How to decide the requirement of air flow
- a calculation guidance

In order to select the correct Absolent filter unit regarding airflow and application, please see the guidelines below:

First of all, most of the producers and suppliers of tool-machines have recommendations for the required air volume. This can often be found in the manual.

If there are no recommendations available, there are some general guidelines one could follow. There are two parameters effecting the need of air flow:

- **Total leaking area**
  Leaking areas could be temporary openings of the machine such as openings for inspection and tool exchange hatches.
  In order to have a sufficient air velocity through the openings, we recommend an air velocity of at least 0.5 m/s or 100 f/min.

  Calculation example 1: 0.5 m/s x Total leaking area in m^2 x 3600 = required air flow in m^3/h. Some examples:

Total leaking area [m^2]	Required air flow [m^3/h]	Required air flow [cfm]
0.25 m^2	450 m^3/h	265 cfm
0.5 m^2	900 m^3/h	530 cfm
1.0 m^2	1800 m^3/h	1060 cfm

  Calculation Example 2: 100 f/min x total leaking area in ft^2 = Airflow in **cfm**
  - 1.0 m^2 = 10.76 ft^2

The size of the machining space.

In order to capture the oil aerosol when the inspection / service-door is opened, it is important to know the size of the machining room. Following measuring rod should be used:

The volume of air in m^3 or f^3 inside the machining room should be changed 4 times/ minute.

Calculation example m^3/h: Take a machining space with a volume of 5 m^3. (1 m^3 = 35.25 f^3)
5 m^3 x 4 air changes/minute = 20 m^3/min
20 m^3/min x 60 = **1200 m^3/h**

Calculation example Cfm: Take a machining space with a volume of 176.25 f^3.
176. 25 f^3 x 4 air changes/minute = 705 cfm

Please note, that the airflow can be reduced, if the service-door is not opened directly after machining is finished. Wait 10-20 seconds.

You can find a unit selection guide in the following pages!

Unit selection guide

Type of machine	Unit selection guidance
Small turning machines	 **Coolant:** We assume that the coolant is an emulsion **Air requirement:** The air requirement is roughly 500 m³/h. **Unit selection:** For this machine it would be suitable with one ODF 800 (600 m³/h or 353 cfm). **Others:** If the customer has a group of smaller lathes, the best solution would be to use an ODF 2000, which could serve up to 4 lathes.
Turning machine with a large service-door	 **Coolant**: Emulsion **Air requirement**: 1000 m³/h or 590 cfm. **Unit selection**: ODF 1000 Standard or ODF1000C
Twin spindle turning machine	 **Coolant**: Emulsion **Air requirement**: Between 700-1000 m³/h or 410-590 cfm **Unit selection**: ODF 1000 Standard or ODF1000C

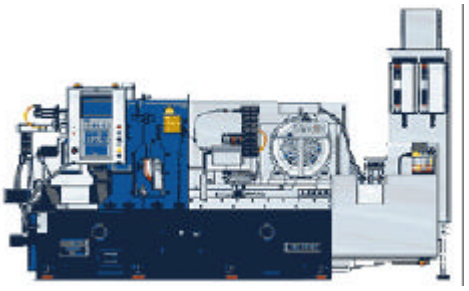
CNC, one-spindle machine	 **Coolant**: Oil **Air requirement**: 400 m³/h **Unit selection**: There are two options here: A) ODF 2000S (1000m³/h or 590 cfm) capacity will be enough to cover two lathes. B) ODR 3000 (3000-4000m³/h or 1765-2350 cfm) This is the filter we want to recommend. We can cover the need from a group of 7 –10 lathes with this filter-unit. **Others**: In cases where oil is used as a coolant, there will be a substantial amount of oil smoke and due to the smoke particles the standard range of ODF can not be used. Risk for fire. **Coolant**: Emulsion **Air requirement**: 400 m³/h **Unit selection**: With emulsion it is possible to use one ODF 800.

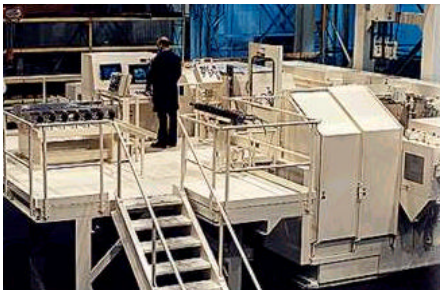
Type of machine	Unit selection guidance
CNC Six spindles machine	 **Coolant**: Normally oil **Air requirement**: 600-700 m³/h or 350-410 cfm. **Unit selection**: In this case model ODF 2000S (1000m³/h or 590 cfm) would be necessary. This model will cover the need for 2 six spindles machines. **Others**: Normally, a high amount of aerosol is created, when hard machining is done. There can also be oil smoke.

