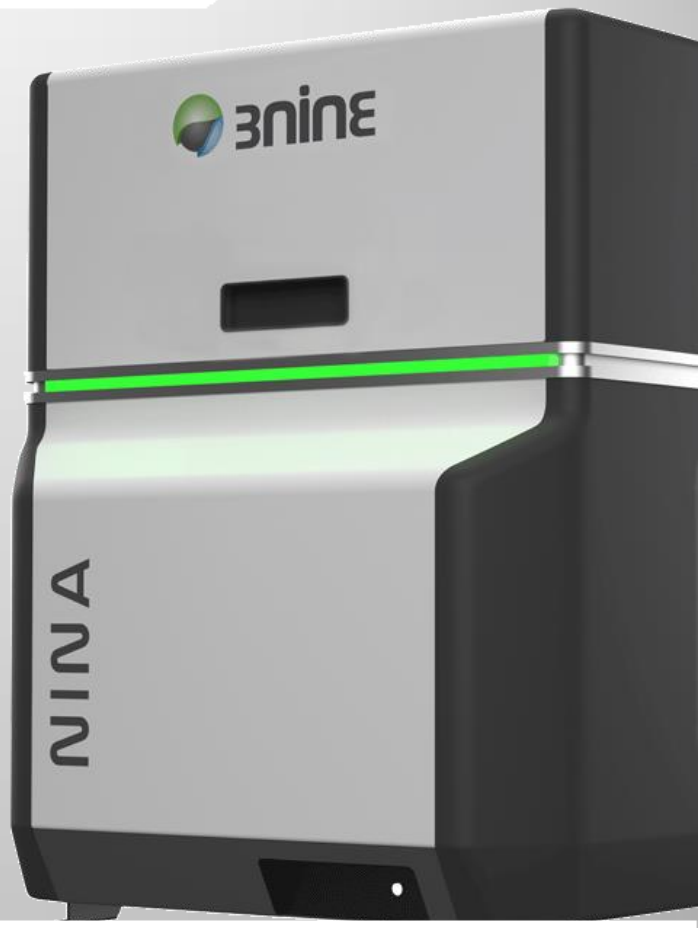
GREEN LINE

OIL MIST SEPARATOR

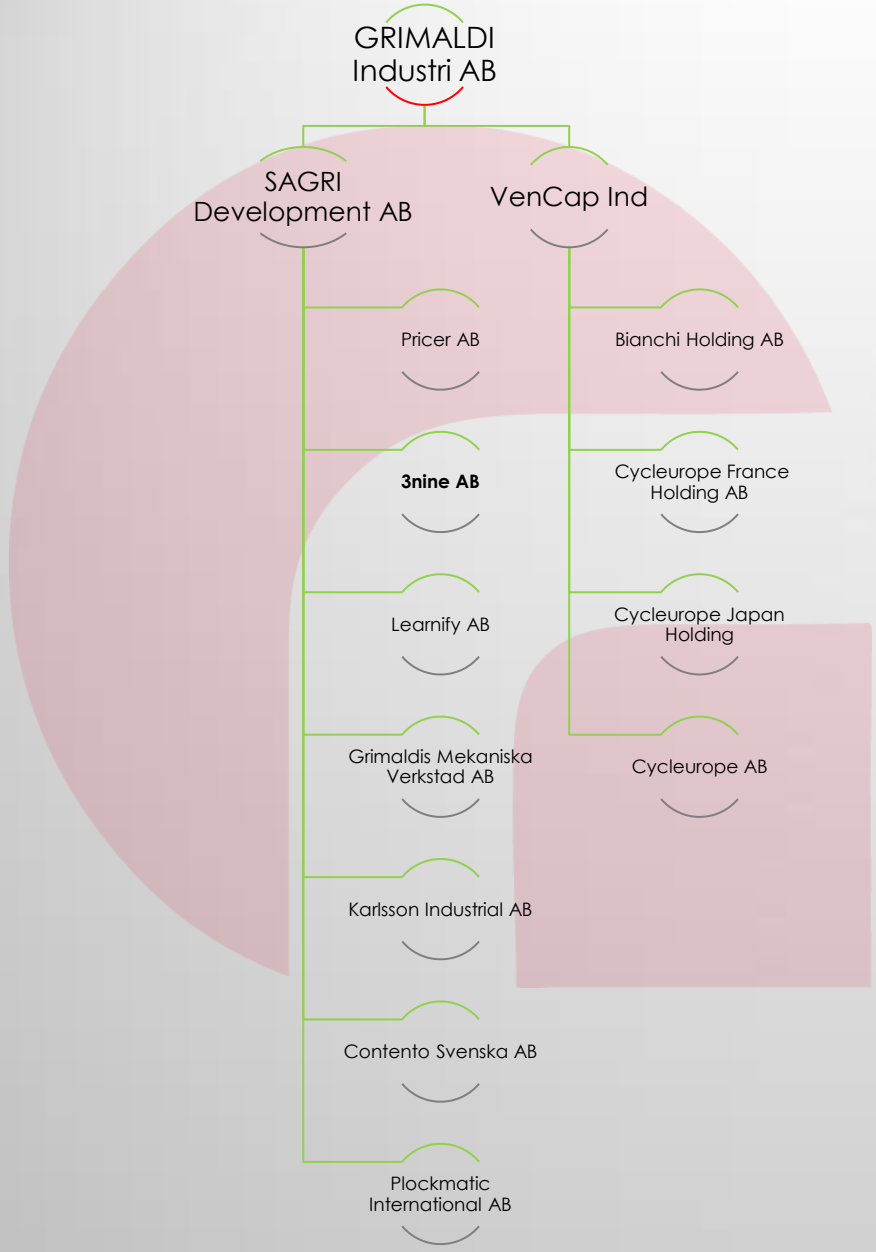


3nine

CONTENT

ABOUT 3NINE

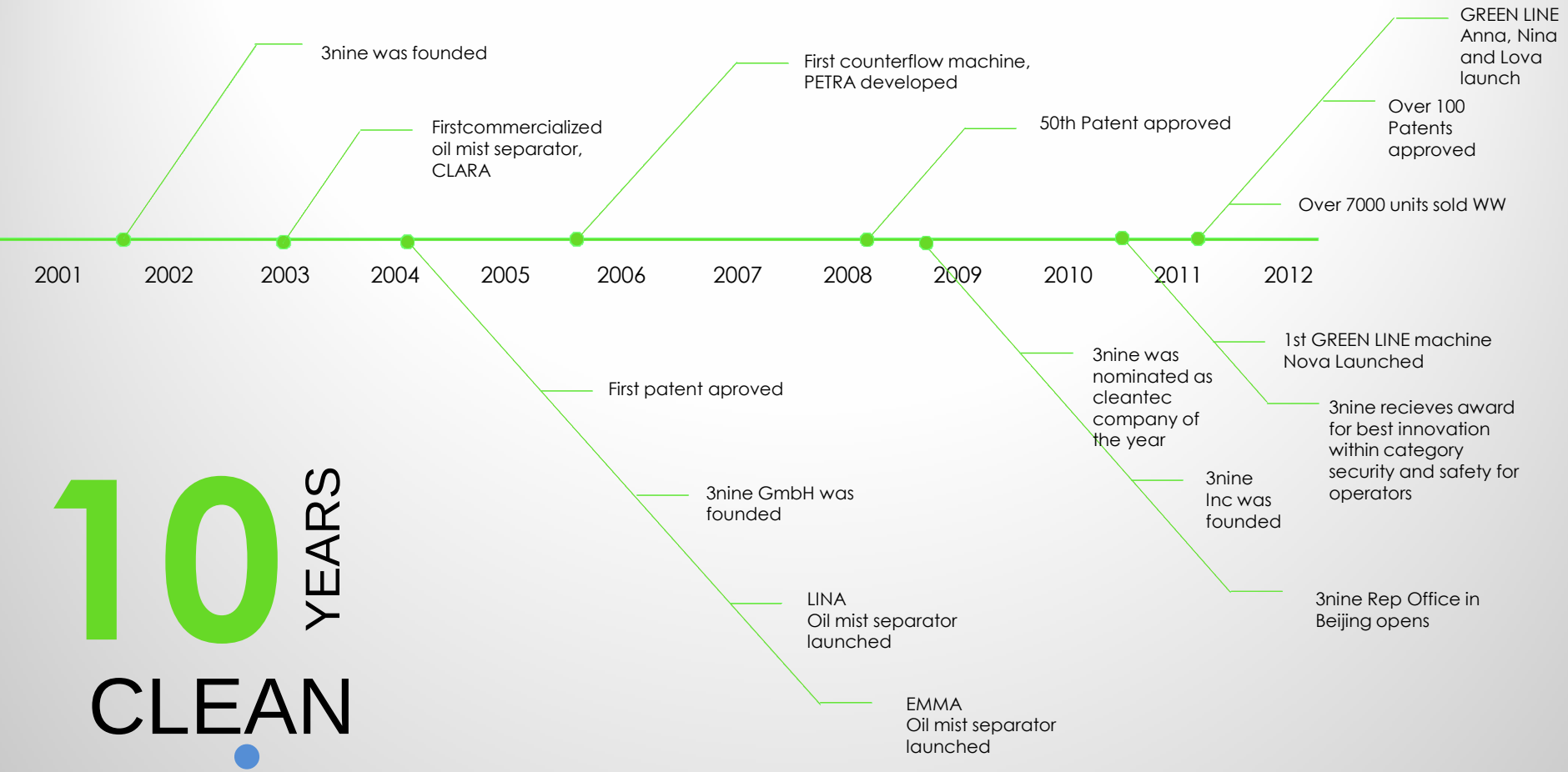
3NINE A GRIMALDI INDUSTRY COMPANY



The Grimaldi Industri Group employs more than 1,000 people world-wide and a has turnover of 220 MEUR.

Since 2002, 3nine has been a member of Grimaldi Industri AB Group.

MILESTONES



10 YEARS

CLEAN air

3NINE INTERNATIONAL PRESENCE

HQ:
Sweden

Sales Offices:
China
Finland
France
Germany
USA

Agent/distributors:
Canada
Czech Republic
Denmark
Hungary
Italy
Japan
Malaysia
Mexico
Netherlands
Norway
Poland
Slovakia
Slovenia
Spain
Thailand
Turkey
United Kingdom

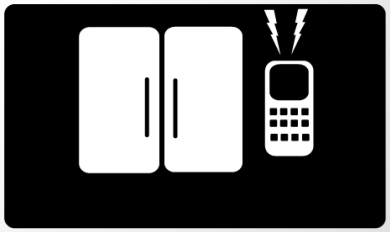
ISSUES WITH OIL MIST

PROBLEMS OIL MIST

Health Issues
- Eczema
- Oil acne
- Oil Pneumonia
- Lung Cancer
- Prostate Cancer

Slippery Surfaces
- Coating all surfaces increase risk for injuries.

Cleaning
- Coating surfaces demands regular cleaning.



Electrical problems
- Coats all surfaces and can cause electrical failures.

