

# Prüfprotokoll

## Test protocol

1. **Test Method:** DIN EN 149:2009
2. **Type of test:** EU Type-Test
3. **Customer:** Venus Safety & Health Pvt. Ltd.
4. **Test specimen**
  - 4.1 Type: Particle filtering half mask
  - 4.2 Designation: VENUS V-420-SL FFP2 NR D
  - 4.3 Marking: VENUS V-420-SL FFP2 NR D EN 149:2001+A1:2009
  - 4.4 Class of device: FFP2 NR D

### 5. Visual inspection

The particle filtering half masks VENUS V-420-SL FFP2 NR D, which are submitted for EU-type-test, are, except marking, visually identical with the under EC-Type test certificate No. IFA 1401074 as of 2014-09-16 tested particle filtering half masks VENUS V-420-SL FFP2 NR D.

### 6. Conditioning

#### 6.1 Simulated wearing

The in table 4 of DIN EN 149:2009 given number of particle filtering half masks has been subjected to simulated wearing treatment according to DIN EN 149:2009 clause 8.3.1 before carrying out the further in table 4 given tests.

After simulated wearing treatment none of the conditioned particle filtering half masks shall have suffered mechanical failure of the facepiece and the particle filtering half masks shall not collapse.

The requirements are fulfilled.

#### 6.2 Temperature conditioning

The in table 4 of DIN EN 149:2009 given number of particle filtering half masks has been subjected to temperature conditioning according to DIN EN 149:2009 clause 8.3.2 before carrying out the further in table 4 given tests.

After temperature conditioning none of the conditioned particle filtering half masks shall collapse.

The requirement is fulfilled.

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**6.3 Mechanical strength**

The in table 4 of DIN EN 149:2009 given number of particle filtering half masks has been subjected to mechanical strength conditioning according to DIN EN 149:2009 clause 8.3.3 before carrying out the further in table 4 given tests.

**7. Breathing resistance**

**7.1 Requirements**

Max. inhalation resistance at a flow rate of 30 l/min: 70 Pa  
 Max. inhalation resistance at a flow rate of 95 l/min: 240 Pa  
 Max. exhalation resistance at a flow rate of 160 l/min: 300 Pa

**7.2 Test specimen**

T.-No 1-2, 4-9: VENUS V-410-SL FFP1  
 T.-No 10: VENUS V-420-SL FFP2  
 T.-No 11: VENUS V-420-SL FFP2 NR  
 T.-No 3, 12: VENUS V-420-SL FFP2 NR D

**7.3 Test results**

Test	Conditioning	Breathing resistance [Pa]		
		Inhalation at 30 l/min	Inhalation at 95 l/min	Exhalation at 160 l/min
1	as received	59	187	296
2	as received	57	179	280
3	as received	36	133	208
4	EN 149:2001, 8.3.1	57	183	291
5	EN 149:2001, 8.3.1	56	179	284
6	EN 149:2001, 8.3.1	52	168	261
7	EN 149:2001, 8.3.2	52	171	272
8	EN 149:2001, 8.3.2	51	165	267
9	EN 149:2001, 8.3.2	52	168	264
10	EN 149:2001, 8.3.2	45	154	245
11	EN 149:2001, 8.3.2 & 8.3.3	32	106	170
12	EN 149:2001, 8.3.2	35	131	212

The requirements are fulfilled.

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## 8. Filter penetration at test against paraffin oil

