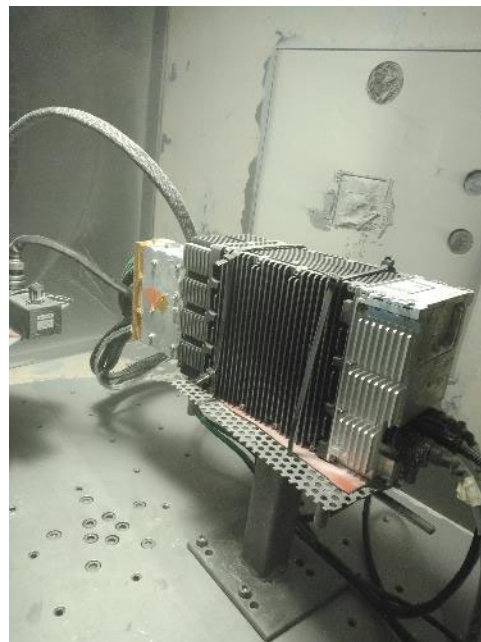


photo 23

5.3.1.2. Side 2:

Pictures before test at +25°C:

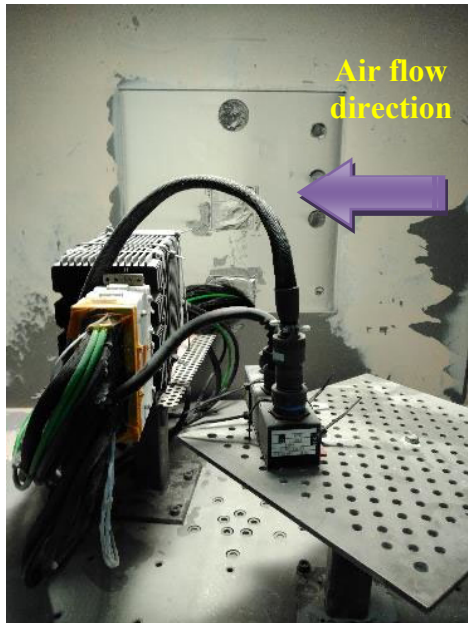


photo 24

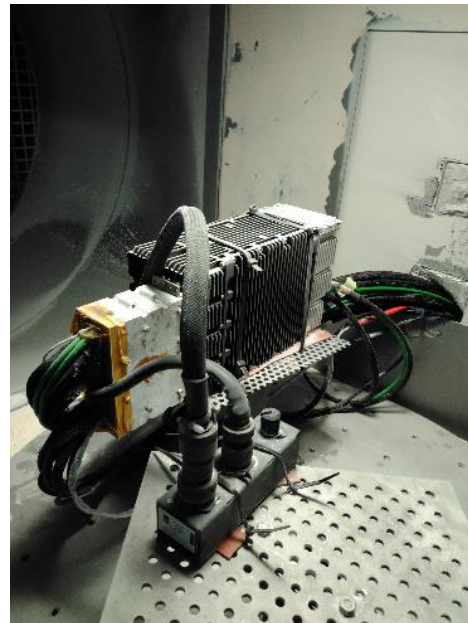
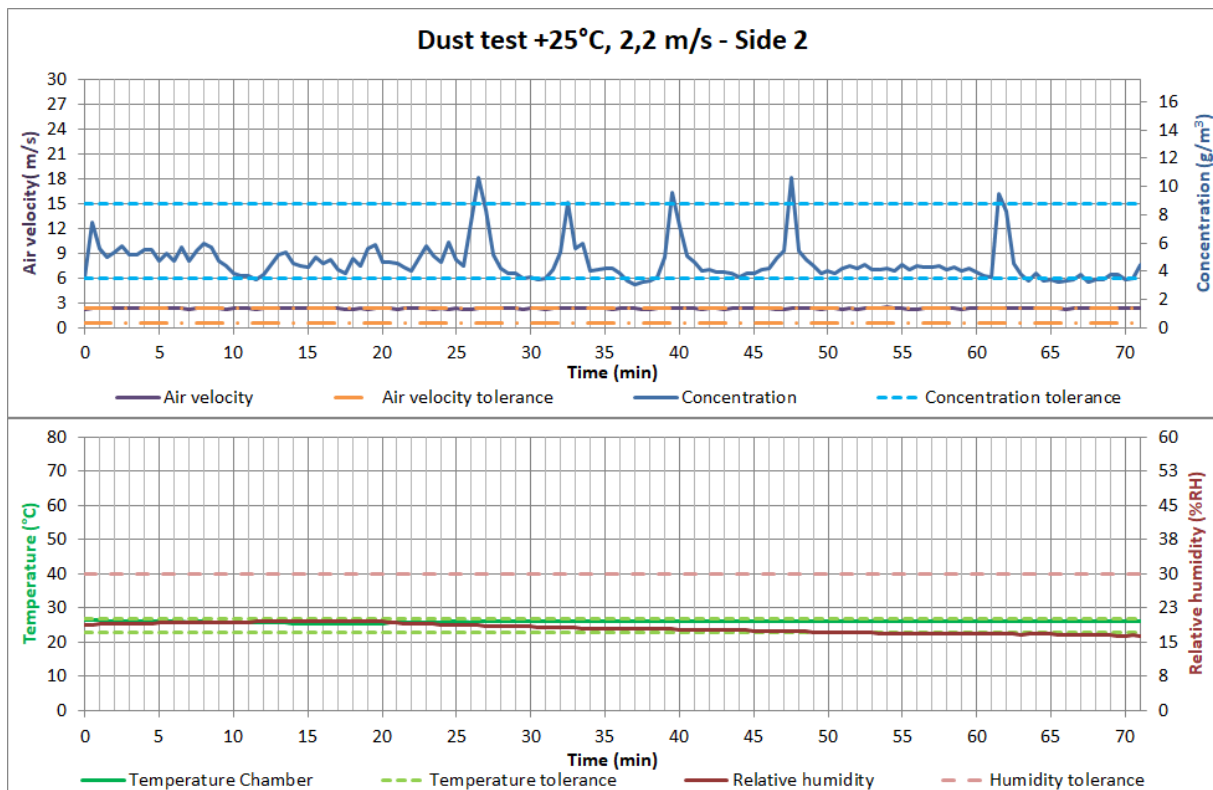


photo 25

Test was started after having set all parameters.



curve 2

Pictures after test at +25°C:

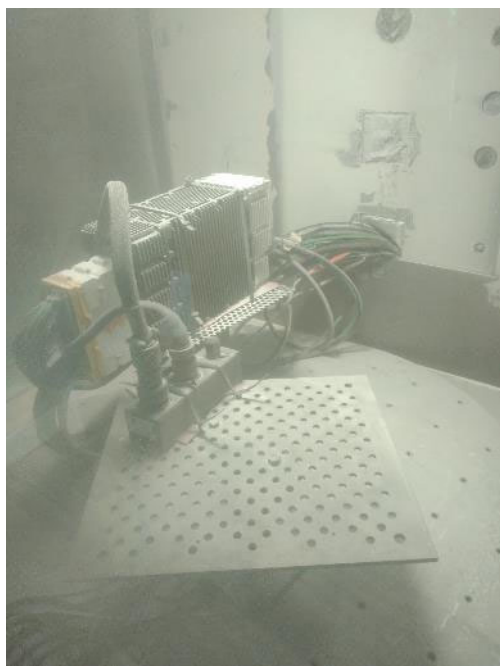


photo 26



photo 27

5.3.1.3. Side 3:

Pictures before test at +25°C:

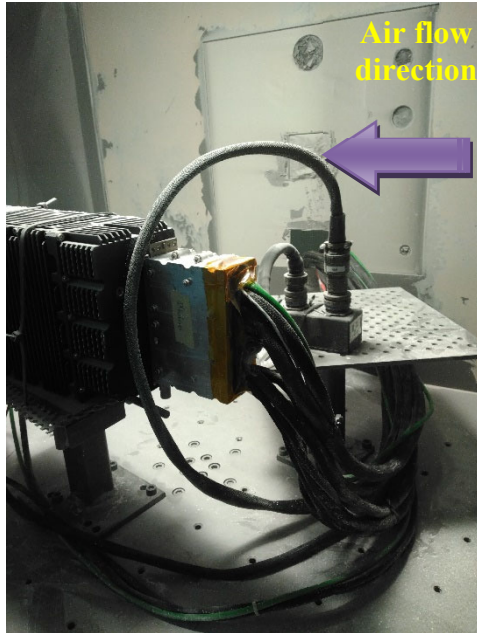


photo 28

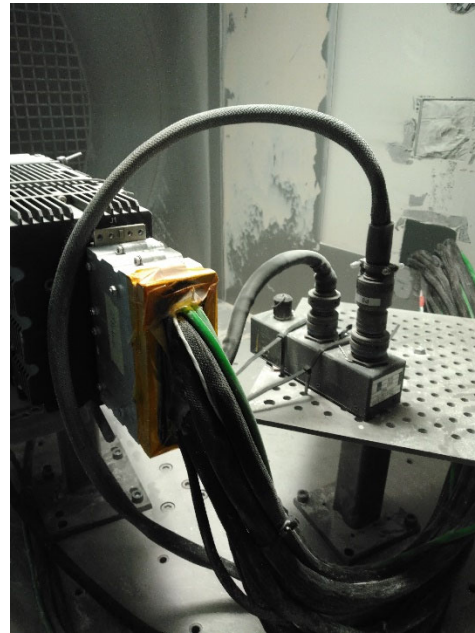
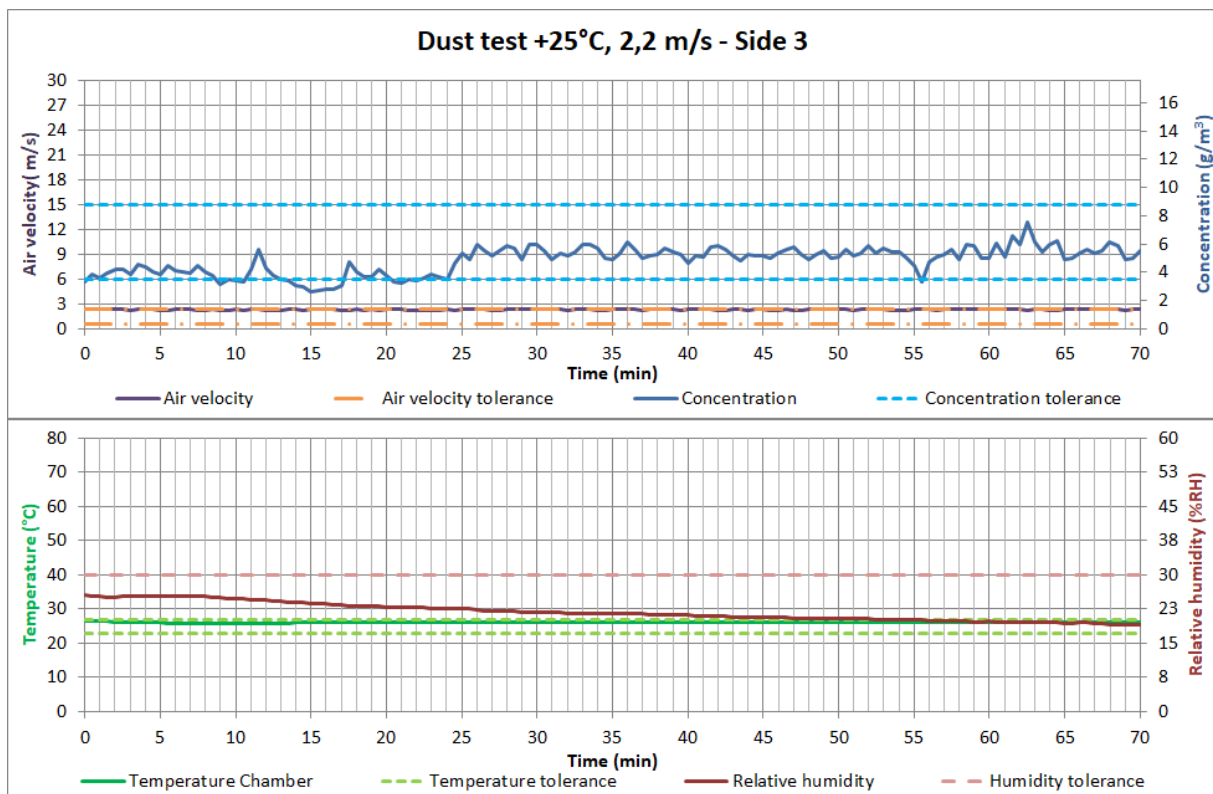


photo 29

Test was started after having set all parameters.



Pictures after test at +25°C:



photo 30



photo 31

5.3.1.4. Side 4:

Pictures before test at +25°C:

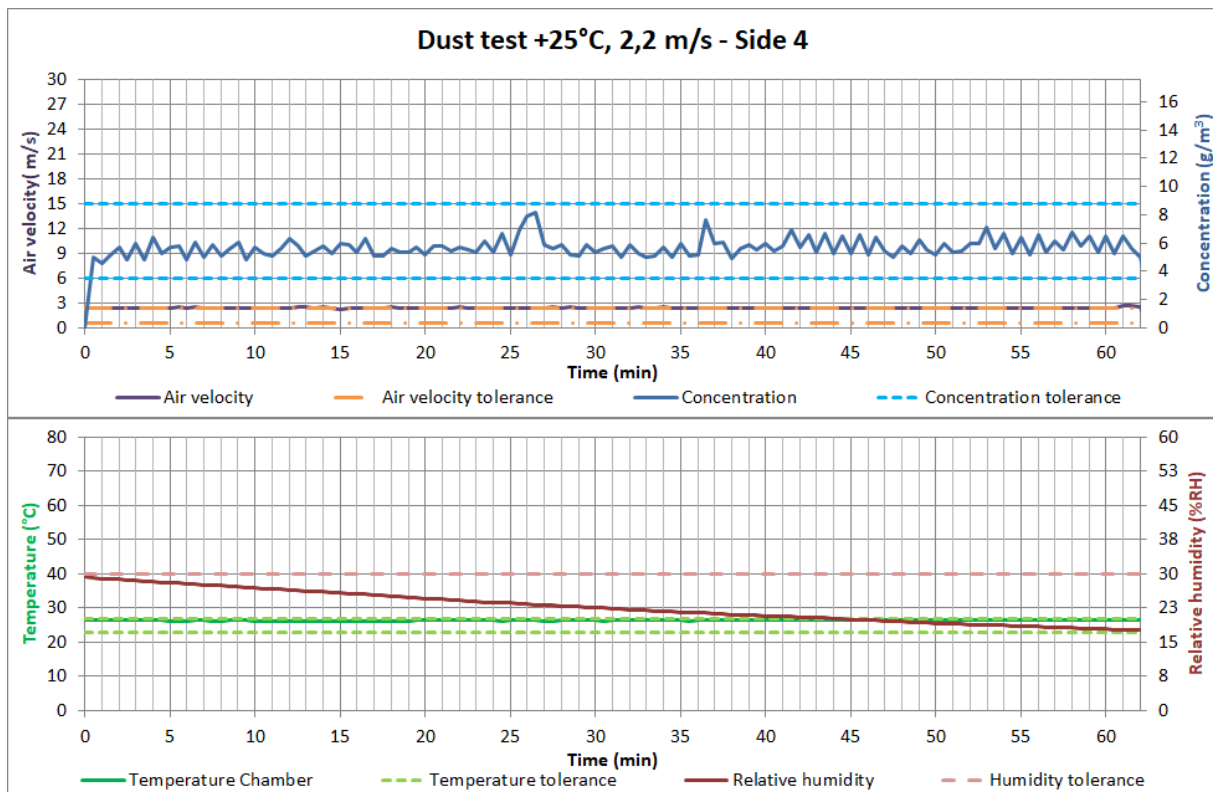


photo 32



photo 33

Test was started after having set all parameters.



