

Higher performance chemical filter

# GIGASORB



7A-52-C

Patent NO.2085290



This is a higher performance chemical filter realizing high removal efficiency by original three dimensional filament structure with solid BAC.

**GIGASORB** <sup>TM</sup>

GIGASORB, it's higher performance chemical filter of three dimensional filament structure with solid BAC (Beads shaped Activated Carbon). The property of GIGASORB is better fit to make best clean room environment for super fine processing of LSI.

With the progress of high-density and highly integrated construction of semiconductor integrated circuits, cleanliness in their manufacturing environments has become a requirement of greater importance. Even contamination on molecular level, which was rarely questioned in the past, has now come to be closely related with the yield and reliability of the products.

Under such market environments, we Nitta Corporation developed a super high-performance chemical filter GIGASORB realizing high-efficiency filtration, toward establishment of higher reliability of LSI, etc.. GIGASORB is an epoch-making chemical filter which efficiently removes molecular contaminants in the air, realized by carrying the BAC (Beads shaped



Activated Carbon) of a diameter of approximately 0.5mm on a porous polyurethane foam structure. Thanks to this special structure, GIGASORB has a lot of excellent features: it realizes highly efficient filtration, sharply reduces pressure drop, controls dust emission from the filter media itself, and realizes light weight construction at the same time. Please make the best use of GIGASORB for the creation of high-grade clean environments.

## Realized sharp reduction of pressure drop

Conventional adsorbent had a defect of increasing the pressure drop when the adsorbing efficiency is raised, because, for a structure reason, correlation was produced between adsorbing efficiency and pressure drop.

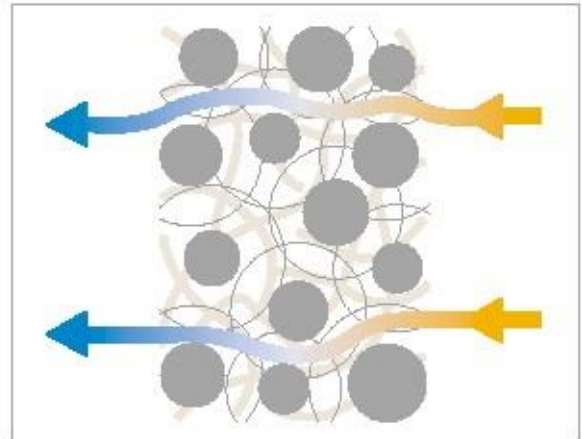
GIGASORB secures excellent air permeability by itself thanks to its special structure of carrying BAC of a diameter of approximately 0.5mm on a polyurethane foam base with excellent air permeability, and therefore sharply reduces pressure drop.

## High removal efficiency

The BAC of a diameter of approximately 0.5mm blended in GIGASORB is capable of effectively putting its pellets and molecular contaminants in contact with each other in spite of a high void ratio, thus providing high adsorbing effects by frequent contact of gas with BAC, without any linear passage, thanks to complicated structure of polyurethane foam.

## Less dust emission

Surface of BAC in GIGASORB is formed very hard, therefore, amount of dust emission from GIGASORB is much reduced.



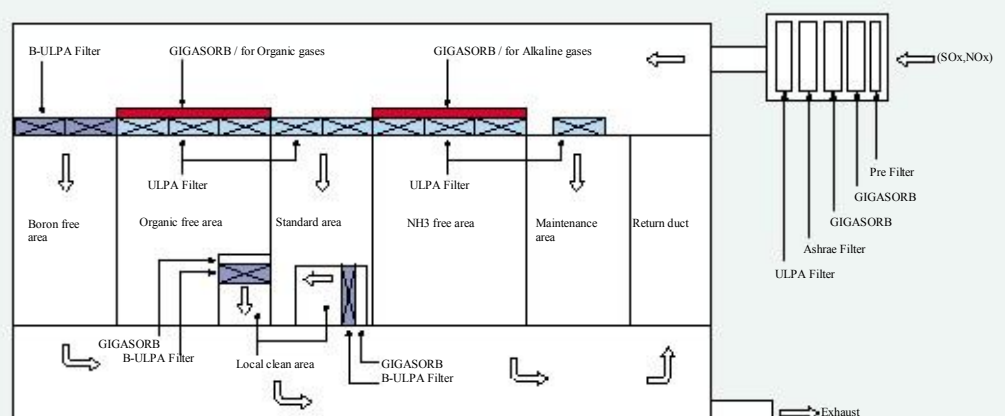
As molecular contaminants pass through the GIGASORB media constructed with three dimensional filament structure, they get in contact accurately with the surface of the BAC provided in it to be adsorbed.

