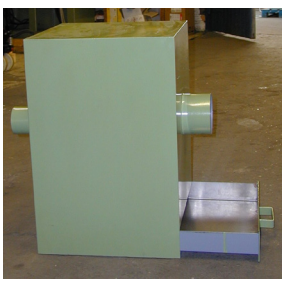

Surtech

Easy Guide Dust

A step by step guide to choosing the correct dust extractor for SURTECH's grinding, de-burring and polishing machines.

All information in this guide is of a general nature. Each dust extraction system must be assessed individually, particularly where hazardous dusts are involved.

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EASY GUIDE - DUST

INTRODUCTION

The information in this guide is meant to draw your attention to the many hazards of dusts produced from grinding, deburring and polishing operations. The data is collected from many sources and may not be up to date in all cases.

However, as long as it encourages you to investigate further we think it offers valuable practical advice.

To comply with Health and Safety Recommendations all our grinding, de-burring and polishing machines must be connected to a suitable dust extraction system. Do not assume that the extractor supplied with the machine is the correct one, unless you have filled in our questionnaire and you have declared all relevant details and received our written confirmation.

In its simplest form dust in our industry can be divided into low hazard, medium hazard, high hazard and difficult dusts.

Hazardous refers to fire and explosion risks and to medical risks. hazard, medium hazard, high hazard and difficult dusts.

Hazardous refers to fire and explosion risks and to medical risks.

THE DUST EXTRACTOR MODELS

Dry dust extractors with fabric filters are the most common dust extraction systems used in our industry.

A number of fabric filter bags hang inside a metal housing. The total surface area of the filters and the fan size determine the extractor's capacity. Always choose the extractor with the larger filter area.

Fabric filters must be shaken regularly to stop filters clogging . There are extractors with manual shaking and extractors with motorised shaking. Dust drops into a dust pan at the bottom of the extractor from where it can be removed and disposed of.

These dry, fabric filter extractors are not recommended for hazardous dusts which can present a fire or explosion risk. They can, however, be used for aluminium as long as they are fitted with an explosion panel and a blast barrier of the correct size and design.

ASK FOR ADVICE !

Where a lot of hot sparks are created the fabric filter extractors are prone to filter bag fires. To prevent such fires spark traps and/or spark arresters must be fitted. Spark traps and spark arresters are part of the ducting connecting the dust extractor with the machine.

Unless one of our dust questionnaires is filled in or we are informed in writing of the nature of the dust we will assume that a standard extractor and standard ducting will suffice.

Model ASP 700 Bolt on dust extractors

For small amounts of non hazardous dusts.

Our bolt on extractors comprise a motor with fan, a metal bodied bottom half cyclone with clipped on dust tray and a top fabric filter bag.

Bolt on extractors are only recommended for bench and pedestal grinding and polishing machines which are used for light to medium duty work that creates small amounts of non hazardous dust. Dust laden air is drawn into the extractor by the 0.75 hp fan unit.

Heavy dust is separated in the semi cyclone deposited into the bottom metal tray.

Light dust is filtered by the top fabric filter bag.

The bottom tray can be unclipped for the disposal of dust.

The fabric filter can be removed and should be cleaned regularly.

Fan motor:	0.75 hp, 400V, 3ph
Air volume approx.	380 cfm
Inlets:	2 x 80mm OD, 2 x 100mm OD
Approx. weight:	20 kg
Approx. dimensions:	770mm high x 650mm x 420mm

Model ASP 700-T

Dust extractor on trolley

Same as the Bolt on model but mounted on a trolley

Both the Model ASP 700 bolt on extractor and the Model ASP 700 trolley extractor are not recommended for large amounts of dusts , for dusts with hot sparks and for hazardous dusts.

Model DE 2000

Mounted on casters Same design principle as Model ASP 700 but with much larger volume.

Motor:	1.5 KW, 400 V, 3ph
Air volume:	approx. 2200 cbm/hr = 1300 cfm
Inlets:	2 off 80mm dia and 2 off 100mm dia.
Dimensions:	800mm dia x 1200mm high
Weight	approx. 55 kg

Model DVS

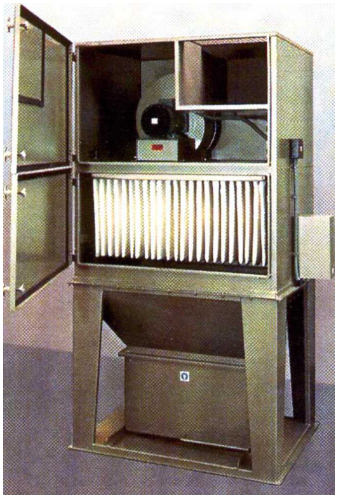
Dry extractor. With collection tray at front.

For small to medium amounts of non hazardous dusts.

Motor size:	0.37 KW 400 V, 3 ph or 230 V single phase approx. 500 cfm
Inlets:	2 off 75mm dia
Filter size:	305 x 405 x 25mm
Dimensions:	920 x 590 x 850mm
Weight:	approx. 60 kg

The above low capacity, simple extractors are mostly connected to machines with flexible, corrugated ducting hoses. They can be bent easily and are very economical. They do, however, need to be cleaned regularly because dust can collect inside and even cause a fire. To avoid such problems smooth bore fixed ducting has to be installed, possibly together with a small spark arrester.

MODEL FX COLLECTORS



The FX range covers our most popular dry collectors. They are traditional collectors with hanging needle felt bags and manual shaker units.

FX collectors are available in standard specification for non hazardous dusts and in ATEX specification.

MODEL	cbm/h	cfm
FX30/86	425	250
FX30/98	595	350
FX30/112	760	440
FX50/98	595	350
FX50/112	760	440
FX50/123	850	500
FX75	1020	600
FX100	1360	790
FX125	1700	998
FX150	2040	1200
FX175	2380	1400
FX205	2710	1590
FX250	3400	2000
FX294	4000	2350

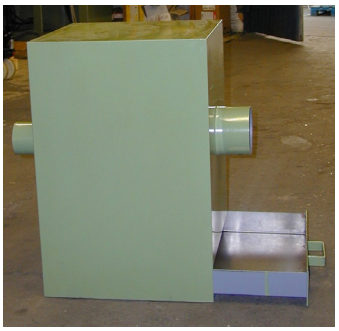
All FX extractors are also available with ATEX modifications for hazardous materials.

HOT SPARKS AND SPARK ARRESTERS

Where a lot of hot sparks are created the fabric filter extractors are prone to filter bag fires. To prevent such fires spark traps or spark arresters must be fitted.

Spark arresters are metal boxes installed between the machine and the extractor to catch hot sparks before they enter the dust extractor and burn holes in the fabric filters.

Spark arresters are designed to trap hot sparks by reducing the air velocity and by creating an air current that sends them to the bottom of the spark arrester.



Model OM10

With fabric filters. For small to medium amounts of non hazardous dust. Not ATEX approved.

580 cfm
0.55 KW motor
100mm dia spigot
Filter area: 25 sq ft
Dimension: 550x550x1120 mm
Manual shaker
Weight approx. 60 kg
Dust pan in bottom

Model OM12

1200 CFM
1.1 KW motor
150mm dia spigot
Filter area: 25 sq ft
Dimensions: 550x550x1120 mm
Dust pan in bottom

Model DUSTOMAT - 10

An ATEX conforming extractor, with cartridge filter.
Suitable for aluminium dust.

Also recommended for wood, plastics, lacquer dusts.

Motor: 1.1 KW, 400 V, 3ph or 230 V single phase
Filter area: 3.5 sq m
Airflow approx: 720 cbm/hr = 420 cfm
Manual shaker
Inlet: 100mm dia
With built in pressure gauge.
Large dust collection bucket with sight panel.
Dimensions: 1150mm x 515mm x 1640mm
Weight: approx. 82 kg

Model ASP 01 HP4

Dry dust extractors with all-metal cyclones for non hazardous dusts.

Ideal for polishing dust which consists of dust from cotton or sisal buffs and polishing compound.

All-metal cyclones reduce the risk of fires and are recommended for grinding operations where a lot of hot sparks are created.

Cyclones are not as efficient as fabric filters and should be used for coarser dust only, i.e. where grinding operations with abrasive belt grits 24 to approx. grit 80 are carried out.

All-metal cyclones are not recommended for hazardous materials as they do not have explosion panels and blast barriers.

