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Contents

of potential leaks using thermal imaging control technologies on process pipelines, units, vessels and apparatuses of the entire production is 7579. Of the 7579 inspected “points”, 270 “points” relate to auxiliary production; 6811 - main production, 498 - tank farm.
In 498 tank equipment, analyzes were carried out at 1,790 “points” and only one was detected, and 6,811 points in the main production of 29 cases of fugitive emissions. It has been established that the main share of fugitive emissions comes from the methane technological communication system and logistics. Based on this, in the applied significance of this study, similar enterprises are recommended to systematize and strengthen control in the presence of such systems and components.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research.

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Influence of technological modes for manufacturing parts from plastic materials on the accuracy of their dimensions

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Abstract. Constructions of oilfield equipment details (thread, cover, flange, etc.) can be made of various plastic materials. The influence of technological modes of casting on the quality of plastic parts of oilfield equipment is considered. In the manufacture of plastic parts from various compositions of press materials, the main technological factor affecting the quality of the parts is the casting regime. Based on the results obtained, modes are recommended for a specific brand of plastics used in oilfield equipment.

Keywords. plastic parts, technological parameters, casting temperature, injection molding, optimal cylinder temperature.
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1. Introduction.

The nature of the course of physical and chemical processes, the formation of the structure and properties of plastics, mainly depends on the technological parameters of the manufacturing process of specific parts.

The mode of manufacturing parts from plastics during pressing and injection molding is determined by three components: temperature, residence time of the part in the mold and pressure. It should be noted that the accuracy of manufacturing plastic parts depends not only on fluctuations in the values of these main technological factors, but also on changes in their nominal values [1]. In the latter case, the issues of improving the accuracy of manufacturing parts should be addressed together with the issues of economics of production, increasing labor productivity.

The temperature at which casting takes place determines the cooling time of the material in the mold, the filling time, the required pressure, the initial temperature of the mold, and the final properties of the products. In the injection molding process, heat is consumed to heat the material in the cylinder, to transform the material into a viscous-flowing state, and partially goes into the environment.

2. Methodological part.

The choice of the optimal temperature of the heating cylinder in each case is determined depending on the characteristics of the processed material. Therefore, for each brand of material, it is necessary to set the optimum temperature of the cylinder, at which a high productivity of a homogeneous melt and the required quality of products are achieved.

The pressing temperature depends on the properties of the material and its initial state, as well as the configuration of the part and the dimensions of the part. It is economically beneficial to increase the pressing temperature, but this measure does not always have a positive effect on accuracy, since it causes an increase in part shrinkage [2].

The fluctuation of the values of the pressing temperature in production conditions is mainly due to the following reasons: uneven and unequal heating of the punch and matrix; uneven modes of operation of electric heating devices; different nature of heat transfer, which depends on the type of mold and its weight, ambient temperature, etc. Temperature fluctuations during pressing in removable molds turn out to be much larger, for which it is recommended that parts are pressed out on special heated plates in order to prevent mold cooling.

The pressure during molding of parts made of thermoplastic plastics is necessary for filling the mold cavity with the cast material, its compaction, as well as for the normal course of relaxation processes during cooling in the mold.

It has been established that the value of the optimal pressure on the casting depends on the brand of material, thickness and configuration of the parts.

Pressing pressure has little effect on the accuracy of plastic parts. Holding under pressure is designed to seal the part after filling the mold and prevent material from flowing out of it [3]. With a change in exposure under pressure, the amount of material entering the mold, the pressure in the

mold and the cooling rate of the part in it change, which ultimately has a certain effect on the quality of the parts.

The holding time under pressure is assigned depending on the type of binder resin and on the pressing temperature. This time depends on the type of mold, namely: when pressing in closed molds, it is longer than when pressing in open molds, since the hardening reaction is slowed down by the presence of moisture and volatile substances, the release of which is difficult. The holding time under pressure can be reduced by applying preheating, pre-pressing and holding pressure operations. The operation for pressing is performed when pressing on stationary molds in the manufacture without reinforcing parts. It consists in removing gaseous products from the mold cavity immediately after it is closed.

3. Results and discussion.

Pressure delay operation, i.e. observance of a pause between the moment the punch touches the press material and the moment the mold begins to close is made to prevent the flow of material with high fluidity from the mold cavity even before the material is completely compacted. Operations for pressing and holding pressure increase the accuracy of manufacturing plastic parts [4].

When injection molding thermoplastics, the main factors that determine the mode of manufacturing parts are: the temperature of the material cylinder, which determines the melting temperature of the mass supplied by pressure into the mold; the temperature of the mold, where the cooling of the mass and its curing take place; pressure in the material cylinder; mass injection pressure; pressure in the filled mold; injection speed; total time or duration of the casting cycle, which consists of the cooling time of the plastic part in the mold, the time the material is held in the mold under pressure, the mold closing time, and a number of other terms; design and dimensions of parts.

4. Conclusion.

In general, factors such as temperature, pressure and time affect the accuracy of injection molded parts in the same way as pressing and injection molding, but this influence is further enhanced by a very short manufacturing cycle and its full automation. Due to the high elasticity of plastics processed into parts by injection molding, both the absolute value of the pressure and fluctuations in the pressure value have a particular influence on the accuracy. The specific properties of injection molded plastics also explain the increased influence of molding temperature fluctuations on manufacturing accuracy. In practice, this temperature is equal to the temperature of the material cylinder.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research.

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Predicting the flare temperature of binary mixtures according to data on activity coefficients

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Abstract

A method for calculating the flash point from the results of simulating liquid–solid equilibrium at constant pressure using the Gibbs equation is discussed. A model is used to predict the flash point of the mixture based on the modified Le Chatelier equation, the Antoine equation and a model for estimating the activity coefficient.

The flammability hazard of liquids is primarily characterized by their flash point. The flash point is defined as the temperature at which a liquid evaporates and forms a flammable mixture with air. To measure the flash point, closed and open type devices are used. In closed-type devices, the state of equilibrium between the liquid and vapor components of the mixture is studied. Open type devices take into account the interaction of a mixture of flammable liquids with the atmosphere. The flash point of a mixture is a critical property, but experimental data for many mixtures are lacking and obtaining such data is expensive and time-consuming. Therefore, the development of mathematical models for analyzing the state of the environment under conditions of increasing risk of emergency situations is an important scientific and practical task. This paper examines the possibility of predicting the flash point in closed-type devices, i.e. the influence of atmospheric conditions is not taken into account in this approximation. Several models for predicting the flash point for mixtures of various types have been proposed previously.

Keywords: binary mixtures, flash point, boiling point, activity coefficients, solvation coefficient, association coefficient.

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1. Introduction