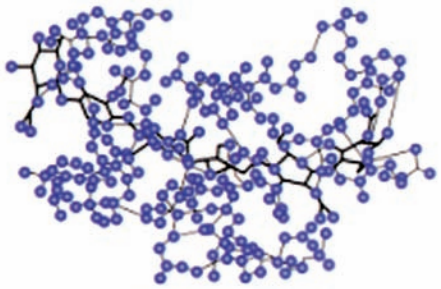
Enzymic Microbial Inhibition Filter Series
Medium / High Efficiency Filter

PACMAN

Classification Model	Medium / High Efficiency Filter		HEPA Filter	
	Mini-Pleat Type	Separator Type	Mini-Pleat Type	Separator Type
Model Series	N2-9T-□G	N2-CP-□-EA	N1-1T-□□	N1-1□-□ N1-1L□-□
Test Method	JIS B 9908 Light Scattering Integration		0.3am Test	
Efficiency	80% at 0.4μm / 90% at 0.7μm		99.97%+ / 99.99%+	

Features

- Quick and effective
- Functions at room temperature: No electricity or heating required
- Enzymes molecularly bonded to glass fiber media: No enzymes released by physical impact
- Natural enzymes: Safe for the environment and human beings

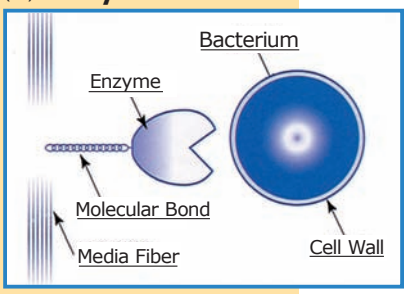


Enzyme Molecular Structure

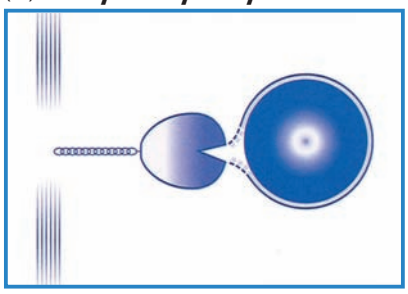
Enzymic Sterilization Mechanism

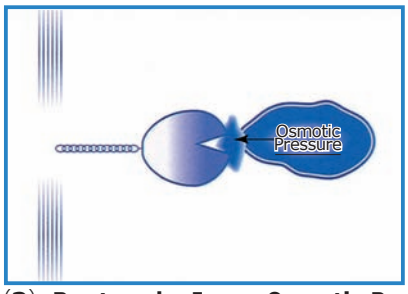
Enzymic Filters employ modified lysozymes with an extensive sterilization spectrum, thus providing sterilization reliability over a wide range of bacteria.
In the Enzymic Filter's sterilization process, enzymes fixed on media fibers hydrolyze and break the molecular bonds of bacterial cell walls (glycoside, amido, or peptide). Cell membranes are then ruptured by inner osmotic pressure and the bacteria are destroyed

(1) Enzyme vs. Bacterium

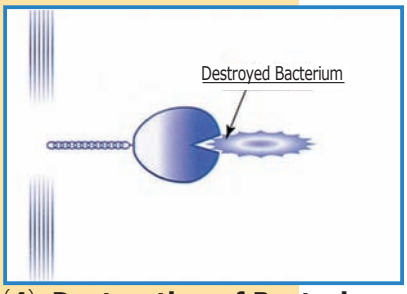


(2) Enzyme Hydrolyzes Cell Wall





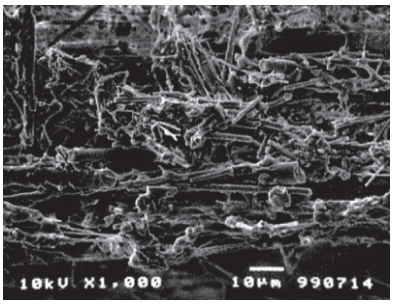
(3) Rupture by Inner Osmotic Pressure



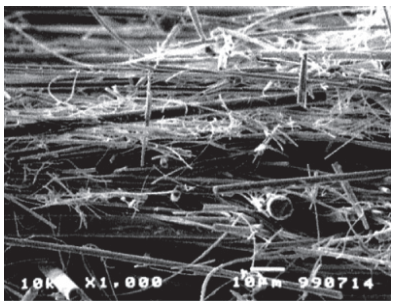
(4) Destruction of Bacterium

Secondary Contamination Prevention

Particles collected on the exposed upstream surface of the filter may accumulate to a thickness of 1/3 of one layer of filter media.