## Weight of about 50% compared with conventional product (of our make)

GIGASORB itself is very light because it has a special structure of polyurethane foam as its base. It can therefore be held with a simple filter frame, and its weight as chemical filter is much smaller than that of pellet shaped active carbon of the same volume, providing a wide range of selection as place of installation of chemical filter.

## Protective measure against molecular contamination

GIGASORB can be used for a variety of applications in a clean room. For example, it can be installed on the up-stream side of ULPA filter in the system ceiling, to be utilized as protective measure against molecular contamination. Moreover, it can also be set in clean booth or FFU for protection against local molecular contamination with standard ULPA filter of combined with B-ULPA filter into a system as general protective measure effective against molecular contamination by organic matters, contamination with ammonia, contamination with boron, etc..

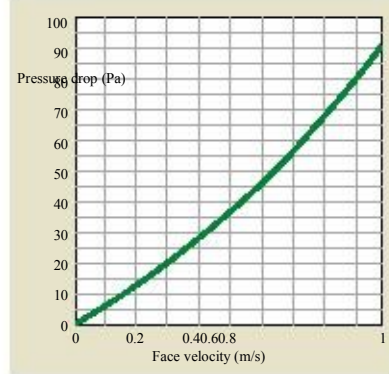


## GIGASORB specification

Item	Specification
Type	T20-A/for Alkaline gas removal
	T20-L/for Organic gas removal
	T20-C/for Acidic gas removal
Carrier	Poly-urethane foam
Media	Beads shaped Activated Carbon (BAC)
	Diameter 0.2~1mm
	Average diameter 0.5mm
Thickness	20 ± 2 mm
Pressure drop	δ 4.8 mm Pa at (0.3 m/s)
Media weight	3.2 ± 0.5 kg/m <sup>2</sup>
Total weight	3.8 ± 0.8 kg/m <sup>2</sup>

## GIGASORB test data

Pressure drop (Panel type)

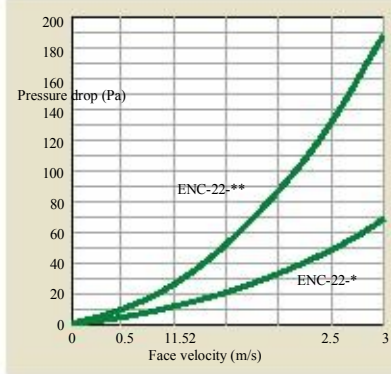


• Test conditions

- Panel type
- GIGASORB / 3 layers
- with instillation of Cover textile

## GIGASORB test data

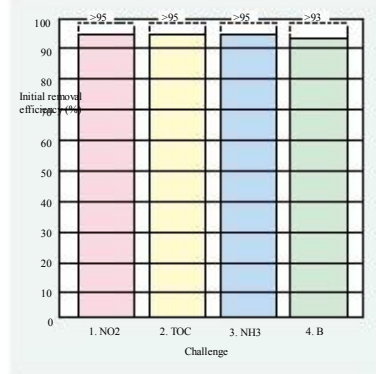
Pressure drop (Cell type)



• Test conditions

- ENC-22-\*\*  
GIGASORB / 2 layers
- ENC-22-\*  
GIGASORB / 1 layers

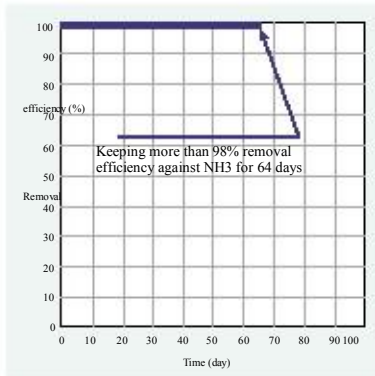
Initial removal efficiency



• Test conditions

- Analysis method 1. Chemiluminescence method  
2. Gas chromatograph-mass spectrometry  
3. Ion chromatography  
4. ICP-MS
- Media1. T20-C  
2. T20-A, L, C / 3 layers  
3. T20-A / 3 layers  
4. T20-C
- Residence time. 0.12 sec.
- Challenge gas1. NO2 (approximate 20 g/m<sup>3</sup>)  
2. Total Organic Compounds (clean room air, approximate 300 g/m<sup>3</sup>)  
3. NH<sub>3</sub> (clean room air, approximate 5 g/m<sup>3</sup>)  
4. B (clean room air, 16 g/m<sup>3</sup>)

