Manufacture and test of the new D19 banana

T.L. van Vuure, J.-F. Clergeau, B. Guérard
ILL, BP 156, 38042 Grenoble, France

Around the time of the Spring 2005 Conference on EPSRC-ILL Millennium Projects, the new D19 banana detector has been assembled and is undergoing a testing phase before its final mounting on the D19 instrument.

The individually functional parts of the detector, called 'cradles', were tested separately under conditions similar to those in the final banana pressure vessel. The testing methods and acceptance/rejection criteria will be introduced, as well as the results.

Some pictures of the detector in various stages of construction will be presented.

Figure 1: the D19 banana just before closing the pressure vessel. The chrome-coated glass plates resemble mirrors from this distance. The anode and cathode wire planes are suspended a few millimeters from this surface, and seem to exert an almost irresistible attraction on the fingers of visiting dignitaries.

The detector measures 160 cm by 40 cm active area. At a distance to the sample of 70 cm, this means an angular coverage of 120 x 30 degrees, or 1.16 steradials. Considering that individual readout of all channels is expensive, but effective for reducing gamma sensitivity, a compromise hybrid readout was chosen where the anode wires are read out individually and the horizontal position is determined by charge division over the glass plates.
Position resolution is 2.5 mm horizontally and 3-5 mm vertically. This vertical resolution can be achieved only because the parallax effect is reduced by application of an electrostatic lens. In absence of this lens, which causes the electric field inside the sensitive volume to be focussed toward the sample position, the vertical position resolution near the high and low ends of the detector would deteriorate to ~8 mm.