VERIFICATION OF CAVITATION PHENOMENON AND PRESSURE INDICATORS OF ELECTRIC PUMPS

Mirzaliev B.B.
Fergana Polytechnic Institute
E-mail mirzaliyevbobur3@gmail.com

ABSTRACT

The phenomenon of cavitation in electric pumps in accordance with the pressure and flow efficiency in the elements of the pump. Examples of studying the structure of electric pumps and testing them are described

Keywords: pumps, pressure, performance, stations, cavitation and pump.

The process of formation of bubbles as a result of the pressure drop in the pump elements at a certain point of the flow to the pressure level of the saturated vapors (elasticity) of the liquid is called the phenomenon of cavitation. When the pressure goes to high zones, these bubbles break and destroy the details of the pump, and cause a decrease in its performance (Q, N, η). Quantitative and qualitative adjustment methods are used to change the performance of the electric pump device. Theoretical examples of studying the structure of electric pumps and testing them are described. due to the bursting of bubbles, it destroys the details of the pump, and causes a decrease in its performance indicators (Q, N, ē). Admissible vacuum metric Njvak and geodesic hjs suction heights that prevent cavitation formation in pumps are found by the following formulas

$$H_{вак}^{ж} = H_0 - h_{буг} - \Delta h_{ж} + \frac{V_s^2}{2g},$$

$$h_s^{ж} = H_{вак}^{ж} - \sum h_{ws} - \frac{V_s^2}{2g};$$

where: Na - atmospheric pressure, (m);

hvapor - saturated water vapor pressure; m, (Table 1).

Δhj - permissible cavitation margin, m;

∑hws is the sum of hydraulic resistances of the suction network, m;

Vs is the speed of the flow in the suction of the pump, m/s;

(1-jadval).

t °S	5°	10°	20°	30°	40°	50°	60°	80°	100°
$h_{bug`,m}$	0,09	0,12	0,24	0,43	0,75	1,25	2,02	4,88	10,33

The permissible suction height is calculated by the following formula for the theoretical fluid flow of one-way and differential piston pumps. The structure designed for fluid transmission, consisting of a pump, engine, mechanical power transmission, suction and pressure pipelines, is called a pump device. In practice, pumping devices installed in open basins can be of three types. The full pressure of the pump (device) N is determined in two different ways. determination of the pressure of the pump in the form of summation of resistances, (calculation method)

$$H = H_r + \sum h_w \quad H = H_r + \sum h_w$$

So

$$\sum h_w = \sum h_м + \sum h_в$$

Pressure loss to local hydraulic resistance is generally expressed by the following formula Determination of pump pressure using measuring devices (vacuum meter, manometer) (practical method) where Nr is full geodetic lifting height, m. ∑hw is the sum of pressure losses due to local and longitudinal hydraulic resistances in pipelines, permissible vacuum metric Njvak and geodesic hjs suction heights that prevent cavitation formation in pumps are found by the following formulas height

$$H^{ж}_{s,кел} = H_a - h_{буг} - \Delta h_ж$$

Δhj or values of Hjs.lel are given in the factory characteristics of the pumps. In some cases, the cavitation reserve can also be found by the following formula

$$\Delta h_j = \varphi \sigma N$$

here, φ = 1.2-1.4 - reserve coefficient;

σ - cavitation coefficient;

The formula of S.S. Rudnev can be used to determine the cavitation coefficient σ.

$$\sigma = \frac{n_s^{4/3}}{A};$$

here, A is the coefficient depending on the design of the pump, i.e. when ns=110, A=4700, when ns=180, A=6300 is accepted. The theoretical liquid drive of one-way and differential piston pumps for cavitation piston pumps is calculated by the following formula

$$Q_t = \frac{F_n S \cdot n}{60}$$

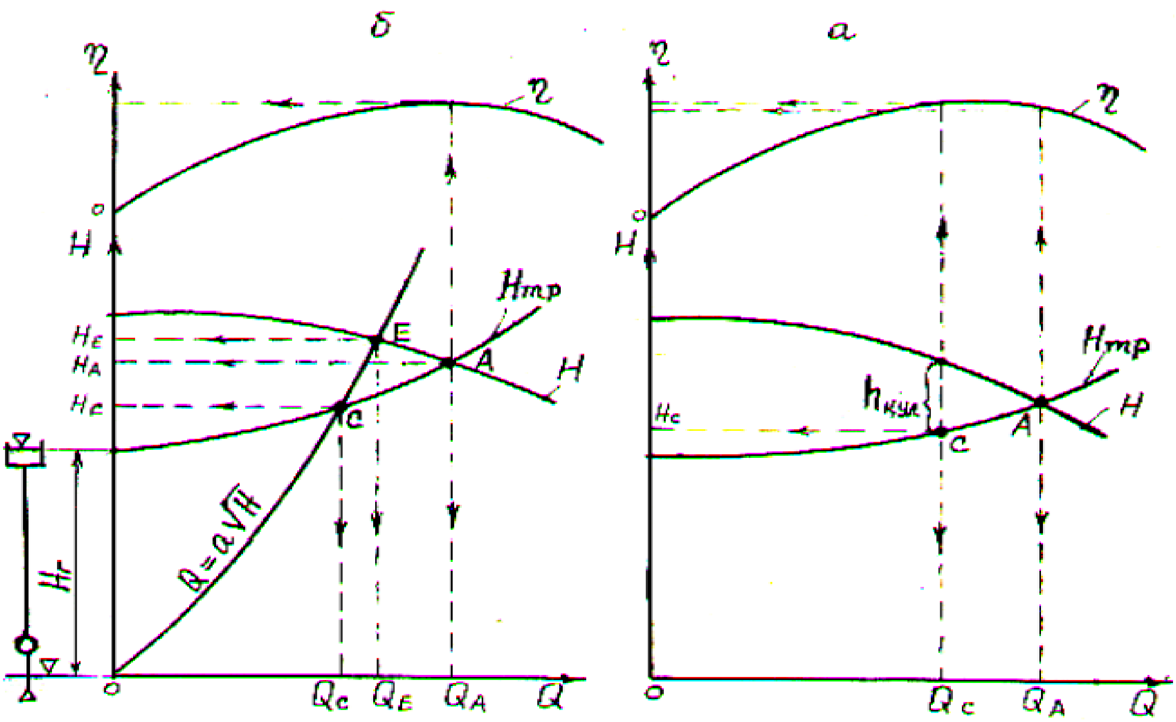
here, Fn is the cross-sectional surface of the piston;