4 hp fan motor
Approx. 1300 cfm
Dimensions: 1900mm high x 750mm deep x 7500mm wide
Weight approx: 150 kg

WET DUST EXTRACTORS

INTRODUCTION

In wet extractors dust is mixed with water and deposited in a sludge tank from where it can be disposed of. There is little chance of a fire in a wet extractor, however, if not properly constructed gases can collect inside and cause an explosion.

Wet dust extractors are safest for hazardous materials as long as they are correctly specified for aluminium, titanium or magnesium and other hazardous materials.

To find out if dust is suitable for extraction via a wet extractor try this simple experiment:

Fill jar with water. Sprinkle dust on water. Fit lid and shake vigorously. Leave jar standing for a few minutes. If dust has mixed well with the water the wet extractor should be suitable.

If dust has not been wetted and is floating on top of the water then a wet extractor is not suitable.

Wet extractors are approx. 98 % efficient on particles greater than 10 microns and 95% efficient on particles between 5 and 10 microns.

Wet extractors are not suitable for dusts which become chemically reactive in water. Water additives increase performance, extend extractor life and reduce health risks.

NF MODEL RANGE WET DUST EXTRACTORS

All NF extractors are self induced spray wet scrubbers. Dust laden air is drawn into the extractor where it passes through swirling water. The dust is separated and settles as sludge at the bottom of the extractor. From here it can be raked out into a container for disposal.

MODEL	cfm
NF W 60/1,1	500
NF W 80/2,2	1200
NF W 80/3	1500
NF W 120/4	2000
NF W 120/5,5	2250
NF W 120/7,5	2700
NF W 185/7,5	3350
NF W 185/11	4400
NF W 220/15	6000

All wet extractors listed below are available in 3 specifications:

1. **Standard for non hazardous dust**
   Ducting can be flexible or solid.

2. **Modified for aluminium dust and titanium**
   Anti-spark strap. Electrcal controls to IP65. Ducting must be solid 14 gauge steel with access flaps for cleaning.

3. **Modified for and magnesium dust**
   Anti-spark strap. Electrical controls to IP65. Magnesium control system. Ducting must be solid 14 gauge steel, flanged, with access flaps for cleaning.

Model NF W60/1.1

Capacity approx.: 500 cfm
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity: 218 l
Motor size: 1.1 KW
Water level control
With Silencer: 79 dBA
Drain valve
Inlet spigot size: 152 mm dia
Size: 870 mm x 730 mm x 1870 mm

Extractor must be properly vented to prevent hydrogen gas collecting.inside the extraction.

Model NF W 80/2.2

Capacity approx.: 1200 cfm
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity: 282 l
Motor size: 2.2 KW
Water level control
Silencer
Drain valve
Inlet spigot size: 203mm dia
Size: 970mm x 830mm x 2140mm

Wired to the polishing machine so that the polishing machine cannot be operated without the extractor working.
Electrical controls to IP 60.

Extractor must be properly vented to prevent hydrogen gas collecting inside the extraction.

Model W 80/3

Capacity approx.: 1500 cfm
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity
Motor size: 3 KW
Water level control
Silencer
Drain valve
Inlet spigot size: 203mm dia.
Size: 660 x 860 x 2140mm

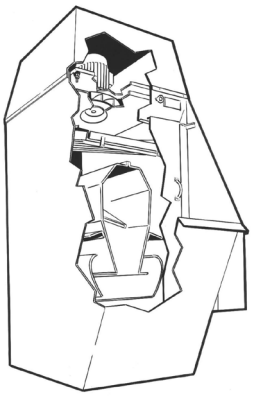
Optional extras:
Wired to the polishing machine so that the polishing machine cannot be operated without the extractor working.
Electrical controls to IP 60.

Extractor must be properly vented to prevent hydrogen gas collecting. inside the extractor.

Model NF W 120 /4

Capacity approx.: 2000 cfm
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity: 482 l
Motor size: 4.1 KW
Water level control
With Silencer: 83 dBA
Drain valve
Inlet spigot size: 305 mm dia
Size: 1030mm x 1220mm x 2580mm high

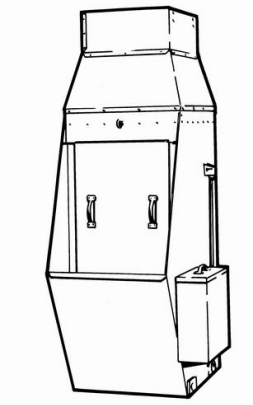
Model NF W 120/5



Capacity approx.: 2250 cfm
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity: 482 L
Motor size: 5.5 KW
Water level control
Silencer
Drain valve
Inlet spigot size: 305mm dia
Size: 1030mm X 1220mm X 2580mm

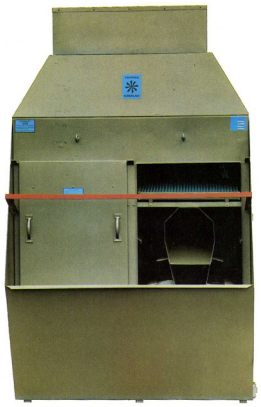
This line drawing shows how NF wet extractors work. Dust laden air is drawn into the spray inducer where the dust particles are separated and drop into the bottom dust bin.

Model NF W 120/7.5



Capacity approx.: 2700 cfm
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity: 886 l
Motor size: 5.5 KW
Water level control
Silencer
Drain valve
Inlet spigot size: 305mm dia
Size: 1030 x 1220 x 2580mm

Model NF 185/5.5

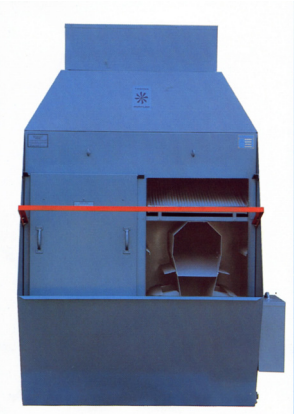


Capacity approx.:
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity: 886 l
Motor size: 5.5 KW
Water level control
Silencer
Drain valve
Inlet spigot size: 305mm dia
Size: 1670 x 1860 x 2580 mm

Optional extras:
Wired to the polishing machine so that the polishing machine cannot be operated without the extractor working. Electrical controls to IP 60

Extractor must be properly vented to prevent hydrogen gas collecting inside the extractor.

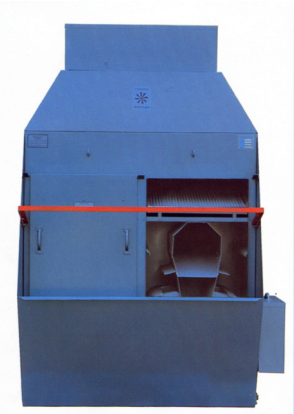
Model W 185/7.5



Capacity approx.: 3300 cfm
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity: 886 l
Motor size: 7.5 KW
Water level control
With Silencer: 83 dBA
Drain valve
Inlet spigot size:
Size: 1670mm x 1860mm x 2580mm high

Extractor must be properly vented to prevent hydrogen gas collecting inside the unit.

Model NF W 185/11



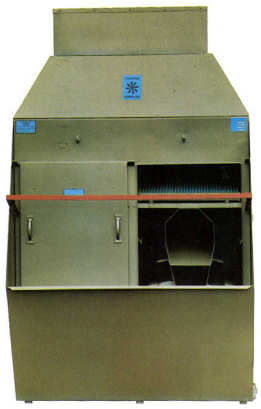
Capacity approx.: 4400 cfm
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity: 886 l
Motor size: 11 KW
Water level control
With Silencer: 83 dBA
Drain valve
Inlet spigot size: 305 mm dia
Size: 1860mm x 1670mm x 2580mm high

Optional extras:
Wired to the polishing machine so that the operated without the extractor working.

Electrical controls to IP 60.

Extractor must be properly vented to prevent hydrogen gas collecting inside the unit.

Model 220/15



Capacity approx.: 6000 cfm
Self induced scrubbing action
Sludge bin and rake
Direct on line starter
Water capacity: 964 l
Motor size: 15KW
Water level control
Silencer
Drain valve
Inlet spigot size: 304mm
Size: 2700mm x 2000mm x 2820mm high

CORROSION AND FOAM
A corrosion inhibitor should be added to the water in wet extractors to prevent premature corrosion.

Wet extractors can create foam under certain conditions. This can diminish effectiveness. An anti foam agent will reduce the formation of the foam.

Model ASP 07

A wet extractor with fabric filter exhaust.

Suitable for non hazardous dusts and for dusts with hot sparks.
Not suitable for aluminium and other hazardous dusts.
Fan motor: 1.1 KW, 400 V, 3ph
Airflow: 1200 cbm/hr, approx. 700 cfm
Weight 44 kg.

