

Ultrasonic cleaner for cleaning neutron detector mechanics

Detector & electronics Lab, ZWE FRM II

The Forschungs-Neutronenquelle Heinz Maier-Leibnitz (FRM II) is the leading German research reactor. It is situated in Garching near Munich and it is operated by the Technische Universität München. The FRM II serves as neutron source used mainly for fundamental research in physics, chemistry, biology and materials science.

The more than 25 scientific instruments installed at the FRM II, operated by several universities and institutes, are used to investigate the atomic structures and dynamics of soft and solid matter in a non destructive manner. Using neutron detectors scientists are able to record scattering patterns of neutrons passing through samples and obtain important insights into the structure and properties of matter.

Main task of the detector & electronics group at the FRM II is developing and maintaining neutron detectors for scientific instruments. At present the group is manufacturing a Helium-3 gas-filled Multi-Wire Proportional Counter (MWPC), a two dimensional detector that will be installed at the STRESS-SPEC diffractometer, an instrument devoted to measuring residual stress and texture of materials. This type of detector provides excellent properties in term of detection efficiency, position resolution and rejection of gamma rays, however in order to achieve and keep these performances some key issues deserve special attention. An extremely clean atmosphere inside the detector must be guaranteed avoiding the use of any outgassing material that might contaminate Helium-3 gas as well as residuals and dirt have to be accurately removed before closing the detector.

The detector & electronics group has used the Ultrasound Cleaner SONICA 90L EP to clean the MWPC detector vessel and other parts. The 90 liters model can easily accommodate mechanical parts in a size of 400 x 400 mm² such as stainless steel flange, aluminum window and PCBs allowing a very fast and effective cleaning.

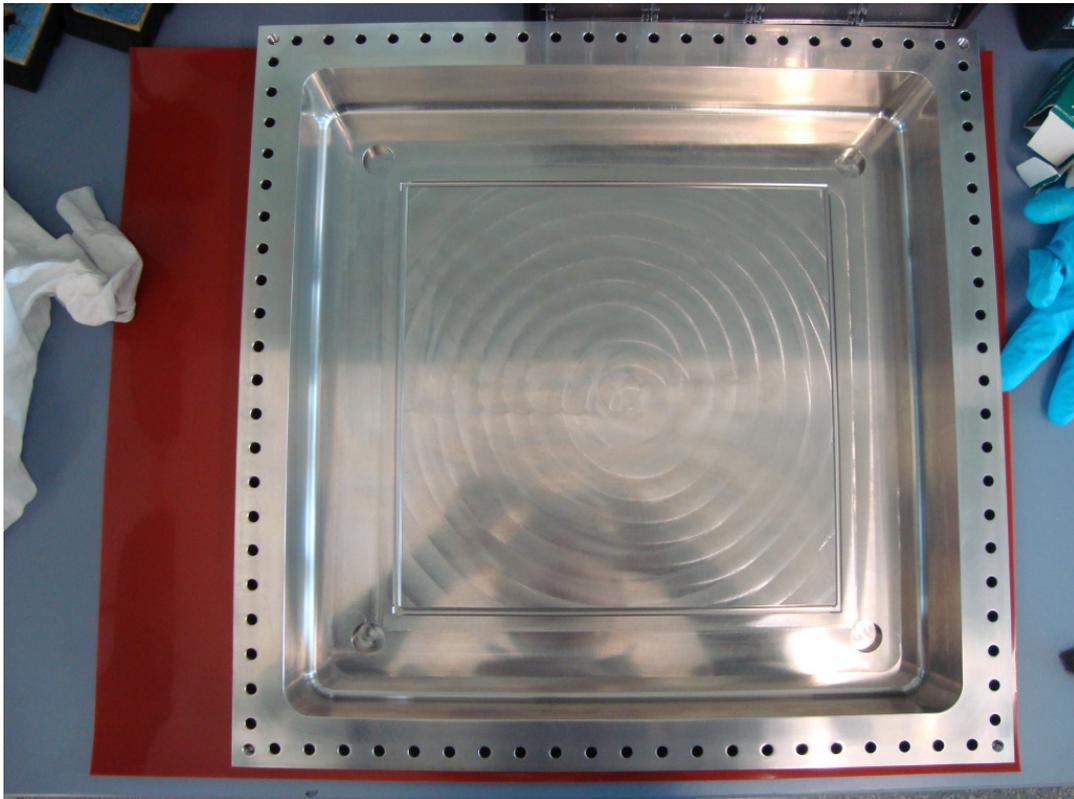


Figure 1. MWPC Detector: entrance window (Aluminum)

