the metal powders of the alloy components in the nominal composition Ni46Mn41In13. The resulting ingot had the form of a «tablet» with a diameter of 20 mm and a height of 10 mm and, for the purpose of homogenization, was annealed in a vacuum furnace at a temperature of 900 ° C for 48 hours, followed by natural cooling in vacuum. Samples were cut out of this ingot by the method of electroerosion cutting for study. The elemental chemical composition of the sample was determined by energy dispersive X-ray spectroscopy (EDX) and amounted to Ni50,2Mn39,8In10 [5].

The characteristic temperatures of the structural and magnetic phase transitions were determined using a universal differential scanning calorimeter. The rate of temperature change of the test sample was about 5 K/min. The study of the temperature dependence of the electrical resistance was carried out using the 4-contact method. Contact wires are fixed to the ends of the sample in the form of a parallelepiped with dimensions of 7 mm × 1 mm × 1 mm by soldering.

To determine the magnitude of the magnetocaloric effect, the method of direct measurement of the adiabatic temperature change of the alloy sample was used when the magnetic field was turned on or off. Two plates measuring 6 mm × 6 mm × 1 mm were cut from the alloy ingot. One of the copper constantane thermocouples was placed between the plates. The end of the second thermocouple was attached through a small heat insulator. Then all this was isolated and placed in a tank, inside of which, with the help of an electrical resistance furnace and nitrogen vapors, the set temperature of the FE measurement was set. The X-input of the recorder was supplied with the value of the second thermocouple, which registers the real temperature of the sample. A potential difference was applied to the Y-input from the first and second thermocouples, which shows how different the temperature of the sample itself is from the adiabatically isolated system in which it is placed.

Conclusions

1. According to the results of studies of phase transformations by differential scanning calorimetry, the following phase transformation temperatures were established: MS = 296 K; MF = 287 K; AS = 297 K; AF = 308 K; TC = 325 K.

2. It is established that under the action of an applied magnetic field, the temperature of the structural transformation is shifted to the low temperature region. In a magnetic field with a strength of up to 1.55 MA/m, the transformation temperature decreases by 4.8 K.

3. In the field of magnetic transformation, a direct magnetocaloric effect is observed. Its magnitude in a magnetic field of 1.55 MA/m is ΔT = 1.4 K. In the region of martensitic transformation, the reverse magnetocaloric effect is observed.In a magnetic field with a strength of 1.55 MA/m, it is equal to ΔT = 1.75 K.

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OVERVIEW OF TYPES AND PARAMETERS OF GAS FLOW METERS USED IN AUTOMATED ENERGY ACCOUNTING SYSTEMS

Polovinchenko M.I., Dubrovina A.I.

Don State Technical University, Rostov-on-Don, e-mail: m.polovin4enko@yandex.ru, ministrelia69@yandex.ru

In modern automated systems for monitoring and accounting of energy resources and water, the main devices collecting data from consumers are water, electricity and gas meters. In order to develop a meter that surpasses the existing ones in its characteristics and ensure the competitiveness of systems using such meters, it is necessary to review the measuring devices available on the market. This paper collects data on natural gas meters.

Gas meter (gas meter) is a metering device designed to measure the amount (volume), less often – the mass of gas passed through the pipeline. The amount of gas is usually measured in cubic meters (m3), rarely in units of mass (this mainly concerns process gases).

Devices that allow measuring or calculating the passing amount of gas per unit of time (gas flow) are called flow meters or flow meters. Most often, gas consumption is measured in cubic meters per hour (m3/h).

Gas meters with slightly worse accuracy than conventional commercial meters, designed only for technological or on-farm accounting, are often called quantometers.

Gas meters differ in design, in their characteristics and functional purpose.

Main characteristics of counters:

Throughput is the range of expenses in which the meter measurement error declared by the manufacturer is provided.

According to the maximum throughput, gas meters are conditionally divided into household, municipal and industrial.