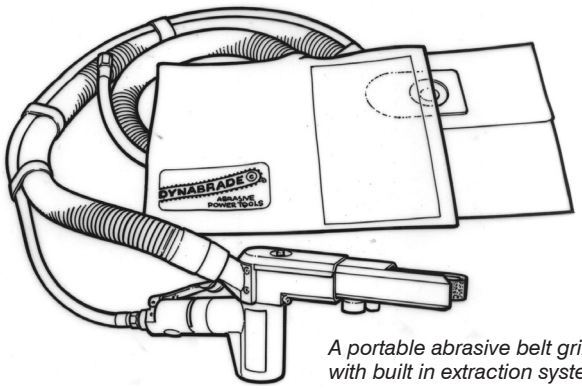
DUST EXTRACTION AND PORTABLE ABRASIVE POWER TOOLS

It is extremely difficult to capture dust from a portable abrasive power tool. The working angle changes constantly and with most tools a capture hood would be in the way and render the tool unworkable.

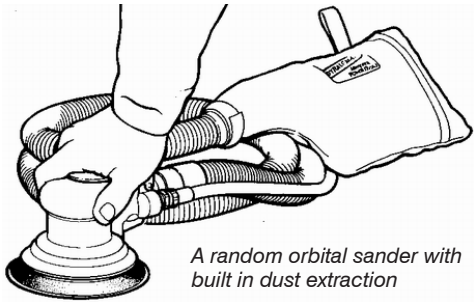
Very few manufacturers offer dust extraction systems and the few that do offer them only for a limited range of tools.

Where dust extraction for a portable tool is essential an individual solution will have to be sought.

Alternatively bench extractors can be used.



A portable abrasive belt grinder with built in extraction system



A random orbital sander with built in dust extraction

The above dust extraction systems with simple bags are rather basic and supplied as optional extras by the manufacturer. There are more efficient dedicated system available from specialist suppliers.

We do not recommend the snorkel type extractors. They are designed for fumes and not for metal dust.

Despite this we regularly are contacted by customers who believe the snorkel could be the answer to their problem. Unfortunately the snorkel is just not powerful enough.

The position of portable abrasive power tools is constantly changed and with it the flow of sparks and dust. You would spend more time adjusting the nozzle of the snorkel than you would grinding.

A snorkel type fume extractor

Our recommendation for extracting dust from portable abrasive power tools is to use a bench extractor

A portable abrasive belt grinder used with a bench extractor

DUST EXTRACTORS FOR WIDE BELT MACHINES, WIDE DEBURRING MACHINES AND WIDE POLISHING MACHINES

Most wide belt machines are used for grinding, graining, de-burring, finishing and polishing of sheet metal, hollow sections, flat bar and stainless steel fabricated parts.

A wet extractor is the only answer to comply with current recommendations for mixing metals.

Our NF W models listed above are ideal.

The following dust extractors are specially designed for use with LISSMAC wide de-burring machines.

Model 2N

With spark trap
Noise attenuation
Exit filter
4000 cbm/h
Motor: 3.6 KW
Filter size: 20 sq /m = approx. 200 sq ft
Noise level: 78 dBA
Weight approx. 300 kg
Dimensions: 665 x 983 x 2070mm

Model 2/2N

With spark trap
Noise attenuation
Exit filter
2x4000 cbm/h
Motor: 2x3,6 KW
Filter size:
40 sq/m = approx. 400 sq ft
Noise level: 78 dBA
Weight approx. 600 kg
Dimensions:
1330 x 983 x 2070mm

DUST EXTRACTION BENCHES

We can offer two types of dust extractor benches:

With extractor built into the bench for small to medium amounts of dust

With extractor separate from the bench for medium to large amounts of dust.

We can offer dust benches 1000 mm, 1250mm, 1500mm and 2000mm wide.

1000mm and 1200mm benches have a single 200mm dia spigot for connection to Model MS 100 extractor.

1500mm and 2000mm benches have two 200mm or 250mm dia spigots for connection to two Model MS 100 extractors.

Model MS 100 B1 - 1000

1000mm wide bench with 200mm single spigot

Working height: 900mm
Canopy internal depth: 510mm
Canopy opening:
640mm wide x 460mm high
Separate 2 off MS 100 extractor

Model MS 100 B2-2000

2000mm wide bench with 2 off 200mm dia spigots

Separate 2 off MS100 extracto

COOLANT SYSTEMS

Some of our machines run wet with a coolant system. This is the preferred method for throughfeed flatbed machines and for centreless tube polishing machines.

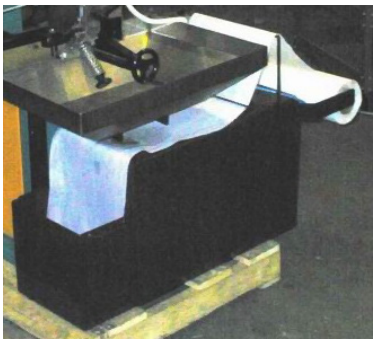
The coolant reduces the temperature of the part, reduces distortion of the part, removes dust and debris and extends the life of abrasive belts.

The coolant system consists of a coolant tank with pump, pipes to the coolant nozzles on each head and the coolant nozzles.

Basic coolant system with sediment tanks

Consists of a coolant tank with 3 compartments, a pump. hoses and nozzles. Dust mixes with the coolant and sinks to the bottom of the tank from where it can be removed.

More sophisticated coolant systems have manual or automatic paper filters on top of the coolant tank. The paper filter separates dust and debris from the circulating coolant and deposits it into a disposal container.



Automatic paper filter

Model VRA coolant filter

75l coolant capacity
Automatic coolant level control
Automatic paper filter

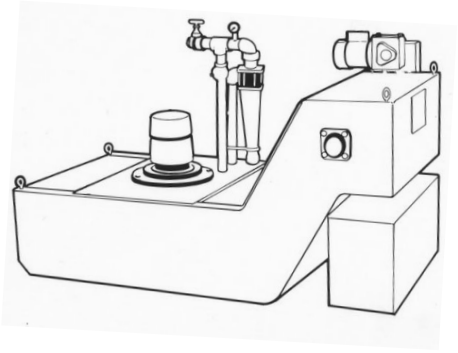
Hydrocyclones

For large grinding and polishing machines with wet operation we recommend hydrocyclones.

They can handle much larger amounts of coolant than coolant tanks with paper filters.

Hydrocyclones consist of a large coolant tank, a pump and a centrifugal unit that separates dust and debris from the recirculating coolant.

Dust and debris are automatically deposited into a disposal container.



A hydrocyclone dust extractor with coolant tank and disposal container.

POSITIONING OF DUST EXTRACTORS

FOR EFFICIENCY
Position dust extractor as close to the machine as possible. We recommend max. 2 m. The further you position the extractor from the machine the less efficient it will be. If close proximity is not possible chose a larger extractor.

FOR ACCESS
Extractors need regular maintenance and cleaning. Make sure the manual shaker remains easily accessible and access panels can be removed.

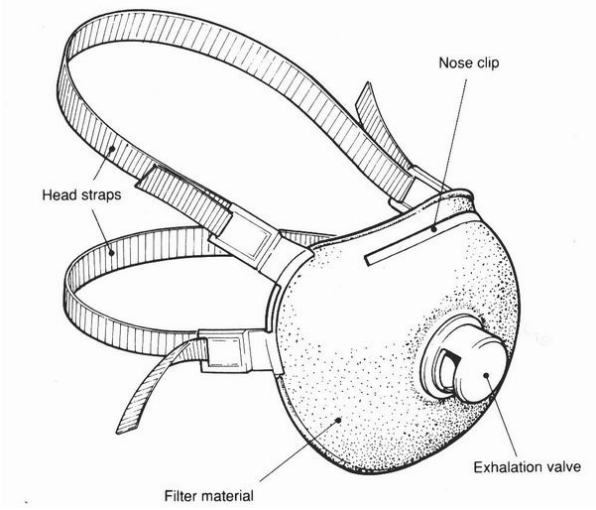
FOR DUCTS
Extractors need room for inlet spigots and ducts. Inlet spigots can be on any of 3 sides depending on model. Ducting fitted to the inlet spigots also needs space, particularly if flexible ducting is used and it needs to be bent. Both inlet spigots and ducting could take up an extra 600mm.

FOR DISPOSAL OF DUST AND SLUDGE
Both dry and wet extractors need extra space for either removing the dust container or removing sludge.
Make sure you allow for this extra space and you position the extractor to give easy access.

