

# Water-jet machining

## 1. Read the text on water-jet machining and find the English equivalents of the following Slovak keywords.

The process uses a high velocity narrow jet of a liquid (water) to cut materials. The jet of liquid velocity is about 2000 ft/sec. Material is eroded from the workpiece at the impact location of the liquid jet. An important benefit of this machining process is the ability to cut material without interfering with the material's inherent structure as there is no "heat-affected zone".



It is considered a "green" technology. It produces no hazardous waste, reducing waste disposal costs. Materials commonly cut with this process include rubber, foam, plastics, composites, stone, tile, metals, food, paper and much more. Materials that cannot be cut with this process are tempered glass, diamonds and certain ceramics.

vysokorýchlostný vodný prúd

tepelne ovplyvnená zóna

obrobok

tekutina

nebezpečný odpad

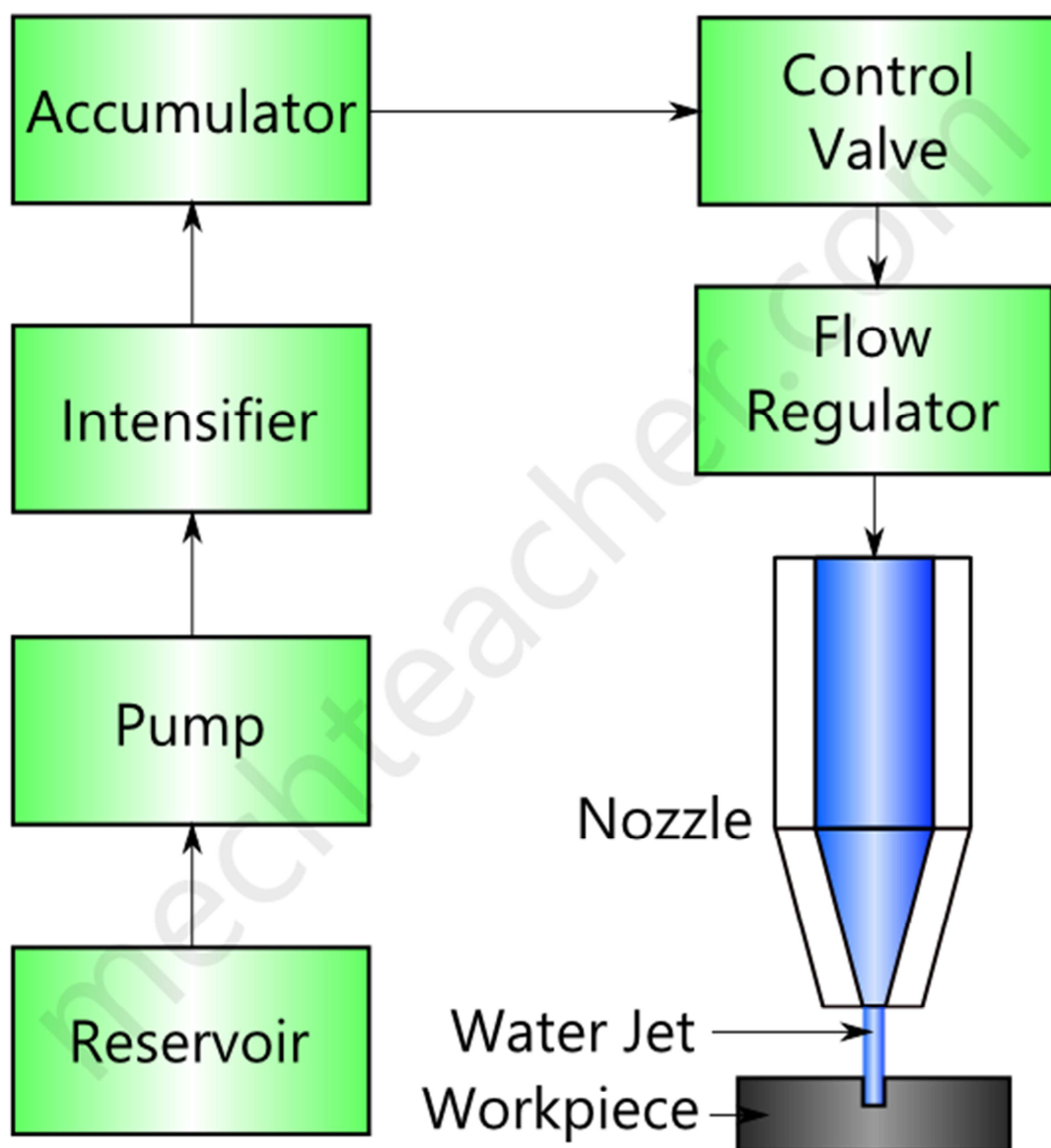
náklady na likvidáciu odpadu

kompozitné materiály

## 2. Complete the text on water- jet abrasive cutting with the following words: *adjusted, concrete, heat, pressure, properties, substance.*

Water-jet abrasive cutting uses a high .....<sup>1</sup> jet of water combined with an abrasive .....<sup>2</sup> to cut through materials. The advantages of this form of cutting are that the jet can be .....<sup>3</sup> and the kind of abrasive changed so that almost any kind of material can be cut. In addition, the material can be cut without changing its .....<sup>4</sup> in any way. With .....<sup>5</sup>, there is always some damage to the areas nearest the cut. This form of cutting has many applications. It can be used to cut metals, composites, and even thick .....<sup>6</sup>.

**3. Match the components of the water jet machining apparatus with their functions.**



## COMPONENTS:

1. Nozzle
2. Accumulator
3. Intensifier
4. Pump
5. Control Valve
6. Flow regulator
7. Reservoir

## FUNCTIONS:

- a) It is used for storing water that is to be used in the machining operation.
- b) It pumps the water from the reservoir.
- c) It is connected to the pump. It pressurizes the water acquired from the pump to a desired level.
- d) It is used for temporarily storing the pressurized water. It is connected to the flow regulator through a control valve.
- e) It controls the direction and pressure of pressurized water that is to be supplied to the nozzle.
- f) It is used to regulate the flow of water.
- g) It renders the pressurized water as a water jet at high velocity.

### **3. Based on the diagram put the stages of the water jet cutting process into the correct order.**

\_\_1\_\_ Water from the reservoir is pumped to the intensifier using a hydraulic pump.

\_\_ \_\_ Pressurized water is then sent to the accumulator. The accumulator temporarily stores the pressurized water.

\_\_ \_\_ Flow regulator regulates and controls the flow rate of water.

\_\_ \_\_ Pressurized water then enters the nozzle by passing through the control valve and flow regulator.

\_\_ \_\_ Control valve controls the direction of water and limits the pressure of water under permissible limits

\_\_ \_\_ The intensifier increases the pressure of the water to the required level. Usually, the water is pressurized to 200 to 400 MPa.

\_\_\_ \_\_\_ Pressurized water finally enters the nozzle. Here, it expands with a tremendous increase in its kinetic energy. High velocity water jet is produced by the nozzle.

\_\_\_ \_ When this water jet strikes the workpiece, stresses are induced. These stresses are used to remove material from the workpiece.