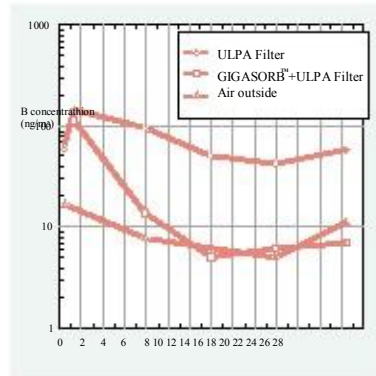
## Removal efficiency of NH3



• Test conditions

- Analysis method Ion chromatography
- Face velocity 0.5m/s
- Media T20-A / 3 layers
- Residence time 0.12 sec
- Challenge gas NH<sub>3</sub>(Clean room air)
- NH<sub>3</sub> concentration approximate 5 g/m<sup>3</sup>
- Dimensions of test Filter 200Hx200Wx70D (mm)
- Media volume 2.4

## Removal efficiency of Boron



• Test conditions

- Analysis method ICP-MS
- Face velocity 0.5m/s
- Media T20-A, L, C / 3 layers
- Residence time 0.11 sec.
- Challenge gas Clean room air
- Dimensions of test Filter 610H x 1220W x 165D (mm)

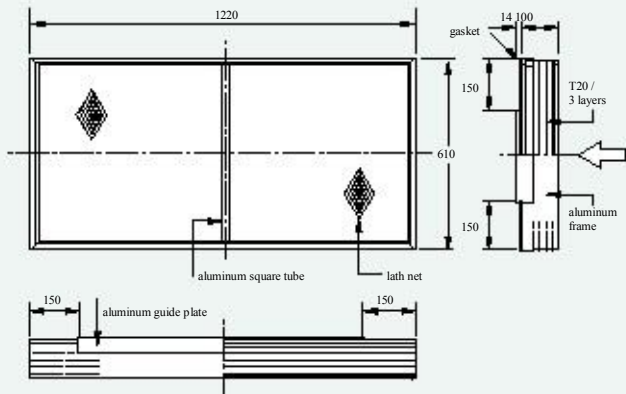
NP series /  
Specification of Panel type chemical filter



Specification

Item	Specification
Face velocity	0.3 m/s
Pressure drop	approximate 2 mmAq
Media	T20/ 3 layers
Depth size	100 mm
Residence time	0.2 sec.
Space velocity	18,000hr <sup>-1</sup>
Face guard	lath net (anodized aluminum)
Option	Cover textile
Filter weight	approximate 14 kg(610Hx1220Wx100D size)
Type	NP-24-ALC-T <ul style="list-style-type: none"> <li>&lt;Cover textile&gt;</li> <li>T :installed</li> <li>  :no installation</li> <li>&lt;GIGASORB&gt;</li> <li>A :T20-A</li> <li>L :T20-L</li> <li>C :T20-C</li> <li>&lt;Filter Dimensions&gt;</li> <li>2 :Height (1: 305 mm)</li> <li>4 :Width (2: 610 mm)</li> <li>          (3: 915 mm)</li> <li>          (4:1,220 mm)</li> </ul>

