

پژوهشگاه علوم و فنون هسته‌ای  
پژوهشگاه مواد و روش‌های هسته‌ای

کد مدرک: QM-F-510-01-01

گواهی آزمون

صفحه ۱ از ۱

نام درخواست کننده: شرکت ریت ابزار پودان

کد پیگیری: 109-1171

نوع درخواست: برون سازمانی

کد پروژه قرارداد: ۵۰

تاریخ درخواست: ۱۳۹۹/۰۴/۱۰

تاریخ انقضای آزمون: ۱۳۹۹/۰۴/۲۱

شماره گواهی آزمون: ۹۹۰۵۴۸

تاریخ صدور گواهی آزمون: ۱۳۹۹/۰۴/۲۱

آدرس درخواست کننده: تهران، جاده قزوین، کرج، اصفهان، تیسلیس، جاده شهرک - شهرک صنایع گلگرد - خیابان مرکزی

شماره دفتر خانه: ۹۹۰۱۱۶۸۵۱

دوش آزمون: نام و کد روش

نتیجته کارآزمایی فیلتر

ردیف	کد نمونه	کد آزمایشگاه	موضوع آزمون	نتیجه	واحد
۱	Flat fold face 40g	109-1471,001	تست کارایی بستر		
۲	Flat fold face 50g	109-1471,002	تست کارایی بستر		
۳	3-ply face 40g	109-1471,003	تست کارایی بستر		
۴	cone-40g CX	109-1471,004	تست کارایی بستر		

ملاحظات:

۱۲ صفحه تکمیلی به پیوست می باشد

تهیه کننده: کارشناس

نایب کننده: کارشناس ارشد

تصویب کننده: مدیر فنی

توضیحات: بر گواهی بدون مهر آزمایشگاه، ذکر اعتبار است.

نتایج تنها مربوط به اعلام آزمون است و بر گزارش به معنای گواهی اعتبار نیست.

نمونه ها در صورت پایدار بودن بعد از انجام آزمون به مدت دو هفته در آزمایشگاه نگهداری خواهند شد.

مهر گواهی که بر روی این گواهی باید به اجزای منگوب آرد این گواهی به صورت کامل و در تمامی صفحات باشد.



فرماندهی همکاری کارکنان سازمان انرژی اتمی، تهران، محله علوم و فنون هسته‌ای، پلاک ۱۱، تهران، شماره تماس: ۰۲۱-۸۴۸۱-۸۴۸۵  
 بخش پشتیبانی: تهران، پلاک ۱۱، تهران، شماره تماس: ۰۲۱-۸۴۸۱-۸۴۸۵  
 ایمیل: naci.nacn@aeoi.ir



Report name: Respirator Filter Media Quality Test

Date: 7/9/2020

Report number: I99-1471-01

### Laboratory Data

Report No: I99-1471-01

Date: 7/9/2020

Test Laboratory: Safety & Environmental Laboratory

Operator: Hossein Yousefi-Pegah Azimzadeh

Supervisor: Prof. Asghar Sadighzadeh

Particle Counter(s): Condensation Particle Counter (Grimm) and Laser Particle Counter (Grimm)

Manometer: Kimo MP 202

### Device Manufacturer's Data

Manufacturer: Zist Abzar Pajouhan Co.

Product Name: Respirator Filter Media

Product Model declared by manufacturer: Nano Coated

Test requested by: Zist Abzar Pajouhan Co.

Sample obtained from: Mr. Ghavami



### Test Conditions

Temperature (°C): 29

RH (%) < 15

Air flow rate (l/min<sup>1</sup>): 5, 10, 15, 20, 25, 30

<sup>1</sup> Liter Per minute



## Respirator Filter Media quality test

### I. Pressure drop $\Delta P$ as a function of air flow rate $Q$

Note: Air Filtration Media surface area used for test is 100 cm<sup>2</sup>.