curve 4

Pictures after test at +25°C:



photo 34



photo 35

5.3.1.5. Side 5:

Pictures before test at +25°C:

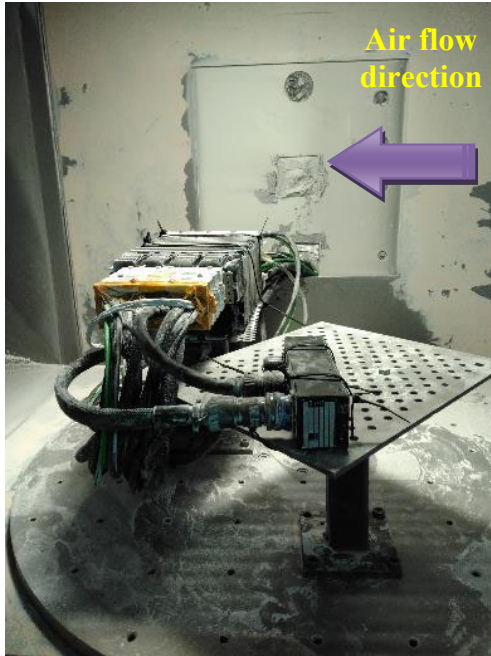


photo 36

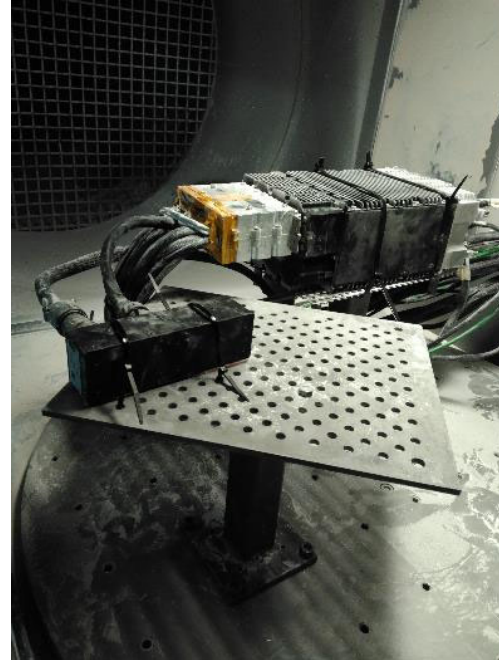
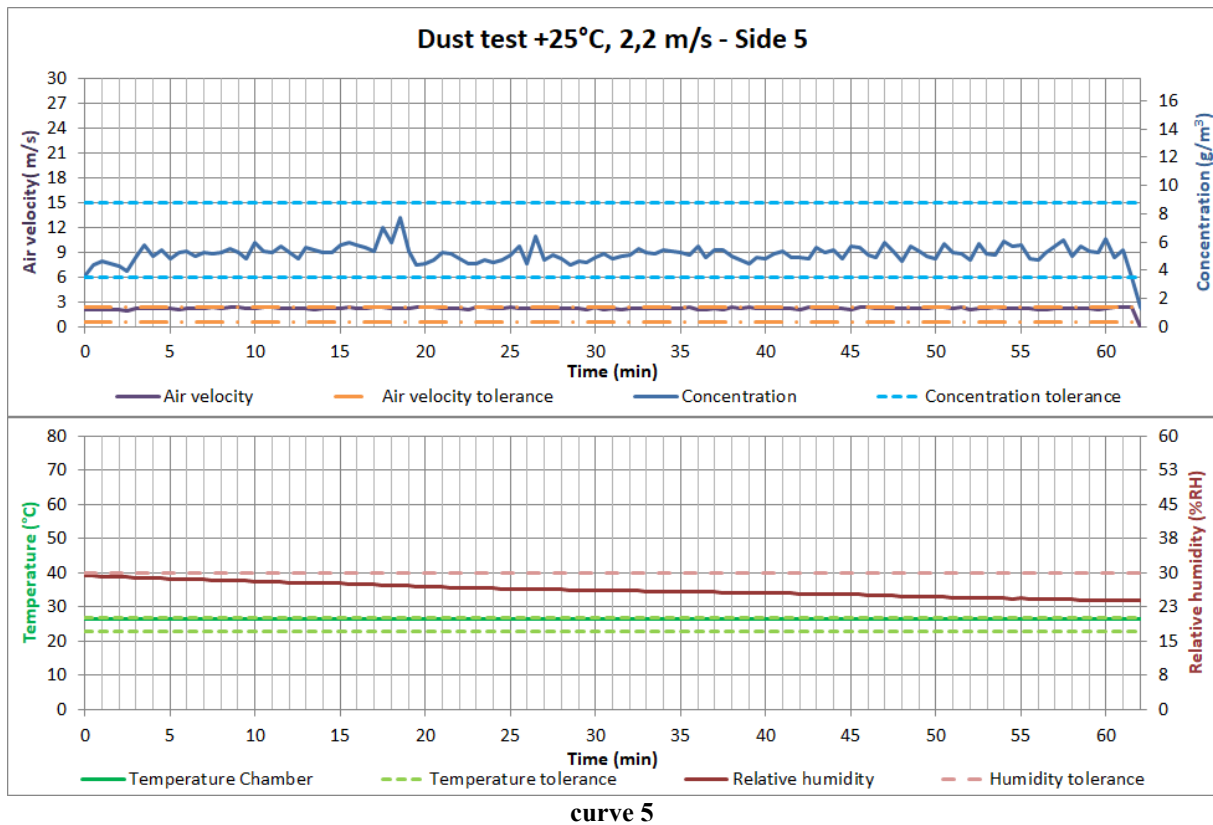


photo 37

Test was started after having set all parameters.



Pictures after test at +25°C:



photo 38



photo 39

5.3.1.6. Side 6:

Pictures before test at +25°C:

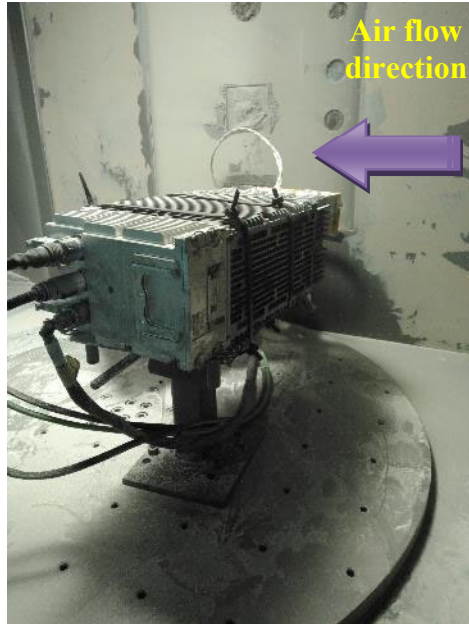
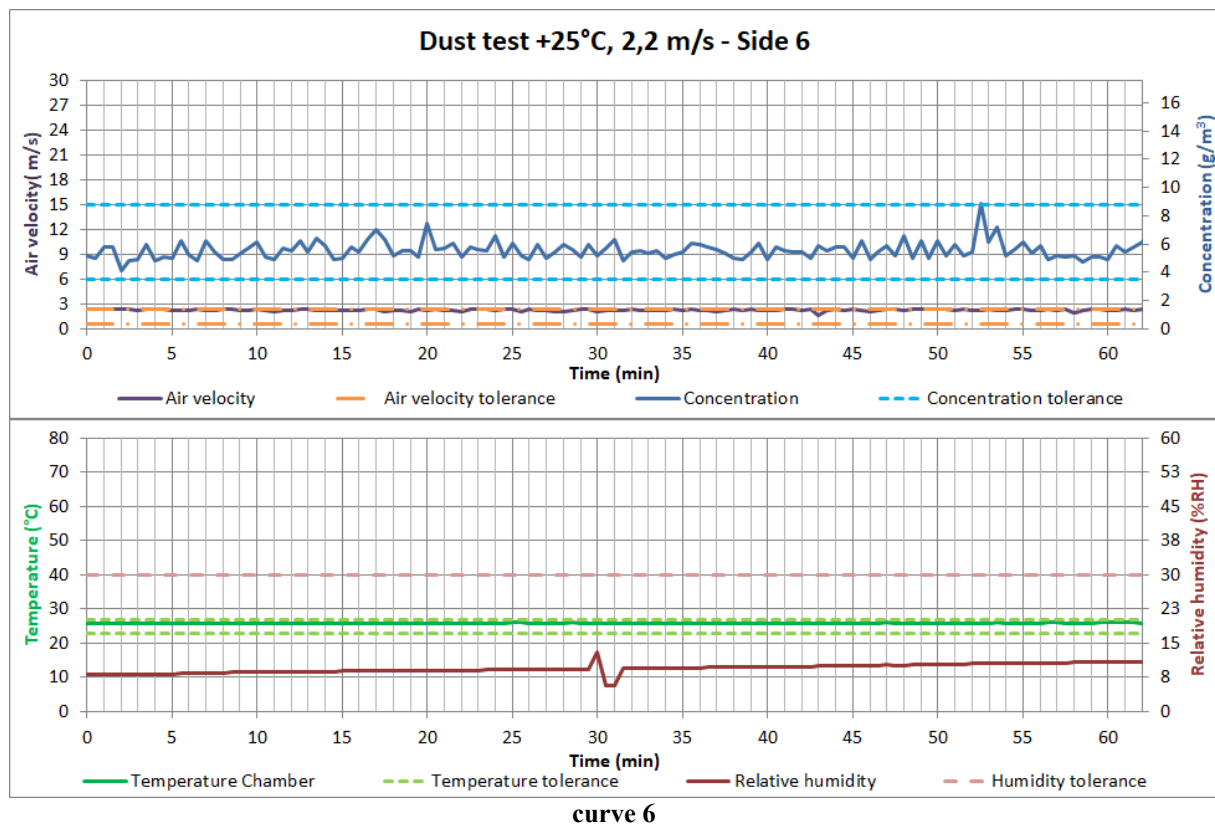


photo 40



photo 41

Test was started after having set all parameters.



Pictures after test at +25°C:



photo 42



photo 43

5.3.2. *Dust test at +55°C:*

5.3.2.1. Side 6:

Pictures before test at +55°C:

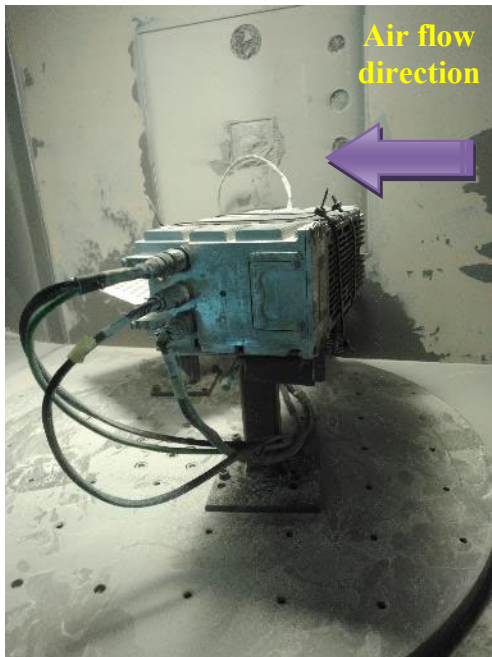


photo 44

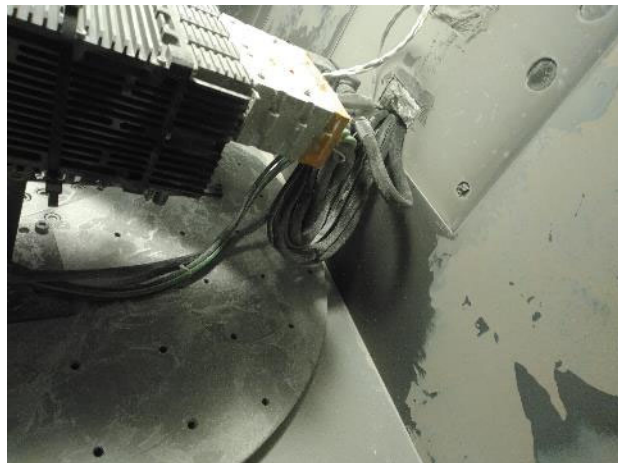
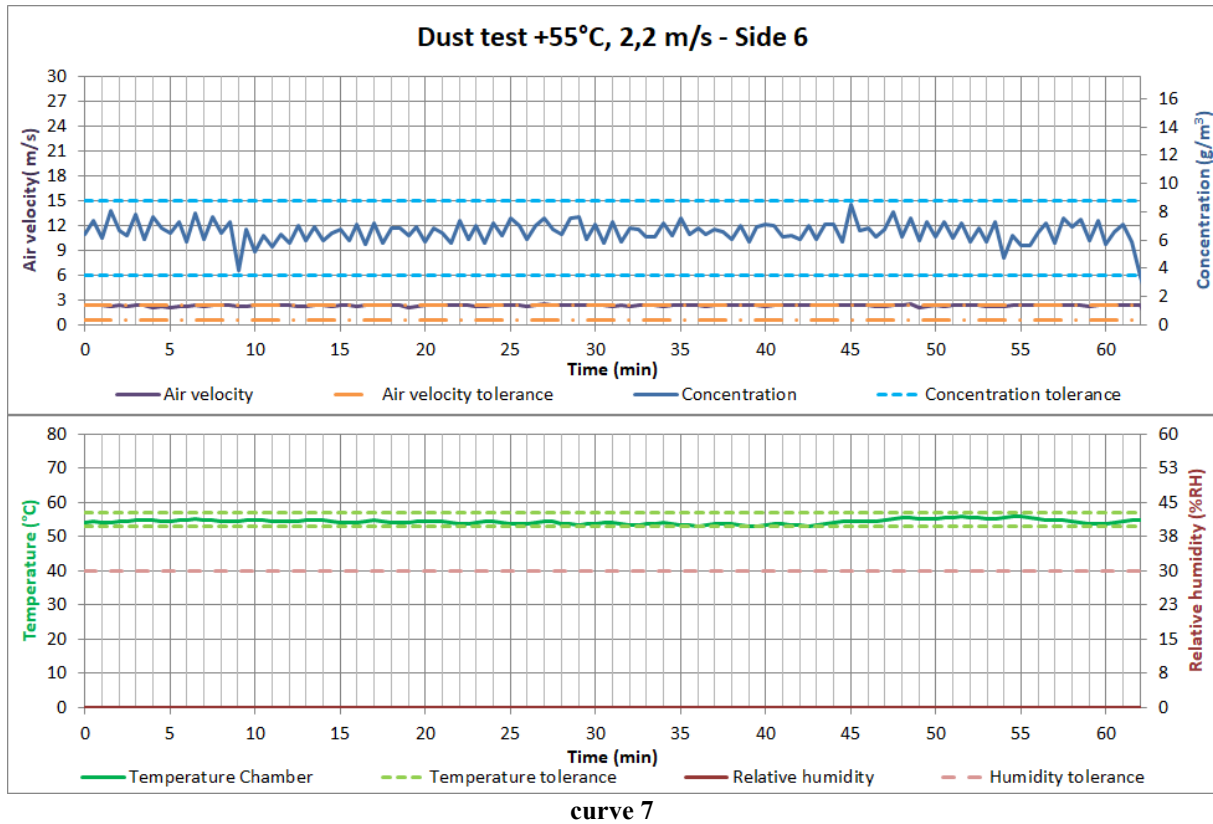


photo 45

Test was started after having set all parameters.



