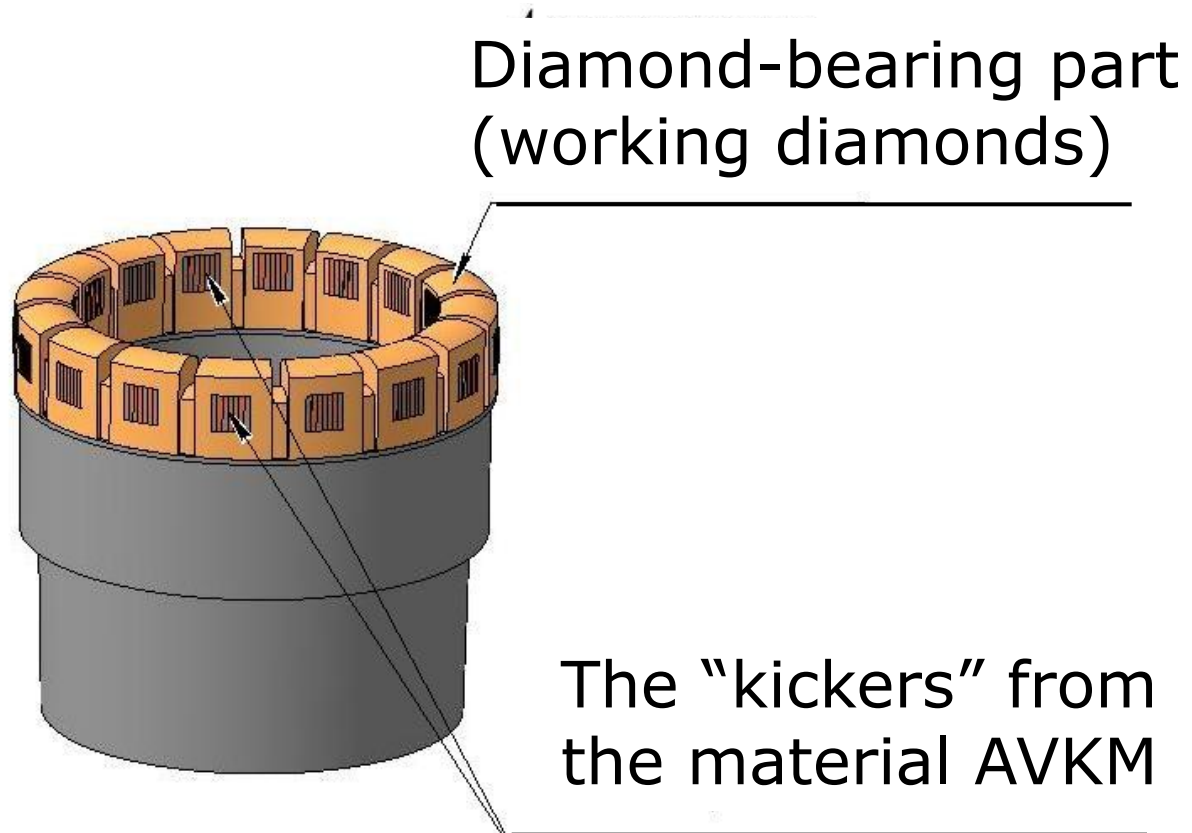


# Institute for Materials Science Problems n. I.N.Frantsevich NAN of the Ukraine

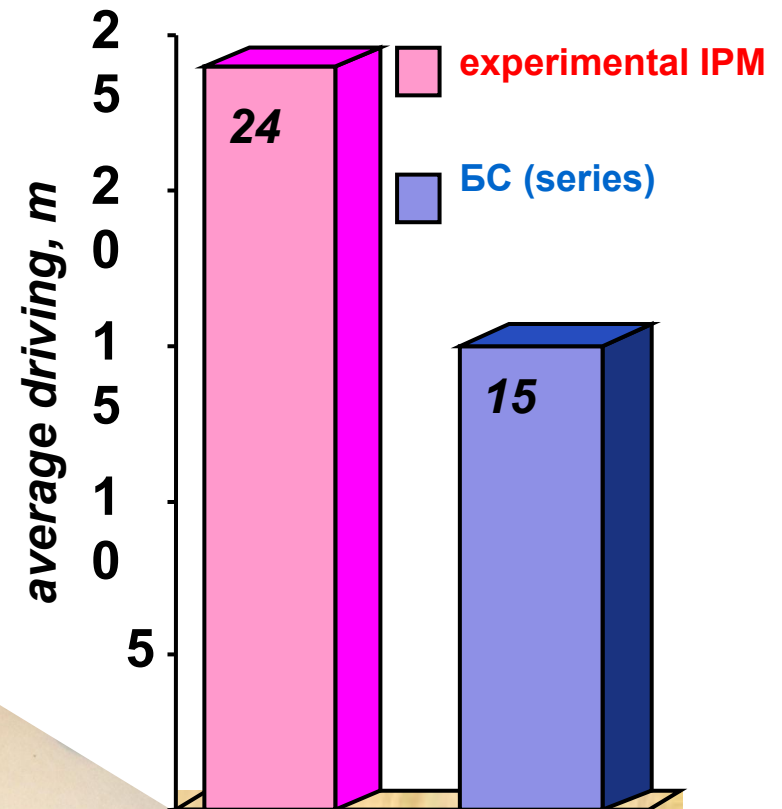
## Diamond -hardalloy macrocomposit high-modulus material brand AVKM