8.1 Test flow rate: 95 l/min

### 8.2 Requirements

Maximum filter penetration: 6,0 %

### 8.3 Test specimen

T.-No 1-6 & 10-12: VENUS V-410-SL FFP1

T.-No 7-9: VENUS V-420-SL FFP2

T.-No 13: VENUS V-420-SL FFP2 NR

T.-No 14-15: VENUS V-420-SL FFP2 NR D

### 8.4 Test results

Test	Conditioning	Penetration [%]	
		measured value 1	measured value 2
1	as received	1,0	-, -
2	as received	0,9	-, -
3	as received	0,7	-, -
4	EN 149:2001, 8.3.1	0,4	-, -
5	EN 149:2001, 8.3.1	0,6	-, -
6	EN 149:2001, 8.3.1	0,9	-, -
7	EN 149:2001, 8.3.2	1,1	1,5
8	EN 149:2001, 8.3.2	1,1	1,5
9	EN 149:2001, 8.3.2	0,7	1,0
10	EN 149:2001, 8.3.3	0,6	-, -
11	EN 149:2001, 8.3.3	0,5	-, -
12	EN 149:2001, 8.3.3	0,6	-, -
13	EN 149:2001, 8.3.3 & 8.3.2	1,7	2,4
14	EN 149:2001, 8.10	4,0	-, -
15	EN 149:2001, 8.3.2 & 8.10	1,0	-, -

Measured value 1: Filter penetration after 3 minutes

Measured value 2: Maximum filter penetration during paraffin oil exposure until 120 mg

The requirements are fulfilled.

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**9. Filter penetration at test against sodium chloride**

9.1 Test flow rate: 95 l/min

9.2 Requirements

Maximum filter penetration: 6,0 %

9.3 Test specimen

T.-No 1-6 & 10-12: VENUS V-410-SL FFP1

T.-No 7-9: VENUS V-420-SL FFP2

T.-No 13: VENUS V-420-SL FFP2 NR

T.-No 14-15: VENUS V-420-SL FFP2 NR D

9.4 Test results

Test	Conditioning	Penetration [%]	
		measured value 1	measured value 2
1	as received	0,4	-, -
2	as received	0,3	-, -
3	as received	0,2	-, -
4	EN 149:2001, 8.3.1	0,3	-, -
5	EN 149:2001, 8.3.1	0,4	-, -
6	EN 149:2001, 8.3.1	0,3	-, -
7	EN 149:2001, 8.3.2	0,3	0,3
8	EN 149:2001, 8.3.2	0,3	0,3
9	EN 149:2001, 8.3.2	0,3	0,3
10	EN 149:2001, 8.3.3	0,4	-, -
11	EN 149:2001, 8.3.3	0,3	-, -
12	EN 149:2001, 8.3.3	0,4	-, -
13	EN 149:2001, 8.3.3 & 8.3.2	0,9	0,9
14	EN 149:2001, 8.10	0,3	-, -
15	EN 149:2001, 8.3.2 & 8.10	0,8	-, -

Measured value 1: Penetration after 3 minutes

Measured value 2: Maximum penetration

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## 10. Clogging

10.1 Test flow rate: 15 cycles/min and 2,0 l/stroke

10.2 Test conditions

According to DIN EN 149:2001 clause 8.10 clogging is performed at a Dolomite dust concentration of  $(400 \pm 100) \text{ mg/m}^3$  until the product of dust concentration and test period is  $833 \text{ mg}\cdot\text{h/m}^3$  has been clogged.

10.3 Requirements

The breathing resistance after clogging of particle filtering half masks of the device class FFP2 NR D without exhalation valve shall not exceed 400 Pa for inhalation and exhalation measured at a continue flow rate of 95 l/min.

10.4 Test results

Test	Conditioning	Inhalation resistance at 95 l/min [Pa]	Exhalation resistance at 95 l/min [Pa]
1	as received	189	164
2	EN 149:2001, 8.3.2	173	172

The test results refer to a dust concentration and test period product value of  $833 \text{ mg}\cdot\text{h/m}^3$ .

The requirements are fulfilled.

## 11. Total inward leakage

11.1 Test conditions

Treadmill speed: 6 km/h

Duration of exercise: 2 min per exercise

Type of exercises: Ex. No. 1 = Walking  
Ex. No. 2 = Walking and turning the head  
Ex. No. 3 = Walking and head up and down  
Ex. No. 4 = Walking and speaking  
Ex. No. 5 = Walking

11.2 Requirements

The total inward leakage shall not exceed 11 % in 46 of the 50 individual results (10 persons x 5 exercises).

The total inward leakage shall not exceed 8 % in 8 of the 10 arithmetic means (10 persons).