Pictures after test at +55°C:



photo 46



photo 47

5.3.2.2. Side 5:

Pictures before test at +55°C:

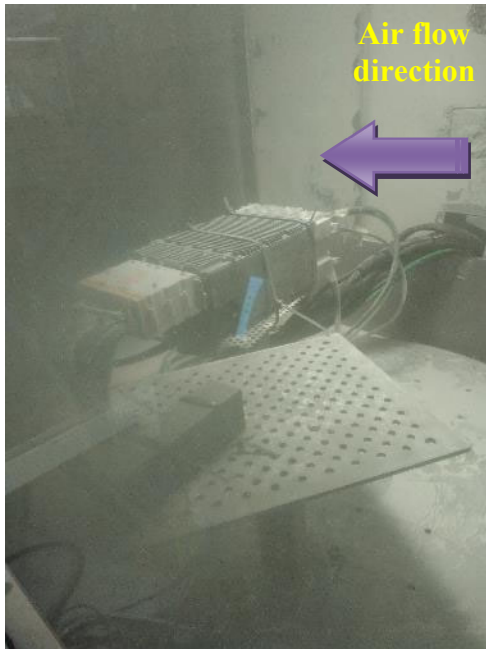


photo 48



photo 49

After the change of the side, the “MEI Carte VIDEO” was defective due to the rise in temperature > 80°C on the equipment. After stabilization, the defect disappears, the testing continues.

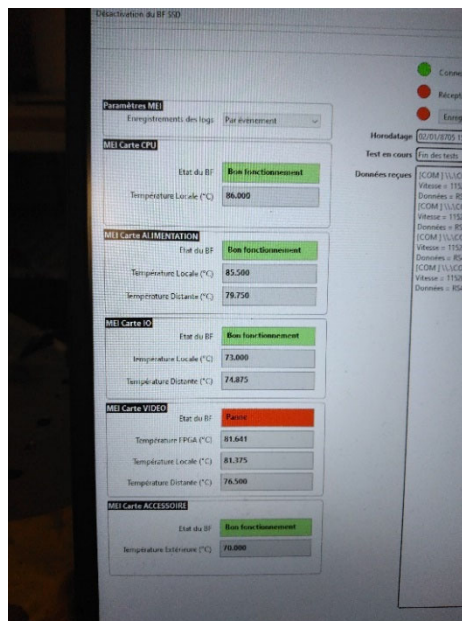
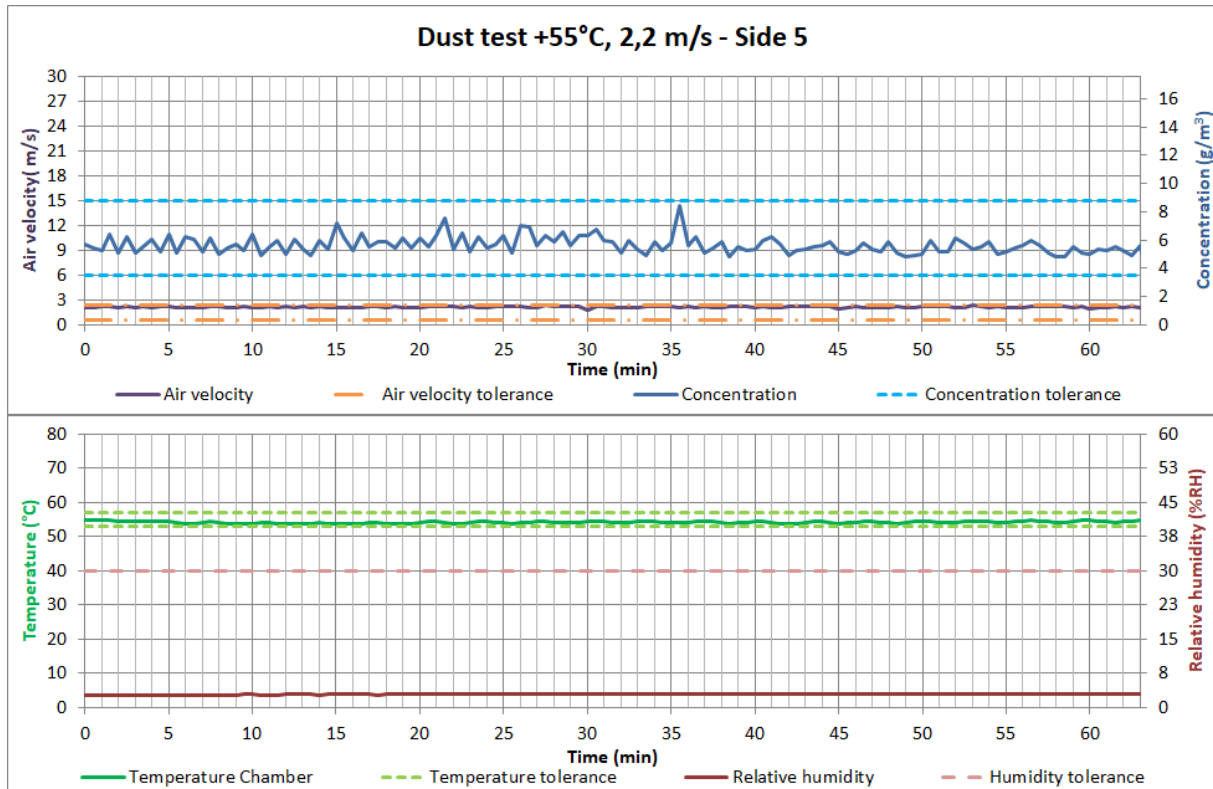


photo 50

Test was started after having set all parameters.



curve 8

Pictures after test at +55°C:



photo 51

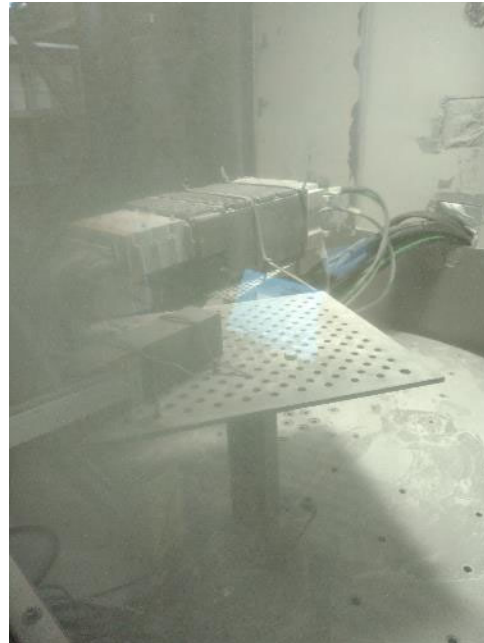


photo 52

5.3.2.3. Side 1:

Pictures before test at +55°C:

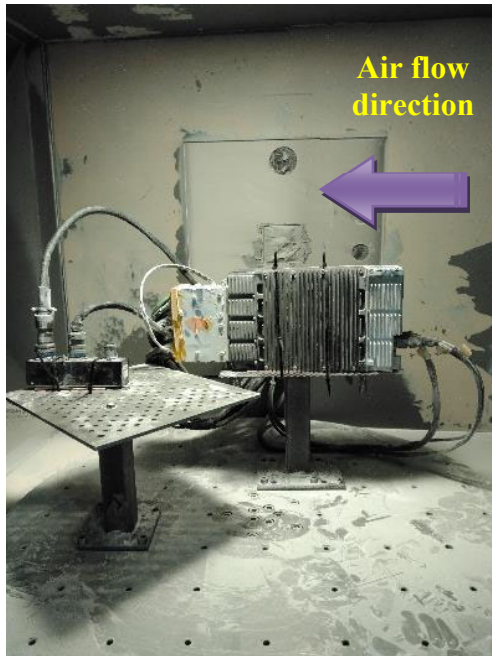


photo 53

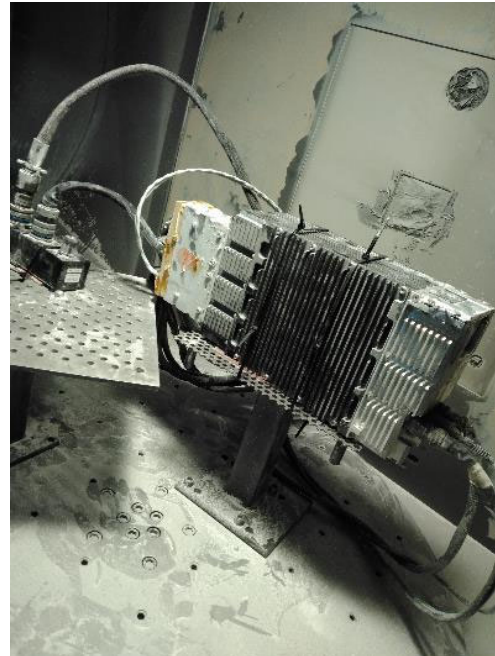
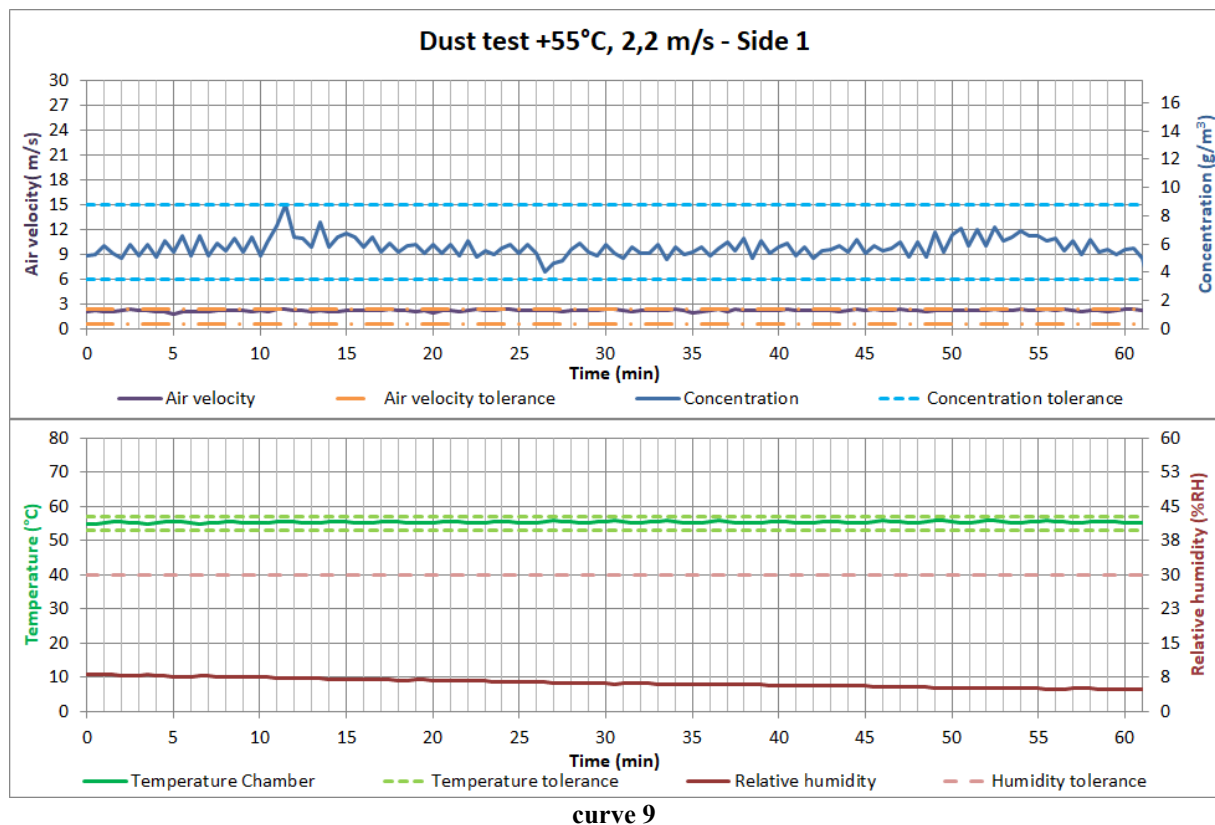


photo 54

Test was started after having set all parameters.



Pictures after test at +55°C:



photo 55

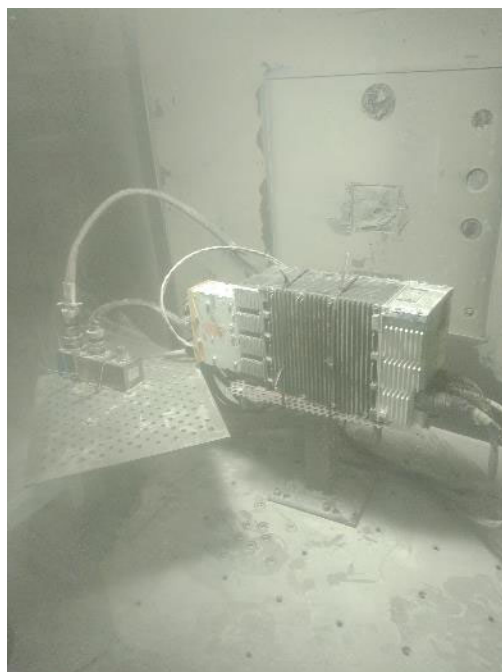


photo 56

5.3.2.4. Side 4:

Pictures before test at +55°C:

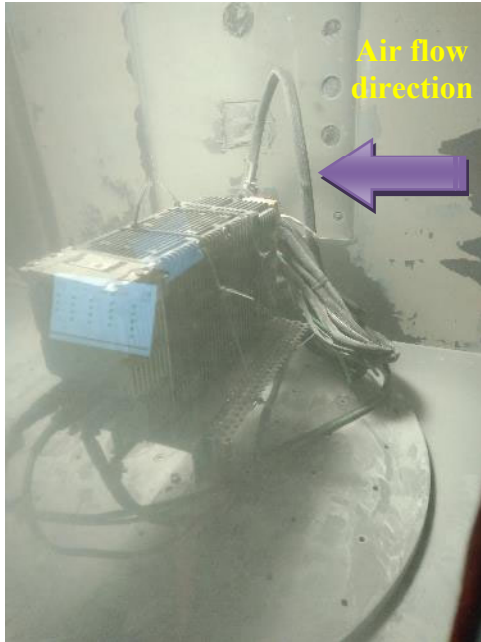
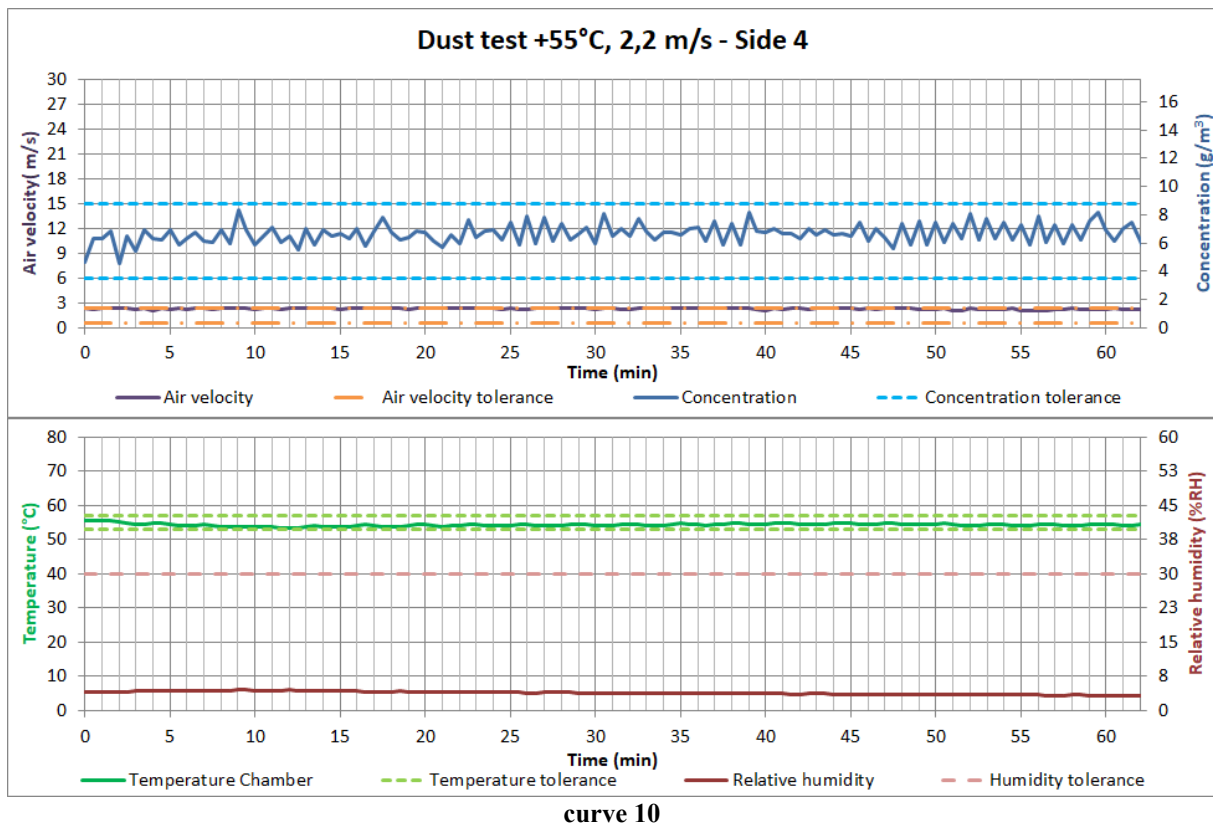


photo 57



photo 58

Test was started after having set all parameters.