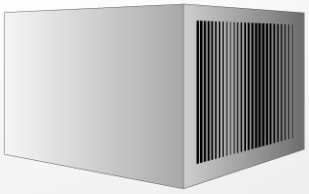
SEPARATION TECHNOLOGY

COLLECTION VS SEPARATION

Rotating
filter

COLLECTS

Mechanical
filter

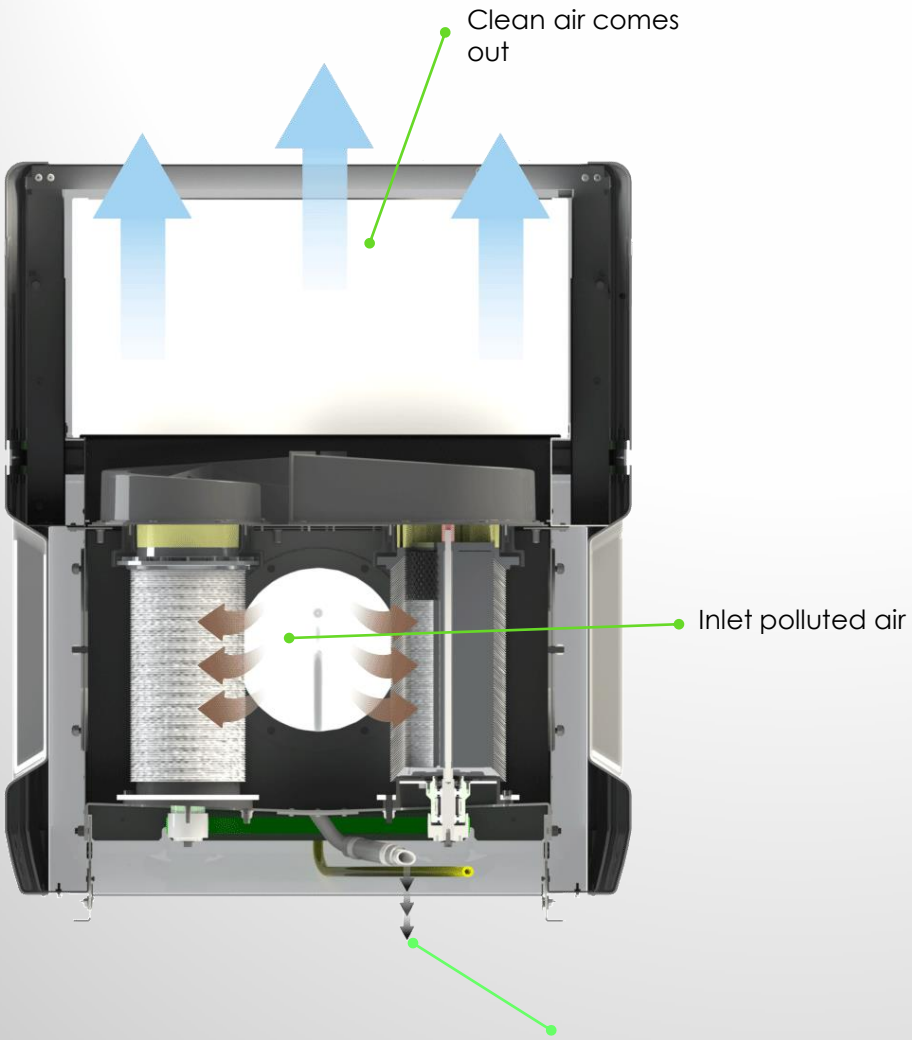


Electrostatic
filter

SEPARATES

3nine
separator

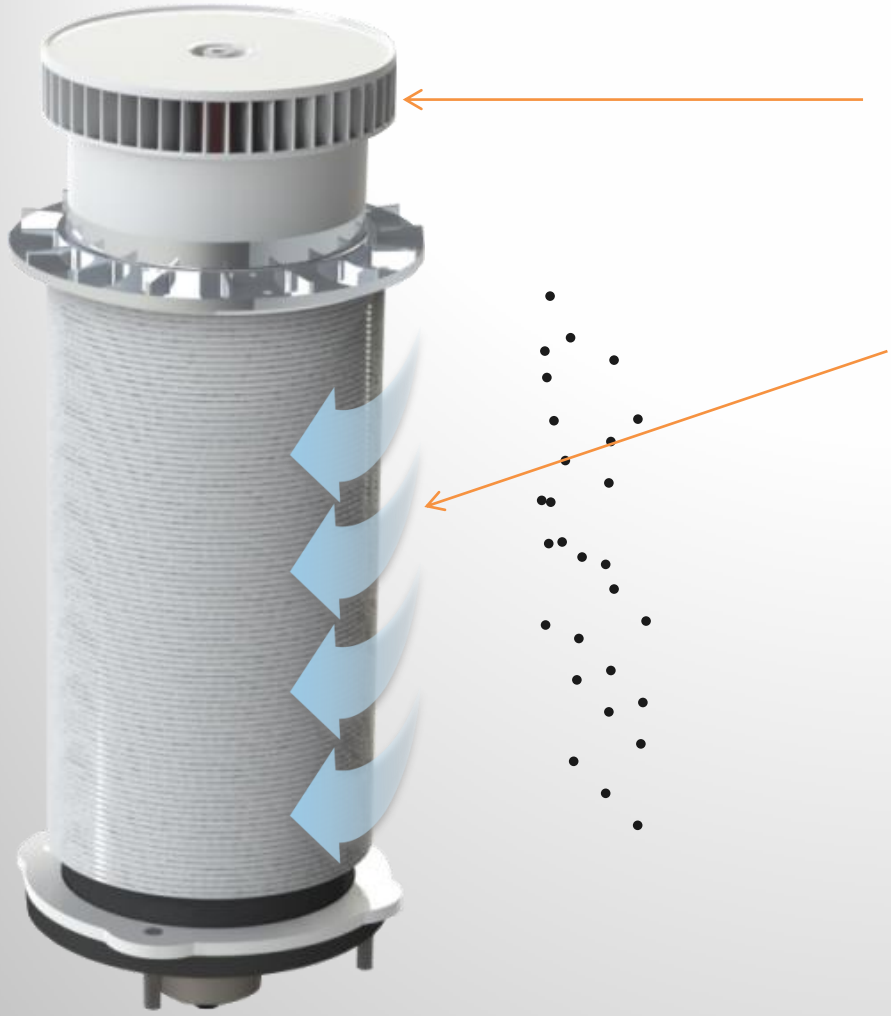
OPERATING PRINCIPLE



3 step cleaning

1. Counterflow = separates the largest particles down to ~10µm.
2. Disc Stack= separates smaller particles 100% >1µm
3. HEPA filter = collects particles 99,95% <1µm