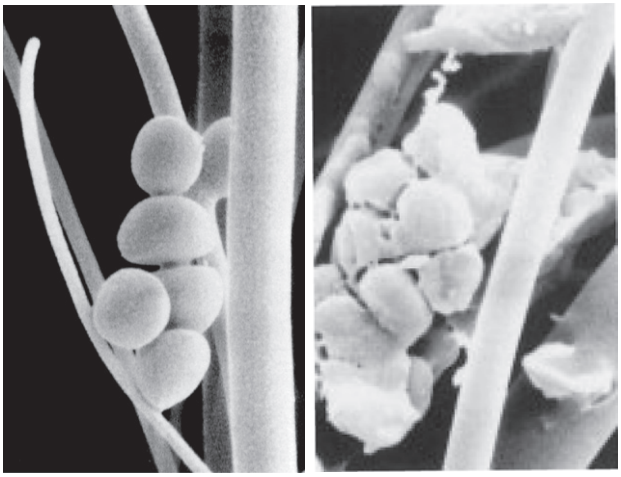


Media Cross-section
(upstream inlet)



Media Cross-section
(downstream outlet)

Analysis of a conventional HEPA filter used for one year by a food manufacturer showed particle accumulation of 0.1 mm thickness on a cross-section of upstream filter media (thickness: 0.33 mm) and further detected Gram-Positive, and other bacteria proliferation within the particles. Also, secondary scattered Gram-positive and other bacteria were detected on sections of the filter that appeared to be clean: within 0.1 mm of the downstream face where there was no particle adhesion. This indicates the existence of bacteria proliferation and scattering throughout the filter.


Staphylococcus aureus ATCC700698

This type of secondary contamination can be prevented through the use of Cambridge Enzymic Filters. The Enzymic Filter collects and neutralizes bacteria as they move through the filter towards the downstream face. Lytic enzymes are evenly deposited throughout the filtration media by molecular bonds, thus providing efficient microorganism sterilization and reliably preventing secondary contamination.

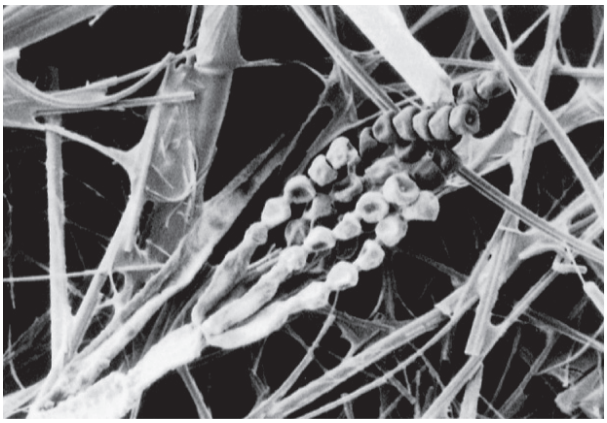
MRSA

Methicillin Resistant Staphylococcus Aureus can cause skin infections, pneumonia and food poisoning. MRSA is a known cause of staph infections which can occur in medical facilities.

Fungus Inhibition

It is known that fungus contamination which may occur during food product, pharmaceutical and cosmetic manufacturing processes, can cause infections and lead to the development of skin lesions. In addition, contamination can lead to allergic diseases, such as asthma, allergic rhinitis and atopic dermatitis caused by fungus and fungivorous parasites.

If oxygen and nutrition sources, temperature, humidity, and time permit, fungi can produce hyphae, then implant a large number of spores on media causing secondary contamination.


