

EXPERT CORNER

TECHNICAL GUIDE

5 BENEFITS

OF PNEUMATIC GRINDERS

Safety and Ergonomics ■ Productivity Gains ■ Durability



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Air tools provide
unmatched
power-to-weight ratio
& durability



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How to choose the best tool for the task at hand?

This guide looks at pneumatic grinders, and explains the main benefits of this type of tools. Whatever the job, the right choice of pneumatic grinder will be key to ensuring maximum performance and comfort.

How do pneumatic grinders work?

Pneumatic grinders are very durable tools, run by compressed air at 90 PSI / 6.3 bar dynamic pressure. The power source is located outside the tool, actuating a pneumatic motor (compressor) that ensures durability and good power-to-weight ratio. One key element to consider when looking at pneumatic tools is that just like any mechanical device, they need to be regularly lubricated and maintained.



Learn how and why using an FRL can improve your productivity

What about electric grinders?

Electrical tools (or AC/DC tools) are powered through the electrical network, and due to their integrated motor, weight is a consideration for the operator. Electrical tools are affordable and adaptable for casual or garage usage, and they can be easily maintained. But they have a limited life span.

Safety and ergonomics, productivity gains and durability... Pneumatic grinders boost a full range of operator benefits.

1 SAFETY AT WORK

Power tools are often used in presence of moisture, dust and conductive metals.

These working conditions present an electrical hazard for operators. **If an electric wire is damaged or cut, there is an electric shock risk** when the tool is being used.

A good way to avoid this situation is to **remove electric power from the equation by using pneumatic tools** (air tools). An air tool, less sensitive to water and dust, will not generate an electrical hazard to the operator.

DANGER
ELECTRICAL HAZARD



GREATER SAFETY
**Pneumatic Tools Avoid
Operator Electrical Hazards**

HOW TO SAFELY OPERATE A PNEUMATIC GRINDER



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TECH TIPS

How to use a grinder?

Maintain an angle of 30° for proper abrasive use

3:52 / 4:14

HD



To remain safe at all times the use of any power tool requires personal protective equipment (PPE / IPE). A couple of simple rules, shown on the video, should also be followed.

Once you are familiar with these rules, they will quickly become part of your daily routine!

2 COMPACT AND ERGONOMIC DESIGN

A major benefit of air tools is their compact size, which results in excellent power-to-weight ratio.

The reason behind this operator benefit is the very nature of the internal components; a lightweight yet durable steel pneumatic motor, along with a compact and robust aluminum body with composite grip for comfortable handling.

The rule of thumb is that with equivalent power, an air motor is 1/6 of the size of an electric motor, and 1/4 of its mass.

The benefit of this for the operator is a tool that is smaller and lighter, which results in easier handling, faster operation and increased productivity.

Commonly Used Units Of Power Measurement

- Horsepower (hp)
- Watt (W)

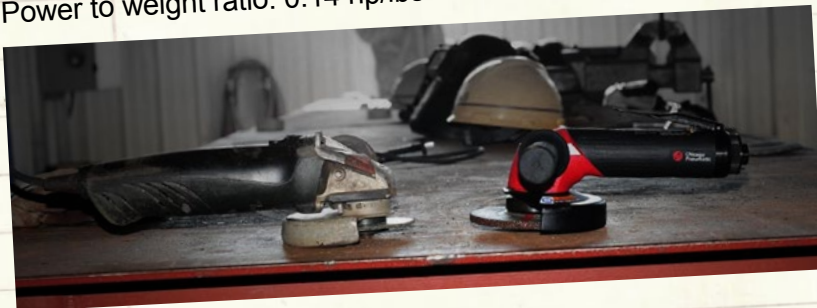


Seen on the field

Example of an electric grinder

Model used by an industrial manufacturer asking for advice about productivity

Power: 0.9 hp – 710 W
Weight: 6.8 lbs – 3.1 kg
Power to weight ratio: 0.14 hp/lbs – 229 W/kg



Example of a pneumatic grinder adapted to this company's application

CP3650 Industrial Grinder

Power: 2.3 hp – 1700 W
Weight: 4.2 lbs – 1.9 kg
Power to weight ratio: 0.5 hp/lbs – 805 W/kg



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Did you know that a power value given for an air tool has a different meaning to a power value given for an electric tool?

