INDUSTRIAL AUTOMATED SYSTEMS “NIKA-PROFILE” AND TECHNOLOGIES FOR PRODUCTION SHAPED SAPPHIRE BY EFG (STEPANOV) TECHNIQUE

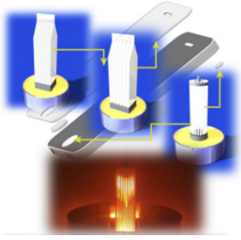
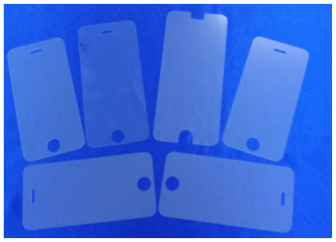
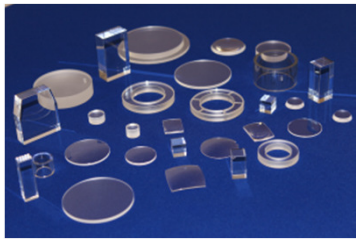
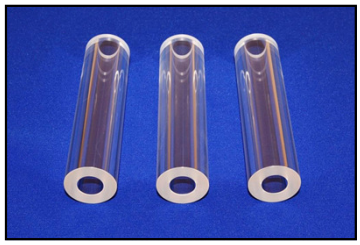
Equipment “NIKA-Profile” is intended for growing wide range of shaped sapphire crystals such as tubes, rods, plates and other profiles.

Technical parameters

· Heating temperature	up to 2200^{O} C
· Type of heating	Induction
· Crucible diameter	up to 250 mm
· Crystal weight	up to 16 kg
· Weight sensor sensitivity	0.05 g
· Upper shaft translation	850 mm 1050 mm
· Rate of upper shaft movement	0,01 - 140 mm/min
· Lower shaft translation	200 mm
· Rate of lower shaft movement	0,05 - 100 mm/min
· Type of power converter (generator)	IGBT
· Output power of generator	0,1 - 100 kW
· Precision of power control	0,003 kW
· Frequency	5-20 kHz
· Output power deviation	± 0,05%
· Gas pressure in chamber	up to 1,5x10^{5} Pa
· Limit vacuum in chamber	2.6 Pa 2*10^{-3} Pa
· Pressure of cooling water	200 - 250 kPa

Equipment advantages:

- Crystals weight up to 16 kg.
- Automated seeding system.
- Automatic crystal growth control system which allows automatic tuning of the power regulator during crystallization process.
- End-to-end automation system for all stages of the crystal growing process.
- Vacuum long-stroke bellows for crystal pulling and crucible movement allows to minimize vacuum leakage .
- Precision motors for pulling crystal and crucible movement.
- High stable IGBT generator for induction heating with automated restart system.
- The highly cost-effective technology for producing sapphire protective screens for smartphones and other mobile devices has been created.
- Simultaneously growth of the 24 sapphire plates.
- Width of sapphire plates 90 mm, thickness from 1,4mm, length up to 1000 mm.
- Cycle time 16-20 h, crystals weight up to 16 kg.
- Cost of the screens made of EFG plate is 1.5-1.7 times lower than that screens cutted from ingots grown by the Kyropoulos technique.

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