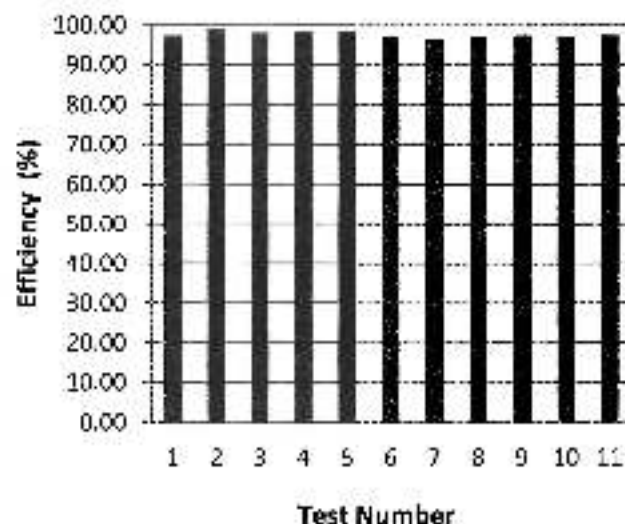
$Q$ (l/min)	5	10	15	20	25	30
$\Delta P$ (P <sup>a</sup> )	10	23	37	50	63	79

### II. Efficiency $E$

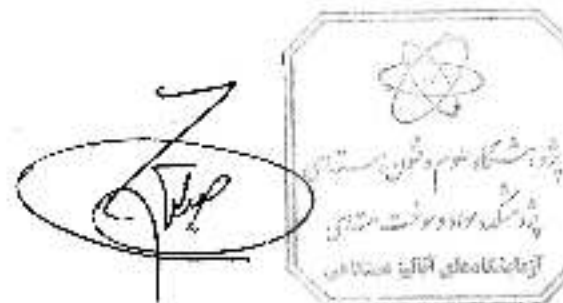
#### a. Total removal efficiency for aerosol particle with diameter $\geq 3$ nm<sup>3</sup>

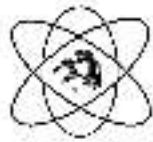
Data extracted by Condensation Particle Counter (CPC)

Average removal efficiency for aerosol particles with diameter  $\geq 3$  nm: 97.75 %



<sup>a</sup> Pascale  
nanometer

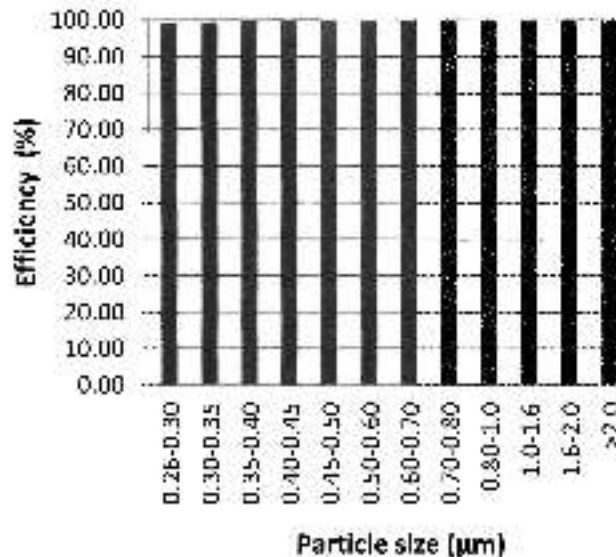




**b. Removal efficiency in term of aerosol particle size(Dp)**

Data extracted from Laser Particle Counter (Grimm)


particle size Dp (µm)	Average of 40 measures N <sup>4</sup> (pA) <sup>4</sup>	Average of 40 Measures N <sup>5</sup> (p/l)	Efficiency (%)	Flow rate Q (l/min)
0.26-0.30	5.77E+04	4.34E+02	99.25	30
0.30-0.35	4.40E+04	2.54E+02	99.42	
0.35-0.40	2.10E+04	8.61E+01	99.59	
0.40-0.45	4.85E+03	1.45E+01	99.70	
0.45-0.50	2.56E+03	5.32E+00	99.79	
0.50-0.60	1.34E+03	2.78E+00	99.79	
0.60-0.70	9.56E+02	1.10E+00	99.89	
0.70-0.80	5.38E+02	1.78E-01	99.97	
0.80-1.0	7.10E+02	1.23E-01	99.98	
1.0-1.6	5.31E+02	8.22E-02	99.98	
1.6-2.0	2.34E+02	4.11E-02	99.98	
>2.0	4.58E+02	5.48E-02	99.99	



