

Fourth School Year

FIXTURES 2

Pneumatic fixtures

They use *compressed* air. The advantages are: the high clamping speed, simple structure, *uniform* clamping, easy regulation.

The disadvantages are: that there has to be big equipment for great force and lesser clamping *solidity*, because the air is *compressed*.

Kinds of pneumatic clamps:

a) a cylinder with a piston (*single-acting*, *double-acting*, tandem),

b) membrane clamping (great clamping force, but small stroke).

Single-acting cylinder with a piston



Membrane clamp

1...compressed air

- 2...membrane
- 3...clamping stroke





Hydraulic clamping

It clamps using pressure oil. It achieves the greatest clamping force.

Advantages are in regards to pneumatic clamp: greater clamp *solidity*, lesser dimensions.

The disadvantage is the fixture is more expensive.

Pneumatic-hydraulic clamping (intensifier)

It has two parts, low-pressure is pneumatic and high-pressure is hydraulic. By using a little air pressure great pressure in liquids is formed.



Hydroplastic clamping

It is used for clamping workpieces with external or internal cylindrical surfaces. It consists of a fixed case, hydroplastic matter (it is semi-liquid), of a flexible *thin-walled* steel clamping *case*.

Clamping is very quick and simple, and more than one workpiece is often clamped at the same time. Since the material is flexible, it is possible to even clamp formed workpieces.

- 1...control screw with piston
- 2...filling hole
- 3...flexible clamping *case*
- 4...plastic











Magnetic and electrical magnetic clamps

The clamping force comes from a permanent or electrical magnet. It is used for surface grinding machines and for thin parts.

Literature and sources used: Augustin Frank a kol., Strojírenská technologie 4, SNTL, Pavel Hlásek a kol., Strojírenská technologie 3, SNTL





OP Vzdělá

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

VOCABULARY

case	pouzdro
check valve	zpětný ventil
compressed	stlačený
double-acting	dvojčinný
drive	pohon
filling	plnící
gripping jaw	upínací čelist
lubricator	maznice
purifier	čistič
single-acting	jednočinný
solidity	tuhost
thin-walled	tenkostěnný
uniform	rovnoměrný
valve	ventil

COMPREHENSION QUESTIONS 1. What are pneumatic fixtures?

- 2. What are the advantages and disadvantage of hydraulic clamping?
- 3. What do you know about hydroplastic clamping?4. When do we use a magnetic and electrical magnetic clamp?



EXERCISES

1. Name what you see in the pictures:





2. Hidden message - 15 words were placed into the puzzle. Find the words and then the hoden message.

W	Е	Н	Y	D	R	А	G	U	L	Ι	С	S	С	Е
Е	L	K	А	М	Е	Р	Ι	N	N	G	W	0	R	С
R	G	Κ	0	V	L	Ι	Q	U	Ι	D	Κ	L	Х	А
С	G	А	L	R	Ζ	В	Ζ	Ζ	С	D	А	Ι	R	F
S	K	А	Т	D	Т	N	K	Y	Y	Н	Ν	D	K	R
В	V	Х	В	Ν	0	S	L	Q	G	Е	А	Ι	W	U
М	U	Н	V	Т	А	Ι	М	F	Y	K	М	Т	R	S
K	Ι	М	S	Р	Ν	V	U	Ι	Х	Ζ	V	Y	S	G
V	Н	Ι	Х	D	W	K	D	N	S	Р	В	F	L	G
V	Р	Х	Е	М	0	S	Е	А	Ι	Е	М	Н	Р	Е
W	0	R	K	Р	Ι	Е	С	Е	0	F	Q	Н	J	С
E	R	U	S	S	Е	R	Р	Η	U	С	0	Q	U	R
N	J	Q	F	L	Е	Х	Ι	В	L	Е	М	R	J	0
С	Т	L	А	V	U	D	W	Х	U	М	Т	М	М	F
V	L	Y	Е	Е	Е	L	Ν	S	Η	Р	G	L	Ν	Р
ADVANTAGE FORCE PISTON					CYLINDER GRINDING PRESSURE			-	FLEX LIQU SCRE					

STROKE

VALVE

SURFACE

WORKPIECE

Hidden message

SOLIDITY

UNIFORM



EXERCISES – KEY FOR TEACHERS

1. Name what you see in the pictures:

1 liquid 2 magnet 3 clamp 4 screw 5 cylinder 6 valve 7 workpiece 8 piston

2. Hidden message

WEHYDRAGULICSCE E L K A M E P I N N G + O +C R G + O V L I Q U I D + L + AC + A L R + + + + C D + I + FS + A T + T N + Y + + N D + R V + NOSL+ + + Ι + ++ + IJ Т ΤА Ι + + RS + ++++ + N V U + Y + + G + +S +++ Ι D + + D N ++ + $^+$ + + ++ + +Ρ $^+$ Е + + + +A I + ++ + Е W O R K P I E C E + F ++ +С E R U S S E R P + + + O ++ R ++ + F LEXIBLE+R+O + + + + + + + + + + + M F

> (Over, Down, Direction) ADVANTAGE(9,10,NW) CYLINDER(10,4,SW) FLEXIBLE(4,13,E) FORCE(15,14,N) GRINDING(15,8,NW) LIQUID(6,3,E) PISTON(2,10,NE) PRESSURE(8,12,W) SCREW(1,5,N)SOLIDITY(13,1,S) STROKE(7,6,NW) SURFACE(15,7,N) UNIFORM(8,8,SE) VALVE(2,6,NE) WORKPIECE(1,11,E)

Hidden message - hydraulic clamping