1 COUNTER FLOW TECHNOLOGY

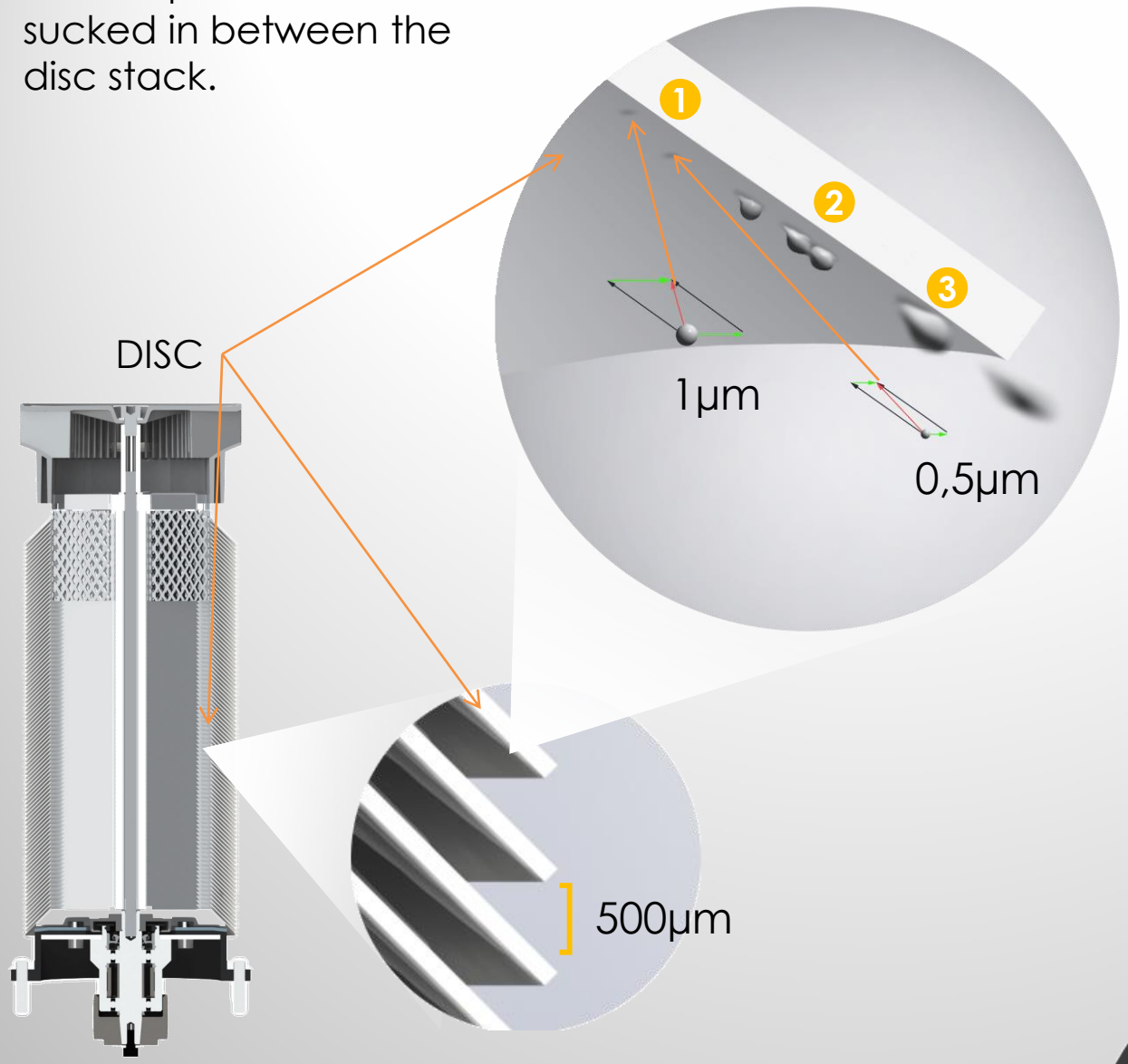


A fan on top of the rotor will create a suction of polluted air into the machine.

Rotation of the rotor creates an air barrier for pre-separation, preventing larger particles to enter between the disc stack. Instead the particles are thrown to the wall, and separated out.

2 DISC STACK SEPARATION

Smaller particles will be sucked in between the disc stack.



