International Journal of Engineering and Information Systems (IJEAIS)
ISSN: 2643-640X
Vol. 5 Issue 3, March - 2021, Pages: 207-209

The Structure Of The Energy Passport Of Industrial Consumers

Mirzaev Uchkun, Uktamov Davron, Akhmedov Abdurauf

Faculty of Power engineering and Radio electronics, Jizzakh polytechnic institute, Jizzakh city, Uzbekistan
Uchqun8822@gmail.com

Abstract *— This article provides information on the structure of the energy passport of industrial energy consumers*

Keywords *— energy passport; energy resources; energy audit; solid surface;*

Introduction

The energy passport (EP) of an industrial consumer of fuel and energy resources (FER) allows obtaining in a concentrated form objective information on the level and efficiency of the use of fuel and energy resources at manufacturing enterprises, industrial facilities and housing and communal services [1].

State standard GOST 51379–99 regulates the main provisions of energy certification, establishes the forms of documents (components of the passport of an industrial consumer of fuel and energy resources), reflects the accumulated experience in the field of energy certification of enterprises and offers a single unified approach to its composition and structure.

GOST R 51379–99 establishes the basic requirements for the construction, presentation and content of an energy passport for an industrial consumer of fuel and energy resources (FER) in order to determine the actual balance of consumption of fuel and energy resources, assess energy efficiency indicators and formulate energy saving measures. The standard is used by the state energy supervision authorities during energy audits of energy consumers and assessing the efficiency of fuel and energy resources use [2].

The energy passport of a consumer of fuel and energy resources is developed on the basis of an energy survey conducted in order to assess the efficiency of using fuel and energy resources, the development and implementation of energy-saving measures. The development and maintenance of the passport is provided by the consumer of fuel and energy resources. Methodological recommendations for filling out and maintaining an energy passport are developed by energy auditors and coordinated with federal executive authorities authorized for state supervision over the efficient use of fuel and energy resources.

The objects of energy inspection are:

• production equipment, machines, installations, units, production

consuming fuel and energy resources, converting energy from one type to another for the production of products, performance of works (services);

• technological processes associated with the transformation and consumption of fuel, energy and energy carriers;

• Processes associated with the expenditure of fuel and energy resources for auxiliary needs (lighting, heating, ventilation).

Energy surveys of the efficiency of fuel and energy resources use are carried out:

• consumers of fuel and energy resources (own internal surveys);

• energy audit organizations working under the contract;

• Bodies exercising supervision and control over the efficiency of the use of fuel and energy resources.

Materials and methods

The rules for conducting energy audits of consumers of fuel and energy resources are established by the federal executive body authorized for state supervision over the efficiency of using fuel and energy resources [3].

The base year is the last reporting calendar year at the time of drawing up the passport. Information on the current years of the passport's validity period is not reporting to the federal bodies of Uztech-supervision and is entered by the enterprise to determine the dynamics of the implementation of energy saving programs.

Information in the energy passport is updated in accordance with the current regulatory legal acts in the field of control and efficiency of the use of fuel and energy resources. The nomenclature of indicators of those technological processes for which economic activity is carried out is subject to filling. Filling of standard forms of electronic signature is carried out for those energy carriers that are used in a specific technological process [4]. Responsibility for the reliability of the data of the energy passport is borne by the persons who carried out the nergy inspections, the administrative management of the consumer of fuel and energy resources. The energy passport of the consumer of fuel and energy resources must be kept at the enterprise, in the territorial body of state energy supervision and in the organization that conducted the energy audit. The stamp of the energy passport is determined by the management of the consumer of fuel and energy resources in the prescribed manner.

Saving or preserving thermal energy largely depends on the processes of heat propagation in bodies and the processes of heat exchange between bodies. Heat transfer processes are an integral part of the thermal processes of machines, engines, devices, enclosing structures of buildings and structures. In matters of heat transfer and energy saving, two main tasks can be distinguished.

1. Determination of the amount of heat that, under given conditions, passes from one part of the body to another or is transferred from one body to another. This task is the main one in the calculations of heat exchangers.

goods, heat transfer through flat, cylindrical walls, determination of heat loss through insulation, etc.
2. Determination of the temperature in various parts of the body involved in the process of heat exchange. This problem is important when calculating machine parts, enclosing structures, since the strength of materials depends on temperature, and the uneven temperature distribution causes the appearance of thermal stresses.
There are three main ways to transfer heat energy:
1) thermal conductivity - the transfer of heat from more heated to less
heated areas of the body due to thermal movement and the interaction of microparticles, which leads to an equalization of body temperature;
2) convection - heat transfer due to the movement of particles of matter in space and is observed in moving liquids and gases;
3) thermal radiation - the transfer of energy by electromagnetic waves in the absence of contact between bodies.
In most cases, the transfer of heat between bodies is carried out simultaneously in two or three ways. For example, the exchange of heat between a solid surface and a liquid (or gas) occurs by conduction and convection at the same time and is called convective heat transfer or heat transfer. In steam boilers, in the process of transferring heat from flue gases to a heat carrier (water, steam, air), all three types of heat exchange are simultaneously involved - heat conduction, convection and thermal radiation. The transfer of heat from a hot liquid to a cold one through the wall separating them is called the heat transfer process.

