

## Research of the lubricity of materials used in the production of a release coating for die casting molds of aluminum alloys under pressure

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The methodology of the research on the study of lubricity developed at the Department of Materials Science and Resource-saving Technologies is given in the works [1–3].

The names of the test release coatings are given in Table 1.1. The results of the study of the lubricity of various separating coatings used in the Republic of Belarus for aluminum alloy pressure casting are shown in Figure 1.1.

Table 1.1 – Compositions of the studied release coatings for die casting molds of aluminum alloys

Release number	Separating coatings based on:	The basis, %	Surfactant, %	Filler, %	Water, %
1	Mineral Oil Vapor	20	2.5	–	Rest
2	Mountain wax B40, Belarus	40	2.5	–	–
3	Firm "Petrofer", Germany	–	–	–	–
4	Firms "Eutektika", Belarus	25	2.5	–	–
5*	Fuse-based lubricant	40	2.5	–	Rest

\* – The developed composition of the release coating.

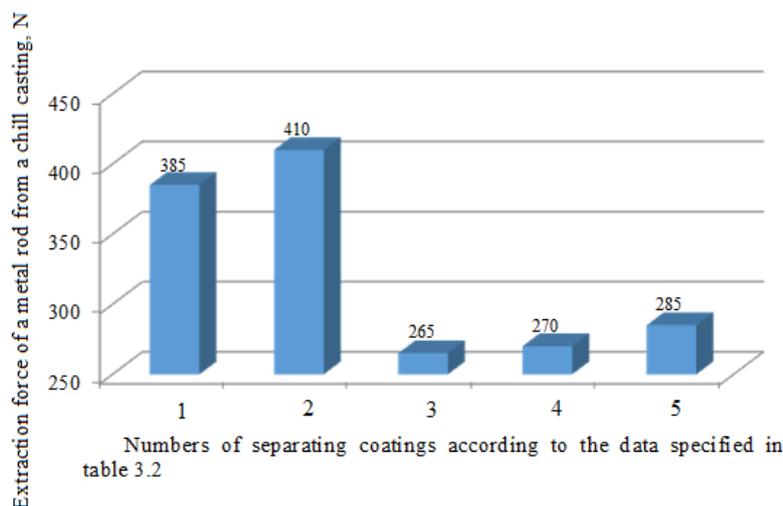


Figure 1.1 – The results of the study of the lubricity of release coatings for molds for casting aluminum alloys under pressure

As a result of the research, it was found that the fuse-based release coating in terms of lubricity is inferior only to the imported "Petrofer" lubricant and the SV-3 lubricant produced by the "Eutektika" company. In this case, the force of extracting the rod from the aluminum mold casting increases by 20 N and 15 N, respectively. The superiority of lubricants SV-3 and lubricant "Petrofer" over the developed composition can be explained by the fact that materials with high separating and hiding power are introduced into the composition of these separating coatings, which are obtained artificially, namely, high molecular weight silicone oils (polymethylsiloxane liquids) of various viscosities from 100 to 400 cSt. The amount of polymethylsiloxane fluid in these release coats varies

from 10% to 25% of the grease volume. It should also be noted that, despite the higher lubricity, these materials are quite expensive and thus have not been used in the development of a release coating composition for die-casting aluminum alloys.

It was also found that when using lubricants based on Vapor mineral oil and mountain wax (ozocerite), an increase in the extraction force of the metal rod and aluminum mold casting is observed in comparison with the developed release coating composition. In this case, the rod extraction force increases by 24.0% and 30.5%, respectively. This result can be explained by the higher lubricity of natural vegetable oils and natural fats compared to petroleum-based artificial materials (mineral oil and ozocerite).

#### Reference list

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