S is the path of the piston, S=2 r;

r - the radius of the curve;

n is the rotation frequency of the curve in one minute (or the number of double movements of the piston in one minute).

Theoretical fluid flow of a double-acting piston pump. In order to properly use pumps in various conditions, information about their work, i.e., characteristics, is given. The characteristics of the pump, when the rotation frequency n=const is constant, are referred to the connection graphs N=f1(Q), N=f2(Q), η=f3(Q) and Njvak=f4(Q). The characteristics of pumps can be given in specific, universal and dimensionless forms.



(Fig. 1) Adjustment of the bypass pump operation procedure of electric pumps

a) quantitative adjustment; b) qualitative adjustment

Point A, where the pressure characteristic curve of the pump N=f(Q) and the hydrodynamic curve NTR=Ng+RTQ2 of the pipeline intersects, is called the working point (Fig. 1 a).

FOYDALANILGAN ADABIYOTLAR RO‘YXATI: (REFERENCES)

1,Chebaevsky V.F, i dr. Nasosy i nasosnye stansii., -M.:, Agropromizdat.

2,Latipov K.Sh. Hydraulics, hydraulic machines, hydraulic systems. Tashkent.: "Teacher",

3, Zinovev I. "Vse nachinalos s kolesa". M .«Selsky Mechanizator», 2001. No

4,Chebaevsky V.F. i dr. Design of pumping stations and testing of pumping stations. -M.: "Kolos", 2000, 376 p.

5, Khansuvarov K.I., Seitlin V.G. Technika izmereniya davleniya, raskhoda, kolichestva i urovnya jidkosti, gas i para. -M.:, Izd. Standartov, 1990, -287 p.

6, Nosirovna N. N. et al. Energy saving technologies and problems of their implementation //Проблемы современной науки и образования. – 2019. – №. 12-2 (145).

7, Nosirovna, N. N., Kamolovich, K. N., No‘Monjonov Shakhzod Dilshodjohn, O. G., & Bakhtiyorovich, M. B. (2019). Energy saving technologies and problems of their implementation. Проблемы современной науки и образования, (12-2 (145)).

8, Mirzaliyev B. B. THE PROCESS OF SWITCHING ON UNCHANGED VINE MACHINES //Theoretical & Applied Science. – 2020. – №. 1. – С. 772-776.

9, Mirzaliyev B. B. THE PROCESS OF SWITCHING ON UNCHANGED VINE MACHINES //Theoretical & Applied Science. – 2020. – №. 1. – С. 772-776.

10, Bakhtiyorvich, M. B., & Qizi, E. D. U. (2023). Fuel Combustion Processes at Thermal Power Plants. Central Asian Journal of Theoretical and Applied Science, 4(4), 104-108.

11, Baxtiyorvich, M. B., & Qambarjon o‘g‘li, R. R. (2022). SILICATE MATERIALS WORKING-IN MANUFACTURING ENTERPRISES TYPES OF HEATING DEVICES USED. CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES, 3(12), 346-349.

12, Мирзалийев, Б. Б. (2022). Принцип Работы И Основные Энергетические Характеристики Тепловых Электростанций. Central Asian Journal of Theoretical and Applied Science, 3(11), 126-132.

13. Usmonov S. Y. Analysis of Working Modes of Well Pumping Equipment Eectr //Central Asian Journal of Theoretical and Applied Science. – 2022. – Т. 3. – №. 11. – С. 119-125.

14. Yulbarsovich U. S., Nurillaevich M. N. FREQUENCY CONTROL OF POWER EQUIPMENT DURING SECONDARY STEAM GENERATION IN THE PRODUCTION UNIT //PRINCIPAL ISSUES OF SCIENTIFIC RESEARCH AND MODERN EDUCATION. – 2022. – Т. 1. – №. 6.