<sup>4</sup> Particles Number Concentration in upstream of the mask

<sup>5</sup> Particle per liter

<sup>6</sup> Particles Number Concentration in downstream of the mask




Report name: Respirator Filter Media Quality Test

Date: 7/9/2020

Report number: 199-1471-02

### Laboratory Data

Report No: 199-1471-02

Date: 7/9/2020

Test Laboratory: Safety & Environmental Laboratory

Operator: Hossein Yousefi-Pegah Azimzadeh

Supervisor: Prof. Asghar Sadighzadeh

Particle Counter(s): Condensation Particle Counter (Grinm) and Laser Particle Counter (Grimm)

Manometer: Kimo MP 202

### Device Manufacturer's Data

Manufacturer: Zist Abzar Pajouhan Co.

Product Name: Respirator Filter Media

Product Model declared by manufacturer: Nano coated

Test requested by: Zist Abzar Pajouhan Co.

Sample obtained from: Mr. Ghavami



### Test Conditions

Temperature (°C): 29

RH (%) < 15

Air flow rate (l/min)<sup>1</sup>: 5, 10, 15, 20, 25, 30

<sup>1</sup> Liter Per minute





## Respirator Filter Media quality test

Note: Air Filtration Media surface area used for test is 100 cm<sup>2</sup>.

### I. Pressure drop $\Delta P$ as a function of air flow rate $Q$

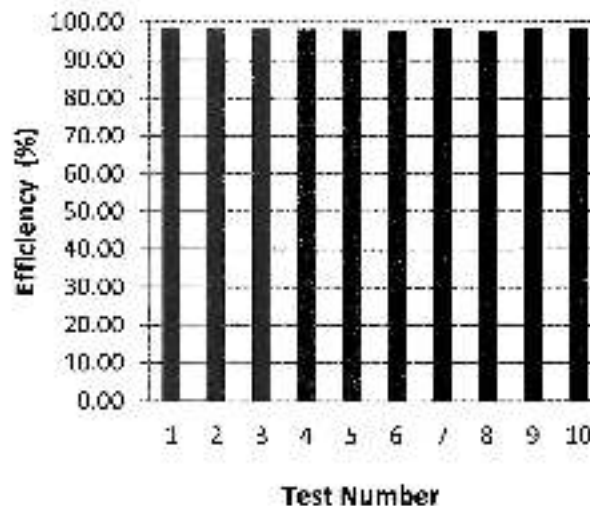
$Q$ (l/min)	5	10	15	20	25	30
$\Delta P$ (Pa)	9	18	30	45	51	65

### II. Efficiency $E$

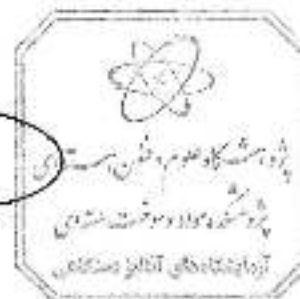
#### a. Total removal efficiency for aerosol particle with diameter $\geq 3$ nm<sup>3</sup>

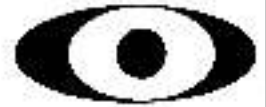
Data extracted by Condensation Particle Counter (CPC)

Average removal efficiency for aerosol particles with diameter  $\geq 3$  nm: 98.21 %