Dimension of chemical filter



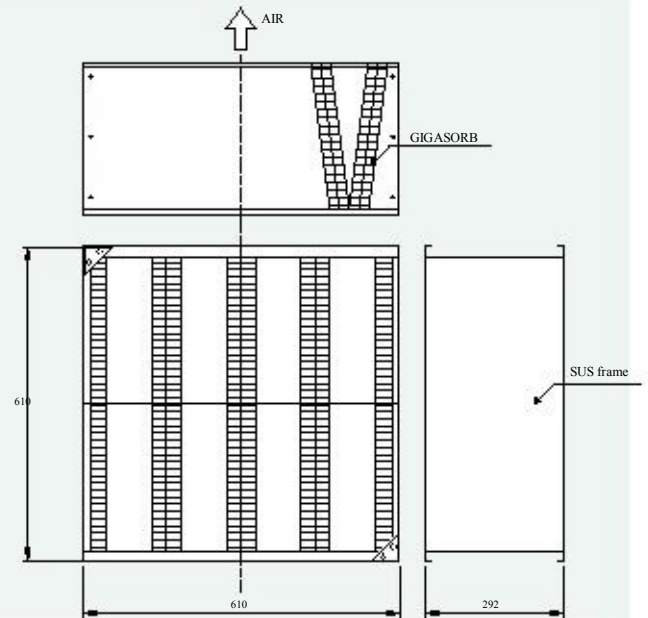
ENC series /  
Specification of Cell type chemical filter



Specification

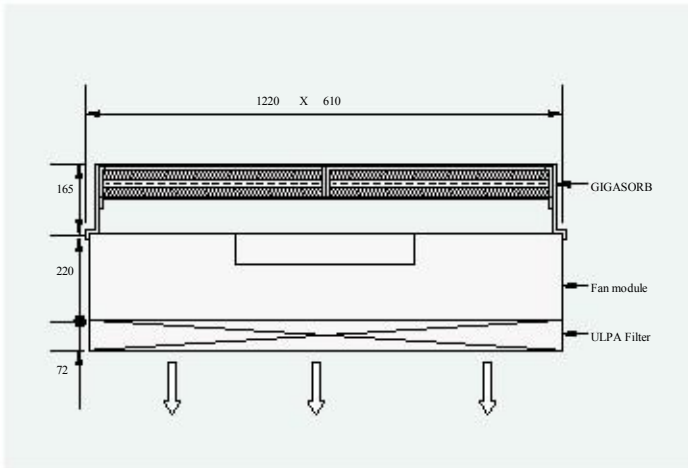
Item	1 layer	2 layer type
Structure of Filter	Cell type, 4V	
Air flow volume	Full size 56.6 m <sup>3</sup> /min Half size 28.3 m <sup>3</sup> /min	
Pressure drop	50Pa	140Pa
Media	T20/ 1 layer	T20/ 2 layer
Residence time	0.03 sec.	0.06 sec.
Space velocity	120,000hr <sup>-1</sup>	60,000hr <sup>-1</sup>
Filter weight	1 layer : 17 kg (610Hx610Wx292D size) 2 layer : 25 kg (610Hx610Wx292D size)	
Type	ENC-22- ** <ul style="list-style-type: none"> <li>&lt; GIGASORB &gt;</li> <li>A :T20-A</li> <li>L :T20-L</li> <li>C :T20-C</li> <li>AA stand for T-20-A / 2 layers.</li> <li>&lt; Filter size &gt;</li> <li>12 :305Hx610Wx292D(mm)</li> <li>22 :610Hx610Wx292D(mm)</li> </ul>	

Dimension of chemical filter

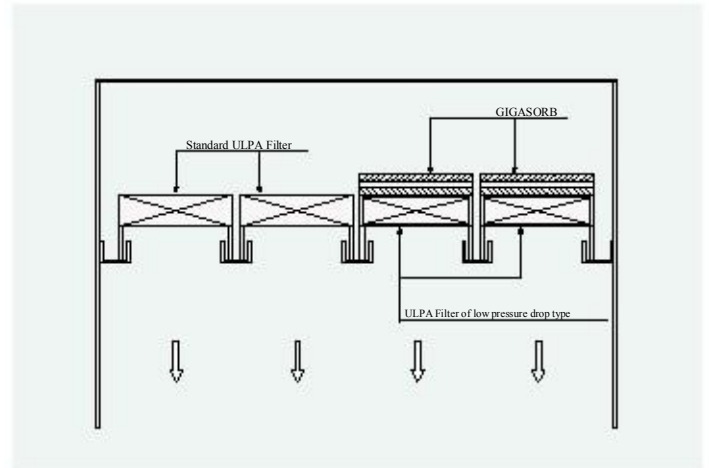


## Application

### FFU (Panel type)



### System ceiling



### AHU (Cell type)