Household

With a maximum throughput from 1 to 6 m3/h. Most often used in apartments, houses, offices, small furnace rooms for local accounting of gas consumption. These are, as a rule, small membrane (chamber, diaphragm), less often ultrasonic, jet, small rotary gas meters.

Public utilities

With a maximum throughput from 10 to 40 m3/h. They are used to account for gas consumption by small boiler houses, technological installations, etc. These are, as a rule, larger membrane (chamber, diaphragm), rotary, ultrasonic, jet gas meters.

Industrial

With a maximum throughput of over 40 m3/h. They are mainly used at metering units of large consumers – gas boiler houses, industrial and agricultural enterprises, metering units of gas distribution networks (rotary, turbine, vortex, ultrasonic, jet gas meters), on main networks (narrowing devices, turbine, vortex, ultrasonic gas meters).

Types of household gas meters by design [1]:

- diaphragm counters;
- rotary counters;
- turbine meters.

Diaphragm meter (membrane, chamber) is a gas meter, the principle of operation of which is based on the fact that with the help of various movable converter elements, the gas is divided into fractions of volume, and then their cyclic summation is performed.

Advantages of diaphragm meters: ease of manufacture, low cost of diaphragm meters, relatively accurate counting even with a small use of gas.

Disadvantages of diaphragm counters: counters practically do not tolerate overloads (both temporary and permanent).

A rotary meter is a chamber gas meter in which eight – shaped rotors are used as a converter element.

Advantages of rotary meters: the rotary meter has a relatively large throughput with a relatively small size and weight, it is durable and can withstand some overloads.

Disadvantages of rotary meters: a rotary gas meter costs more than others because of the expensive materials used for its production, and it also requires careful adjustment of all parts.

Turbine gas meters are gas meters in which, under the influence of a gas flow, the turbine wheel is rotated, the number of revolutions of which is directly proportional to the flowing volume of gas. Recently, the counting mechanisms of turbine gas meters are equipped with modems, thanks to which all readings are directly transmitted to the servers of the checking services.

At gas industry facilities, gas consumption and its quantity are measured mainly by the method of variable pressure drop on the constricting device, using tachometric flow meters and meters, as well as ultrasonic flow meters have been actively introduced recently [2]. Also, various electronic solutions are being introduced into modern natural gas flow meters to improve the accuracy of measurement and the service life of the meter [3].

The essence of the variable pressure drop method is to measure the pressure drop before and after the constricting device installed in the gas flow.

The principle of operation of tachometric flowmeters is based on the dependence of the rotation speed of the converter installed in the pipeline on the flow rate of the substance. The advantages of such devices are high speed, high accuracy, and a large measurement range. The error of the counters is ± 0.5 – 1.5%, the use of tachometric converters can reduce the error of converting the flow rate into the frequency of rotation of the converter to ± 0.3%.

The main disadvantage of tachometric flowmeters is the wear of supports, the presence of movable elements and the main disadvantage, in relation to flowmeters with constricting devices, is the need for calibration installations.

The ultrasonic flow measurement method is based on the phenomenon of displacement of sound vibrations by a moving medium [4,5].

The method is characterized by the following negative factors [6]:

- dependence of the intrinsic velocity of ultrasonic vibrations on the physico-chemical properties of the measured medium;
- the flow velocity is averaged along the ultrasonic beam, and not along the cross section of the pipe.

The latter factor forces developers to supply the design with additional sensors or reflectors, which makes the flow meter more complex, increases the likelihood of operating errors when the sensors of the system fail. Nevertheless, this method has a number of advantages:

1. no pressure drop,
2. high performance;
3. absence of moving elements.

In [7] it is reported that so far the optimal way to measure the flow and quantity of gas in the gas industry is the method of variable pressure drop. The errors of differential pressure sensors, absolute pressure and temperature, as well as calculators are in the range from 0.01 to 0.075% and meet regulatory documents.