<sup>1</sup> Pascale  
<sup>2</sup> nanometer





Report name: Respirator Filter Media Quality Test

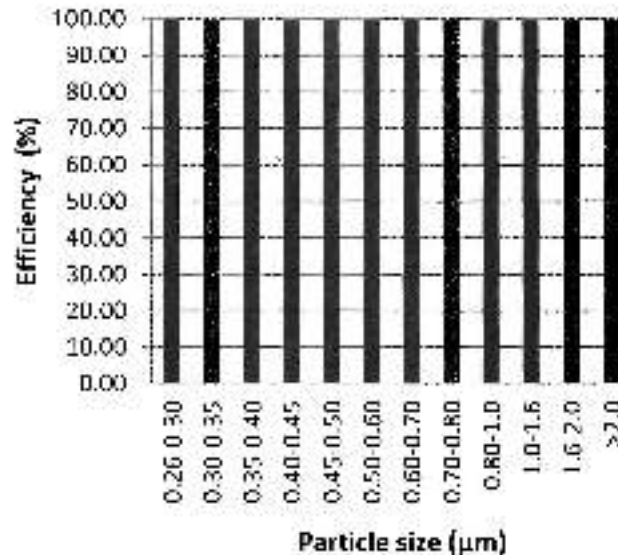
Date: 7/9/2020

Report number: 199-1471-02

**b. Removal efficiency in term of aerosol particle size(Dp)**

Data extracted from Laser Particle Counter (Grimm)

particle size Dp (μm)	Average of 40 measures N <sub>i</sub> (p/l) <sup>1</sup>	Average of 40 Measures N <sub>f</sub> (p/l)	Efficiency (%)	Flow rate Q (l/min)
0.26-0.30	4.85E+04	2.58E+01	99.95	30
0.30-0.35	3.50E+04	1.03E+01	99.97	
0.35-0.40	1.60E+04	5.67E+00	99.96	
0.40-0.45	3.69E+03	1.87E+00	99.95	
0.45-0.50	2.12E+03	1.47E+00	99.93	
0.50-0.60	1.15E+03	9.82E-01	99.91	
0.60-0.70	8.30E+02	3.77E-01	99.95	
0.70-0.80	4.28E+02	2.04E-01	99.95	
0.80-1.0	5.26E+02	4.90E-01	99.91	
1.0-1.6	3.73E+02	4.40E-01	99.88	
1.6-2.0	1.44E+02	1.09E-01	99.92	
>2.0	2.48E+02	0.00E+00	100.00	



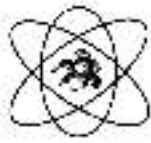
<sup>1</sup> Particles Number Concentration In upstream of the mask

<sup>2</sup> Particle per liter

<sup>3</sup> Particles Number Concentration in downstream of the mask

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*[Official stamp of Nuclear Science & Research Institute]*



Report name: Respirator Filter Media Quality Test

Date: 7/9/2020

Report number: 199-1471-03

### Laboratory Data

Report No: 199-1471-03

Date: 7/9/2020

Test Laboratory: Safety & Environmental Laboratory

Operator: Hossein Yousefi-Pegah Azimzadeh

Supervisor: Prof. Asghar Sadighzadeh

Particle Counter(s): Condensation Particle Counter (Grimm) and Laser Particle Counter (Grimm)

Manometer: Kimo MP 202

### Device Manufacturer's Data

Manufacturer: Zist Abzar Pajouhan Co.

Product Name: Respirator Filter Media

Product Model declared by manufacturer: Nano coated

Test requested by: Zist Abzar Pajouhan Co.