Pictures after test at +55°C:



photo 59



photo 60

5.3.2.5. Side 3:

Pictures before test at +55°C:

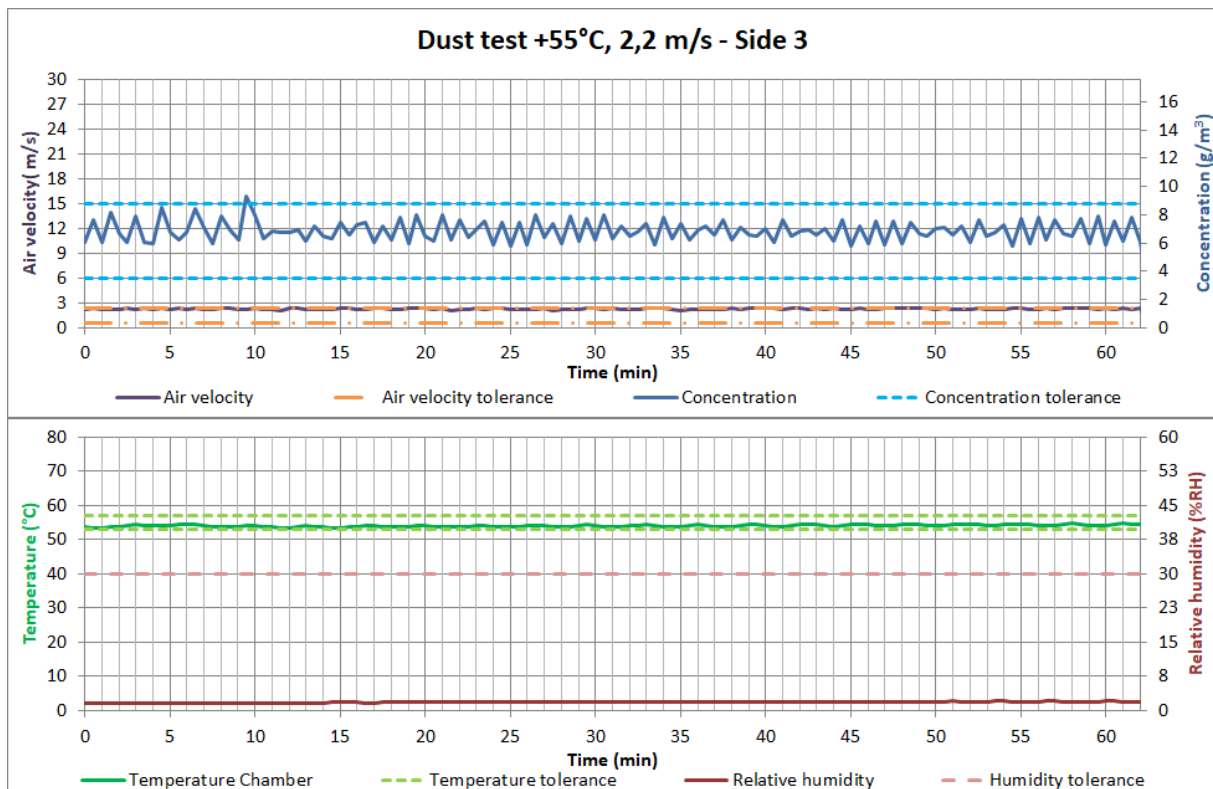


photo 61



photo 62

Test was started after having set all parameters.



curve 11

Pictures after test at +55°C:



photo 63



photo 64

5.3.2.6. Side 2:

Pictures before test at +55°C:

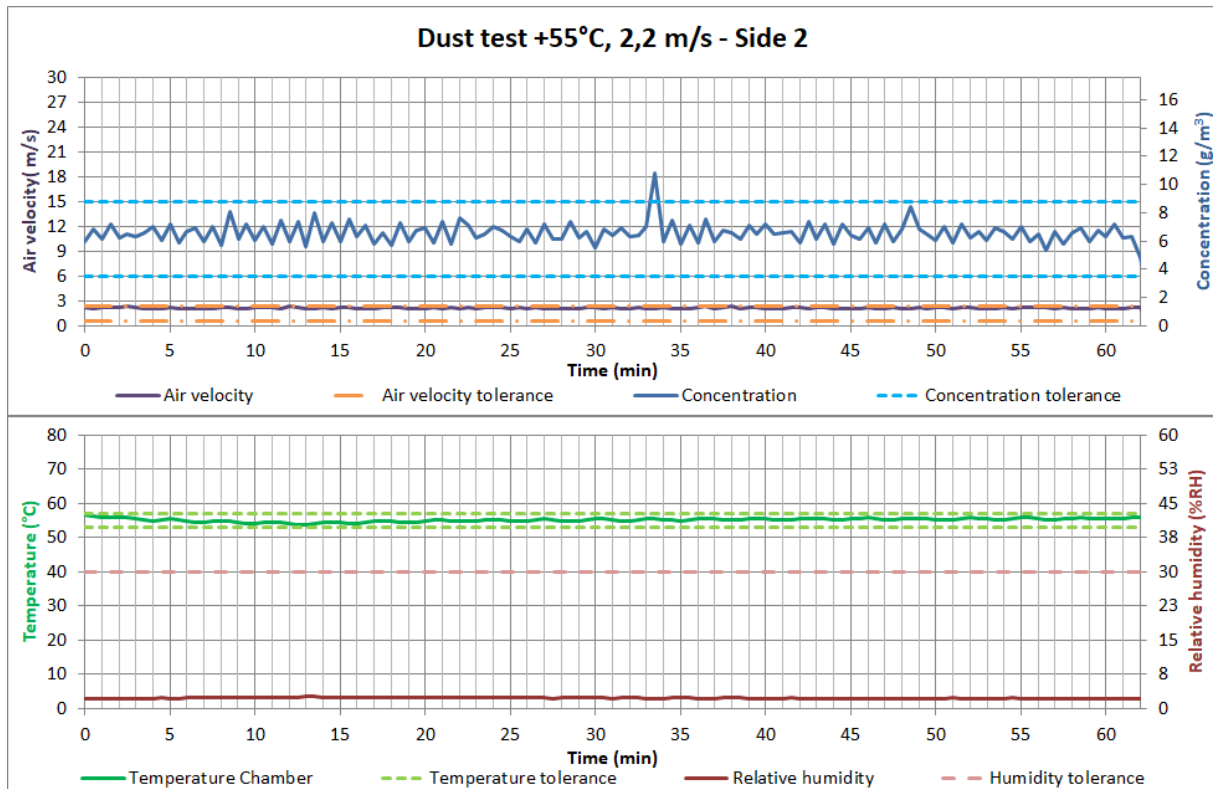


photo 65



photo 66

Test was started after having set all parameters.



curve 12

Pictures after test at +55°C:



photo 67

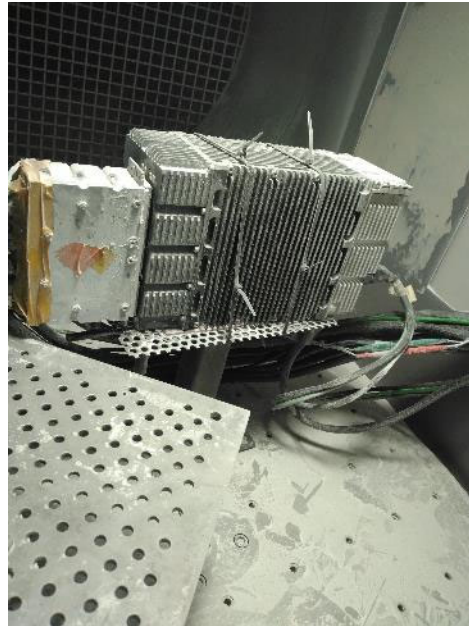


photo 68



photo 69

5.3.3. *Control after dust test:*

MU-NG & SU-NG:

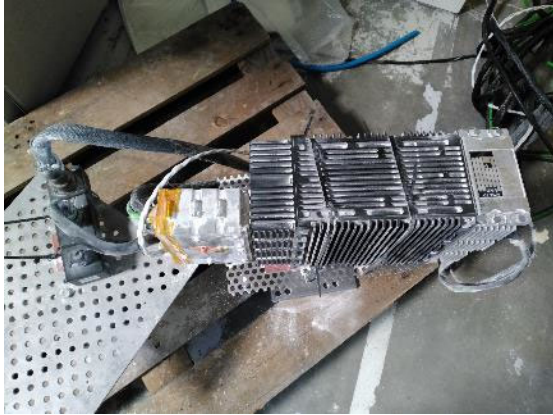


photo 70

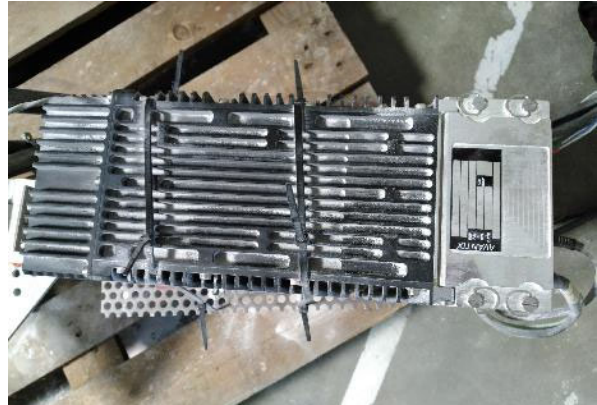


photo 71



photo 72



photo 73



photo 74



photo 75



photo 76



photo 77



photo 78



photo 79



photo 80

End of the dust test.

5.4. Sand test:

Note 1: For technical reasons (untimely detachment of clusters of particles deposited on the equipment), equipment was over exposed on - negligible time in comparison of the duration of the test, and have no influence on the final result (functional and visual).

Note 2: Concentration: the time passed under the low tolerance is added at the test duration.

5.4.1. Sand test at +25°C:

5.4.1.1. Side 3:

Pictures before test at +25°C:

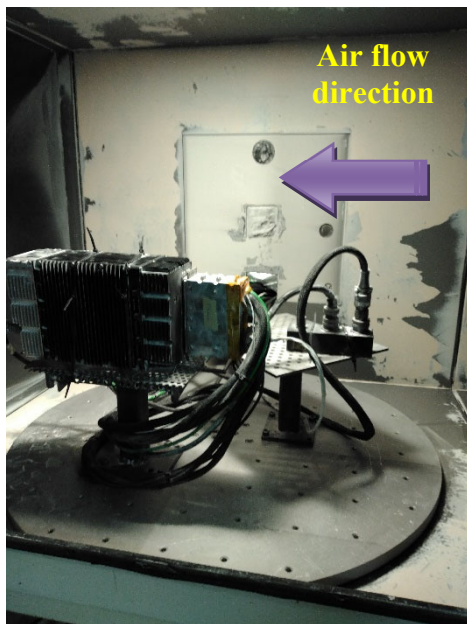
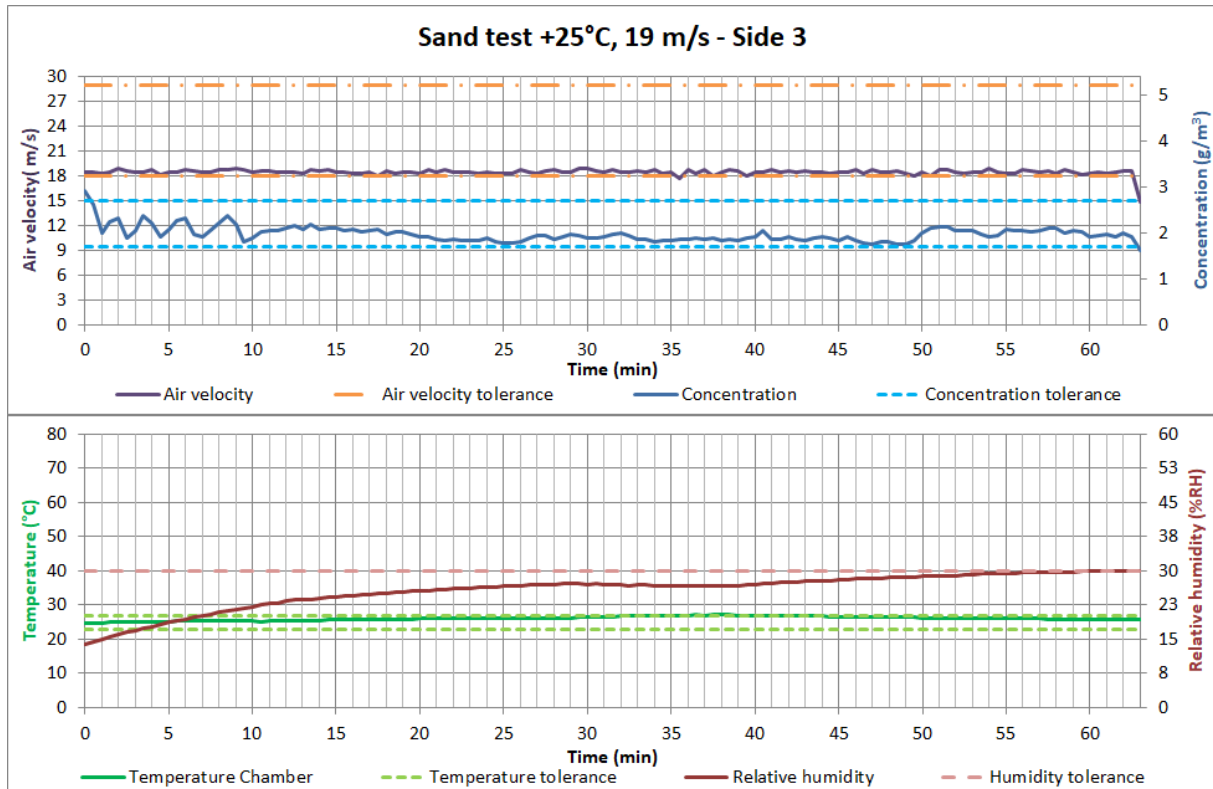


photo 81



photo 82

Test was started after having set all parameters.



