CLASSIFICATION OF FLUID MACHINERY

"Fluid machinery" is an umbrella term used to describe all machines that convert energy with the help of a fluid.

For the purpose of classification, fluid energy machines can be divided into groups of machines. There are two basic criteria:

1. we distinguish between driven machines and driving machines based on the **energy flow** and the **direction of energy transfer**. Driving machines are also known as prime movers.
2. turbomachines differ from positive displacement machines in their **mode of operation and pressurisation.**

Moreover, the following differentiations are made:

- depending on the **physical properties of the fluid:** compressible, incompressible
- depending on the **mode of operation:** rotating or oscillating, normal suction or self-priming, single-stage, multi-stage…
- depending on the **direction of flow** of the fluid: radial, axial, diagonal…
- depending on the **design:** reciprocating engine, membrane, gear…
- depending on **use:** supply, drainage, circulation, site of operation…
- depending on the **source of energy:** thermal power, hydroelectric power, wind energy, electrical energy

A fluid energy machine can belong to several groups. The decision about which group the fluid energy machine is assigned to depends on the perspective of the observer. If the focus is, for example, on the **working medium,** the categorisation is made by differentiating between **hydraulic** fluid energy machines with **incompressible fluids** and **thermal** fluid machinery with **compressible fluids.** GUNT catalogues 3 and 4 are based on this categorisation. Catalogue 3 covers part of the thermal fluid energy machines. Catalogue 4, among other things, deals with hydraulic fluid energy machines.

This catalogue offers an overview of the whole range of fluid machinery. The machines are classified according to the way they convert energy. The graph below illustrates this.

Fluid energy machine:
A machine that transfers energy by means of a liquid or gaseous fluid

Driving machine, also known as prime mover:
Energy is removed from the fluid

Driven machine:
Energy is added to the fluid

Turbomachine:
Transfer of energy between the fluid and the machine by means of flow forces

Positive displacement machine:
Transfer of energy between the fluid and the machine by means of a variable volume, generated by a displacement device

DRIVEN MACHINES
Energy is added to the fluid

TURBOMACHINES
Transfer of energy between the fluid and the machine by means of flow forces

Hydraulic
- centrifugal pump
- propeller pump
- jet pump

Thermal
- ventilator
- fan
- radial compressor

POSITIVE DISPLACEMENT MACHINES
Transfer of energy between the fluid and the machine by means of a variable volume, generated by a displacement device

Hydraulic
- piston pump
- vane pump
- gear pump
- spindle pump

Thermal
- piston compressor
- screw compressor
- vane compressor

DRIVING MACHINES
Energy is removed from the fluid

TURBOMACHINES
Transfer of energy between the fluid and the machine by means of flow forces

Hydraulic
- water turbines

Thermal
- wind turbines
- steam turbines
- gas turbines
- jet engines

POSITIVE DISPLACEMENT MACHINES
Transfer of energy between the fluid and the machine by means of a variable volume, generated by a displacement device

Hydraulic
- hydraulic engine

Thermal
- internal combustion engines
- steam engine
- Stirling engine
- gas expansion engine