Sample obtained from: Mr. Ghavami

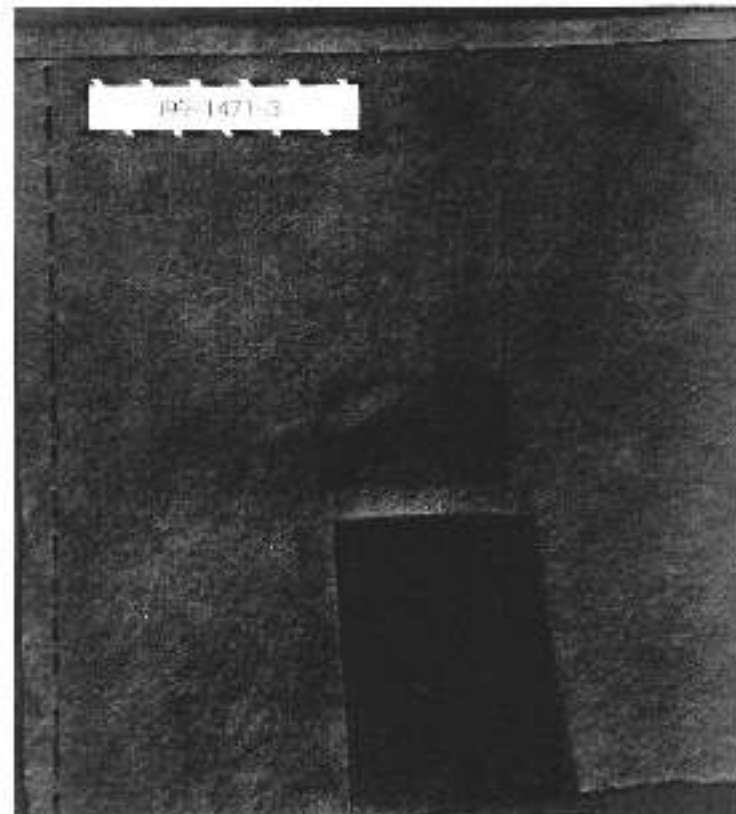
### Test Conditions

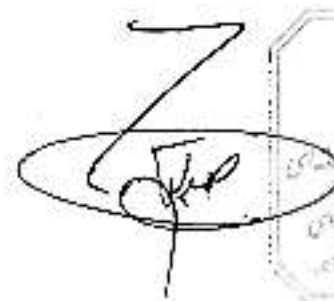

Temperature (°C): 29

RH (%) < 15

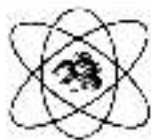
Air flow rate (l/min)<sup>1</sup>: 5, 10, 15, 20, 25, 30

<sup>1</sup>Liter Per minute







Report name: Respirator Filter Media Quality Test

Date: 7/9/2020

Report number: 199-1471-03

## Respirator Filter Media quality test

Note: Air Filtration Media surface area used for test is 100 cm<sup>2</sup>.

### I. Pressure drop $\Delta P$ as a function of air flow rate $Q$

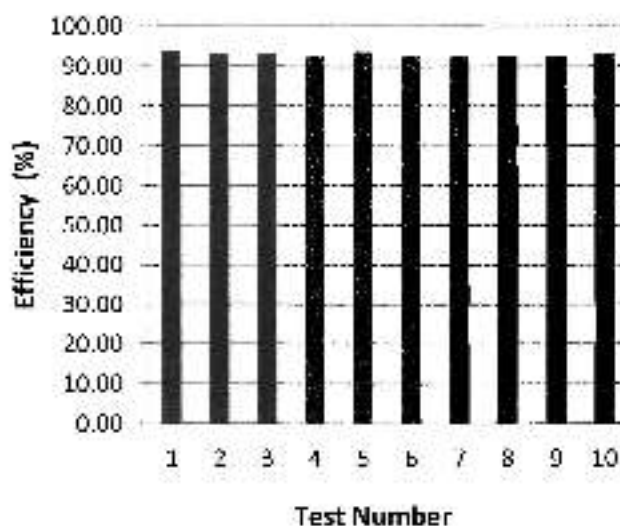
$Q$ (l/min)	5	10	15	20	25	30
$\Delta P$ (P <sup>a</sup> )	11	22	35	46	57	68

### II. Efficiency $E$

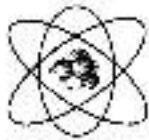
#### a. Total removal efficiency for aerosol particle with diameter $\geq 3$ nm<sup>b</sup>

Data extracted by Condensation Particle Counter (CPC)

Average removal efficiency for aerosol particles with diameter  $\geq 3$  nm: 93.10 %