1. Particles are separated if they hit the disc before leaving the disc stack. 1µm is the smallest particle that is separated even if it starts at the worst possible position

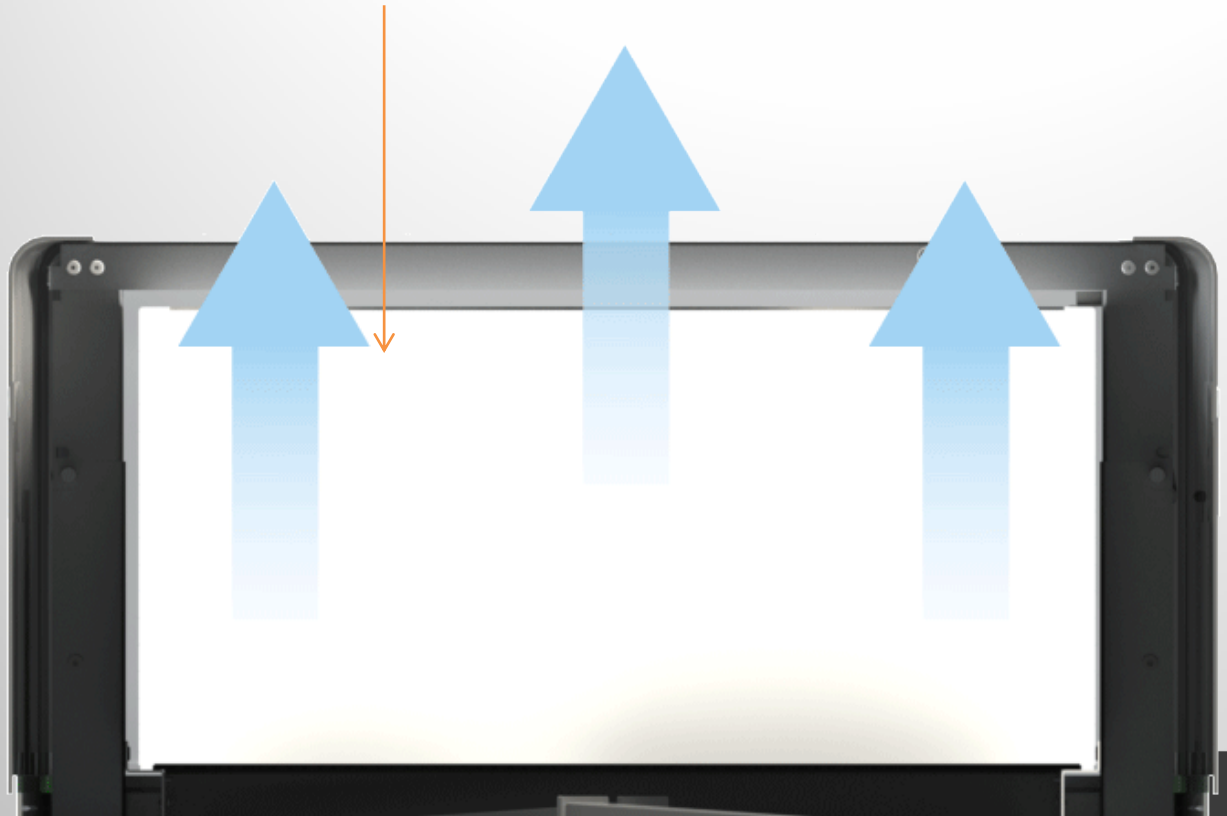
   Some particles smaller than the limit particle (1µm) are also separated if they start in a more favorable position

2. The particles will start to coalesce with each other creating heavier and larger particles

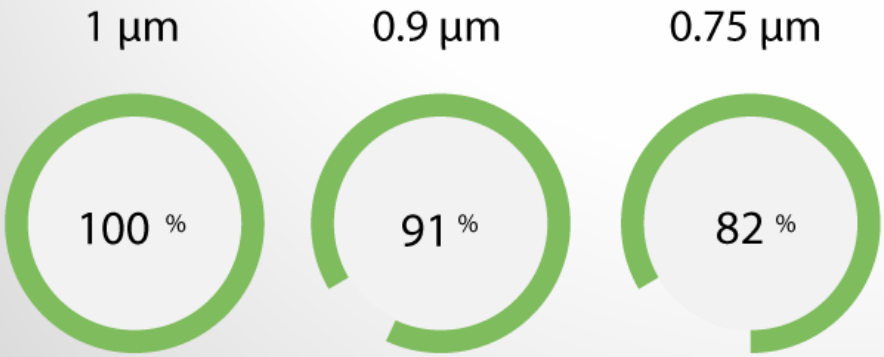
3. The larger they become the heavier they get and the faster will they move towards the edge of the disc where they will be separated out

3 HEPA-filter

The last cleaning step is when the air passes the H13 HEPA filter. Only the finest particles, such as smoke, that was not separated in the disc stack will be collected here. The HEPA filter will take 99,97% of remaining particles.