Discussion

Thermal conductivity is the process of heat distribution (transfer) by direct contact of microparticles with different temperatures, or by contact of bodies (or their parts) when the body does not move in space. The heat transfer mechanism is molecular or electronic in nature.

In thermal physics and heat engineering, it is generally accepted that any body consists of the smallest particles. In the elements of the body that are subject to heating, the molecules begin to move, as a result of which elastic waves arise, which are transmitted from a higher temperature to a lower one. This leads to an equalization of body temperature. This molecular heat transfer is observed in solids, dielectrics, liquids and gases. In metals, the motion of free electrons is added to this phenomenon, therefore the thermal conductivity of metals is higher than in dielectrics, liquids and gases.

The thermal conductivity of liquids and gases can be considered only in those cases when they are stationary throughout the volume. In real practical conditions, there is a relative and continuous movement of particles inside liquids and gases, the transfer of thermal energy is carried out mainly by convection, and the effect of thermal conductivity becomes secondary. Therefore, the thermal conductivity of liquids and gases is rare.

According to the analytical theory of thermal conductivity, any substance is considered as a continuous material medium - a continuum, which is very convenient for mathematical analysis, since it allows one to represent physical phenomena in a small differential form and creates wider opportunities for the application of existing laws of natural science. However, such a view of matter is acceptable only when the sizes of the differentials of the matter are large enough in comparison with the sizes of molecules and the distances between them. This circumstance is observed in the overwhelming majority of cases. If the distances between molecules become commensurate with the value of the differentials of a substance (for example, in a highly rarefied gas, when the concepts of temperature, pressure, etc. are not preserved), the assumption that the medium is continuous becomes unacceptable.

Any physical phenomenon occurs in time, space and is associated with the concept of a field (temperatures, pressures, potential). The process of thermal conductivity is associated with the distribution of temperatures inside the body. Temperature characterizes the degree of heating and the thermal state of the body.

The set of temperature values at different points in space at different points in time is called the temperature field. If the temperature of a specific point of the body depends only on the coordinates $T = f(x, y, z)$, then such a temperature field is called stationary, and if on the coordinates and time $T = f(x, y, z, \tau)$, it is nonstationary. Distinguish between stationary (time-independent) and non-stationary (time-dependent) temperature field, as well as one-, two- and three-dimensional field, which is characterized by one, two or three coordinates.

Conclusion

An isothermal surface is a locus of points of the same temperature. Any isothermal surface divides the body into two regions: with higher and lower temperatures. Heat passes through the isothermal surface to a lower temperature region. The amount of heat ΔQ (J) passing per unit time $\Delta\tau$ (s) through an arbitrary isothermal surface is called the heat flux Q J / s (W). In the general case, the heat flux may or may not coincide with the heat stream line, it may vary along the heat stream line, or remain constant. Heat flux values may or may not depend on time.

References

[1] Mirzaev, Uchkun, Mathematical Description of Asynchronous Motors (April 15, 2020). International Journal of Academic and Applied Research (IJAAR), 2020, Available at SSRN: https://ssrn.com/abstract=3593185 or http://dx.doi.org/10.2139/ssrn.3593185

[2] Mirzaev, Uchkun, Choice For Electric Power Unit Smoke Exhausts №1 Tolimarjon Thermal Electric Power Plant (April 30, 2020). International Journal of Engineering and Information Systems (IJEAIS), 2020, Available at SSRN: https://ssrn.com/abstract=3593125

[3] Mirzayev Uchqun, Tulakov Jahongir. The Research of the V-I Characteristics of Solar Panel Using a Computerized Measuring Bench "EPH 2 Advanced Photovoltaics Trainer". Automation, Control and Intelligent Systems. 2019; 7(3): 79-83. doi: 10.11648/j.acis.20190703.11 ISSN: 2328-5583 (Print); ISSN: 2328-5591

[4] Mirzaev, Uchkun, Experiment of Open-circuit Voltage in 'EPH 2 Advanced Photovoltaics Trainer' Laboratory and Types of PV Cell (April 30, 2020). International Journal of Engineering and Information Systems (IJEAIS) Vol. 4, Issue 4, April – 2020, Pages: 41-46; ISSN: 2643-640X, Available at SSRN: https://ssrn.com/abstract=3623014

[5] Mirzaev, Uchkun, Study of the Electrical Characteristics of a Solar Panel for Multi-Residential Apartments Using a Computerized Measuring Stand 'Eph 2 Advanced Photovoltaic Trainer' (2020). International Journal of Academic Engineering Research (IJAER) ISSN: 2643-9085 Vol. 4, Issue 4, April – 2020, Pages: 59-61 , Available at SSRN: https://ssrn.com/abstract=3622045

[6] Acarnley PP. Stepping Motors: A Guide to Modern Theory and Practice. 4th ed. London, IET; 2002. Pages: 85-86

[7] Hendershot JR, Miller TJE. Design of Brushless Permanent-Magnet Motors. LLC. Motor Design Books;