Where extractors are installed in workshops with a low ceiling check that there is some distance between the top of the extractor and the ceiling. If the extractor is too close to the ceiling you could have the exhaust air blowing down and/or noise from the exhaust being reflected.

FOR EXPLOSION PANELS AND SPARK ARRESTERS.
Make sure the explosion panel is not close to a wall or close to persons working in the vicinity. In an explosion the blast could be thrown back and although the explosion panel must be on a chain or wire it could fly off injuring people nearby.

DUST MASKS AND RESPIRATORS



Dust masks need to be of the correct specification and fit to be effective. They also must be CE marked. The standard for dust masks is EN 149:2001.

The protection level of dust masks is determined by additional markings, such as FFP1, FFP2, FFP3. The higher the number the better the protection.

FFP1 and FFP2 dust masks are for non toxic dust and fumes. FFP3 valved masks are suitable for fine toxic dust, fibres and aqueous mists. A FFP3 mask is recommended for large amounts of hazardous dusts with the proviso that it is also a good fit. Leaking masks do not give the required protection.

You should discard a dust mask after each shift or earlier if it has been exposed to large amounts of dust.

When buying dust masks always ask for a copy of the manufacturer's technical information. FFP 1 to FFP 3 dust masks are recommended for filtering dust. They are not recommended for gases and vapours.

NOT RECOMMENDED
We do not recommend nuisance dusts or any dust masks without CE specification.

Leading manufacturers offer more than 2 dozen different dust mask models and will also advise you of the most suitable model for your operation - ***JUST ASK !***

Respirators are sophisticated dust masks and protect even better. There are many makes and models available and again we recommend a specialist supplier for advice.

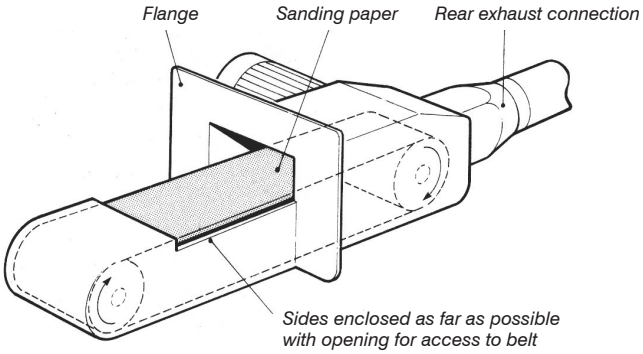
DUST EXTRACTION ACCESSORIES

GUARDS AND CAPTURE HOODS

Before you can extract dust you must first catch it. That is what capture hoods are for, they often also double as guards.

There is often a conflict between the design of the guard for efficient dust capture and the safety aspect. A perfectly designed capture hood guard may restrict the use of the machine. Larger guards than are necessary for best dust extraction may be necessary resulting in the need for higher capacity extractors. It is not uncommon that an efficient dust extractor costs more than the machine.

Examples of standard and tailor made guards.



This is a way to improve dust capture on linishers. Available to special order only.

DUCTING AND SPIGOTS

Ducting and spigots are often overlooked when an extraction system is chosen, yet they are important for extractors to function within their designed capacity.

Ducting should be regarded as part of the extraction system.

We offer the following types of ducting:

STANDARD FLEXIBLE METAL DUCTING FOR GENERAL USE. FOR NON HAZARDOUS DUST

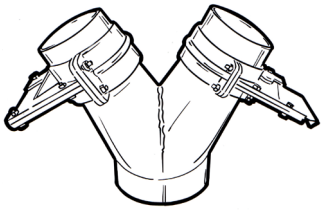
This ducting is very flexible and easy to install. We recommend it for most of our machines with up to approx. 200mm duct diameter.
Standard flexible metal ducting is normally fixed with Circlips or with ducting tape.

Heavy duty flexible metal ducting. Bends are larger than on the standard flexible ducting.

Standard duty flexible metal ducting. It can be bent tighter than the heavy duty version.

HEAVY DUTY FLEXIBLE METAL DUCTING FOR NON HAZARDOUS AND SOMEHAZARDOUS DUST

This ducting is a lot less flexible than the standard ducting.
We recommend it for extractors used for aluminium when solid smooth bore ducting is not practical and when only short runs are needed.
We also recommend it as a heavy duty alternative to standard ducting.
Heavy duty flexible ducting should be fixed with clamps and with screws.



A gate allows you to increase or decrease the airflow on each spigot on multi-spigot machines. The Y-piece allows you to connect 2 machines to an extractor.

HEAVY DUTY SMOOTH BORE SOLID DUCTING FOR HAZARDOUS DUST

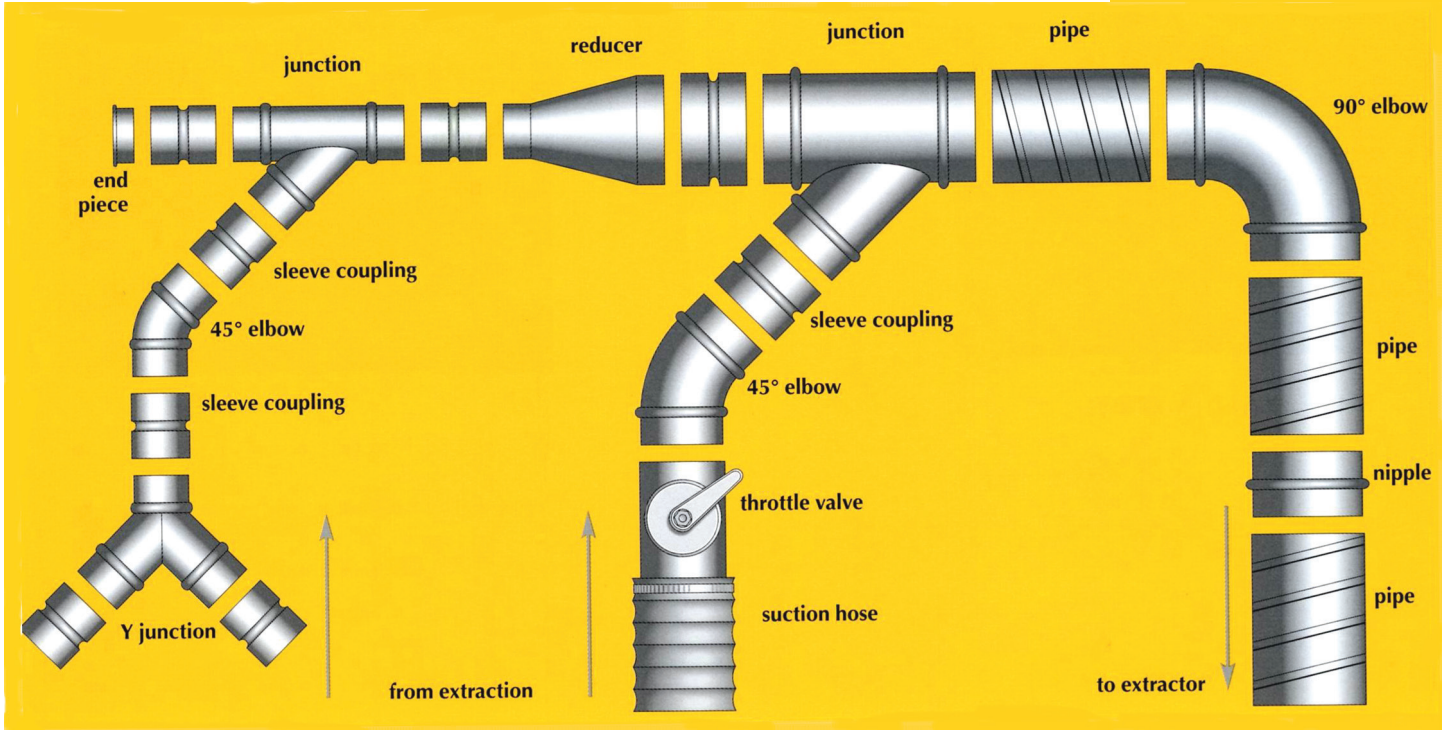
Made from 14 gauge galvanised sheet. This is the ducting recommended for aluminium, titanium and magnesium dust and for all larger machine installations where ducts of 200mm diameter and larger are needed.

Heavy duty smooth bore ducting has no flexibility and can only be made to a floor plan drawing.

Heavy duty smooth bore solid ducting must be fixed with flanges. and the appropriate clamps.

A wide belt machine with three way manifold and smooth fixed metal ducting of 14 gauge steel.

The diagram below shows . . . .