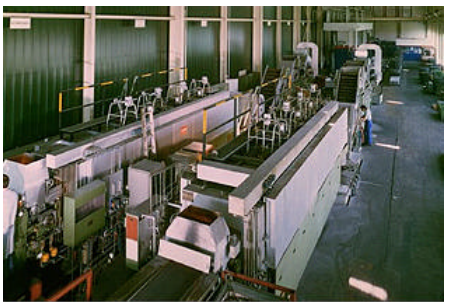
Hydromat	 **Coolant**: Oil **Air requirement**: 400 m³/h **Unit selection**: For hydromat machines we can not recommend anything but the range ODR. Absolent ODR 3000 will cover the need for 5-8 hydromat machines. **Others**: The oil aerosol, which is created, does normally consist of bigger particles (no smoke). The total milligram load of oil mist is very large and therefore a high performance filter unit is required.
Vertical machining centre.	 **Coolant**: Normally emulsion **Air requirement**: There can be some problems, when it comes to deciding air volume for this type of machine. It is quite often delivered without an enclosure on the top, which makes it impossible to receive a sufficient oil mist separation. First of all the customer has to cover the open top part. Recommended air volume for this type of machine is between 1000 and 2000m³/h., depending on the size of the machining room and the dimension of the service/inspection-hatch **Unit selection**: ODF 1000 or ODF 2000.

Type of machine	Unit selection guidance
Horizontal machining center.	 **Coolant**: Normally emulsion **Air requirement**: 1000-1500 m³/h **Unit selection**: ODF 1000 or ODF 2000

Horizontal machining center. (High speed)	 **Coolant**: Oil **Air requirement**: 1000-2000 m³/h **Unit selection**: The combination of oil and high speed machining creates a heavy load of oil-aerosol. In most cases You can expect a load of oil-aerosol in the area from 30-150 mg/m³/h, which makes the ODR to an obvious choice. **Others:** Be aware of the fire risk
Gear-cutting and gear-grinding	 **Coolant**: Normally oil **Air requirement**: 1000-1500 m³/h **Unit selection**: Alternative 1: ODF 2000 S (1000 m³/h or 590 cfm) Alternative 2: We would **prefer** to use ODR 3000 for a group of machines. **Others**: The combination of hard machining and oil, creates a heavy load of oil-mist and oil-smoke. It's absolutely necessary to use the ODR range for this type of machines. Leading suppliers of this type of machinery are Pfauter and Gleason.

Type of machine	Unit selection guidance
Centerless grinding machines,	 **Coolant**: Normally emulsion **Air requirement**: When it comes to air-requirement, its very much depending on the construction of enclosure. Normally we calculate with 1500 m³/h (880 cfm). **Unit selection**: Our proposal would be ODF 2000. **Others**: This machine creates a lot of oil-mist, but we can almost always manage with our ODF range.
High speed grinding-machines,	 **Coolant**: For this construction of machines, oil is normally used as coolant. **Air requirement**: Recommended air volume would be between 1500 and 3000 m³/h (880 and 1760 cfm), depending on the size of the machine and construction of the enclosure. **Unit selection**: In this case we recommend ODR 3000, that depending on airflow could serve more than one machine. **Others**: The machining-speed is very high as well as the flow of the coolant. This causes a high load of oil-mist and oil-smoke and it is not unusual with loads of aerosols at 100mg/m³. A well-known manufacturer is Junker.

Type of machine	Unit selection guidance
Forging press	 **Coolant**: Either graphite oil or an emulsion of water and graphite. **Air requirement**: Recommended air volume is between 2000 and 3000m³/h (1180-1760 cfm) depending on how well the machine is enclosed. **Unit selection**: When using graphite oil, it is common that oil smoke is created and therefore we advice the use of the filter unit ODR 3000. **Note!** When using emulsion as lubricant, we do not have an acceptable solution today. The emulsion consists of water and graphite. Depending on the heat release, water is transformed to gas-molecules and there will remain only a compound of graphite. This will clog the filter.
Bolt makers	 **Coolant**: Normally straight oil. **Air requirement**: It's difficult to advice the air volume since the size of the machine and the construction of enclosure is varies a lot airflow will be in the range from 1000 to 4000 m³/h (1760-2350 cfm). **Unit selection**: For this type of production we recommend the ODR range, since the load of oil mist/smoke is heavy. **Others:** this machine is a combination of traditional machining and a cold header.

Type of machine	Unit selection guidance
Heat Treatment	 **Air requirement**: Can vary a lot. Ask the supplier about the requested airflow. **Unit selection**: This oil smoke consists of very small particles and it is necessary to use a filter with a deep bed. Filter range ODR is the only choice in this case. **Others**: When installing a filter for heat treatment, always keep in mind that there is a risk for fire. At almost all installations, there is a need for some kind of fire protection equipment. Often, a combination of foam and fire dampers are required.
Die Casting Aluminium	 **Aerosol:** 1. From release agent a mixture of wax, oil and water. 2. Grease for the piston (graphite). **Air requirement**: 2000-6000 m³/h (1180-3530 cfm). **Unit selection**: A special cons truction of the ODR 3000 filter unit. **Others**: To filter aerosol from a die casting machine is very complicated. Aerosol does not drain and the surface of the filter bed will be covered in grease. In order to extend lifetime of the pre filter, water is added via a spray nozzle before the filter unit. The water will solve the grease. Note that the life time for pre filter 1 will be reduced to roughly 5-10 months.