Fungus Build-Up on Conventional Filter

A conventional HEPA filter used for one year by a leading food manufacturer was removed and the filter media near the outlet was sampled. The media cross sections wereanalyzed by electron microscope. The above photograph shows the crucial moment when green mold sporesgrew hyphae, and implanted a large number of new spores onto the filter media.

The Cambridge Enzymic Filter inhibits the growth of hyphae through bacteriostasis, and thus substantially prevents the growth of fungus on filter media.

Microbial Inhibition Enzymic Filter

Mini-Pleat HEPA Filter

ENZYMIC FILTER

Model	N1-1T-□□	
Test Standard	0.3μm	
Efficiency	99.97%+	99.99%+
	–	Scan Tested

- Minipleat HEPA Enzymic Filter
- Lightweight, Low Profile Design

Standard Specifications

Model	Rated Airflow (m³/min)	Pressure Drop (Pa)		External Dimensions (mm)			Weight (kg)
		Initial Max	Final	Height	Width	Depth	
N1-1T-320	4.7	147 (167)	294	610	305	50	1.6
N1-1T-600	10.0				610		2.6
N1-1T-830	12.7				762		3.1
N1-1T-980	15.3				915		3.6
N1-1T-320LP	4.7	98 (118)			305	65	2
N1-1T-600LP	10.0				610		3.3
N1-1T-830LP	12.7				762		4
N1-1T-980LP	15.3				915		4.6
N1-1T-320A	4.7	88 (88)			305	80	2.2
N1-1T-600A	10.0				610		3.7
N1-1T-830A	12.7				762		4.5
N1-1T-980A	15.3				915		5.3

Pressure drop values in ( ): Scan-Tested Models.

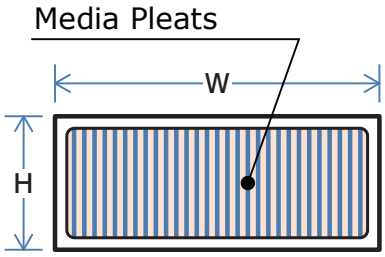
Model Designators

N1 - 1T - □ □

- Depth Designator
  - No Mark:50mm
  - LP:65mm
  - A:80mm
- Size Designator
- Minipleat Designator
- Absolute Filter Designator
- Enzymic Filter Designator

Component Materials / Usage Conditions

Model		N1-1T-□□
Component Materials	Media	Enzyme Embedded Glass Fiber
	Separator	Thermoplastic Resin
	Frame	Aluminum
	Frame Finish	Anodized Aluminum + Clear Acrylic Coating
	Sealant	Urethane Resin
	Gasket	Chloroprene
Usage Conditions	Max. Continuous Usage Temperature (°C)	60
	Max. Peak Humidity (%RH at No Condensation)	90



Available Sizes (mm)

Depth	Max Height	Max Width
50	610	1219
65	762	1219
80	762	1524

For horizontal airflows, install filters with pleats perpendicular to the ground.
Please contact us regarding availability of custom sizes.

Scan Tested Models

N1-1T-600S
N1-1T-600SLP
N1-1T-600AS

Microbial Inhibition Enzymic Filter

Separator Type HEPA

ENZYMIC FILTER

Model	N1-1□-□□		N1-1L□-□□	
	Standard Type		High Volume Type	
Test Standard	0.3μm			
Efficiency	99.97%+	99.99%+	99.97%+	99.99%+
	–	Scan Tested	–	Scan Tested

・Separator Type HEPA Enzymic Filter
・Lightweight, Low Profile Design

Standard Specifications

Model	Rated Airflow (m³/min)	Pressure Drop (Pa)		External Dimensions (mm)			Weight (kg)
		Initial Max	Final	Height	Width	Depth	
N1-1□-50	1.5	249	498	203	203	150	1.2
N1-1□-110	3.9			305	305		2
N1-1□-600	18			610	610		5.2
N1-1□-830	22			610	762		6.2
N1-1□-200	6.4			305	305	292	4.3
N1-1□-450	15			610	305		6.7
N1-1□-1000	32			610	610		11.1