<sup>a</sup> Pascare  
<sup>b</sup> nanometer



Report name: Respirator Filter Media Quality Test

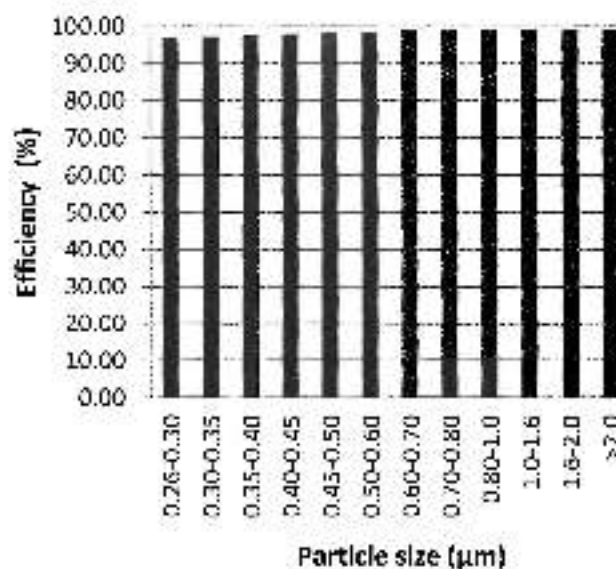
Date: 7/9/2020

Report number: 199-1471-03

**b. Removal efficiency in term of aerosol particle size(Dp)**

Data extracted from Laser Particle Counter (Grinin)

particle size Dp (µm)	Average of 40 measures N <sup>u</sup> (p/l) <sup>a</sup>	Average of 40 Measures N <sup>d</sup> (p/l)	Efficiency (%)	Flow rate Q (l/min)
0.26-0.30	3.96E+04	1.17E+03	97.05	30
0.30-0.35	2.82E+04	7.56E+02	97.32	
0.35-0.40	1.27E+04	2.86E+02	97.74	
0.40-0.45	2.84E+03	5.55E+01	98.05	
0.45-0.50	1.56E+03	2.61E+01	98.32	
0.50-0.60	8.52E+02	1.32E+01	98.46	
0.60-0.70	6.31E+02	5.94E+00	99.06	
0.70-0.80	3.40E+02	2.15E+00	99.37	
0.80-1.0	4.60E+02	3.00E+00	99.35	
1.0-1.6	3.28E+02	1.98E+00	99.39	
1.6-2.0	1.31E+02	1.03E+00	99.21	
>2.0	2.51E+02	1.74E+00	99.31	

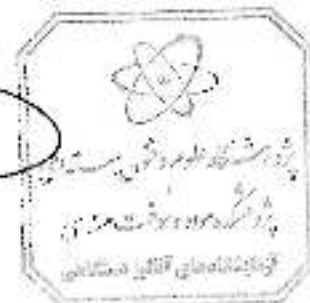


<sup>a</sup> Particles Number Concentration in upstream of the mask

<sup>b</sup> Particle per liter

<sup>c</sup> Particles Number Concentration in downstream of the mask

*[Handwritten signature]*





### Laboratory Data

Report No: *199-1471-04*

Date: *7/9/2020*

Test Laboratory: *Safety & Environmental Laboratory*

Operator: *Hossein Yousefi-Pegah Azimzadeh*

Supervisor: *Prof. Asghar Sadighzadeh*

Particle Counter(s): *Condensation Particle Counter (Grimm) and Laser Particle Counter (Grimm)*

Manometer: *Kimo MP 202*

### Device Manufacturer's Data

Manufacturer: *Zist Abzar Pajouhan Co.*

Product Name: *Respirator Filter Media*

Product Model declared by manufacturer: *Nano coated*

Test requested by: *Zist Abzar Pajouhan Co.*

Sample obtained from: *Mr. Ghavamf*

### Test Conditions

Temperature (°C): *29*

RH (%): *< 15*

Air flow rate (l/min<sup>1</sup>): *5, 10, 15, 20, 25, 30*

<sup>1</sup>Liter Per minute





## Respirator Filter Media quality test

Note: Air Filtration Media surface area used for test is 100 cm<sup>2</sup>.