Pictures after test at +25°C:



photo 83



photo 84

5.4.1.2. Side 2:

Pictures before test at +25°C:

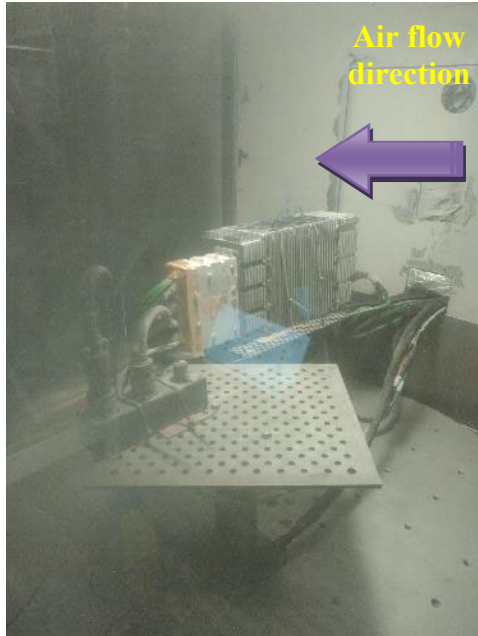
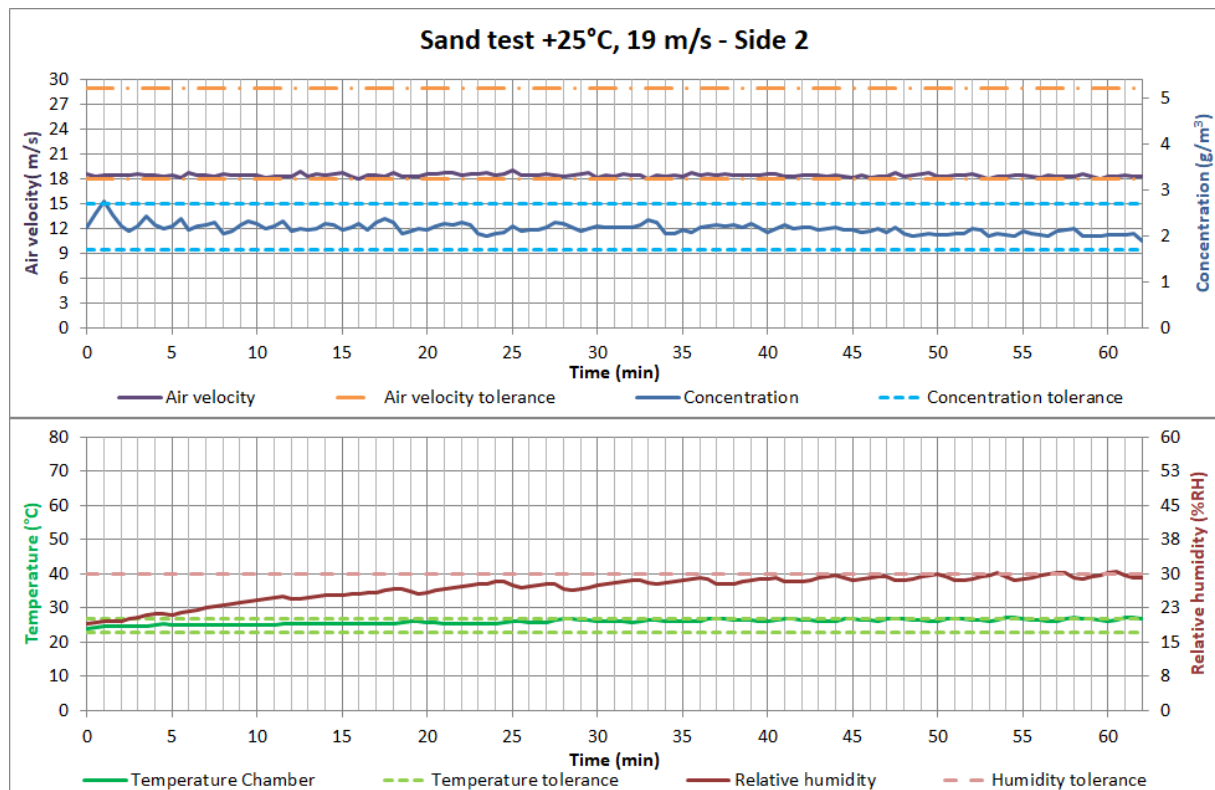


photo 85



photo 86

Test was started after having set all parameters.



curve 14

Pictures after test at +25°C:



photo 87

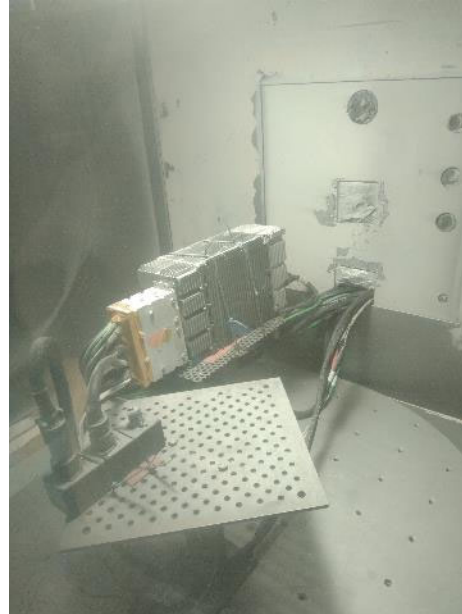


photo 88

5.4.1.3. Side 4:

Pictures before test at +25°C:

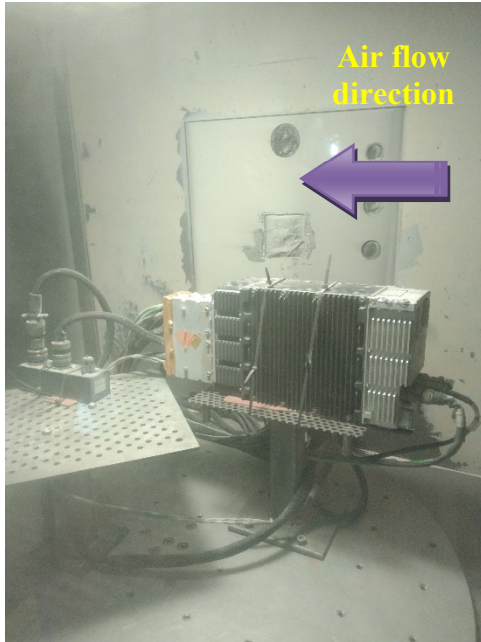
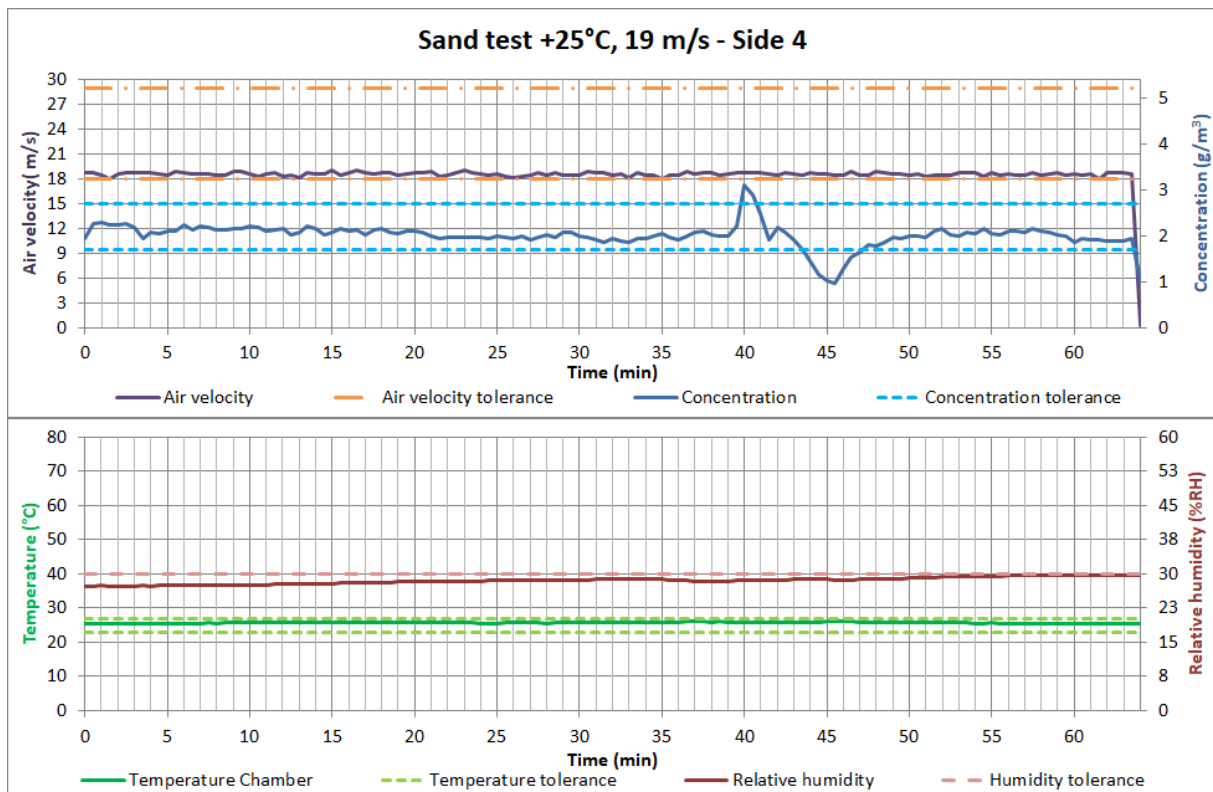


photo 89



photo 90

Test was started after having set all parameters.



curve 15

Pictures after test at +25°C:

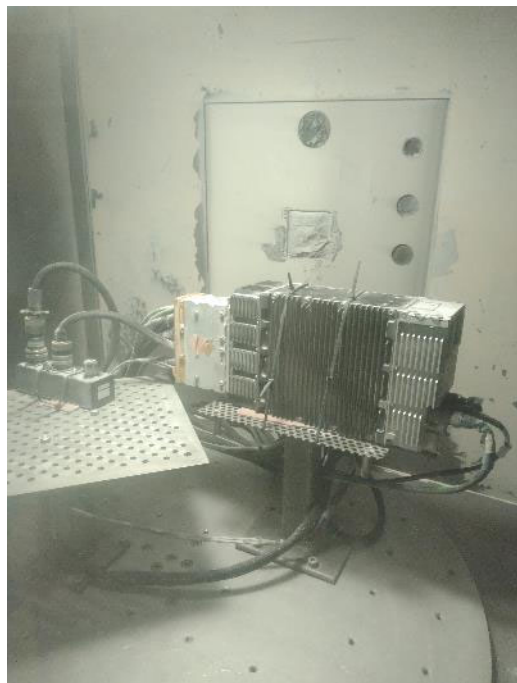


photo 91

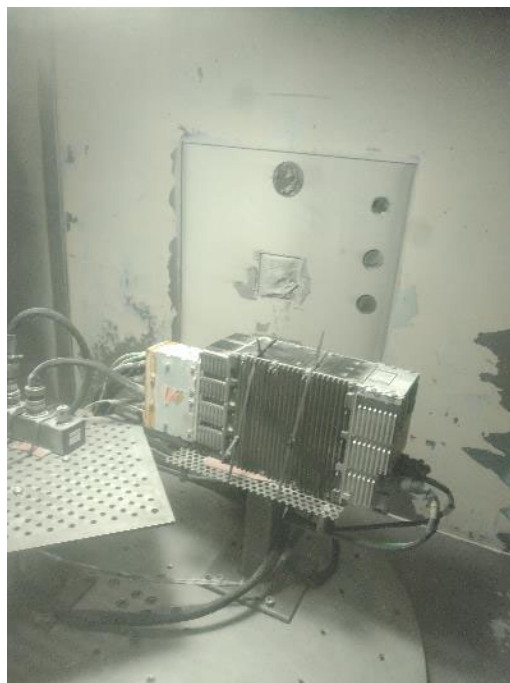


photo 92

5.4.1.4. Side 1:

Pictures before test at +25°C:

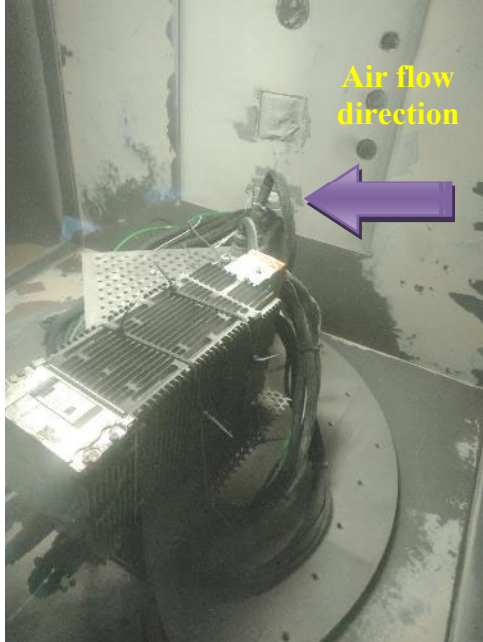
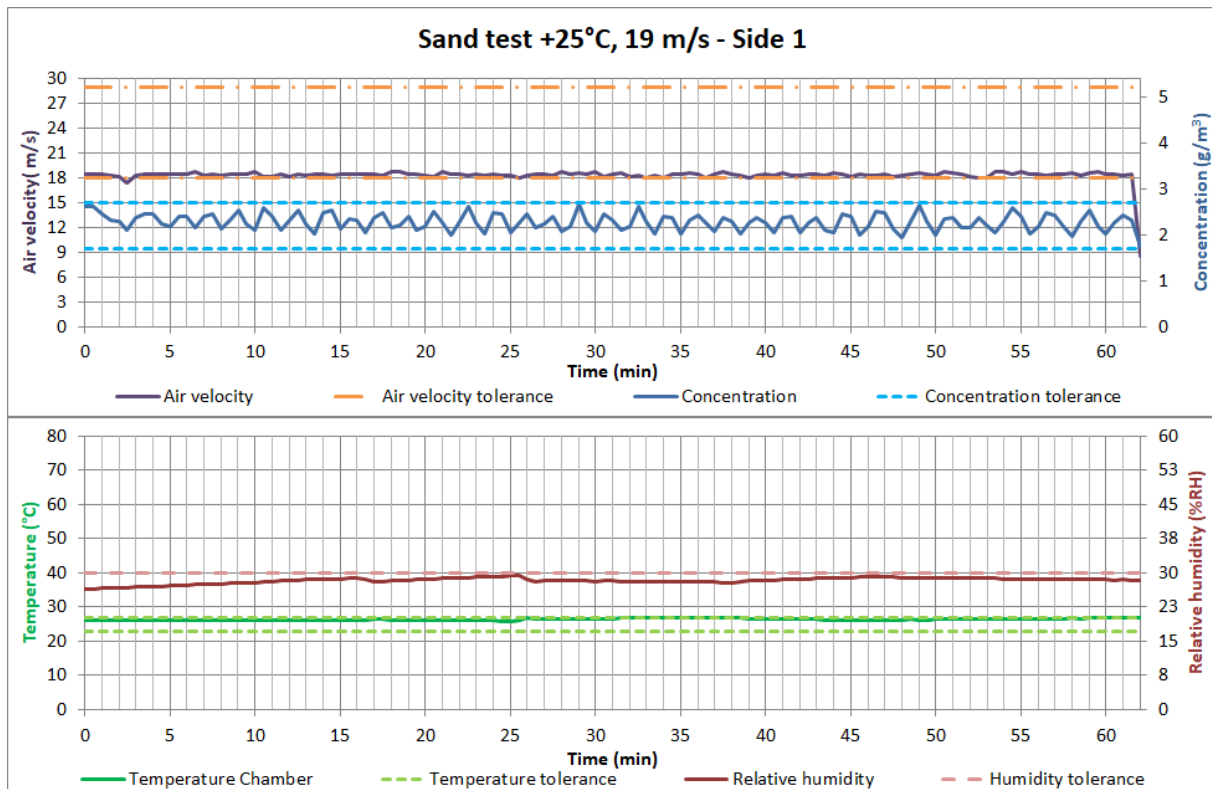


photo 93



photo 94

Test was started after having set all parameters.