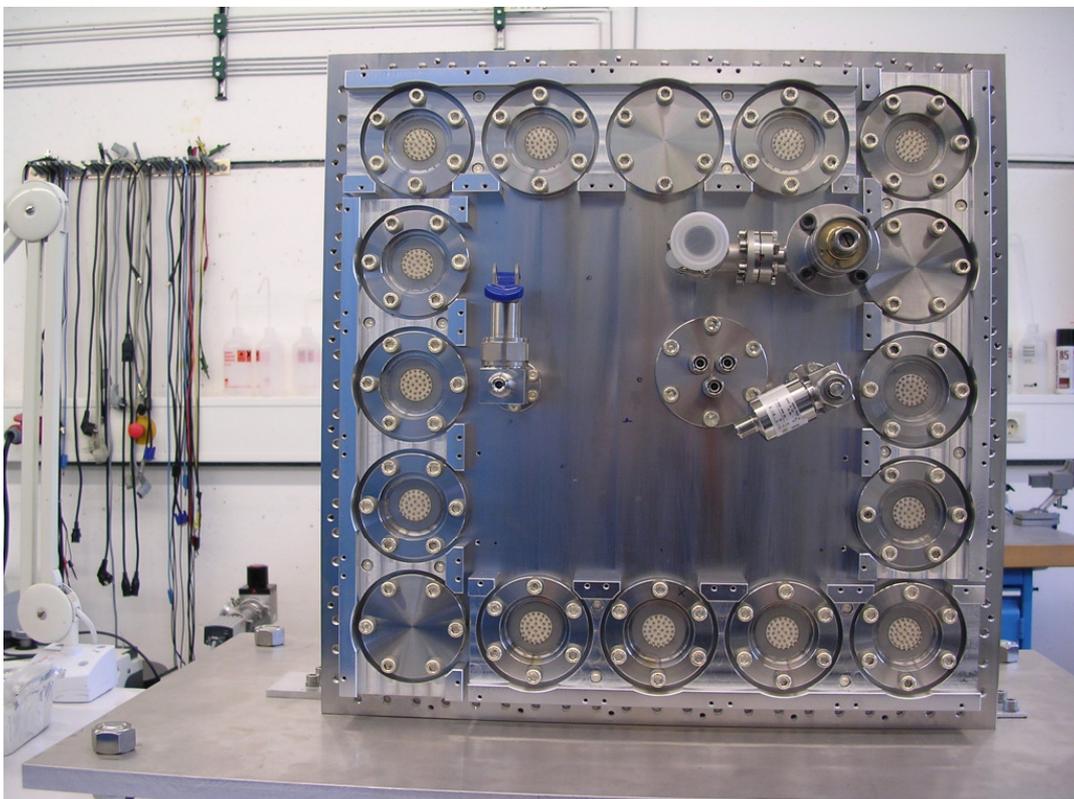


Figure 2. MWPC Detector: back flange (Steel)

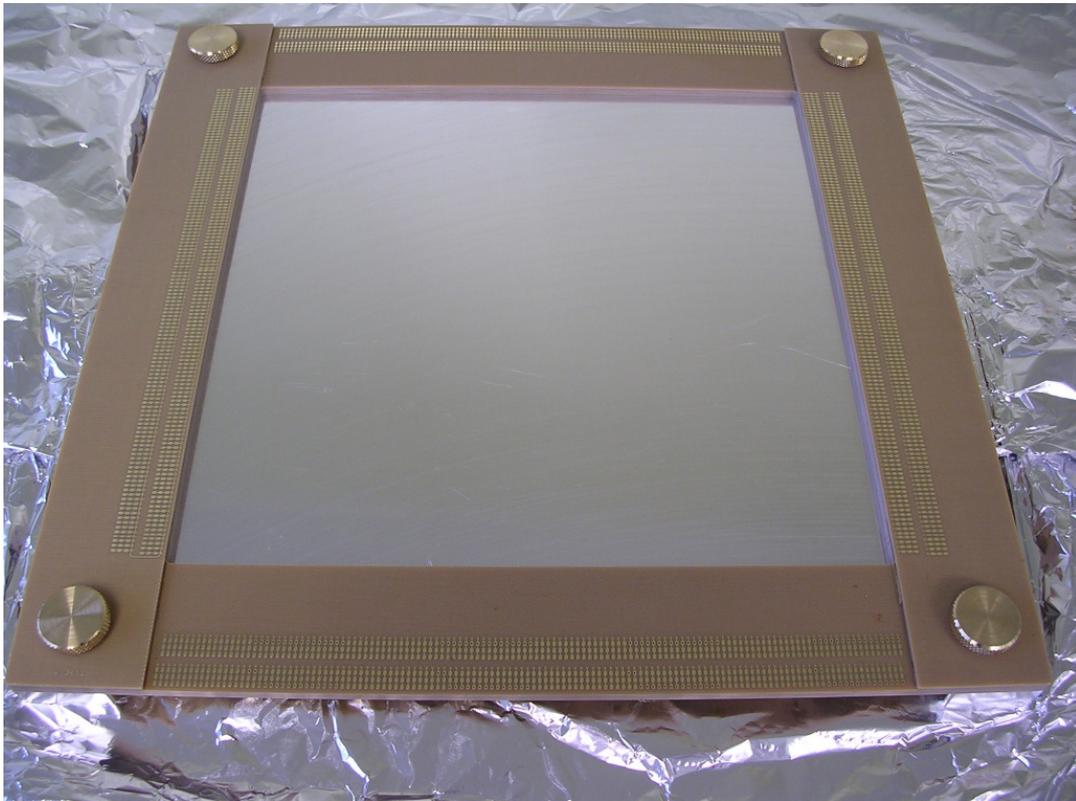


Figure 3. MWPC Detector: PCB