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### 11.3 Test specimen

T.-No 1-9: VENUS V-410-SL FFP1

T.-No 10: VENUS V-420-SL FFP2

### 11.4 Test results (total inward leakage in %)

Subject	Conditioning	Exercises					mean
		1	2	3	4	5	
1	as received	4,1	5,4	2,6	1,4	3,6	3,4
2	as received	7,7	6,0	9,0	5,9	4,7	6,7
3	as received	0,3	0,4	0,4	0,7	0,6	0,5
4	as received	5,5	4,7	4,2	2,6	2,7	3,9
5	as received	2,8	3,3	2,4	0,5	0,8	2,0
6	EN 149:2001, 8.3.2	6,2	9,5	10,4	11,2	12,5	10,0
7	EN 149:2001, 8.3.2	0,3	0,3	0,3	0,4	0,2	0,3
8	EN 149:2001, 8.3.2	1,8	1,2	2,7	5,2	6,6	3,5
9	EN 149:2001, 8.3.2	3,4	2,4	3,4	1,3	0,5	2,2
10	EN 149:2001, 8.3.2	5,7	7,0	8,0	11,8	6,2	7,7

The requirements are fulfilled.

## 12. Practical performance

After the practical performance test the respiratory protective device was assessed by two test subjects.

### 12.1 Assessment wearer 1

Head harness comfort : no complaint  
Security of fastenings: no complaint  
Field of vision: no complaint  
Additional remarks: none

### 12.2 Assessment wearer 2

Head harness comfort: no complaint  
Security of fastenings: no complaint  
Field of vision: no complaint  
Additional remarks: none

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### 13. Carbon dioxide content of the inhalation air

#### 13.1 Test procedure

The carbon dioxide content of the inhalation air (dead space) shall be measured at the mouth of the dummy head with a breathing machine adjusted to 25 cycles/min and 2.0 l/stroke.

#### 13.2 Requirement

The carbon dioxide content of the inhalation air (dead space) shall not exceed an average of 1.0 % (by volume), measured at an ahead wind-speed of 0.5 m/s.

#### 13.3 Test results

Concentration [Vol.-%]	Test 1	Test 2	Test 3
CO <sub>2</sub> content of the inhalation air	0,76	0,82	0,78

The requirement is fulfilled.

### 14. Package

Particle filtering half masks shall be offered for sale and packaged in such a way that they are protected against mechanical damage and contamination before use.

The requirements are fulfilled.

### 15. Flammability

Four particle filtering half masks were tested, two in the state as received and two after temperature conditioning (DIN EN 149:2009, clause 8.3.2).

The four tested samples shall not burn with their own flame.

The requirement is fulfilled.

### 16. Dimensional stability

During the simulated wearing treatment and the temperature conditioning in accordance with clauses 8.3.1 and 8.3.2 of DIN EN 149:2009, the particle filtering half masks shall not collapse.

The requirements are fulfilled.

### 17. Finish of parts

Parts of the device likely to come into contact with the wearer shall have no sharp edges or burrs.

The requirements are fulfilled.

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**18. Head harness**

18.1 Head harness after simulated wearing

After the simulated wearing treatment (DIN EN 149:2009 clause 8.3.1) of three particle filtering half masks, no mechanical deflection of the head harness shall occur.

The requirement is fulfilled.

18.2 Adjustability and hold of the head harness

The assessment was executed during the leakage tests and practical performance tests.

The requirements are fulfilled.

**19. Compatibility with skin**

The materials coming into contact with the wearers' skin during the leakage tests and practical performance tests shall not cause any irritation or any other negative health effect for wearers.

The requirements are fulfilled.

**20. Field of vision**

The field of vision is acceptable if determined so in practical performance tests.

The requirements are fulfilled.

**21. Mass of the respiratory device: 10 g**

**22. Marking**

22.1 Marking of mask

The requirements are fulfilled.

22.2 Marking of packaging

The requirements are fulfilled.

**23. Information supplied by the manufacturer**

Only the instructions for use in English language were revised.

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The performed test results apply to the tested objects only.  
A statement about the uniformity of production cannot be derived.

Institute for Occupational Safety and Health – IFA –  
In charge

  
Dipl.-Ing. Judith Krisinger

Person responsible

  
Benedikt Brenner

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