curve 16

Pictures after test at +25°C:



photo 95



photo 96

5.4.1.5. Side 6:

Pictures before test at +25°C:

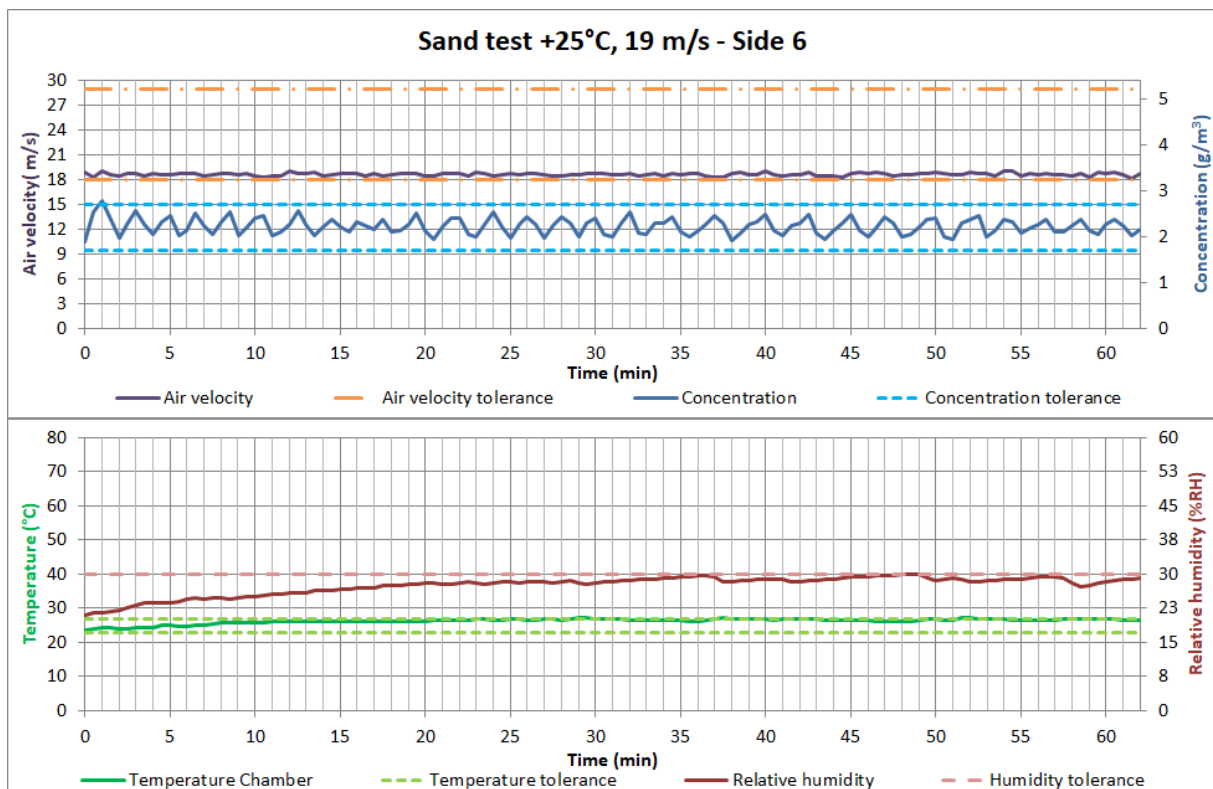


photo 97



photo 98

Test was started after having set all parameters.



curve 17

Pictures after test at +25°C:



photo 99



photo 100

5.4.1.6. Side 5:

Pictures before test at +25°C:

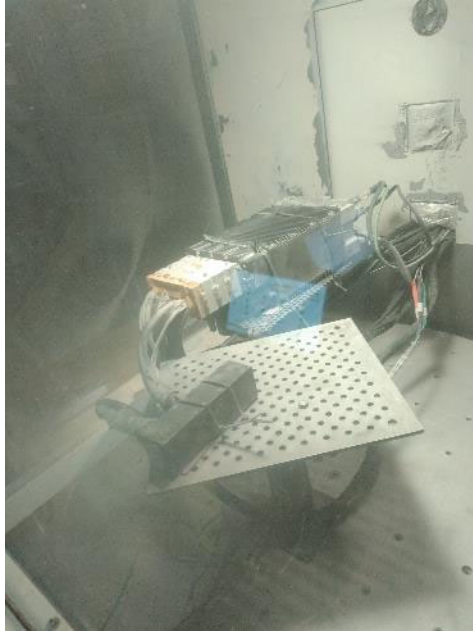


photo 101

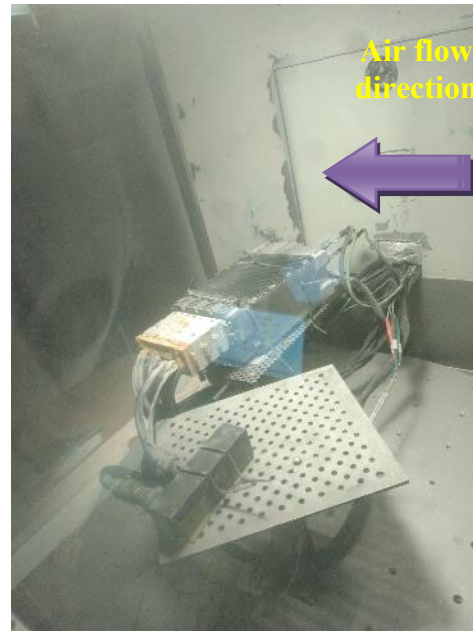
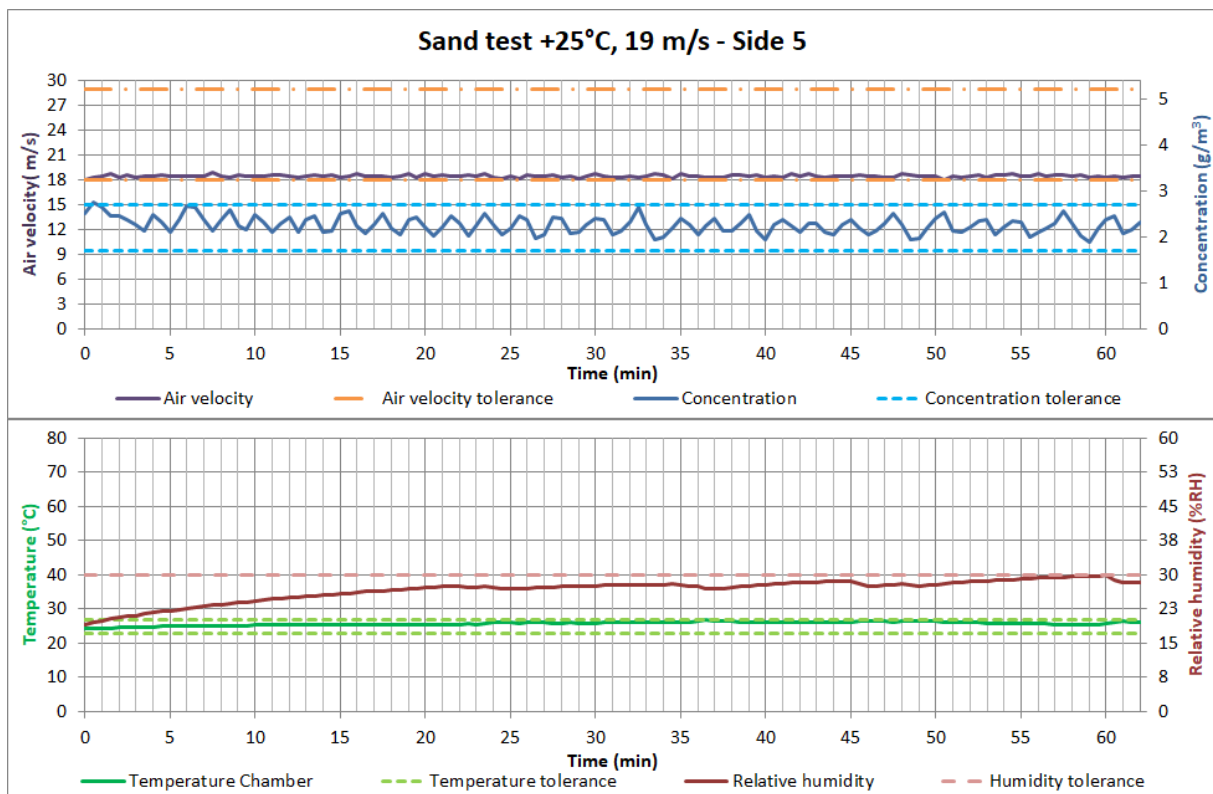


photo 102

Test was started after having set all parameters.



curve 18

Pictures after test at +25°C:



photo 103



photo 104

5.4.2. Sand test at +55°C:

5.4.2.1. Side 5:

Pictures before test at +55°C:

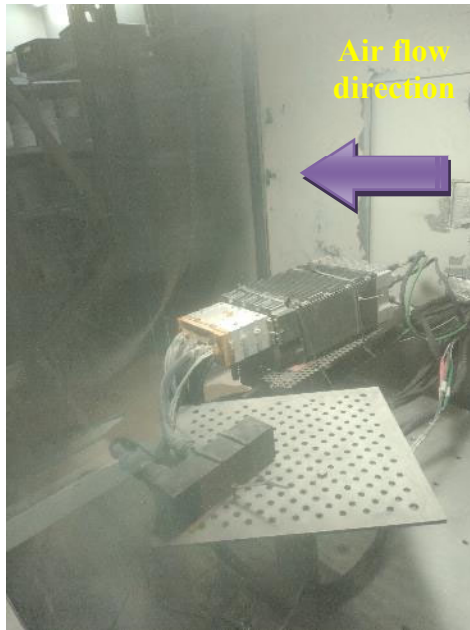


photo 105

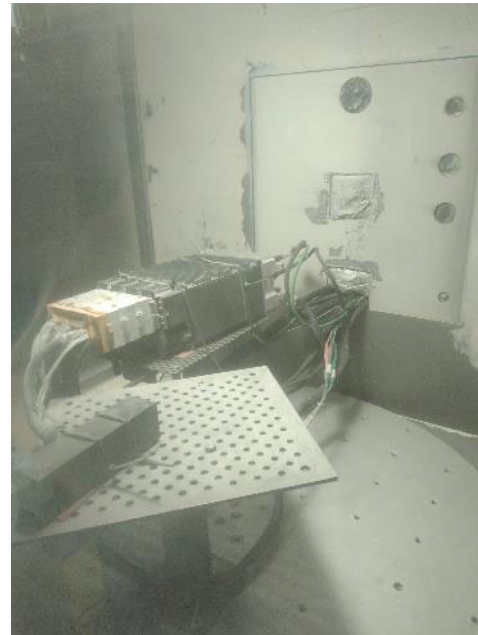
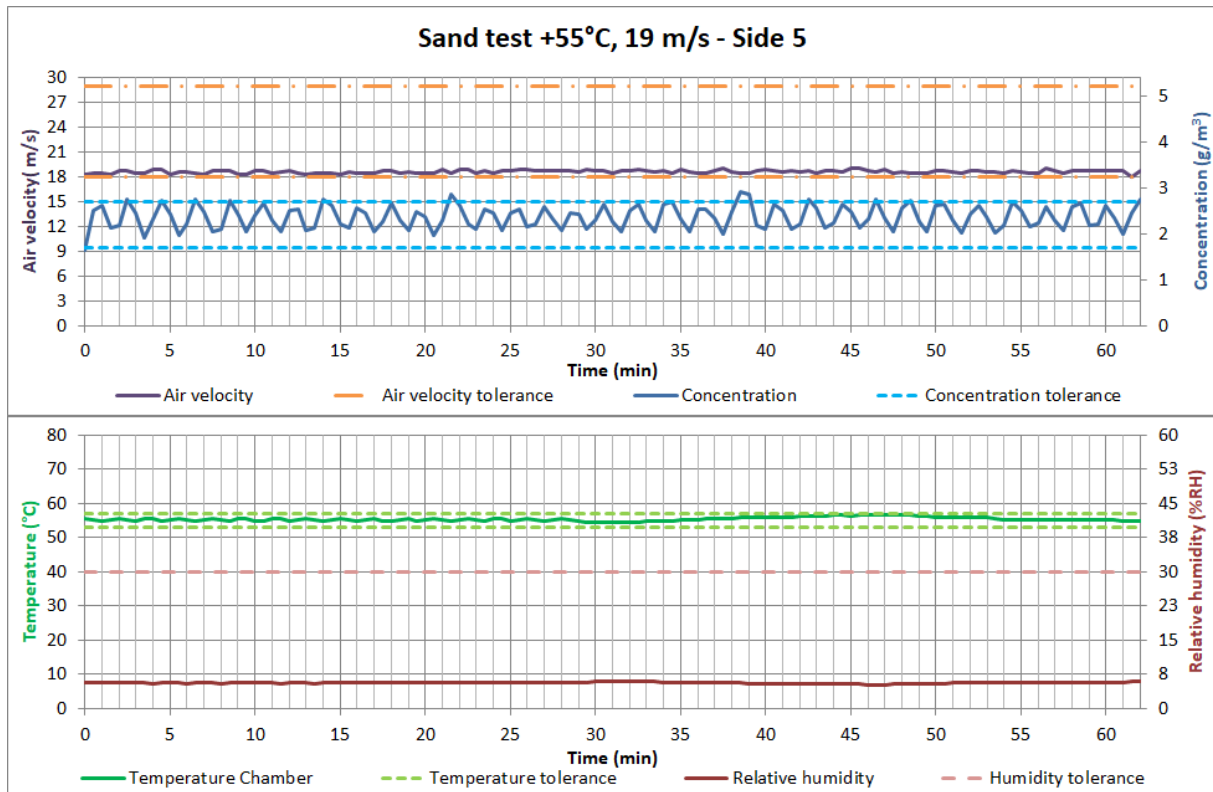


photo 106

Test was started after having set all parameters.