Absolute filters. HEPA filters

HEPA stands for High Efficiency Particulate Air Filter.

Filtration efficiencies of up to 99.9 % are possible provided the correct HEPA filter is chosen.There is not one single

HEPA filter to suit all applications but different HEPA filters designed for individual machines, materials and applications.

No dust particles escape to the atmosphere.

In extreme cases and where highly dangerous dust is created it may be necessary to vent to outside the building.

In our industry HEPA filters are used in combination with standard needle felt filters. The needle felt filter catches most of the dust and the HEPA filter stops the very fine dust from entering the atmosphere

Some typical HEPA filters.

ADDITIONAL NOISE ATTENUATION
All models can be fitted with an additional silencer to reduce noise levels.

EFFICIENCY OF DUST EXTRACTION SYSTEMS
To extract dust from the point where it is created it is necessary to catch it first and then to direct it down the duct into the dust extractor.

To improve efficiency care must be taken with the design of guards and capture hoods. The further away from the source of dust the extractor is positioned the larger its capacity must be.

Most machines are supplied with standard guards and capture hoods which are suitable for most operations. However, in some cases guards will have to be modified and in cases where guards are in the way completely new guards may have to be made. You should also allow for a reduction of efficiency after some use when filters have clogged, and for the fact that most extractors are not maintained at a level to guarantee maimum. efficiency.

Weatherproofing
This is a complicated subject. Consult expert advice in all cases where dusts are mixed!

Extracting different types of dusts through the same extractor needs careful evaluation of risks involved.

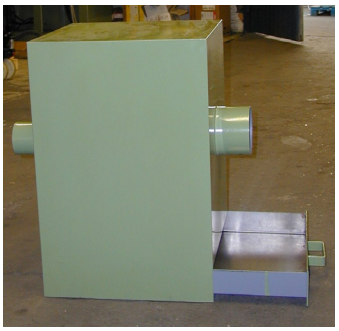
Ideally dust from different materials should not be mixed. If you have to, make sure the various dusts are non hazardous and do not interact with each other.

In extreme cases and where highly dangerous dust is created it may be necessary to vent to outside the building.

A spark arrester with inlet and outlet spigots and with bottom drawer to collect heavy particles.

To prevent fabric filter fires we recommend installing a spark arrester between the extractor and the machine. The spark arrester kills sparks and separates coarse dust. Only the cooled down finer dust reaches the fabric filters.

Alternatively use an all metal cyclone extractor without fabric filters but it will not be as efficient for fine dusts.



A spark arrester with inlet and outlet spigots, with bottom drawer to collect heavy particles.

THE DUST TYPES

Although mixtures of dust and air within the flammable range are capable of explosion, they will not explode unless they are ignited. During the build up to an explosion the pressure rises. Whilst all explosions are highly dangerous and must be avoided at all cost some are more severe than others.

Aluminium, titanium and magnesium have some of the highest pressure rises measured in psi per second.

LOW HAZARD DUSTS

Most steel and non ferrous metal dusts present no particularly risk of fire, explosion and no personal risks as long as maximum exposure levels are adhered to.

Zinc is a material often ground or finished on our machines. Zinc is considered more hazardous than steel but less hazardous than aluminium.

Chromium presents medical risks. Miimum. exposure levels must be adhered to.

FIRE RISK FROM LOW HAZARD DUSTS

Small amounts of dust from low hazard metals ground with fine abrasive belts create no particular risk and are safe with dry extractors fitted with explosion panels and blast barriers.

The same dusts from heavy duty grinding with coarse belt from grit 40 to 80 can create large amounts of red hot sparks which can set the fabric filters in the extractor alight.

Fine steel and iron dust burns. easily if the steel parts are oily when ground. The oil mixed with fine dust creates a highly flammable mixture and resulting fires are extremely difficult to extinguish.

Dust can smoulder for some time and develop into a fire after working hours. Clean the extractor and check regularly.

An abrasive belt power grinder for high stock removal. The amount of sparks shown indicate how much metal is removed.

HIGH HAZARD DUST

The most common hazardous dusts encountered by our customers are aluminium, titanium and magnesium. All of these present considerably increased risks of fire and explosions.

TOXICITY OF METAL DUST

Some metals can be toxic and fatal if they enter the bloodstream, ie when smoke fumes are inhaled.

Never fight a metal fire without proper protective equipment or if not having been trained in the correct use of fire extinguishers.

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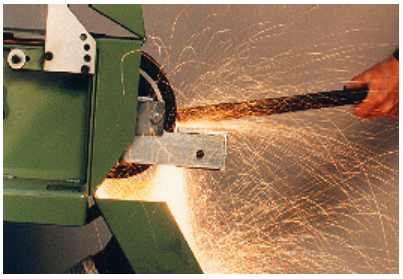

The photo shows mild steel being ground with a coarse abrasive belt. The hot sparks can set alight the fabric filters inside the dust extractor unless a spark arrester is fitted.

STAINLESS STEEL DUST

Stainless steel contains a wide range and percentage of other metals to make up the various grades. Check contents of the stainless grade you are using and consult safety sheets for the various constituents.

A typical make-up is:

1. Nickel 3%
2. Chromium 18 %
3. Iron 69 %
4. Molybdenum 3 %

Of these alloys the following can present health hazards:

1. Nickel (above a concentration of 1%).
Nickel can cause allergic contact dermatitis.

2. Chromium
The primary use of chromium is as a surface finish.
Due to its toxicity and suspected carcinogenicity it is regulated for human health and for the environment. It has a low maximum exposure level.
Hexavalent chromium occurs in chrome plated parts and is classified as hazardous.

Stainless steel does not contain hexavalent chromium.

TITANIUM AND MAGNESIUM DUST

This must never be extracted into dry collectors. Statutory requirements exist for extractors suitable for titanium and magnesium. Make sure the wet extractor you choose is designed for either titanium or magnesium.

Statutory features for titanium and magnesium are:

Automatic coolant control
Timer to start extractor before machine is started and to stop the extractor after machine has stopped.
Special electric controls
Explosion relief
Anti spark brass strap.

INTRODUCTION TO TITANIUM & MAGNESIUM

Titanium and magnesium are used in many aerospace applications. Aero-engine parts like rings, discs, rotors, blades, engine casings, turbine blades, etc. Both metals are also popular materials for tail sections, frames, landing gear and fasteners.

When titanium and magnesium are ground it can easily be heated up to the point of ignition. Mixed with oxygen they can burn and explode. It is therefore essential that extraction systems have dedicated specifications.

TITANIUM

Titanium is a combustible metal. As with all metal dusts the size of the dust particles determine the degree of hazard. The finer the higher. Fine dust ignites easily and burns with the release of much heat.

Fine dust and chips can be ignited with a match. As larger chips are mostly mixed with fine dust you should assume a very low ignition point.

Fine titanium dust does not ignite spontaneously, as for example zirconium and magnesium does, unless it is as fine as flour. Ignition temperatures range from 300° to 500° C.

The very bright 'star shaped' sparks are typical for titanium.

To prevent explosions titanium dust must be extracted via wet dust collectors with titanium specification. This includes a design that prevents hydrogen gas accumulating inside the extractor and specific water level controls.
It is the formation of hydrogen that causes explosions.

Explosion limit of titanium dust is 45g per cbm
Ignition temperature of dust layer 290° C.

Titanium powder can burn even when wetted with water. Dust clouds are highly explosive. Titanium fires are extremely difficult to extinguish and react violently with water at high temperature.

Water fire extinguishers must never be used on a titanium fire.

MAGNESIUM

The melting point of magnesium is 650° C. However fine magnesium dust can be ignited below 400° C.

Many magnesium grades can contain other metals, e.g. aluminium, manganese and zinc and some of these have significant lower ignition temperature. Some of these magnesium alloys can ignite at temperatures below 400 degrees C. Magnesium dust can ignite spontaneously.

Magnesium fines from grinding and extracted via a wet dust collector produce hydrogen gas which burns violently and can lead to explosions. Make sure the dust collector is designed to let hydrogen gas escape and not to collect inside the collector.

Magnesium dust collectors must be grounded and have an interlock between the fan motor and the water level control. Never mix magnesium dust with other metal dusts. Use dedicated dust collectors only.
Never dispose of magnesium dust by dumping it outside or by deliberately setting fire to it. Follow your local authority's recommendations for disposal.

OTHER HIGHLY COMBUSTIBLE METALS

Sodium, potassium, lithium, zirconium, calcium, zinc, plutonium, thorium, uranium. All ignite readily in fine dust form but not in solid form.