### I. Pressure drop $\Delta P$ as a function of air flow rate $Q$

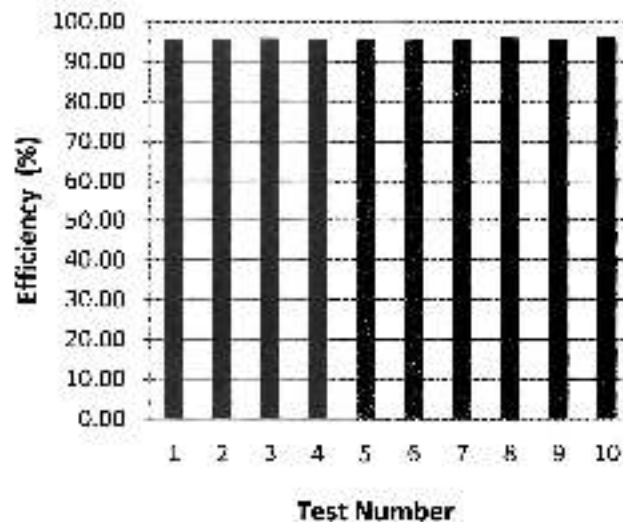
$Q$ (L/min)	5	10	15	20	25	30
$\Delta P$ (P <sup>2</sup> )	11	20	32	44	58	67

### II. Efficiency $E$

#### a. Total removal efficiency for aerosol particle with diameter $\geq 3$ nm<sup>1</sup>

Data extracted by Condensation Particle Counter (CPC)

Average removal efficiency for aerosol particles with diameter  $\geq 3$  nm: 95.85 %



<sup>2</sup> Pascale  
<sup>1</sup> nanometer





Report name: Respirator Filter Media Quality Test

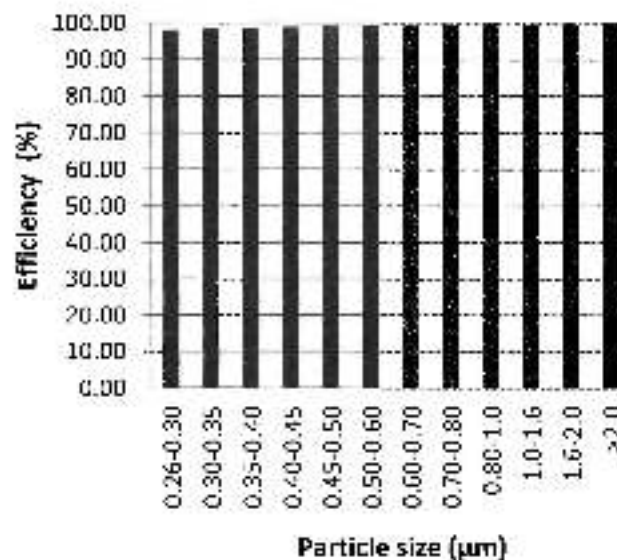
Date: 7/9/2020

Report number: I99-1471-04

**b. Removal efficiency in term of aerosol particle size(Dp)**

Data extracted from Laser Particle Counter (Grimm)

particle size Dp (µm)	Average of 40 measures N <sup>u</sup> (p/l) <sup>a</sup>	Average of 40 Measures N <sup>d</sup> (p/l) <sup>b</sup>	Efficiency (%)	Flow rate Q (l/min)
0.26-0.30	4.00E+04	7.22E+02	98.19	30
0.30-0.35	2.93E+04	4.48E+02	98.47	
0.35-0.40	1.34E+04	1.55E+02	98.84	
0.40-0.45	3.01E+03	2.76E+01	99.09	
0.45-0.50	1.65E+03	1.19E+01	99.27	
0.50-0.60	8.84E+02	5.13E+00	99.42	
0.60-0.70	6.74E+02	2.50E+00	99.63	
0.70-0.80	3.81E+02	1.81E+00	99.52	
0.80-1.0	5.10E+02	1.56E+00	99.69	
1.0-1.6	3.68E+02	5.63E-01	99.85	
1.6-2.0	1.61E+02	1.25E-01	99.92	
>2.0	2.85E+02	1.88E-01	99.93	



<sup>a</sup> Particles Number Concentration in upstream of the mask  
<sup>b</sup> Particle per liter  
<sup>c</sup> Particles Number Concentration in downstream of the mask

