



# Dosimetry & Physics Service

Kvark d.o.o is founded in 1992, in Kragujevac, and ever since the company is working successfully and continuously. The company is located in central region of SERBIA. Main activities of Kvark d.o.o include commerce, services, and manufacturing.

*Selling of medical equipment in the field of:*

- \* Nuclear medicine
- \* Radiotherapy
- \* Brach therapy
- \* Radiology
- \* Detection and measuring of ionizing radiation
- \* Protection against ionizing radiation

*Services:*

- \* Laboratory Services - Kvarklab
- \* Assemblage of medical equipment
- \* Upgrade of medical equipment
- \* Servicing equipment in the field of nuclear medicine, radiotherapy, and measurement equipment in the field of ionizing radiation
- \* Dosimetric calculations and taking control of protection against ionizing radiation
- \* Circulation (*import, export, transit*) of radioactive material
- \* Transportation of radioactive material (ADR, Class VII)

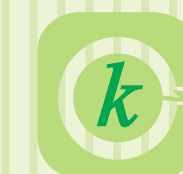
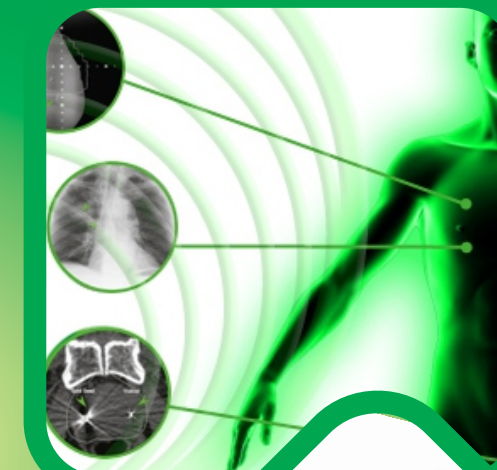
**Physics**

- \* Acceptance test
- \* Beam Data Configuration
- \* Linear Accelerator Commissioning
- \* Clinical support services

*Manufacturing:*

- \* Radiation protection equipment

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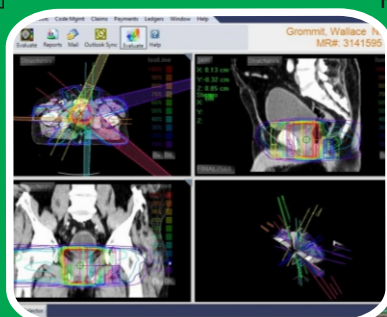


**KVARK**  
Dosimetry & Physics



### Linear Accelerator Commissioning and Beam Data Configuration:

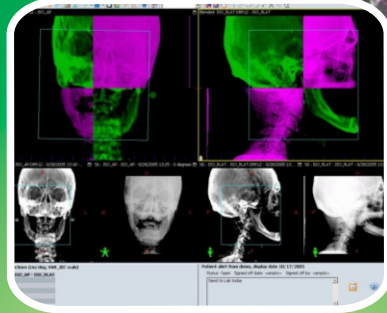
- Measure percentage depth dose data for photon and electron energies.
- Measure output factors for photon energies and electron cone factors for all electron energies.
- Measure physical wedge factors for x-ray energies.
- Measure enhanced dynamic wedge factors for x-ray energies.
- Confirm beam flatness and symmetry by measuring beam profiles for photons and electron energies.
- Adjust energies to deliver 1.000 cGy/MU in accordance with calibration protocol
- Printouts of all beam data measured.
- Printouts of dosimetric tables for hand calculation or independent verifications



- PV calibration, PDIP algorithm configuration and verification
- Enter standard beam data for algorithms for photon energies and electron energies. Includes data for up to four physical wedges per photon energy, EDW, and up to 5 electron applicators per electron energy.

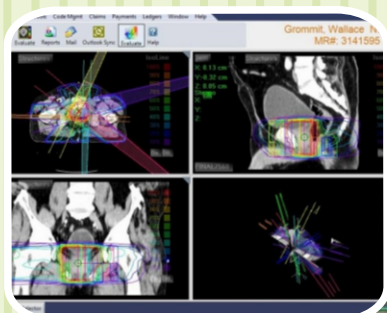
- Full treatment planning system commissioning. Includes comparison of measured data with standard modeled data for different algorithms. Includes validation of percent depth doses, profiles, output factors, wedge factors, EDW factors, and electron cone factors.

- Detailed report and results of all tests performed.
- IMRT configuration and validation for treatment planning system.
- Check IMRT calculations and validate IMRT delivery with ionization chamber in phantom
- Setup IMRT QA dosimetry equipment (QA equipment provided by clinic).



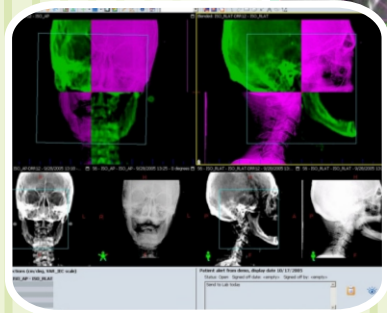
### Rapid Arc/VMAT Commissioning:

- Commissioning of treatment planning system for Rapid Arc/VMAT planning.
- Verification of algorithm beam model and functionality of Rapid Arc/VMAT system.
- Rapid Arc/VMAT dose verification with phantom (QA equipment provided by Clinic).
- Assistance with the implementation of a Rapid Arc/VMAT QA Program.



### IMRT Program Commissioning:

- Commissioning of treatment planning system for IMRT planning.
- IMRT algorithm configuration in treatment planning system.
- Check IMRT calculations and validate IMRT delivery with ionization chamber in phantom
- Setup IMRT QA dosimetry equipment for clinic (QA equipment provided by clinic) or PV dosimetry system.
- Instruct basics of IMRT planning considerations

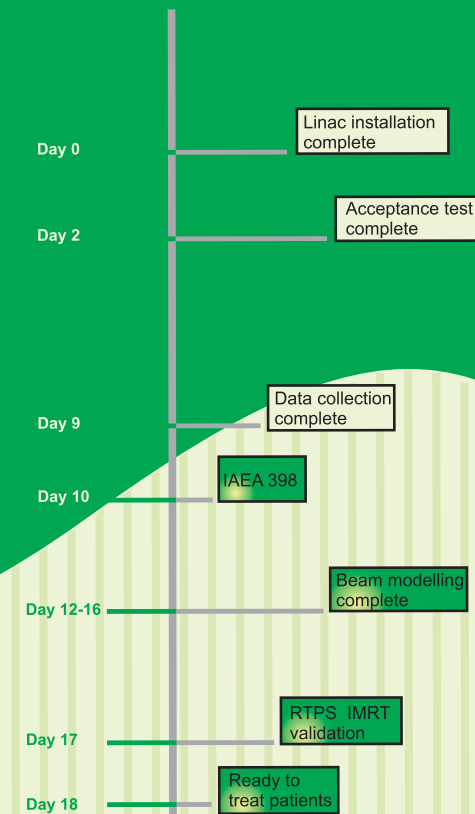


## ACCELERATOR ACCEPTANCE



## INVOLVED PERSONAL TRAINING

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## TIMELINE



### Clinical Support Services:

- Provide clinical support for product implementation
- Provide assistance with commissioning to medical physicists (not directly responsible for the commissioning)
- Provide product training
- Assist with patient treatments using new treatment modalities