DUST FROM ABRASIVE BELT GRINDING OF OILED STEEL

This dust presents a potentially dangerous fire hazard. The mixture of steel dust and oil can easily be ignited. It glows and is extremely difficult to extinguish.

Dry extractors are not suitable and wet extractors will have to be cleaned regularly. The oil separates on top of the coolant and needs to be skimmed off.

We have examined the dust from centreless grinding operations where oiled round bar was ground. . The dust can easily ignite, it glows and it is difficult to extinguish. Even after the bar was wiped with a cloth, sufficient oil was still present to present a fire risk.

VERY FINE DUST

Very fine dust, e.g. as created by some plastics, ceramics, composites, wood , etc, is very difficult to extract and to separate. Often these types of dust escape partly through the exhaust of the extractor into the atmosphere.

Such dusts can only be safely extracted by special design extractors with special filters.

Air velocity is important and must be matched to the type of dust, too low and it will not shift the dust, too high and the dust is blown through the filter. See HEPA filters on page ??.

ALUMINIUM DUST - CAUTION!

Aluminium is not considered a fire risk unless in powder and dust form with approx. 20% of the dust in particle sizes below 44 microns.

Aluminium alloys can contain up to 15 % of alloying metals like chromium, copper, iron, magnesium, manganese, nickel, titanium and zinc.

Aluminium is very reactive and the greatest hazard is chemical reactions.

Aluminium reacts with water or even moisture in the air to form hydrogen gas. It is therefore essential that dust collectors used for aluminium are designed to vent hydrogen to the atmosphere and not to allow it to collect inside the extractor.

Aluminium dust clouds can ignite and cause considerable damage, particularly if the dust cloud has formed in a confined space, e.g. inside a dust collector.

Explosions have been reported with concentrations of about 40 grams of aluminium per cubic metre (0,04 ounces per cubic foot).

The finer the aluminium dust the higher the risk of fire and/or explosion. Aluminium should be extracted into a wet extractor with aluminium specification or into a dry extractor with an explosion relief and a blast barrier of the correct size and installed with the correct specification ductwork and is sited correctly.

Extractors supplied by SURTECH have explosion reliefs and blast barriers of the correct size.

As far as medical risks are concerned you must make sure employees are not exposed to more than the max. exposure limit set by COSHH. Aluminium dust mixed with bodily fluids presents a serious health risk.

Aluminium dust mixed with water, even that present in the atmosphere produces hydrogen gas which is highly explosive. Make sure your extractor is designed not to trap this gas but has vents for it to escape.

A leaflet is available: *'Fire and Explosion hazards in the Grinding and Polishing of aluminium and its Alloys'*, prepared by The Aluminium Federation, Broadway House, Calthorpe Road, Five Ways, Birmingham B15 1TN. Tel: 01212 456 1103.

The Federation strongly favours wet collectors but does not entirely rule out dry collectors. Read the leaflet before you specify equipment for your application. Here is a resumé of the Aluminium Federation's leaflet:-

Aluminium dust can give rise to fire and explosion hazards. For this to occur there must be a means of ignition, which can be a spark from ferrous tools, an arc from a static electricity discharge, smoking, or sparks from grinding ferrous materials on the same equipment.

Do not mix aluminium dust with any other dust.

Do not mix dust from the grinding or brushing of aluminium, with dust from the polishing of aluminium.

Grinding, linishing and brushing of aluminium on a large scale should be used with wet dust collectors of a prescribed specification.

Ducting for aluminium dust extraction equipment must be constructed from a minimum 2mm thick steel, should be as short as possible, and be flanged at all joints, each flange being earth-linked.

Wet dust should be weathered in the open air and should not be stored inside or in closed containers.

Disposal of aluminium dust must be carried out in accordance with local authority regulations.

A dry extractor with explosion panel and blast barrier.

Machines and ducts must be cleaned at the end of each shift. All metal parts of the plant should be earthed to prevent discharge of static electricity. Smoking must not be allowed in areas where aluminium is being ground.

Aluminium dust fires must not be fought with water, vaporising liquid foam, CO2 or any form of pressurised extinguisher. Dry sand applied with long handled shovels is an effective extinguishant. Class D dry powder special purpose extinguishers can be used. Avoid the generation of dust clouds when fighting such fires.

ALUMINIUM DUST - SURTECH's RECOMMENDATIONS

Previously we commissioned a report into the safety aspects of dusts created by our grinding, deburring and polishing machines. It was found that 93 % of the dust particles were above 75 microns in size. It was considered that aluminium dust with this particle size would be very difficult to ignite under normal circumstances.

It would therefore be safe to use a dry extractor with the correct size explosion panel and blast barrier and to use flexible ducting that can withstand pressure of around 160 psi.

However, care must be taken that smaller dust particles do not accumulate anywhere because they can ignite much easier and the resultant explosion would be well above 160 psi.

Heavy duty flexible metallic ducting that can withstand 160 psi is available but above that only 14 gauge fixed ducting is suitable.

The air velocity in the ducting should be around 20 m/sec unless otherwise stipulated.

Install WET collectors for large abrasive grinding machines which create large quantities of dust or when you want to connect several bench or pedestal machines to a central extractor

Install DRY needle felt filter collectors with the appropriate explosion relief panels and blast barriers when you want a separate extractor for each bench or pedestal grinding machine and quantities of dust are low to medium.

MORE COMMENTS ABOUT THE HAZARDOUS (OR NOT) NATURE OF ALUMINIUM

Aluminium is the most widely used of the hazardous metals for grinding, deburring and polishing. It can indeed be hazardous and present fire and explosion risks as well as personal health risks.

However, it is also quite easy to over react. For many machining operations and with proper handling aluminium is no more dangerous than many other metals.

This short article tries to strike a balance. For an explosion to occur a certain quantity of dust must be mixed with sufficient oxygen to form an explosive mixture. This mixture must then be ignited by an ignition source of sufficient strength to set the explosion in motion.

The ease of ignition and the intensity of the explosion are determined by the aluminium particle size. Danger is considered to start at 45 microns and below. Previously we asked for advice on the explosion danger of aluminium dust from abrasive belt grinding.

We produced samples of dust with a grit 180 belt and had the samples analysed in the laboratory. 93% of the dust was above 75 micron in particle size and only 1,6% below 45 microns.

Aluminium particles over 75 microns are extremely difficult or even impossible to ignite. As long as the minute amount of particles below 45 microns is not allowed to accumulate or settle around the workshop then the possibility of a fire or explosion is highly unlikely.

An undisturbed pile of aluminium dust is unlikely to explode, but the same pile of dust, disturbed and mixed with oxygen, will present a highly dangerous mixture, prone to a severe explosion if subjected to an ignition source.

After the prevention of an explosive mixture the second most important aim should be the elimination of all sources of ignition.
Obvious ignition sources are smoking, welding, naked flames, electrical switchgear, and static electricity.

To bring home the message of how even dangerous substances can be handled without excessive risks, consider petrol for your car. It also presents an extremely explosion risk if mixed with the right amount of oxygen and it also needs an ignition source to set off an explosion. Yet millions of people are happy to handle petrol in a safe manner by adhering to a few basic safety rules.

Fighting aluminium fires

Dry sand is one of the most effective material to establish an aluminium fire. Alternatively use dry powder or chemical foam. Do not use water. Try not to disturb aluminium dust lying around. When tackling a aluminium fire wear the appropriate fire fighting equipment

Hydrogen

Aluminium dust will react with water to form hydrogen gas. Over a period of time even the water in the atmosphere will be sufficient to start a chemical reaction. Hydrogen gas can accumulate inside a dust extractor and will only need a spark to ignite it and to cause a major explosion.

COSHH lays down max. exposure levels (MEL) for all materials. LEV (local exhaust ventilation) tests have to be carried out at least every 14 months to assess the performance of the extraction plant.

STAINLESS STEEL

This from a report prepared by the University of Birmingham:

Stainless steels contain nickel and nickel is classified as a skin sensitizer by directive 88/379/EEC., and as a suspected cancer causing substance by the Directive.
67/548/EEC.if the stainless steel grade contains more than 1% nickel.

DIFFICULT DUSTS, DUSTS FROM POLISHING OPERATIONS

Difficult in this context refers to problems with collection and extraction. The most common difficult dust is created by polishing operations using cotton or sisal buffs and polishing compos.

The combination of fabric pieces, fat and minerals and the metal dust creates a difficult to extract mixture which can also present a fire hazard. Such dust can reduce the capacity and effectiveness of the dry extractor by clogging the fabric filter . It also contaminates the water in wet systems.