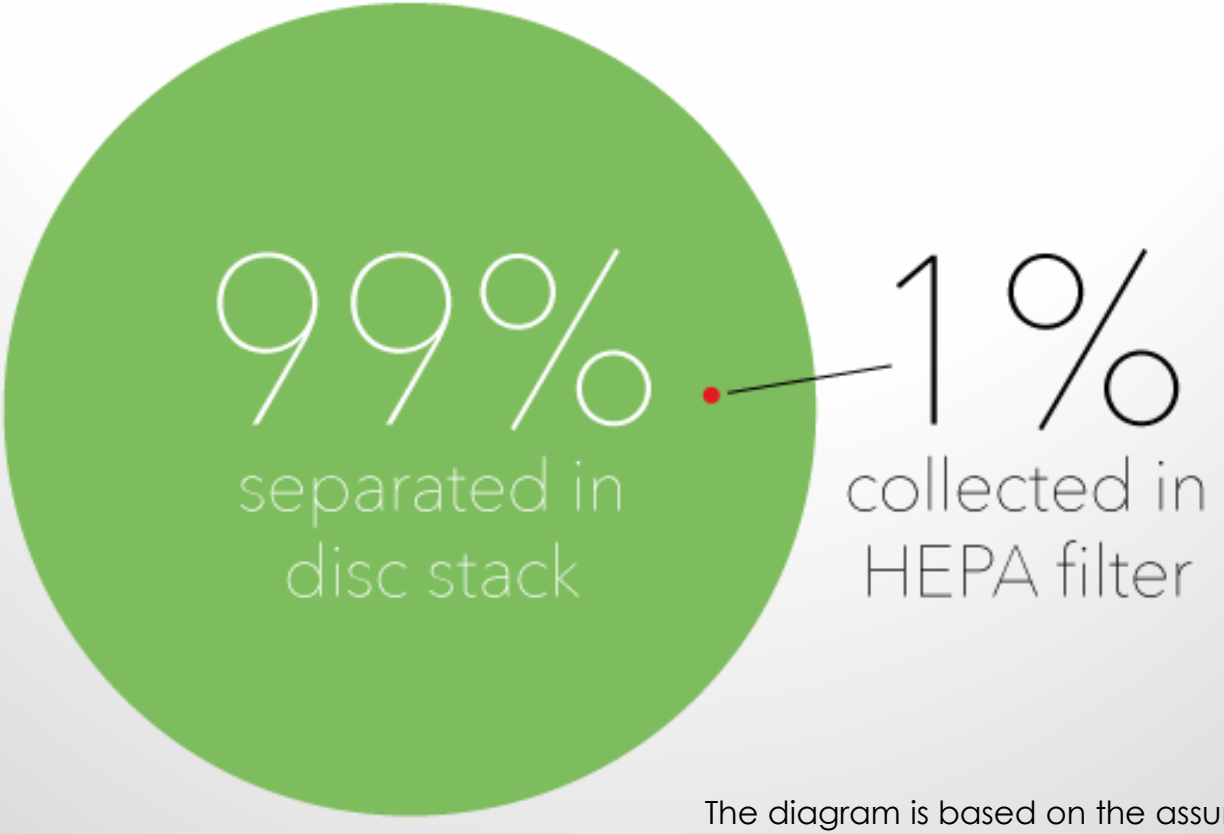
SEPARATION EFFICENCY



SEPARATION INSTEAD OF COLLECTION

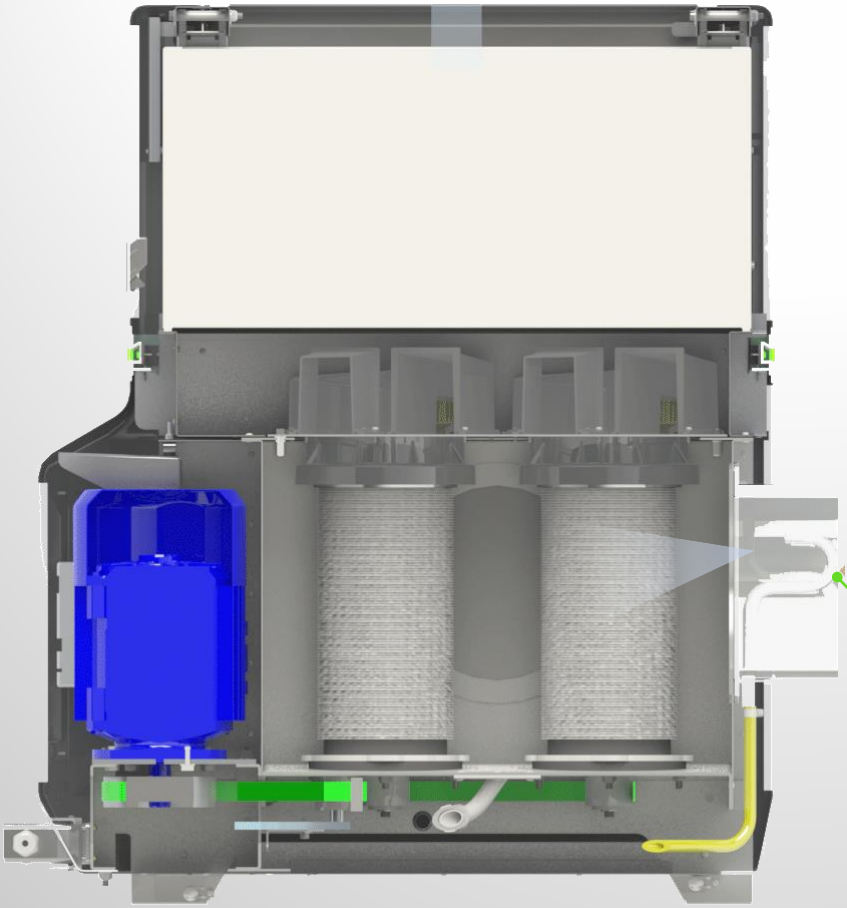
The GREEN LINE Series of units can separate 100% of all particles down to 1µm and 82% of particles as small as 0.75µm.

DISTRIBUTION



The diagram is based on the assumption of 150mg fed in and a log-normal distribution of DV50, Σ0.6. This would be a fairly difficult application.

AUTOMATIC CLEANING SOLUTION



For difficult applications with a lot of solid sticky particles, 3nine's patented solution CIP (Cleaning In Place) will automatically clean the discs in order to avoid any clogging. It is easy to install and uses clean cutting fluid to clean the surfaces.

CIP (Cleaning In Place)

Multi disc-stack rotor technology

Air flow requirement determines amount of rotors.

