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THE EXPERIMENTAL EFFECTS OF THE FRICTION TO THE SONIC FLOW IN THE SYSTEM FORMED BY TWO SERIAL CAPACITY CYLINDERS AND ONE FRICTION RESISTANCE

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ABSTRACT
In the paper we present the effect of the friction used the pressure sonic and the sonic flow by one sonic installation. This installation is formed by two serial cylinders and one resistance of frictions. The effects makes in this case are the effects caloric show by the upper of the temperature in the friction resistance.
Keywords: sonic pressure, temperature**,** friction coefficient, sonic installation, series assembling.

1. GENERAL NOTIONS
Sonicity is the science of transmitting mechanical energy through vibrations. The experimental study is aim to obtained the caloric effect as succession of the transmission of the caloric effect at distance by vibration (through the sonic wave in liquids).
This experimental study used the installation present by the figure 1, to start from different frequency of the drive motor the ram of the sonic generator. For same frequency are use three measures of the static pressure in the installation with the value.

2. THE PARARLLEL ASSEMBLING BY BIG CONDENSERS AND THE FRICTION RESISTANCE

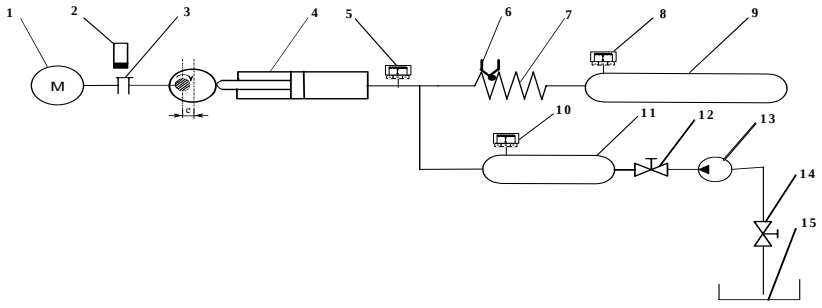

Figure 1. The parallel installation by big cylinder capacity and one friction resistance

In the figure 1 are present the installation were the little (by the little volume) condenser are connected in parallel with the friction resistance. The installation is formed by sonic generators who are

connecting by the friction resistance R_f. with a pipe, this resistance is connected also by a pipe to the capacity cylinder.
In the experimental graphics we are noted with:

ΔG – the variation of the generator pressure;

ΔS_1 – the variation of the pressure obtained by the first sensor of pressure place to the la left of the capacity cylinder;

ΔS_2 – the variation of the pressure obtained by the right sensor of pressure placed to the capacity cylinder;

T – temperature.

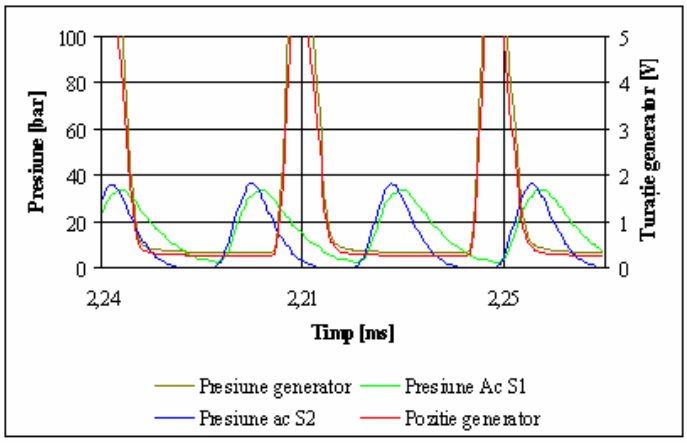

Figure 2. The evolution of the pressure in time for the system with two cylinder capacity

For make in evidence the effects of the friction we can study the effects of the sonic pressure in the system. For this we can have charge the system with static pressure. For same static pressure (0,25 bar, 0,5 bar) we obtained the diagrams for this charges.

After the work of the experimental dates obtained from the three sensor place in the system, are results the primary histograms represented in the figure 2, this show the evolution of the generator pressure and also the pressure to the extremity of the capacity cylinder. Also we can see the revolution of the generator. The evolution of the pressure curve to notice the existence the phases difference by the generator pressure and the pressure of the capacity cylinder.

The diagrams presents in the figure 3 and 4 are realized for a 0,25 bar static pressure, and 600 r.p.m. The temperatures realized in the installation after 56 seconds to work is up to 83ºC.

n = 600 rot/min **p_s = 0,25E+05 Pa**

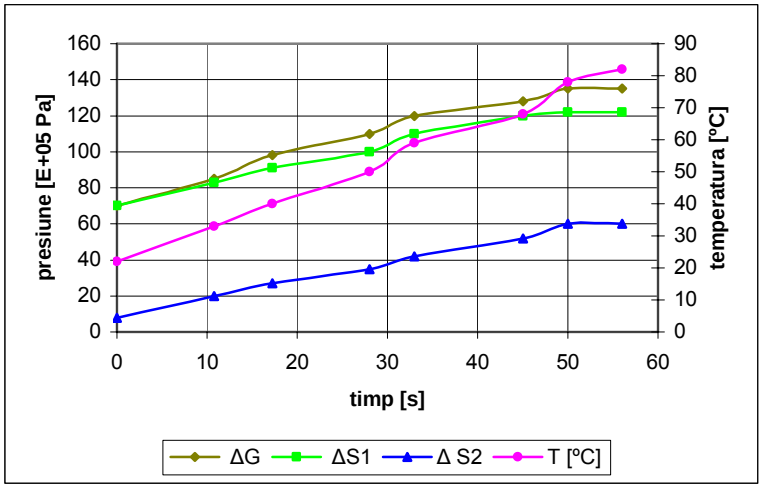

Figure 3. The variation of the pressure and the temperature in time to 0,25E+05 Pa static pressure