The principle of operation of vortex flowmeters (meters) is based on the transformation of the translational motion of the measured medium into a Pocket vortex path by means of a flow body installed across the flow measurements of the frequency of vortex disruption [8]. The frequency of the formation of vortices in the first approximation is proportional to the flow velocity, and their number over a period of time is proportional to the total energy consumption.

The advantage of vortex flowmeters is the absence of any movable elements inside the pipeline, sufficiently good accuracy and linearity in a wide range of measurements, frequency output signal, as well as versatility: the same device after calibration can be a meter of both liquid, gas, and steam [8-10].

It should also be noted that gas meters during operation have variability due to the temperature of the external environment, because the temperature of the gas coming from outside can differ significantly from the temperature in the room in which the meter is located. To account for seasonal temperature changes in the commercial accounting of gas consumption, a special temperature coefficient is used, and the meters themselves use a temperature compensation mechanism. The coefficients are set by the Federal Agency for Technical Regulation and Metrology once every six months, and are valid only for metering devices without temperature compensation installed outdoors.

The analysis shows that the market of household gas meters in the price range has two niches: 2600-4500 rubles and 6000 rubles and above. Moreover, this separation is not due to accuracy characteristics, but to service functions. That is, we can conclude that the consumer is more likely to agree to pay for the convenience of operation, and not for real savings.

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Филологические науки

СТРУКТУРА КЛИНИЧЕСКОГО ТЕРМИНА С КОГНИТИВНЫХ ПОЗИЦИЙ

Абакумова О.А.

Северный государственный медицинский университет, Архангельск, e-mail: abakumovaola6@mail.ru

Терминология стремительно развивается благодаря расширению и открытию новых сфер знания, что ставит задачу ее более тщательного изучения и упорядочения. В популярной нынче когнитивной парадигме знаний термин представляет собой не выражение понятия, застывшее образование, но вербализацию специального концепта, репрезентацию референта как чувственно и мыслительно воспринимаемого объекта на всех этапах его существования [1, с.276]. В современной науке термин рассматривается, как словесная передача концепта. Концепт в когнитивной интерпретации – это мыслительная категория, то есть ментальное явление, еще не языковое [2, с.113]. Вербализация концепта приводит к возникновению термина, формируемого в процессе познания(когниции) теории, осмысляющей ту или иную область знания. Но концепт не всегда можно выразить словесно, он в виде единицы концептосферы может иметь содержание, но не форму, как понятие. «Концептосфера – область мыслительных образов, единиц УПК, представляющих собой структурированное знание людей» [3, с.191]. Она достаточно упорядочена. Концепты, образующие концептосферу, могут находиться по отдельным своим признакам в иерархических отношениях, либо в отношениях сходства или различия с другими концептами [3, с.191]. Научные понятия обозначаются терминами, в отличие от обыденных понятий, которые выражаются обычными словами. Поскольку процесс концептуализации представленных терминов отражает процесс познания, термин с позиции когнитивного терминоведения, можно определить как динамическое явление, которое рождается, формулируется, углубляется в процессе познания, связанный с той или иной теории концепцией, осмысляющий ту или иную область знаний или деятельности [4, с. 22]. Термин своей семантической и структурной составляющими отражает его рождение. Термины существуют в разных языках и сферах, но в медицинской сфере они должны быть особенно едины для всех языков, понятны, легко воспринимаемы и адекватно воспроизводимы. Как знаковые репрезентации языковые единицы активизируют в сознании человека сущности, знаковыми заместителями которых они являются, то есть возбуждают в памяти/сознании человека “связанные знаком” концепты, когнитивные корреляты перцептивно воспринятого опыта [5, с.7]. То есть восприятие термина происходит на основе уже имеющегося опыта и знаний путем сопоставления с ними и построения аналогий, моделей.

Клиническая терминология – это терминология, используемая в клинической практике. Фундамент клинической терминологии – это субтерминосистемы паталогической анатомии и паталогической физиологии [6, с.165]. Клинический термин состоит только из одного слова, но несмотря на это, он четко определяет понятие,