

References for Superpolished Neutron Guides

MIRROTRON Ltd Company was founded by physicists and engineers of the former Central Research Institute for Physics (KFKI Budapest) in 1991. Its activities are centered on scientific instrumentation, primarily related to neutron scattering. The company has been in good position to take advantage of Hungary's rapid move to market economy and to draw on the experience as well as the achievements of the Hungarian school of neutron scattering. A good example is the installation of a new cold source and supermirror neutron guide system as well as a set of neutron beam experimental stations at the 10 MW Budapest Research Reactor (BRR) in the past few years. The first supermirrors were produced and tested at KFKI by *F. Mezei* in 1974.

Together with the K.J. Lesker Co. (USA) two dual target magnetron sputtering system designed and built for large scale production (total area 1,2m²) of supermirror or other multilayer devices - as a major application - for neutron scattering research was installed at the Budapest plant in 1995/96.

MIRROTRON has installed also - in collaboration with the Budapest Neutron Centre - a neutron reflectometer (co-financed by MIRROTRON) on a neutron guide at BRR in order to improve its quality control capacities and insure the direct neutron beam testing of its multilayer products.

At the moment, MIRROTRON is working with 30 full time employees and regularly helped by about the same number of scientific expert consultants (by case by case contracts).

<u>Title:</u>	<u>Nr.</u>	<u>Qualification profile:</u>
- Manager:	5 person	engineers
- Scientist:	1 person	PhD
- Mechanical Designer:	10 person	mechanical engineers
- Electrical Designer:	2 person	electrical engineers
- Technician:	12 person	technician

MR's personnel and associated partners have long experience in instrument development, since the Company was formed by those scientists at the Budapest Research Reactor (BRR) who had been involved in many important neutron instrumentation projects in Europe. Some of the Company's leading persons spent several years at various outstanding laboratories such as ILL Grenoble, HMI Berlin, LLB Saclay or FLNP Dubna. The successful reactor and neutron scattering instrumentation upgrading at BRR has been also partly lead by this team. MIRROTRON's scientists have had a dominant involvement in instrument construction for about 16-20 neutron scattering spectrometers at 6 different European laboratories.

MR developed its own in-house superpolishing technology Borkron, N-BK7 or Zerodur substrates and built a complete polishing facility with all necessary machinery next to the glass cutting workshop.

Concerning superpolished neutron guides, MR has delivered neutron optical components or entire guide systems to the following laboratories:

Berlin Neutron Scattering Center; Budapest Neutron Centre; Frank Laboratory of Neutron Physics, Dubna; Hahn-Meitner Institut, Berlin; Institut Laue Langevin, Grenoble; Los Alamos National Laboratory – details see below.

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In years 1995 - 2011 Mirrotron received awards for several contracts for delivery of entire guides or guide systems from Borkron, N-BK7 or Zerodur substrates (these contracts have only a partial overlap and a suitable sequence with the current task/proposal), thus the company's capacity has been considerably extended.

For reference examples, the following are listed below:

- **LANL FP13 Shutter Guide Assembly and In-Pile Neutron Guide**

Contact Person: Dr. Margarita Russina



- **LANL FP12 In-Pile Neutron Guide and Neutron Guide System**

Experiment in Technical Area 53 (TA-53) – 50 m long

Contact person: Dr. Seppo Pentilla



- **BNC TOF, B3, IKI Upgrade of the complete neutron guide system**

In-pile guides Zerodur

TOF guide 22m long, 100x25mm, m=2 coating

IKI guide 22m long, 100x25mm, m=1 Ni coating

B3 guide 6.5m long, 100x25mm, m=2 coating

Contact person: T. Hargitai



- **HMI Removable Section**

3m long - 125x30mm with m=1 Ni coating

Contact Person: Dr. Judith Peters



- **DUBNA Beamline**

16m long; 200x10mm with m=2 coating

Contact Person:



- **ILL – IN11 Beamline**

3m long; 30x30mm with Cu65 coating

Contact Person: Dr. Béla Faragó



- **ILL –H-122 Beamline Part 3-4**

60m long – straight and tapered sections 115x90mm with m=2 coating

Contact Person: Dr. Michael Kreutz