The pressure of the sensor of generator is stabilized about the 70E+05 Pa, the fall of the pressure by the friction resistance is the 30E+05 Pa.

p_s = 0,25E+05 Pa

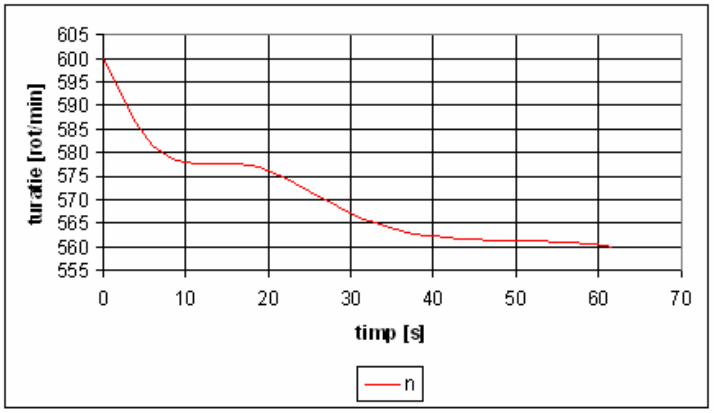

Figure 4. The variation of revolution in time for the static pressure to 0,25E+05 Pa

n = 1000 rot/min **p_s = 0,5E+05 Pa**

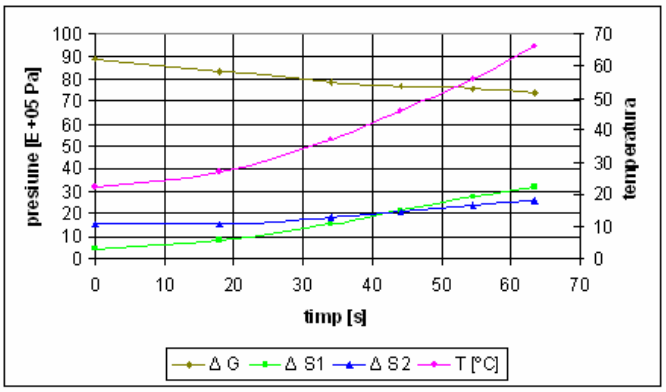

Figure 5. The variation of the pressure and the temperature in time to 0,5E+05 Pa static pressure

p_s = 0,5E+05 Pa

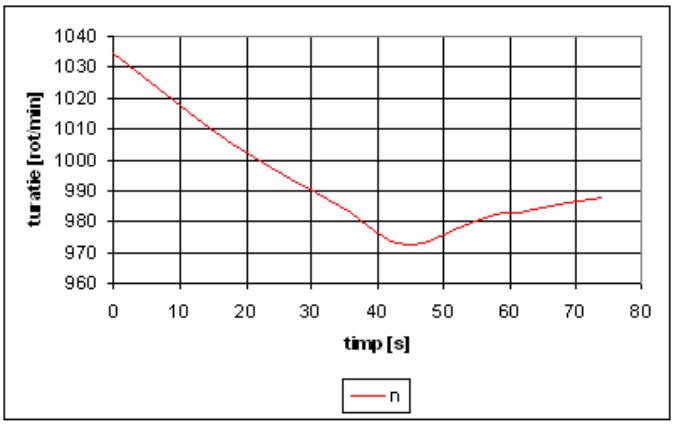

Figure 4. The variation of revolution in time for the static pressure to 0,5E+05 Pa

The diagrams presents in the figure 5 and 6 are realized for a 0,5 bar static pressure, and 1000

r.p.m. The variation of the pressure and the temperature in function by the r.p.m, after 60 seconds the r.p.m is stabilizes to the 980 r.p.m. The pressure to the generator sensor is about the value 140E+05 Pa, the fall of the pressure by the friction resistance is the 28E+05 Pa. After one minute the temperature by the exterior surface of the temperature sensor is nutty the value 86ºC.

3. REFERENCES

[1] Constantinesco**, G.**, Theory of Sonics: A Treatise on Transmission of Power by Vibrations, The Admiralty, London, 1918.
[2] Constantinescu, G., Teoria sonicității, Editura Academiei R.S.R., Bucureşti , 1985.
[3] Pop, I., Marcu, I. L., Personalități în ştiință şi tehnică - Gogu Constantinescu, Editura AGIR, Bucureşti, 2004.
[4] Pop, I., Tratat de teoria sonicității, Editura Perfomantica, Iasi 2006.
[5] Popa, Bazil, s.a., Manualul inginerului termotehnician, vol. I, Ed.Tehnică, Bucureşti, 1986.
[6] Constantinesco, G., Haddon, W., Transmission of impulsive forces through liquids, patent no. 182206/1920.
[7] Constantinesco, G., Haddon, W., Liquid wave transmission, patent no. 132027/1920.
[8] Constantinesco, G., Haddon, W., Hydraulic power transmission, patent no. 24231/1920.