Pictures after test at +55°C:

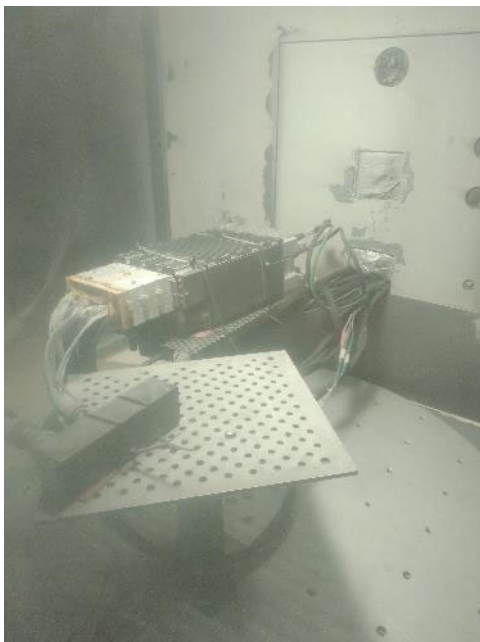


photo 107



photo 108

5.4.2.2. Side 6:

Pictures before test at +55°C:

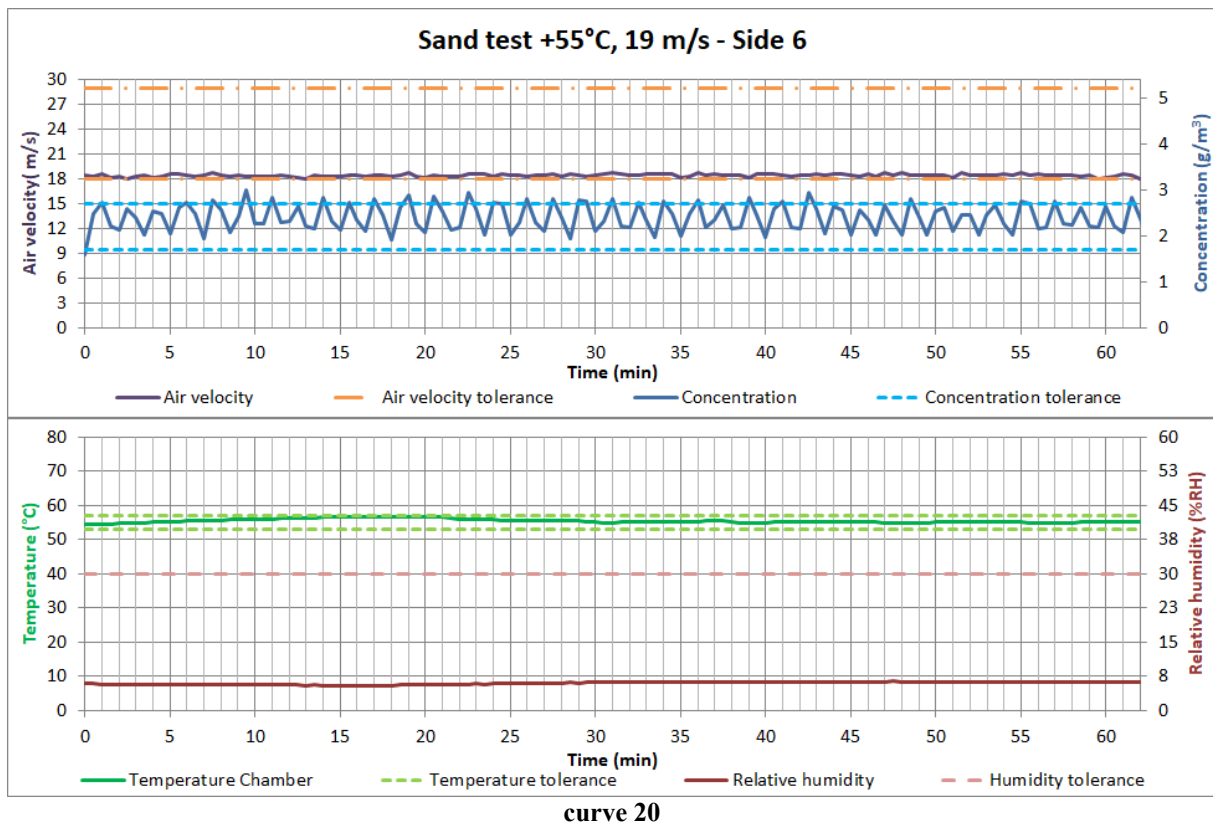


photo 109



photo 110

Test was started after having set all parameters.



Pictures after test at +55°C:



photo 111



photo 112

5.4.2.3. Side 4:

Pictures before test at +55°C:

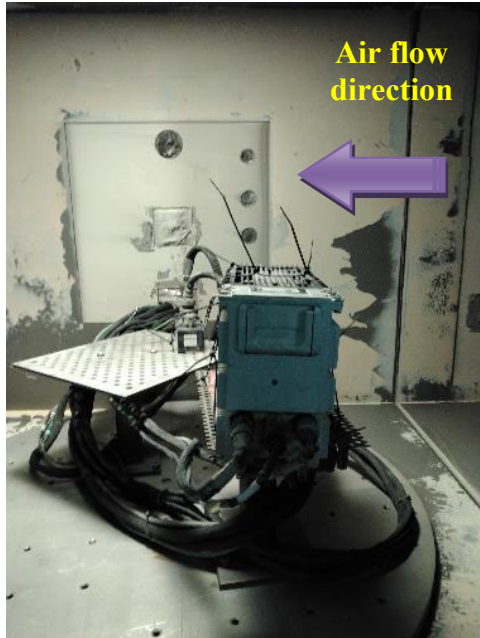


photo 113

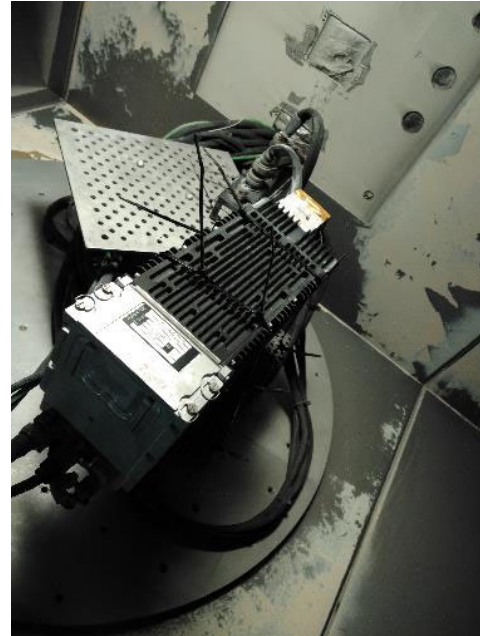
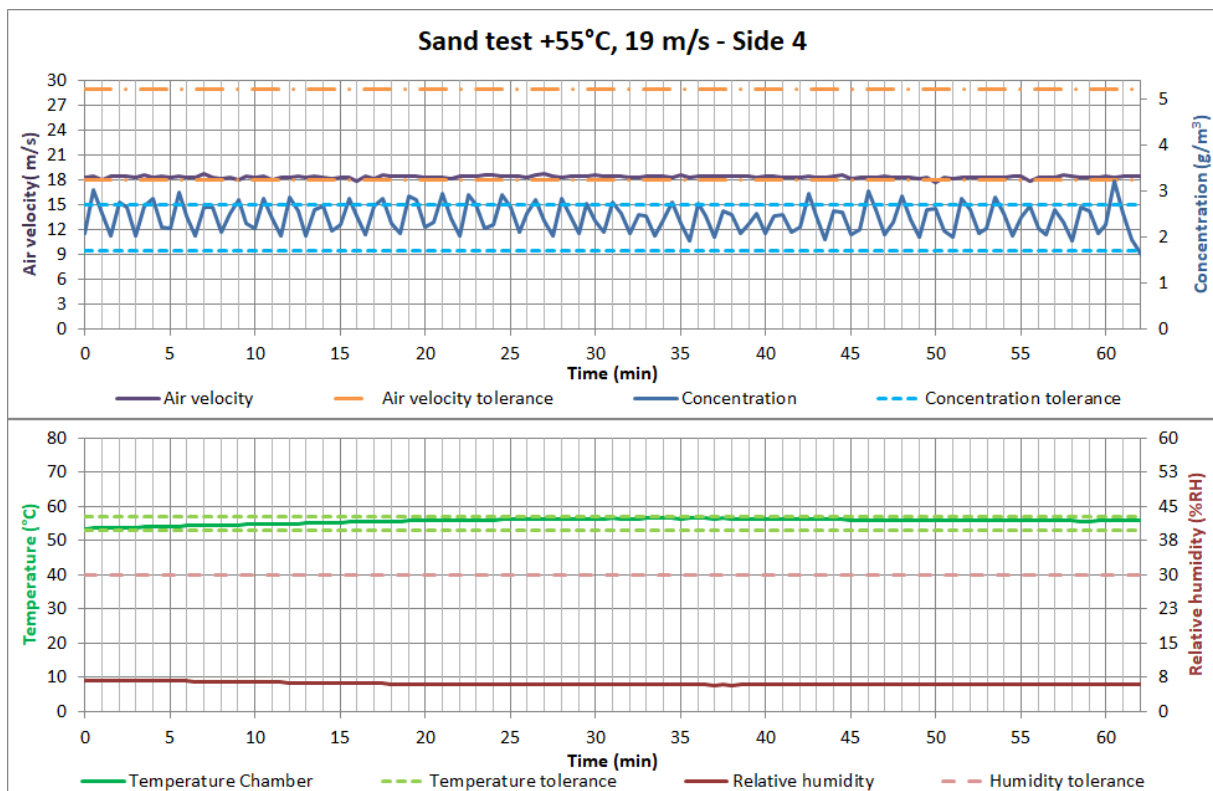


photo 114

Test was started after having set all parameters.



curve 21

Pictures after test at +55°C:



photo 115

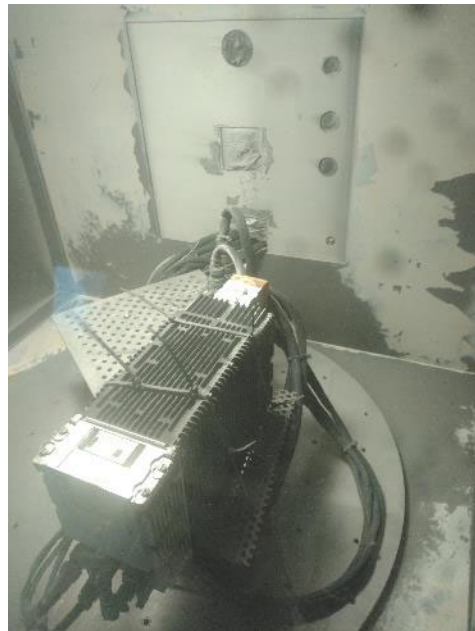


photo 116

5.4.2.4. Side 3:

Pictures before test at +55°C:

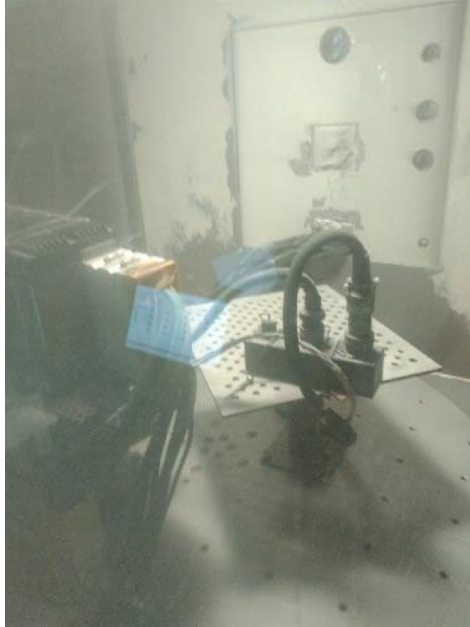


photo 117

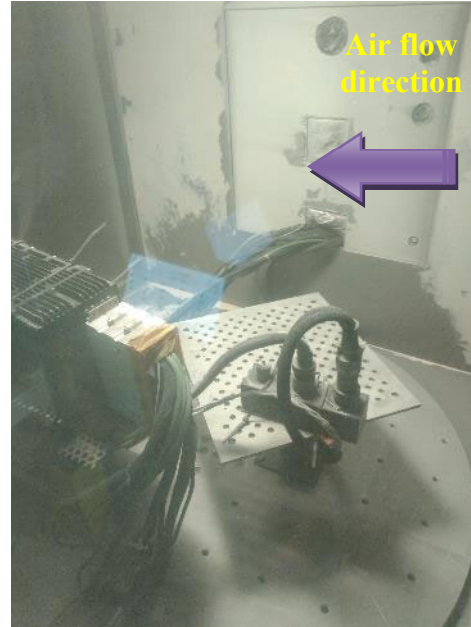
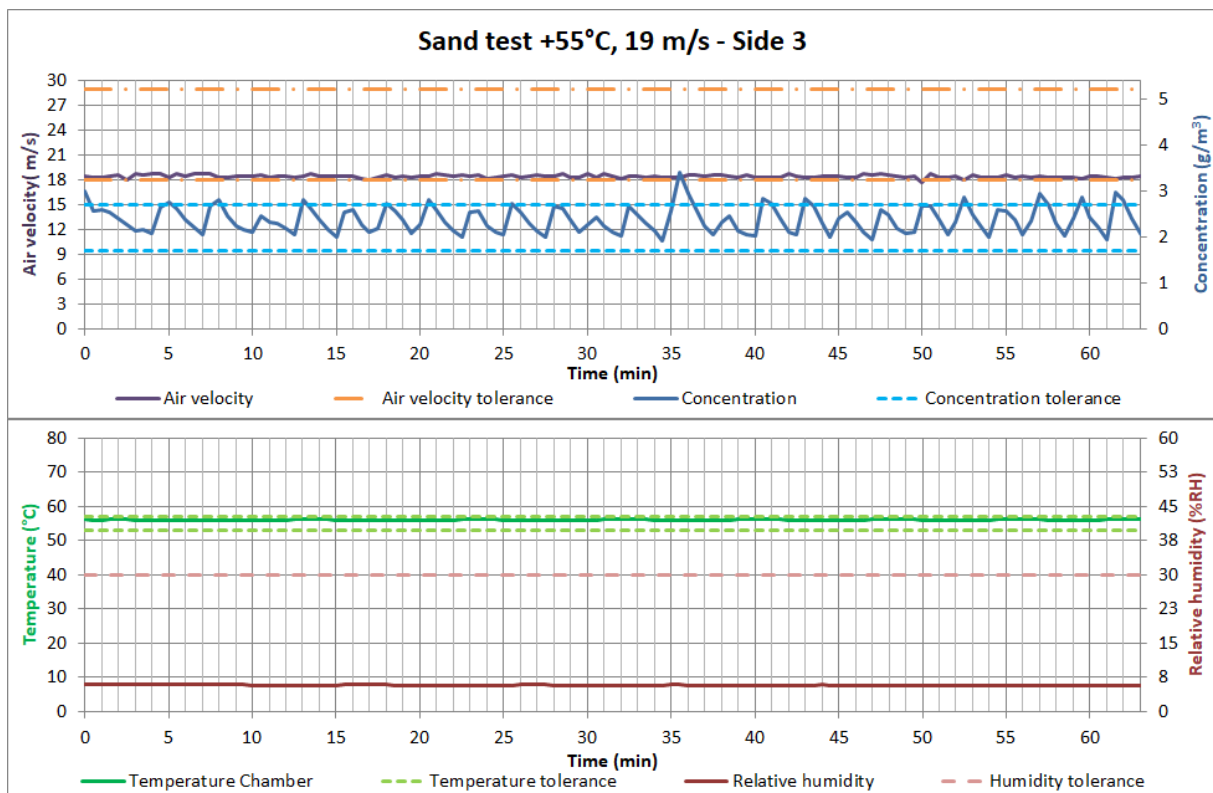


photo 118

Test was started after having set all parameters.



curve 22

Pictures after test at +55°C:

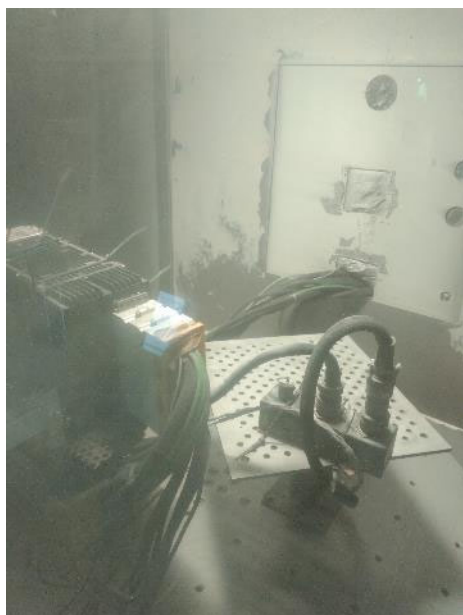


photo 119



photo 120

5.4.2.5. Side 2:

Pictures before test at +55°C:

