

## FLUID POWER

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#### Brief intro

The word “fluid” in the term “fluid power”, as used in industry, may surprise many students because the study of pneumatics deals with systems operated with air or other gaseous media. In ordinary speech, the word “fluid” is nearly or entirely synonymous with the word “liquid”. Scientifically, however, both liquids and gases are classed as fluids of different types. Both the gaseous (pneumatic) and the liquid (hydraulic) types are used in thousands of practical and industrial applications.

Pneumatics, literally “pertaining to air” (the atmosphere enveloping the Earth), has one set of fundamental laws governing the behaviour of gaseous fluids. Hydraulics, literally “pertaining to water”, relates also to other liquids, especially oils, and has a different set of fundamental laws. To some extent, **(1) the two subjects** are interrelated, but these instances will be minimized and limited to applications where pneumatics is the primary system and hydraulics is the secondary **(2) one**.

The term “fluid power” is fairly recent in man’s history, and relates to the employment of fluid media under controlled conditions to perform useful work. The power itself, however, is very ancient. In fact, **(3) it** has been in existence on this planet since there has been water and an atmosphere.

When we mention fluid power in general, we think of two main media capable of transmitting force in any direction. **(4) These** are the atmosphere surrounding the earth and the water found in abundance in most parts of the Earth. These media have no inherent source of energy in themselves. **(5) They** are therefore useful for performing work only as they are permitted to be influenced by a force.

Taking a well-known example from nature, a surface may be heated by the rays of the sun faster than the surrounding areas, causing the air above to rise, because air becomes lighter when expanded by the heat. This will cause an inrush of air from other directions. Under certain conditions, if two or more turbulent currents of air meet, a tornado is started. **(6) This** is a rotating funnel cloud resulting from condensation of moisture by cooling and expansion, thus lifting the air. This rotating cloud, using the primary medium of air, may transmit an enormous force. If **(7) it** passes over water, this cloud may also use the water as a secondary medium for transmitting force.

## TASK 1

1-What does pneumatics study?

- a.-The behaviour of fluids of different types.
- b.-The behaviour of both gases and liquids.
- c.-The behaviour of gaseous fluids.

2-What is the meaning of the word hydraulic?

- a.pertaining to water
- b.pertaining both to water and air
- c.pertaining to air

3\_What are the two main media capable of transmitting force in any direction?

- a.the air rising when heated by the rays of the sun
- b.the atmosphere and the water in Earth
- c.hydraulics and pneumatics

4-Which of the following statements is not true?

- a. The air expands when heated.
- b.When air starts rising it becomes lighter.
- c.The air becomes lighter when heated by the sun.

5-When is a tornado started?

- a.When there is an inrush of air.
- b.When condensation of moisture cools and expands.
- c.When different turbulent currents of air meet under certain circumstances.

6-Scientifically, gases are not considered to be fluids.

TRUE

FALSE

7\_Pneumatics and Hydraulics are governed by the same laws.

TRUE

FALSE

8-Pneumatics and Hydraulics are interrelated.

TRUE

FALSE

9-The term fluid power has been in existence since there has been water and an atmosphere on the Earth.

TRUE

FALSE

10-Air is the primary medium used by tornadoes, and water may be the secondary medium, depending on the direction the tornado takes.

TRUE

FALSE

## Fluid power - Task 2

What do the highlighted words (1-7) refer back to? Write the referred words/phrases in the spaces provided.

1-

2-

3-

4-

5-

6-

7-

## Fluid power - Task 3

Read the definitions below (1-7), and find the corresponding words / phrases in the text.

1-Find a word / phrase in the text which means

- 1- *is concerned with.*
- 2- *equivalent in meaning.*
- 3- *the two of them.*
- 4- *essential, being the foundation or basis*
- 5- *is connected or associated with.*
- 6- *the gases surrounding the Earth.*
- 7- *allowed.*