1 rotor=300m³/h

PRODUCT LINE

GREEN LINE

GREEN LINE SERIES

NOVA

Air flow capacity:300m³/h
Machine tool cabin size: <2m³

ANNA

Air flow capacity: 600m³/h
Machine tool cabin size: <6m³

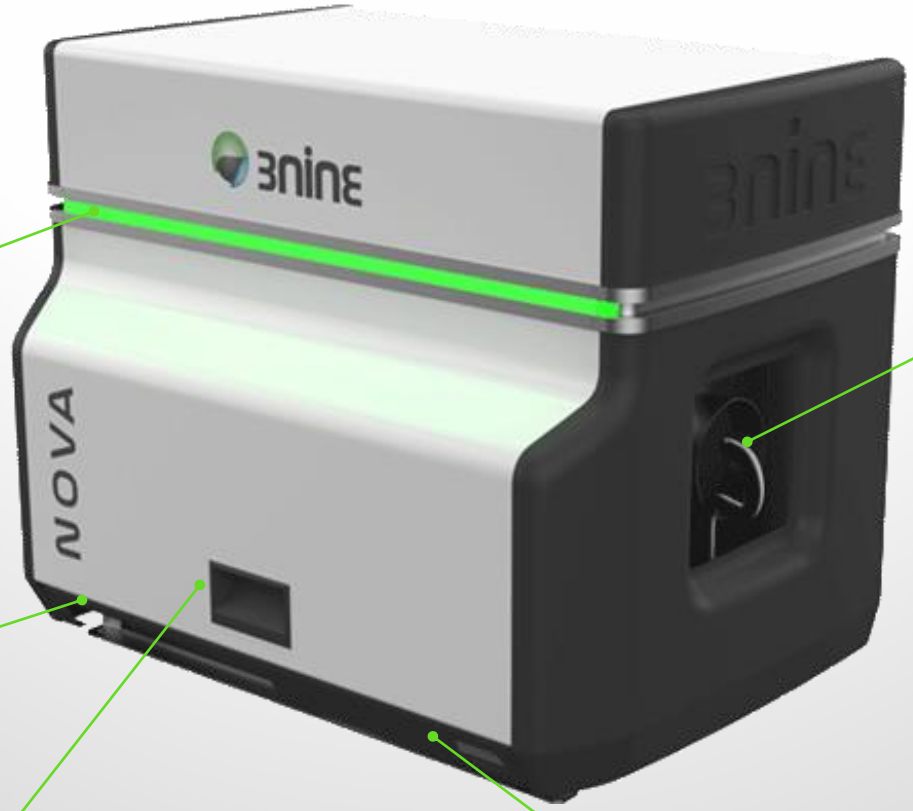
LOVA

Air flow capacity: 900m³/h
Machine tool cabin size: <9m³

NINA

Air flow capacity: 1200m³/h
Machine tool cabin size: <12m³

NOVA 300m³/h



RGB LED Light communication

Automatic cleaning unit (optional)

99,97% Particle free air

Ergonomic filter change under hatch

100% of particles down to 1µm, out separated

Award winning product at the Salon Industrie Paris 2012 Category security

NOVA BASIC

1

1. RGB LED List
2. HDC - connection
3. End Filter (HEPA H13)
4. Simple Filter monitor

   - When pressure drop is going up to 480 Pa. Alarm goes on.

NOVA ADVANCED

2

1. RGB LED List
2. Harting Type Connection
3. End Filter (HEPA H13)
4. CIP (Cleaning Unit)
5. Possible integration with Machine Tool
7. Control box

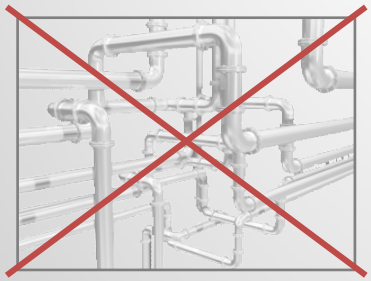
- Advanced filter monitoring based on pressure drop and flow rate measurements
- Warning when end filter is starting to clog
- Alarm when filter is clogged
- Warning when system pressure drop is starting to build up
- Alarm when system pressure drop gets high
- Alarm if drive belt loss

ADVANTAGES

Installation

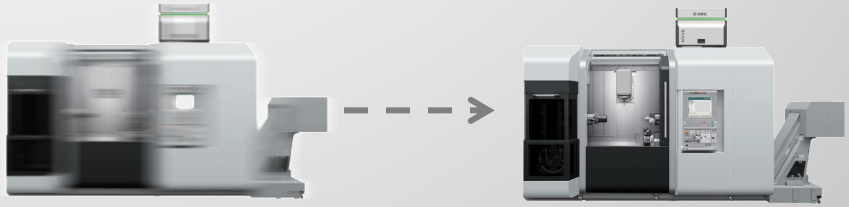
One machine for all applications
GREEN LINE oil mist separators works for all applications using cutting fluid or oil in the process. From simple applications such as lathing, to more difficult such as grinding or die casting.

Simple installation
Just install the machine on top of the machine tool, or on a pillar stand and plug in the HDC connector .

