

TASK 2

Pneumatics

<https://www.norgren.com/uk/en/expertise/industrial-automation/what-is-pneumatics>

What is Pneumatics?

Pneumatics is how air pressure powers and moves something. Essentially, pneumatics puts compressed air to practical use by moving applications like the tools and machinery used in the engineering, manufacturing and construction industries.

1-

Using energy made from the controlled release of compressed air and turning it into movement.

2-

Pneumatics is a simple and reliable way to make things move, just by using clean, dry air. Pneumatic systems use this compressed air to create mechanical motion and power applications to 'do work' in factory automation systems. Pneumatics are seen in a range of other applications too, from fairground rides and trucks, medical applications and food preparation through to air tools and blow moulding.

Pneumatics makes use of an air compressor to reduce the volume of the air in order to increase its pressure. This then moves through a filter into pneumatic tubing, where it's controlled by valves before reaching an actuator which does the work at the end of the process. That could be a cylinder, or a device that performs a function, for example, lifting, moving or gripping.

3-

Pneumatic systems can be used as an alternative to electric actuators and motors by driving linear and rotary motion applications. It is generally used with smaller loads as pneumatic systems produce less force than hydraulic systems and as air is easy to compress, pneumatics can absorb excessive shock.

As manufacturing makes advances, and with developments in seals such as corrosion resistance, the environments in which pneumatic systems can be used has increased, with pneumatics comparable to some electric automated systems. Pneumatics is such a versatile way to power tools and machinery that it remains an important technology in a number of sectors.

To select a pneumatics system for industrial applications, consider what you require in terms of your operating sequence. Pneumatics works in linear and rotary motion and is a simple way to actuate an output motion or apply a force.

When choosing a pneumatics system, you must consider the pressure and flow requirements for the best possible performance. If incorrect components are used, the pneumatics system may not perform properly.

Flow and pressure are different, and should be controlled individually. The regulation of pressure in compressed air systems does not precisely control flow, which could lead to an increase in energy costs.

Whereas pressure is a force applied across a given area, the flow is the volume of compressed air moved in a given time. Greater pressure over a small area can be the same as lower pressure over a larger area. Flow control works by restricting the orifice through which air can flow – as it closes, less air can flow, at a given pressure, in a given time.

The cost of maintaining pneumatics and pneumatics systems is generally low, but care should be taken to monitor leaks and corrosion. Applying a filtration system and monitoring the air supply will also ensure the pneumatics system works as it should.

4-

Vacuum devices are an example of pneumatics, and are often used in ‘pick and place’ systems such as vacuum cups to handle delicate items like glass, or moving or holding products in position while other work is carried out, such as cutting or crimping.

5-

Pneumatics is prevalent in commercial vehicles, ranging from usage in cab and chassis through to engines; the energy sector, including the oil & gas and power generation industries, and food & beverage where pneumatics is present in everything from blow moulding bottles through to process automation and packaging. Pneumatics are also at work in life sciences, such as medical equipment, and the global rail industry where it’s used in applications like door control and suspension.

Pneumatics is also used across manufacturing to power factory automation systems and is typically seen in sectors like materials handling and packaging. As it turns the energy from compressed air into a linear or rotary movement in order to carry out specific tasks, pneumatics can be used to perform ‘pick and place’ tasks like holding and positioning parts by clamping or gripping, or moving a tool that lifts, presses, cuts, sorts or stacks. Pneumatics is also used in certain types of factory machinery, such as paint-sprayers. It’s also commonly seen (and heard) in power tools like road drills, where compressed air is channelled through a pipe to pump a metal chisel into the pavement.

As pneumatics uses energy stored in compressed air to perform tasks or carry out work, an air supply is required. The quality of compressed air used should be high enough to guarantee efficient operation. Air preparation in pneumatics is therefore key and moisture, unwanted dust particles and oils have to be drawn out otherwise they can congeal or corrode certain components such as valves and seals. Filtration is used in pneumatics in order to remove moisture droplets and solid particles, as well as aftercoolers and drying equipment. The air supply must be filtered and monitored constantly in order to keep the system operating efficiently and the various components working properly

1- Read the article above and match 1-6 with the headlines A-F below:

- A- **Do I need anything else to make a pneumatic system work?**
- B- **Types of pneumatics**
- C- **Also known as...**
- D- **How do I select a pneumatics system?**
- E- **Typical applications of pneumatics**
- F- **How does pneumatics work?**