Standard Specifications

Model	Rated Airflow (m³/min)	Pressure Drop (Pa)		External Dimensions (mm)			Weight (kg)
		Initial Max	Final	Height	Width	Depth	
N1-1L□-20	6	249	498	305	305	150	2.3
N1-1L□-40	12			610	305		3.7
N1-1L□-100	28			610	610		6.3
N1-1L□-130	36			610	762		7.5
N1-1L□-35	9			305	305	292	4.6
N1-1L□-75	20			610	305		7.4
N1-1L□-180	42.5			610	610		12.7

型式表現

N1-1□-□□

- Depth Designator
- Size Designator
- Product Code
- Absolute Filter Designator
- Enzymic Filter Designator

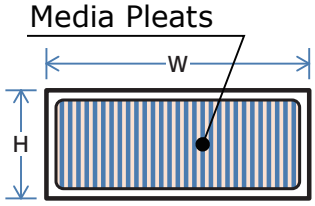
N1-1L□-□□

- S: Scan-Tested / No Mark: Not Scan-Tested
- Size Designator
- Product Code
- High Volume Designator
- Absolute Filter Designator
- Enzymic Filter Designator

Component Materials / Usage Conditions

Model		EA	EU	D
Component Materials	Media	Enzyme Embedded Glass Fiber		
	Separator	Aluminum		
	Frame	Aluminum	Stainless Steel	Plywood
	Frame Finish	Anodized Aluminum + Clear Acrylic Coating	–	
	Sealant	Urethane Resin		
	Gasket	Chloroprene		
Usage Conditions	Max. Continuous Usage Temperature (°C)	60		
	Max. Peak Humidity (%RH at No Condensation)	90		

Media Pleats



Available Sizes (mm)

Depth	Max Height	Max Width
150	762	1219
292	610	915

For horizontal airflows, install filters with pleats perpendicular to the ground.
Please contact us regarding availability of custom sizes.

Microbial Inhibition Enzymic Minipleat Medium / High Efficiency Filter

ENZYMIC FILTER

Model	**N2-9T-□G**
Test Method	**JIS B 9908:2011 Type 2**
Efficiency	**80%+ at 0.4μm / 90%+ at 0.7μm**

- Minipleat Medium/High Efficiency Enzymic Filter
- Optimal for intake air treatment in hospitals, and pharmaceutical and food production facilities
- May be used as a pre-filter for enzymic HEPA filters
- Filtration media embedded with safe, natural enzymes

Standard Specifications

Model	Rated Airflow (m³/min)	Pressure Drop (Pa)		External Dimensions (mm)			Average Efficiency (%)		Weight (kg)
		Initial Max	Final	Height	Width	Depth	0.4μm[1]	0.7μm[2]	
N2-9T-320G	26	147	343	610	305	65	80+	90+	2.1
N2-9T-600G	56				610				3.7
N2-9T-830G	70				762				4.4

1. Geometric Average of 0.3~0.5μm
2. Geometric Average of 0.5~1.0μm

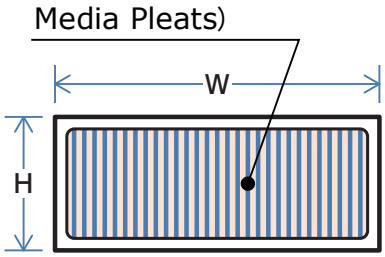
Component Materials / Usage Conditions

Model		N2-9T-□G
Component Materials	Media	Enzyme Embedded Glass Fiber
	Separator	Thermoplastic Resin
	Frame	Aluminum
	Frame Finish	Anodized Aluminum + Clear Acrylic Coating
	Face Guard	Aluminum Lath
	Sealant	Urethane Resin
	Gasket	Chloroprene
Usage Conditions	Max. Continuous Usage Temperature (°C)	60
	Max. Peak Humidity (%RH at No Condensation)	100