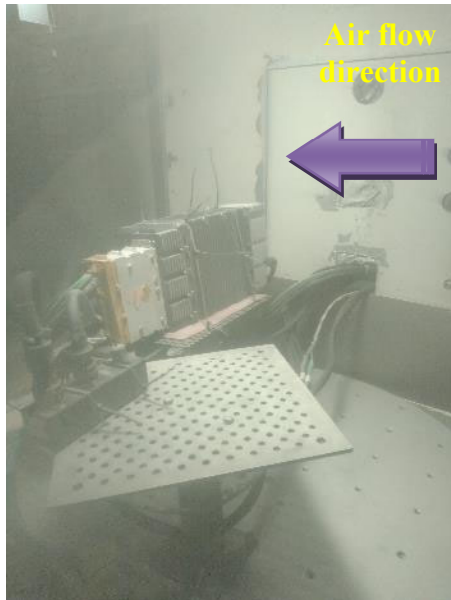
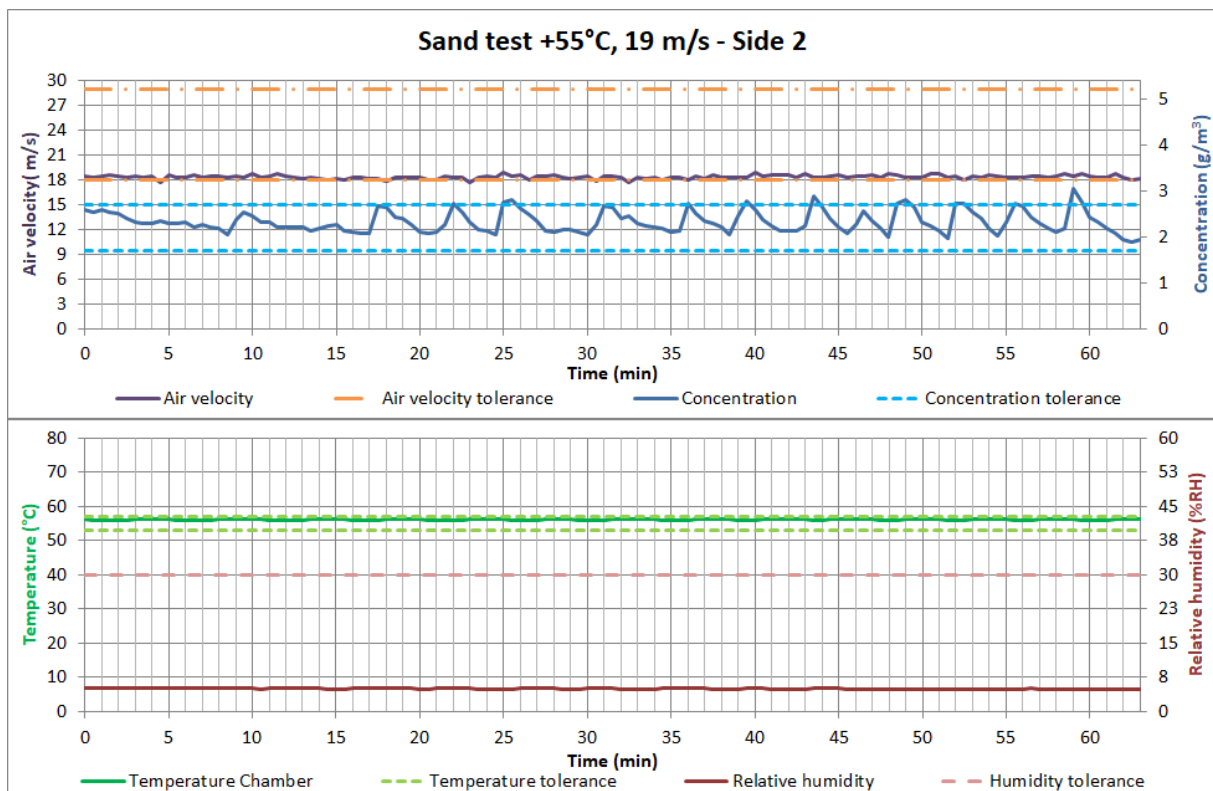


photo 121



photo 122

Test was started after having set all parameters.



curve 23

Between the side 2 and 1, the « Test Video STANAG » and « Test Video PAL /DVI » channels have encountered a fault. After several attempts to resolve the issue, the final test side is launched.

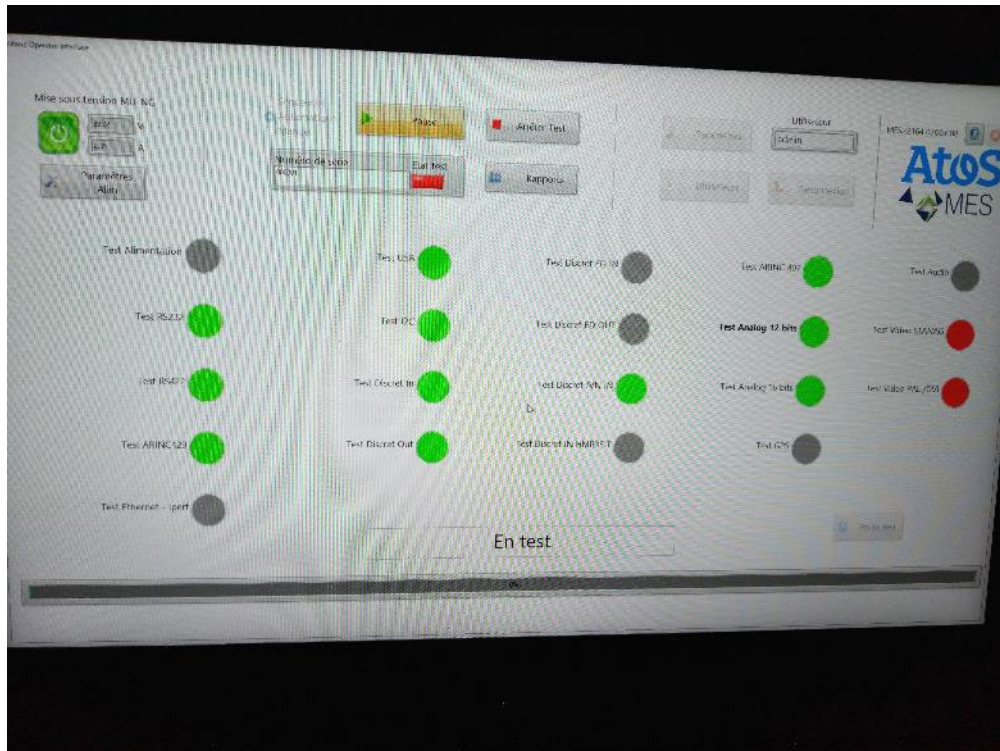


photo 123

5.4.2.6. Side 1:

Pictures before test at +55°C:

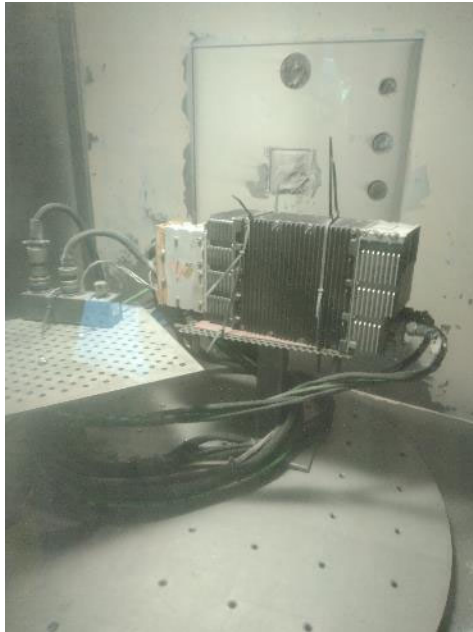


photo 124

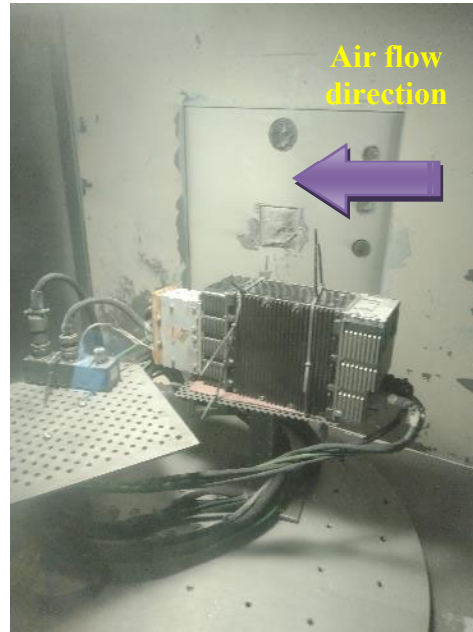
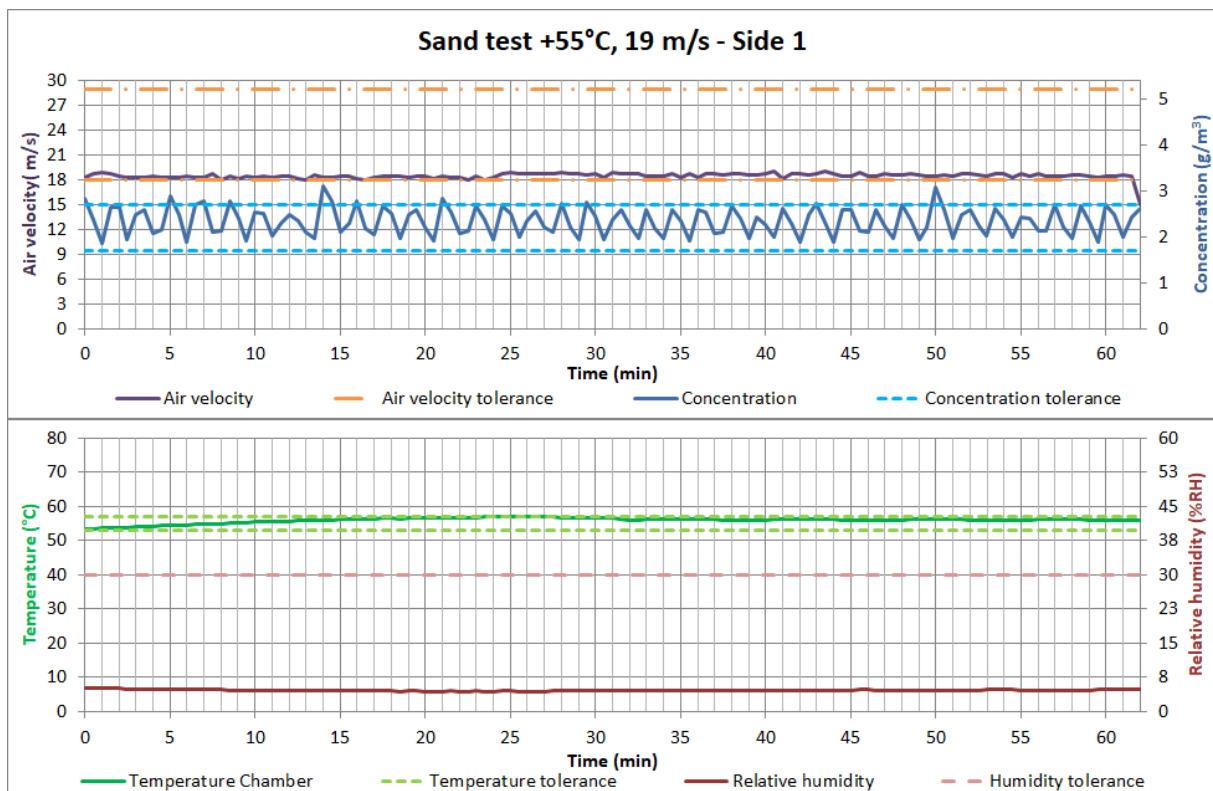


photo 125

Test was started after having set all parameters.



curve 24

Pictures after test at +55°C:

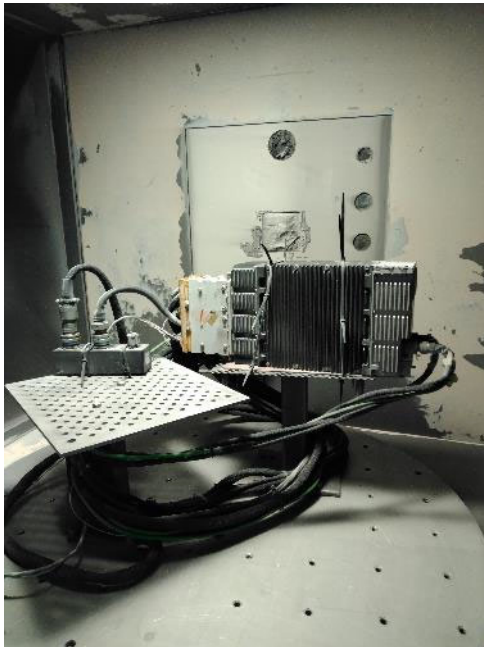


photo 126

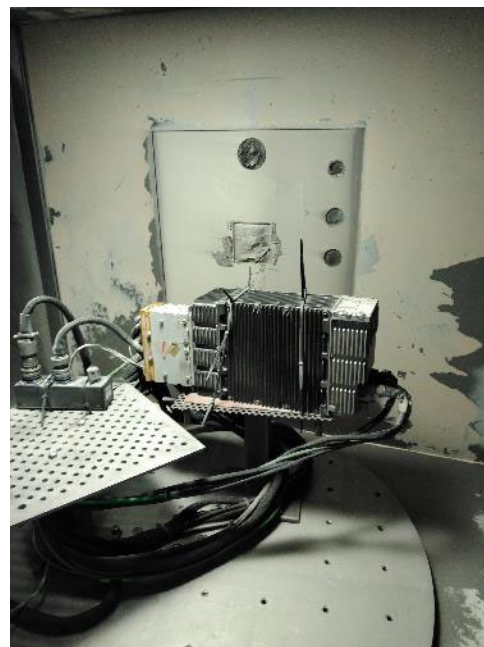


photo 127

5.4.3. Control after sand test:

MU-NG:



photo 128



photo 129



photo 130



photo 131



photo 132



photo 133



photo 134



photo 135



photo 136



photo 137



photo 138



photo 139

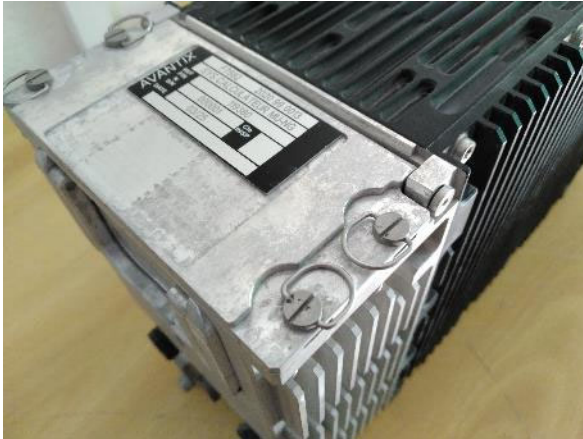


photo 140



photo 141



photo 142



photo 143

SU-NG:



photo 144



photo 145



photo 146



photo 147



photo 148



photo 149



photo 150



photo 151



photo 152

photo 153



photo 154

End of the sand test.

6. CONCLUSION

The equipment was tested in accordance with the test specification described in chapter 3 of this report.

At the end of the tests, no visual degradation was observed. There is sand inside a connector.

The “Test Video STANAG” and “Test Video PAL /VDI” channels are NOK at the end of the test, the results are the responsibility of the company AVANTIX.

Equipment was sent back to AVANTIX for final assessment.

□□□ End of report □□□