- The developer: Division 12 IPMS NAN of the Ukraine.
- Tel. 424-62-01, the fax: 424-30-17, E -mail: [naidich@ipms.kiev.ua](mailto:naidich@ipms.kiev.ua)
- Diamond - hardalloy macrocomposit high-modulus material with the same mechanical properties of matrix as in the hard alloy (WC - 6% of Co), sintered under the standard conditions, and the complete retention of diamonds (absence of the graphitization of diamond and its dissolution in cobalt).

# Diamond crown bit $\varnothing 76$ mm with the “kickers” from the material AVKM



Party of the crown bits  $\varnothing 76$  mm, obtained by the vacuum impregnation and equipped with material AVKM



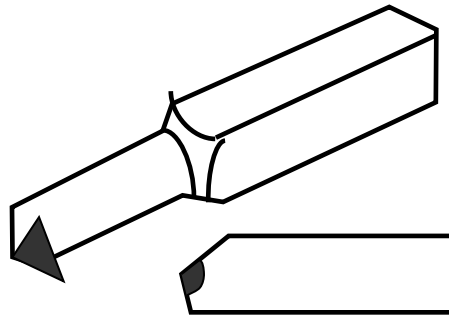
*Driving of crowns with the "kickers" from the material AVKM*

# CUTTERS, EQUIPPED WITH SUPERHARD MATERIAL “EL'BOR- R”

National Academy of the Sciences of the Ukraine

**Institute for Problems of Materials Science n. I.N.Frantsevich NAN of the Ukraine**

Tool is prepared with soldering into the steel or hard-alloy holders (shanks) of the cutting elements from the superhard material - cubic nitride of boron of brand “El'bor- R”. Steel brackets after soldering of the cutting elements are subjected to hardening. Technology provides for vacuum brazing of billets of cubic nitride of boron (diameter - 4-6 mm, height - 5-8 mm) with the aid of the special wetting solders, which ensure the extra-adhesive and chemical fastening of cutting element



## The designation of tool

Cutters (passage, boring, threaded, special, cutter inserts) are intended for the thin high-speed and finish turning, boring of openings in the components made of hardened steels (HRC 45-60), and also high-strength and chilled cast iron. Small cutters are intended for the boring of openings  $\varnothing$ 5-15 mm. The regimes of cutting are given in the table.

- Regimes of cutting

The workable material	The cutting speed, m/min	Longitudinal feed, mm/rev.	Depth of cutting, mm
Hardened steels (HRC 45-60),	60 – 100	0,02 – 0,07	0,10 – 0,30
High-strength and the chilled cast iron	200 – 300	0,05 – 0,08	0,01 – 0,025

- **2. The effectiveness of the application of a cutting-edge tool, equipped with superhard material “El'bor- R”**
- The conducted investigations and factory testing showed that the tool provides the high stability of linear dimensions and the finish of the processed surface in the limits  $Ra=1,0-0,125$  mkm. The durability of the cutters, equipped “El'bor- R”, exceeds the durability of carbide tool 5-10 times. The durability of tool to the regrinding is ~ 60 minutes.
- Productivity of labor during the application of a tool from “El'bor- R” rises 2-3. The operation of grinding can be effectively substituted with finish turning. Maximum effectiveness is reached on the machine tools of the high and increased accuracy with the rigid system SPID.
- **3. The groove (regrinding) of tool**
- Tool sharpening carries out on the universal- tool-grinding machine tools model. 3[B]642, 3[A]64[D] and other by diamond disks on the organic bond, finishing - on the cast iron laps, [sharzhirovannykh] by diamond micropowder. The tool worn in the process of work, is subjected to regrinding and finishing of working surfaces. The durable fastening of the cutting element in the brackets ensures to 8-10 regrindings.
- Cutters makes the division of 12 institutes of the problems of materials science im. I. N. Frantsevicha NAN of the Ukraine.
- Orders to send to an address:
- 03142, Kiev - 142, ul. Krzyzanowski, 3.
- IPM [NANU], division 12, Naidich Y.V.
- **Tel. 424-62-01, the fax: 424-30-17, E -mail: [naidich@ipms.kiev.ua](mailto:naidich@ipms.kiev.ua)**