Model Designators

N2 - 9T - □ G

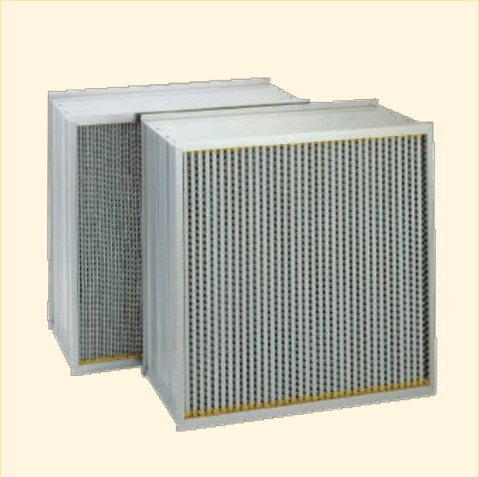
- G: Depth Designator
- □: Size Designator
- 9T: Minipleat Designator
- N2: Enzymic Filter Designator



Available Sizes (mm)

Depth	Max Height	Max Width
65	610	1219

For horizontal airflows, install filters with pleats perpendicular to the ground.
Please contact us regarding availability of custom sizes.



Microbial Inhibition Enzymic Separator Type Medium / High Efficiency Filter

ENZYMIC FILTER

Model	**N2-CP-□-EA-□**
Test Method	**JIS B 9908:2011 Type 2**
Efficiency	**80%+ at 0.4μm / 90%+ at 0.7μm**

- Separator Type Medium/High Efficiency Enzymic Filter
- Sturdy design reinforced by aluminum separators
- Optimal for intake air treatment in hospitals, and pharmaceutical and food production facilities
- May be used as a pre-filter for enzymic HEPA filters
- Filtration media embedded with safe, natural enzymes

Standard Specifications

Model	Rated Airflow (m³/min)	Pressure Drop (Pa)		External Dimensions (mm)			Average Efficiency (%)		Weight (kg)
		Initial Max	Final	Height	Width	Depth	0.4μm[1]	0.7μm[2]	
N2-CP-EA-9A	56	137	343	610	610	292	80+	90+	9.1
N2-CP-EA-9B	28	88	245		610	150			4.4
N2-CP-EA-9C	28	137	343		305	292			5.8
N2-CP-EA-9D	14	88	245		305	150			2.8

1. Geometric Average of 0.3~0.5μm
2. Geometric Average of 0.5~1.0μm

Low Pressure Drop Specifications

Model	Rated Airflow (m³/min)	Pressure Drop (Pa)		External Dimensions (mm)			Average Efficiency (%)		Weight (kg)
		Initial Max	Final	Height	Width	Depth	0.4μm[1]	0.7μm[2]	
N2-CP-T-EA-9AS	56	98	343	610	610	292	80+	90+	11.1
N2-CP-T-EA-9CS	28				305				6.7

1. Geometric Average of 0.3~0.5μm
2. Geometric Average of 0.5~1.0μm

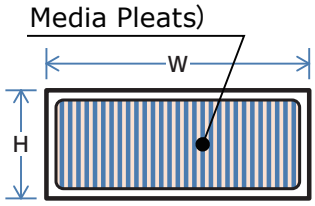
Component Materials / Usage Conditions

Model		N2-CP-□-EA-□
Component Materials	Media	Enzyme Embedded Glass Fiber
	Separator	Thermoplastic Resin
	Frame	Aluminum
	Frame Finish	Anodized Aluminum + Clear Acrylic Coating
	Sealant	Urethane Resin
	Gasket	Chloroprene
Usage Conditions	Max. Continuous Usage Temperature (°C)	60
	Max. Peak Humidity (%RH at No Condensation)	100

Model Designators

N2 - CP- □ - EA - □

- Size Designator
- Aluminum Frame Designator
- Product Code
  No Mark: Standard Type
  T: Low Pressure Drop Type
- CP Filter Designator
- Enzymic Filter Designator



Available Sizes (mm)

Depth	Max Height	Max Width
65	610	1219

For horizontal airflows, install filters with pleats perpendicular to the ground.
Please contact us regarding availability of custom sizes.