

Wire electrodes

Your tool for special purposes

Iwona Hiszpańska

If you are holding in your hands this edition of the magazine "Forum Narzędziowe Oberon", the main topic of which is the report dealing with the electro erosion wire machines available on Polish market, then perhaps you are just considering the purchase of the new wire discharge machine. If so, I'd like to draw your attention to the fact that a quite significant factor when selecting a machine suitable for your toolmaking shop is the question of what types of wire electrodes you can use with that machine. For standard tasks, simple brass wire of good quality and a strength of 490 N/mm² or 960 N/mm² will produce satisfactory results in terms of surface quality and cutting speed, in other cases, standard solutions can prove to be unsatisfactory.



Below, I'd like to discuss situations which toolmakers will have to face in their jobs. It is worth becoming familiar with them, especially when you are going to buy a new machine. They include the following: manufacturing elements for the aviation or medical industries, the cutting of difficult-to-machine materials, cutting at an angle, high-precision cutting when the tolerance of the range 0.01μ is required, when the machined workpiece is very high or, on the contrary, very low, when high productivity and speed are required. Such non-standard situations call for the use of non-standard wire electrodes. It really pays to equip the machine with such technologies which allow non-standard solutions and to rise to the challenge of interesting and highly demanding tasks with our wire erosion machines.

Components for aviation and medical industry

Perhaps today you don't have any manufacturing orders from the aviation or medical industry, however, in 10 years perhaps you will have them and then it would be good to have the possibility to install on your machine the copper wires without coating, as they are preferred for

parts made just for these branches. The reason for this is that during the electro erosion process an exchange of material between the wire electrode and the machined workpiece occurs. This causes the machined surface to become contaminated with the components of the wire electrode. It is mainly Zinc which (next to Copper) is the second most important component of the electrode. Especially unacceptable is Mercury. Both elements cannot be present on the parts made for this industry. The question is what should be used for cutting? We recommend using the Molybdenum electrode (Chinese erosion machines), from Tungsten or Copper without coating.

Cutting of difficult-to-machine materials

It is commonly believed that carbides and graphite are materials which are difficult to machine. The best effects are obtained when using the brass electrode with Zinc or Gamma-type coating (coating of Gamma-type is a coating made from brass of the highest Zinc content). Also, the alloys intended for the aviation industry can be successfully machined using copper electrode with a Gamma- or Beta-type brass coating.

Thickness of materials

Materials with a thickness from 0.40 mm to 5 cm can be successfully cut using a wire electrode of any diameter. However, if the thickness of the material exceeds 5 cm, the selection of diameter and type of the electrode can become a very crucial issue and can have an impact on the surface quality and productivity. Thicker material will require an electrode of a higher diameter, because it should be more resistant to the voltages applied during cutting of higher workpieces. Here, it is worth considering copper or steel electrodes with a Gamma- or Beta-type coating. Such construction can successfully manage even with cutting up to 120-cm-thick workpieces.

Cutting at an angle

Cutting at an angle causes that the wire exiting the guide bends depending on what angle we require when machining the workpiece. The more of an angle, the softer the wire that should be used, which should be easy to bend when exiting the guide. Here, we recommend wires of a maximum diameter up to 0.25 mm. Hardness, i.e. the tensile strength of the wire, is measured in N/mm². The more of an angle we need, the softer the wire we should use or the wire will often break.

- For angles equal to or less than 5 grades - 900 N/mm²;
- For angles from 5 to 15 grades - 490 N/mm²;
- For angles higher than 15 grades - 390 N/mm².

High productivity and precision of manufacturing

When we need to machine a workpiece fast and with high precision, we should consider coated wires. When manufacturing electrodes coated with a brass layer with a high Zinc content (which is needed for high cutting speed), for fast and precision cutting we recommend using semi-hard and hard brass electrodes with a Zinc coating. The hard and semi-hard brass electrodes should be with a Gamma-type coating. The copper wires should be with a Beta-type coating. The electrodes with double coating are made from Beta- and Gamma-type brass on a copper core or on a core with high a copper content. However, please note that although such electrodes are very expensive, they increase cutting speed by 20%. They are very popular, especially in countries where the operator's hourly rates are very high, so providing him with tools which optimize his work is profitable.



To conclude, I'd like to add that all the above-mentioned electrodes are available from the Transcorn Company. We have free-of-charge coils for testing and it is also possible to buy test coils with a large discount in order to match the wires to your tasks.

You are welcome to contact us.



TRANSCORN Sp. z o.o.

Wilimowo 2, 11-041 Olsztyn

E-mail: transcorn@transcorn.pl

www.transcorn.pl