To check the suitability of a wet extractor for the dust you create put water into a glass , add an amount of dust, shake vigorously and allow to stand for a while. If the dust has mixed with the water it is OK. If the dust floats to the top of the water you must either add suitable additives or choose another extractor.

Where the extraction from polishing operations creates a problem we recommend the use of cyclones. Cyclones operate dry and have no fabric filters. There are no general recommendations for difficult dusts other than that each case has to be looked at individually.

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MIXING OF DUSTS

Some of our machines are used for a wide variety of grinding, deburring and polishing operations on a wide variety of materials.

The general rule is: DO NOT MIX DUSTS in a single extractor. At best you could reduce its effectiveness, at worst you could introduce new hazards.

List the materials you intend to use on our machines and estimate the percentage for each material. Then ask for advice!

The most common examples of mixed dusts are wide belt machines for de-burring punched and thermal cut sheet. Most operators work with stainless steel and with aluminium. The standard solution is a wet extractor with aluminium specification and with smooth bore ducting of flanged 14 gauge steel. The length of ducting should usually be no longer than 3m.

There are many different designs for dust extraction units. For this manual it suffices to divide them into dry
and wet systems. Dry systems use fabric filter bags or cartridges, wet systems create a mist

Dust Collector - Maintenance

Like all other machinery, dust extraction plant can only work efficiently if maintained in good working order. This includes following manufacturers instructions and in particular, cleaning regularly. Damaged parts must be replaced immediately. Remember: A badly working dust extractor is not only inefficient by may also put your employees at risk and contravene COSHH regulations.

Sparks

Abrasive operations can create a lot of sparks which cannot always be collected in guards and extracted by the dust collector. Where considerable quantities of sparks exist you must wear body protection, ie. a leather apron

DISPOSAL OF DUST

Dust extractors deposit dust into built in trays or bags. Both need to be emptied regularly. How you finally dispose of dust depends on its hazardous nature and local by laws. Since 1st April 1992 businesses have been responsible for the disposal of their own waste.

The Environmental Protection Act 1990 imposes duties on anyone who has responsibility for controlled waste. If in doubt consult your factory inspector or your council.

TECHNICAL INFORMATION - TABLES

HOW TO CALCULATE DUST EXTRACTION CAPACITY

The figures given below are very rough general estimates based on medium amounts of dust and with the extractor positioned within 3m of the machine. For large amounts of dust or where the extractor cannot be positioned within 3m of the machine choose the next size up.

For small amounts of dust or for intermittent use choose next size down. Machines with 2 extraction spigots need slightly higher capacity extractors than machines with one spigot only.

Machines with well designed dust capture hoods need less extraction capacity than machines with large poorly designed capture hoods. We strongly recommend that you seek expert advice.

BELT WIDTH in mm	SPIGOT DIA in mm	RECOMMENDED EXTRACTION CAPACITY For medium amounts of dust	For large amounts of dust
Up to 40mm	50 - 75mm	250 - 400 cfm	400 - 500 cfm
Up to 50mm	75 - 100mm	400 - 500 cfm	500 - 600 cfm
Up to 75mm	75 - 100 mm	500 - 650 cfm	650 - 750 cfm
Up to 100mm	100 - 125mm	650 - 750 cfm	750 - 1000 cfm
Up to 125mm	100 - 125 mm	750 -1000 cfm	1000 - 1200 cfm
up to 150mm	100 - 150mm	1000 - 1250 cfm	1250 - 1500 cfm

Buffing

Buffing operations need higher capacity dust extraction than abrasive belt operations. This is mainly due to larger size capture hoods but also due to the type of dust - a mixture of metal, sisal or cotton and polishing composition.

Buffing dust clogs extraction filters faster than abrasive belt dust. Regular cleaning of filters improves extraction efficiency but since the regular maintenance is rarely done it is safer to specify a larger extraction unit.

The figures below are based on buff widths of 50mm to 75mm. Wider buff widths require higher extraction capacity

BUFF DIAMETER	SPIGOT DIAMETER
200mm	75 - 100mm
400mm	75 - 100mm
400mm	100 - 150mm

RECOMMENDED EXTRACTION CAPACITY For medium amounts of dust	For large amounts of dust
350 - 500 cfm	500 - 750 cfm
500 - 750 cfm	750 - 1000 cfm
750 - 1000 cfm	1250 - 1500 cfm

CUBIC METRES AND CUBIC FEET

1 cubic metre equals 35 cubic feet.
Cubic metre figure are normally given per hour, ie. :cbm/hr.
Cubic feet figures are normally given per minute, ie cfm

1cbm/hr equals 0.59 cfm

Air volume

The amount of air that an extractor can move is determined by the fan size and an indicator for the fan size if the fan motor. The larger the fan motor the larger the fan and the higher the air volume. Many extractors are offered with different fan sizes for the same model.

Air velocity

The diameter of the extraction spigots and the ducting are used to calculate air velocity. The larger the ducting the lower the air velocity. Too low a velocity can reduce the extractor's ability to move dust. Too high a velocity can blow fine dust through the fabric filter.

Examples of min. explosive concentrations and ignition temperature of the dust cloud.

(These figures are approx. and meant to show the differences between various materials. For more accurate figures check safety sheet of your exact metal grade).

Material	oz. per 1000 cu.ft.	Ignition temperature Degrees C
Aluminium	40	600
Magnesium	20	500
Titanium	30	330
Zinc	480	600
Some plastics	15-70	300-500
Rubber	25	350
Wood flour	40	400

1 oz = 28,35 g
1 cubic metre equals 35 cubic feet

Type of Dust	Ignition temp Of dust cloud In degrees C	Min. explosion Concentration 1000 cu ft	Min explosion Concentration g/cu m	Max expl. pressure psi
Aluminium Anodised	640	40	30	90
Aluminium Milled	550	45		70
Magnesium Milled	520	20	30	95
Titanium	330	45	45	80
Chromium	580		230	
Iron	510		200	
Zinc	630		400	
Plastics	320 - 450	15 - 70	85 - 110	
Epoxy	490		10	
Wood flour	430	40		110

The above figures are a rough guide and meant to show variations between different materials.

The figures have been taken from various sources, please do not use them in your risk assessment. Obtain accurate figures from the internet or industry associations.

We would be grateful if you could point out any mistakes in our list.

THE RULES AND REGULATIONS CONCERNING DUST

COSHH REGULATIONS

COSHH is an acronym standing for The Control of Substances Hazardous to Health Regulations 1988. COSHH introduces a legal framework for the control of substances hazardous to the health of employees. Dust and fumes are health hazards and must be reduced, suppressed or extracted to assure a safe and healthy atmosphere.

COSHH requires employers to assess the risks from hazardous solids, liquids, dusts, fumes, vapours, gases and micro-organisms, and then to introduce measures to eliminate those risks.

In the case of abrasive machines, dust is an important hazard to assess and to control. In some cases there may also be fumes given off by the grinding process. When wet grinding operations are employed, coolants and additives also need to be assessed. In all cases, study the safety recommendations supplied by the manufacturers or seek expert advice.

The regulations list substances which have been given an MEL (Maximum Exposure Level). Employers are responsible for regularly checking that MEL are not exceeded.

THE ABOVE DESCRIPTION OF COSHH IS ONLY A VERY BRIEF OUTLINE. FULL DETAILS MUST BE TAKEN FROM THE ACT.

For further reading:
LIST OF APPROVED WORKPLACE EXPOSURE LIMITS, CALCULATION METHODS, THE EFFECTIVE CONTROL OF EXPOSURE TO SUBSTANCES HAZARDOUS TO HEALTH.

HSE Publication: COSHH – Brief Guide to the Regulations.

ATEX

(From the French Atmosphere Explosible)
The mandatory requirement of ATEX 137 is the production of an Explosion Protection Document. It confirms that explosion risks have been determined and assessed, adequate steps have been taken to comply with the aims of the directive and hazardous areas have been classified and accordingly signposted, and work equipment is designed with due regard to safety.

WHY

Explosive atmospheres can be caused by flammable gases, vapours or combustible dusts. Explosions can cause loss of life and serious injuries and substantial damage to buildings and equipment. It should therefore be in the interest of everybody to eliminate the risk of explosions

SCOPE

Everything supplied after 1.7.2003.

Any equipment working in a potentially explosive atmosphere
The equipment must have an ignition source (electrical sparks, mechanical sparks, static electricity, etc.

If the equipment is used as a protective system (explosion vent panels)

A conformity assessment must be undertaken for equipment in a zoned area to see if ATEX applies.