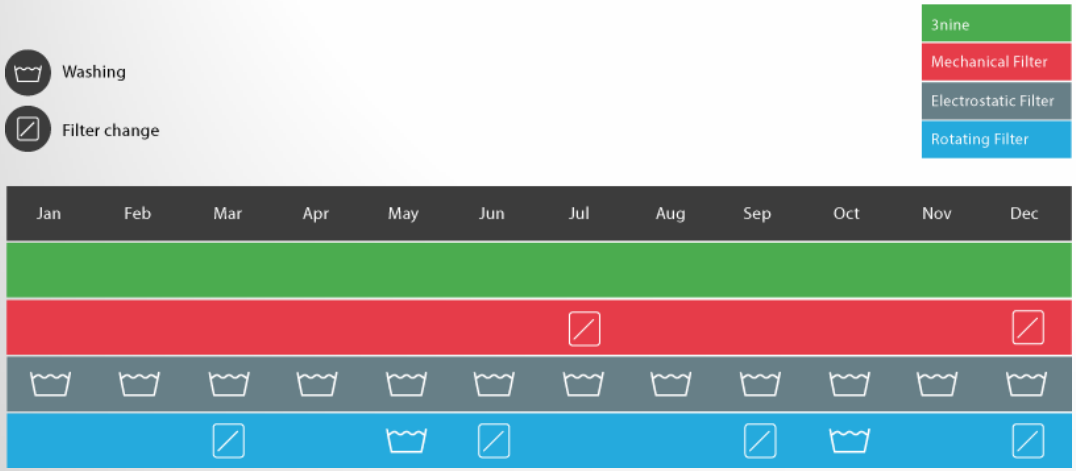


No pipe work required!
Pipe works should always be avoided due to the sedimentation of oil in the pipes which can cause fire hazards.

No pipe = flexibility!
Install the oil mist separator on top of the machine tool and you can move the machine tool freely according to your production requirements.



Maintenance



Reduce maintenance to a minimum

Competing technologies are often combined with frequent filter changes and/or frequent washing.

With GREEN LINE oil mist separators, the only maintenance required is the filter changes approx. every 2-4 years (depending on application).

Automatic cleaning

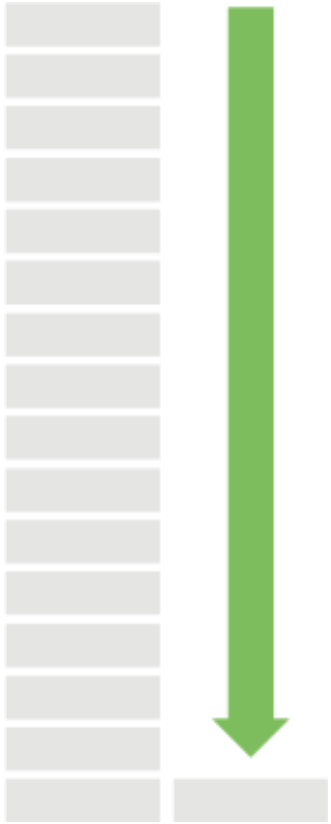
Thanks to 3nine's patented solution CIP (Cleaning In Place)the rotor is constantly cleaned during operation to avoid any clogging. It is easy to install and uses clean cutting fluid to clean the surfaces.

RE USE
RE DUCE
RE CYCLE

AIR/HEAT

The air coming out from our units is so clean that you can reuse the air directly into the workshop. No need to vent it out from the factory!
This will lower heating costs drastically, especially during winter time.

RE DUCE



Thanks to 3nine's extremely high separation rate, the end filter (HEPA-filter H13) is rarely changed. On an average every 2-4 years.

This means lower hazardous waste and lower CO_2 emission due to less transportations.

RE CYCLE

Thanks to 3nine's high separation rate, oil and coolant are constantly separated out to be reused again in the process.

You will therefore save both money on the recycled cutting fluid, but most of all you will reduce the negative impact on environment.

2 900 000L/Y!

Thanks to all our customer world wide, Over 2.9million liter oil/cutting fluid is separated and recycled every year!

That would fill up 64 tank trucks!

TESTIMONIALS
REFERENCES

”Upon first hearing about the technology, we thought this was just another mist collector. We have tried others in the past that worked for a short time and clogged up with cutting fluid and did very little to improve the air quality. The 3nine Mist Separator however, have a very high purification rate and minimum filter replacement (2 years with one filter). The machine operator as well as other staff members have noticed a significant improvement in the air quality. Thank you for introducing us to the 3nine product line.”

Mr Charles Goforth, President Bargo Engineering Inc. Fayetteville, USA

”Before installing the 3nine oil mist separator, we had to change filter every two weeks.”

Mr Jim Leach, Okuma Large Body Cell Machine Manager at MOOG Inc. Aircraft Group, New York, USA

”With 3nine oil mist separator we have guaranteed low maintenance costs.”

Mr Åke Falk, Production Manager, Sandvik Coromant AB, SWEDEN

”Thanks to 3nine’s oil mist separator we now have an outstanding air quality in the workshop, and the maintenance costs have drastically reduced.”

Mr Markus Gutjahr, Mechanical Production Manager, COMET AG, SWITZERLAND

”Thanks to 3nine’s modern technology, we can keep maintenance cost on a minimal level.”

Mr Pottrick, Installation Manager, Eikoff Maschinenfabrik GmbH, GERMANY

"Our first Clara was installed over a year ago, and has required ZERO maintenance.

We now have three 3nine units installed, and our shop air is noticeably cleaner. The fact that the units are quiet and mounted directly on our machines is a bonus."

Dennis Yeaton, General Manager Triangle engineering Inc. USA

REFERENCES


DENSO


BOSCH


Atlas Copco


KONECRANES
Lifting Businesses


SECO


TRUMPF


Freude am Fahren


ZF


AIRBUS


Marioff
A UTC Fire & Security Company


PSA PEUGEOT CITROËN


VOLVO


GETRAG


WÄRTSILÄ


SCANIA


ALSTOM


SAFRAN
Messier-Bugatti-Dowty


SANDVIK


VALTRA


ABB


SIEMENS


PORSCHE

INSTALLATION IMAGES

INSTALLATIONS

INSTALLATIONS