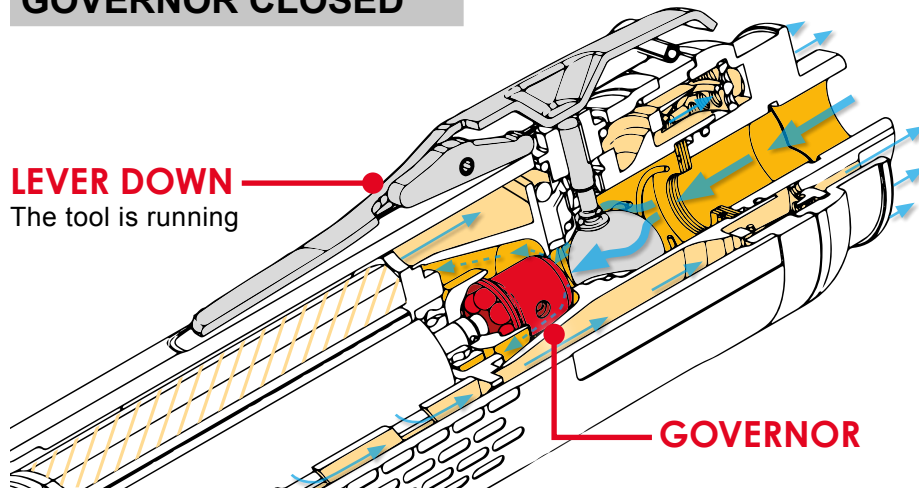
- ✓ For electric tools, the value formulated in horsepower (hp) or watt (W) means the power consumption of the motor, not the useful power. The ratio between the useful power at the abrasive and the power consumption is an average ratio between 0.5 - 0.6. This ratio differs from each machine. As an example, an electric tool with a “power consumption” of 1000 Watts will give a real useful power at the abrasive of 600 Watts.
- ✓ On the contrary, the power value of air tools refers to a value measured directly at the spindle. This means that 1000 W is real power output, and therefore useful power at the abrasive.

Besides durability and ergonomics, working with a grinder is mainly about the rate of material removal. One of the most important factors affecting the material removal rate is the ability of the tool to properly run the abrasive, be it a grinding wheel, sanding pad, or flap disc. These abrasives have been designed to operate at certain speeds for optimal performance. (Example: Most 5" (125 mm) grinding wheels are designed to run at maximum 12000 RPM)

Nowadays, most of the pneumatic grinders designed for industrial use are equipped with an air governor. While the operator increases the load, this device increases the air flow, maintaining the rotation and the optimal speed of the abrasive. As a result, the abrasive is run at the correct speed and delivers maximal material removal.

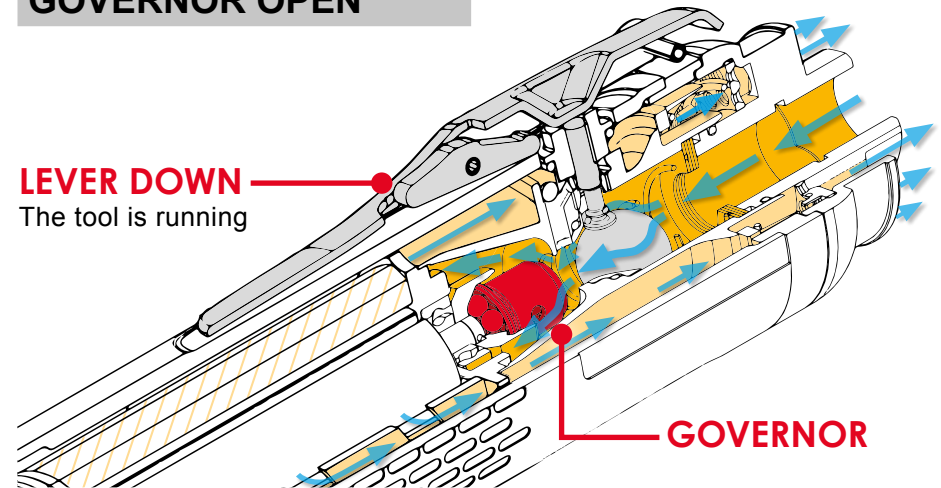
How does an air governor work?

GOVERNOR CLOSED



At maximum free speed, the upper part of the governor body partially obstructs the calibrated inlet passage. This maintains the rated free speed of the tool and reduces air consumption to a minimum.

GOVERNOR OPEN



When the spindle speed drops, and the tool slows down, the governor opens to increase the air flow through the motor. This increase in airflow allows the tool to maintain its rated speed while providing maximum power.



Many tool operators usually attempt to stall the tool during the first minutes of work. This approach is taken for a reason: the operator wants to challenge the tool's limits and stall torque to see whether the equipment can do the job.

Stalling a grinder does not increase the rate of material removal, but is often counter-productive. Leaning heavily on the tool, pressing it against the work surface in the belief that it will grind more effectively only works to the limit of the tool's power. Excessive load is inefficient and can cause fatigue and stress on both the tool and the operator in addition to the possibility of an abrasive failure, and possible injury.

To maximize productivity, operators should find the optimal force to apply on the tool (feed force) to achieve the best material removal rate. A good way of doing this is to watch the spark stream created by the abrasive and find the right force to make it as bright as possible.

The main material removal applications for these tools are grinding and cutting: deburring of casting parts; chamfering of frames or structures; surface preparation prior to welding; weld seam removal; surface finishing; cutting of frames, pipes, bars, gates and runners on castings; bolt cutting, metal or composite sanding.



Electric grinders cannot usually be operated in wet areas. Their composite bodies are also prone to damage when working in extreme conditions, or when subjected to repeated impacts. These conditions, as well as the existence of dust created by grinding and abrasive particles, are a threat to electric motors.