ZONES

Safe area no hazard

Zone 22 occasional hazard
Atex category 3

ATEX approved motors (EExn) and solenoids. All suitable for zone 22

Zone 21 frequent hazard
Atex category 2

Atex approved motors and solenoids for zone 21.

Zone 20 permanent hazard

Atex category 1
ATEX approved motors and solenoids for zone 20

STANDARDS

BS EN 13463-1:2009
Non electrical equipment for use in potentially explosive atmospheres

EN 13463-5:2003 part5
Protection by constructional safety

BS EN 50014:1998
Electrical equipment for use in explosive atmospheres

Dust, fume and ventilation equipment risk assessment should answer and conform to the following main criteria.

Is the equipment used in potentially explosive atmospheres? Does the equipment contain potential sources of ignition, electrical or mechanical? Does the equipment have an explosion control function - relief panel, flame arrester, shut off valve, etc.

DSEAR 2002
Dangerous substances and explosive atmospheres regulations.

WHY?

Dangerous substances can put people's safety and lives at risk.
This is the EU commission's ATEX Worker Protection Directive which applies to the installation and use of equipment for use in a potentially explosive atmosphere. In the UK it has been adopted as part of DSEAR.

SCOPE

Since 1.7.2003

Dangerous substances can put peoples' lives at risk from fire and explosions. DSEAR recommendations are meant to reduce or eliminate such risks.

Dangerous substances used at work and not properly controlled can cause injury to people as the result of fire or explosion. Dangerous substances can be solvents, paints, lacquers, flammable gases, and dusts

Where a hazardous area exists machines must be checked for a likelihood of creating a source of ignition.

HOW TO IDENTIFY

Assess all substances in the workplace for their risk of fire or explosion. Establish boiling points, flash points of flammable liquids.

Find out if any flammable gas that may evolve is lighter or heavier than air. For hazardous dusts find out particle sizes and density

Put controls in place to remove these risks. Prepare plans to deal with fire and explosion incidents.

Train operators in recognizing risks and in fighting incidents

DSEAR L138 gives a detailed definition of dangerous substances. Dangerous substances are substances or mixtures of substances classified as explosive, oxidizing, extremely flammable, highly flammable or flammable under the current CHIP regulations.

Dangerous substances also include dust that when spread in air to form a cloud can explode.
CHIP lists many dangerous substances in the Approved Supply List

Many of the dangerous substances defined by ATEX and CHIP also present personal health risks in which COSHH regulations need to be observed.

MATERIAL DATA SAFETY SHEETS

MSDS sheets for all substances and dusts, with all relevant information on fire risks, flash points, particle size, etc are essential for assessing fire and explosion risks.

SIZE

The amount of dangerous substances and hazardous dusts has a great influence on the degree of risk. Individual dust extractors for our machines can be the size of vacuum cleaners or the size of. For all of these the amount of dust collected is relatively small.

Central dust extraction systems where many machines are connected to one extractor need to be treated in a different way. The amount of dust that can accumulate inside these extractors is big enough to cause a very large explosion.

Combined effect of ATEX and DSEAR

Since 1.7.2003 it has been illegal to sell or to put into use equipment for use in a potentially explosive
atmosphere unless a Declaration of Conformity is supplied..

ATEX and DSEAR

ATEX is a EU directive concerning the supply and use of equipment in potentially explosive atmospheres. To start understanding ATEX and DSEAR we recommend you study the website www.hse.gov.uk/fire and explosion.

The user directive is implemented by HSE under the **Dangerous Substance Atmosphere Regulation (DSEAR)** which came into force in 2002.

For a list of dusts that are explosive see database of dusts on the HSE website.

An explosive atmosphere is an accumulation of gas, mist, dust or vapour, mixed with air, which has the potential to alight or cause an explosion. Dangerous substances are all substances used at work that could cause harm to people as a result of fire or explosion.

You must carry out a risk assessment and take appropriate steps to minimise the occurrence of a fire or explosion. You must also mark the areas of your factory where there are risks and you must inform, train and instruct employees who work in or near these areas.

Mechanical finishing areas presenting risks are those where metals like aluminium, titanium or magnesium are in use. There are statutory requirements for the extraction and disposals of these dusts.

Many otherwise safe metals can create very hot sparks when ground. These sparks can set filter bags on fire. Your risk assessment should indicate whether a standard dry extractor is sufficiently safe or whether you need a spark arrester or even a wet extraction system.

NOISE

The control of Noise At Work Regulations 2005 came into force on 6th April 2006.This regulation requires employers to carry out risk assessments and to provide workers who are exposed to noise with protection.

The lower exposure action level is 80 dB(A)
The upper exposure action level is 85 dB(A)

The peak value is 87 dB(A)

At the lower level protection must be made available. At the higher level action must be taken to reduce noise. The peak level must never be exceeded.

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QUESTIONNAIRE FOR THE SELECTION OF THE CORRECT DUST EXTRACTION UNIT

Dust from grinding, de-burring and polishing operations can present personal health, fire and explosion risks. Dust extraction plant is subject to a number of Health and Safety regulations and recommendations, not all of which are easy to interpret, some even confusing and contradictory. The risks, however, are real. Polishing shops have burnt down and people have been killed by explosions.

Both suppliers and employers have a duty to ensure that dust extraction plant works within the recommended standards and is as safe as it can possibly be made. An understanding of COSHH regulations and Maximum Exposure Levels is essential.

With the above remarks in mind we are obliged to obtain the following information before we can recommend and quote for a suitable system.

1. Grinding, De-burring, Polishing Machine

1.1 Make

1.2 Model

1.3 Diameter of contact wheel, buff, brush, disc:

1.4 No and dia of spigots on machine:

2. Materials to be ground, deburred, polished.
List all materials that are likely to be used:

3. Consumables used
i.e. Abrasive belts, wheels, discs, buffs, etc.

4. Position of machine and extractor
Please supply sketch with dimensions
Show position of walls
Show height of ceiling
Show position of gangway
Show position of nearest work station

5. Environment
Please describe environment around installation: outside walls, windows, roof height, etc (sketch). Are people working in the vicinity of the extractor ? Is it clean and quiet, noisy and dirty, production, assembly, etc. ?

What height is the ceiling?

What material is the ceiling ?

How far is the nearest work station ?

How far is the nearest gangway ?

Are there any hazardous materials in the vicinity ?

6. Other remarks
Company details

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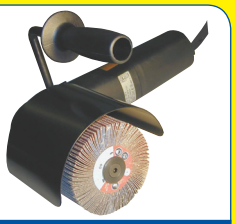
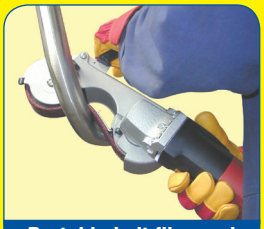
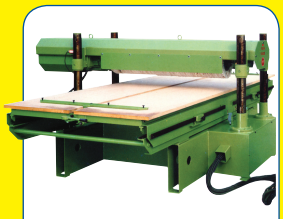


Portable abrasive wheel power tools

Single belt finishing machines



Portable belt files and tube finishing tools



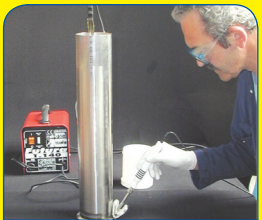
Sheet polishing machines

Belt Grinders

Dust extractors Dry and wet

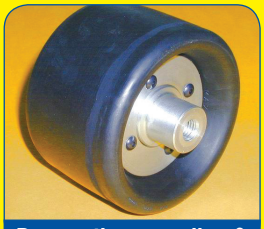
Portable and automatic bevelling machines

Straight and bent tube polishing machines



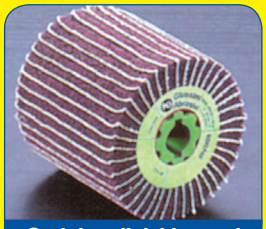
Weld Cleaning tools

Manual sheet Deburrers

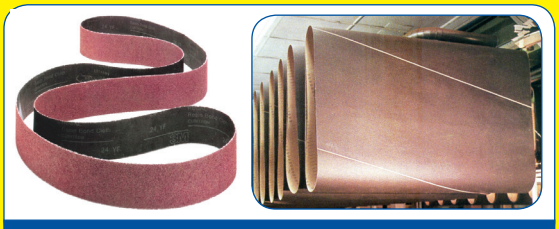


Pneumatic, expanding & standard contact wheels

Polishing mops and compo



Graining, finishing and polishing wheels



Narrow and wide abrasive belts for all applications

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