Pneumatic angle grinders feature a robust air motor, and their housing is aluminum or steel. Their robust internal and external components are designed to perform in demanding conditions, and are not affected by particles or moisture. They have proven records in:

- Foundries, facing extreme temperatures, particles, and rough use.
- Hostile environments such as offshore platforms, where cold temperatures, water and salty conditions are encountered.
- Shipyards, in wet conditions, with salt, rust and dust.
- Windmill blades manufacturing, working in contact of composite particles
- Maintenance repair operations, facing difficult conditions on various applications.

Pneumatic angle grinders are the right choice when it comes to demanding applications where you need the toughest tools for the toughest jobs.

Air grinders can be equipped with a wide range of accessories such as dust extraction guards, for metal or composite finishing or cutting applications.



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Pneumatic grinders, just like most air tools, are high-precision pieces of machinery, and need lubrication.

To make the most of their performance, clean and lubricated air is necessary: the use of an FRL set at two drops per minute will help you make the most of your air tools.

Pneumatic grinders are built to last, and perform reliably over extended periods of time.

They are easy to maintain, and easy to service.

Pneumatic grinders are not disposable pieces of equipment that need replacement - you can depend on them for years of operation.

Typically, the maintenance intervals for most electric grinders are between 60 to 120 hours of trigger time after which brushes need to be replaced. Pneumatic grinder maintenance intervals are measured at up to 200 hours for professional grade tools and 2000 hours for industrial grade.

Whether deburring components in a foundry all day, preparing surfaces or cleaning weld seams, their construction allows the operator to reach maximum productivity. Ultimately, the less time spent performing maintenance means more time for productive material removal, faster return on investment, and revenue!



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Proper maintenance and spare part replacement can make an air tool last for decades.

Most pneumatic grinders have been specifically designed for ease of maintenance, and all original spare parts are available and organized in tune-up kits for fast ordering and replacement.

SAFETY FOCUS

1 Check the free speed

- ✔ The measured speed at a pressure of 90 PSI / 6.3 bars must not exceed the rated speed, which is marked on the grinder.
- ✔ Remove the grinding wheel and outer flange before checking the free speed.
- ✔ Make sure the speed marking on the tool is legible.
- 📅 Carry out checks daily.
- 🔧 Return the machine for repair in the event of overspeeding

2 Check the wheel guard

The wheel guard protects your health and safety.

- ✔ Always use the recommended wheel guard.
- ✔ Check that it is not damaged.
- ⊗ Never use a grinder without the wheel guard.
- ✔ Position the wheel guard between yourself and the grinding wheel.
- ✔ Check that the trigger is working correctly.
- ⊗ The trigger must never be removed or fixed by tape for example.
- 🔧 If the trigger is not working properly, make sure that it is replaced.

3 Maximum speed

Make sure that the stated maximum operating speed (MOS) of the grinding wheel is greater than or equal to the speed specified on the grinder.

4 Check the grinding wheel

Make sure that the grinding wheel is not cracked or damaged in any way.

- ✔ The grinding wheel should have the correct hole dimensions and be fitted correctly on the spindle to avoid unbalanced vibrations.
- ⊗ Do not use dropped or damaged wheels, as these can cause serious injuries.
- 🔧 Damaged grinding wheels must be removed and replaced immediately.

5 Check the flange and wheel

Make sure that flange and wheel combinations correspond to national regulations.

- ✔ Check that the flanges are undamaged and clean.
- ✔ Attach the wheel with the recommended torque.
- ✔ Always disconnect the air-supply when changing the wheel or adjusting the tool.
- ✔ Test-run your grinder in a protected area after assembling the wheel.
- ✔ Check that the grinder is working correctly.

6 Personal protection equipment

Make sure that operators wear:

- ✔ Eye protection, goggles or a visor.
- ✔ Ear protection.
- ✔ Gloves.
- ✔ Steel toe-capped shoes.
- ✔ Protective clothing, such as a leather apron.
- ✔ A helmet (for heavier applications).
- ⊗ Avoid loosely hanging clothing, hair, jewelry (risk of getting caught).

7 Working area

Ensure that the area in which you are working is kept free from other people so that no one can get injured.

- ✔ People nearby must also wear hearing and eye protection.
- ✔ Check that there is good ventilation and dust extraction from the premises.
- ✔ There should be a stand or a place available, on which the machine can be safely placed.
- ✔ Work within a sealed-off area, if possible with protecting walls, since there is a risk that broken discs could fly off.

8 During work

Stop using the grinder if abnormally loud noises and vibrations occur during use. The grinder and its accessories must not be modified in any way.

After the work is finished

Make sure the machine is switched off and has come to a complete stop before it is put down. Put down the tool carefully, so that there is no risk of the tool starting by itself.

Maintenance

Make sure you follow the service instructions provided and the recommended service intervals. Do not dismantle safety-related parts such as the speed governor and overspeed shut off. These parts should be completely replaced when damaged.

All the tools are different!

Even if you have previously used similar tools, get to know your tool capabilities, limitations, potential hazards, how it operates and how it stops. In any case, **always refer to the tool operator manual and safety instructions** provided by the tool manufacturer.

All in all, industrial material removal applications are extremely challenging. The best solution to maximize your productivity while ensuring safe working conditions is the use of air tools.



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