

The Target of G2P|GEP

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This document is trying to describe the target for G2P|GEP. The design of the insert has already been done by the target group. Here we just describe the target material and thickness for each cell or hole.

In the current design, we will have 4 large diameter cells and 2 small holes between the top 2 cells (Cf. Fig 1 for details). Lets index these cells and holes from the top to the bottom as cell 1, hole 1, hole 2, cell 2, cell 3 and cell 4.

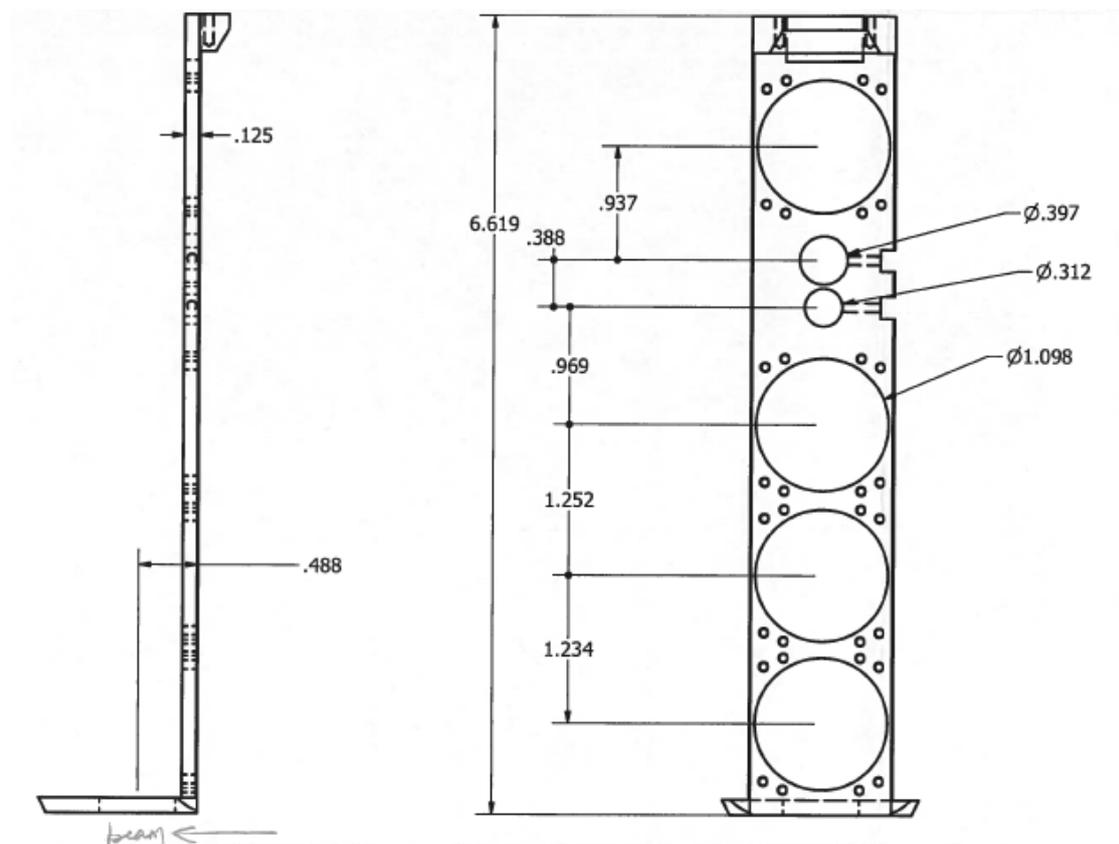


Fig 1: The left side view and the beam view of the target insert in current design.

Cell 1 and 2 are used for normal NH₃ target (55% packing factor in thickness) with aluminum end caps on both ends. The end caps should be as thin as possible.

Hole 1, which is closed to the 1st cell on the top and has a diameter of 0.397 inches (or 10.0838 mm), will be filled with about 40 mil thick C12 foil. No aluminum end caps, please.

Hole 2, which has the diameter of 0.312 inches (or 7.9248 mm), will be filled with

about 100 mil thick CH2 foil. **No** aluminum end caps. If possible, please design something to hold the melted CH2, such that it will not drip/flow to the cylinder of Cell 2 beneath it.

Cell 3 is the so called empty target with end caps as thick as cell 1 and 2. This cell will be used to determine the beam position, and also to study the background and dilution factor. The upstream cap will have a cut out of "F" shape, or whatever shape that is easy to make and be able to determine the beam position.

Cell 4 is mainly for both optics and cross section calibration. Do **NOT** place any end caps for this cell. The target material in this cell is 40 mil or 100 mil **HIGH** precision C12 foils. We want the thickness in high precision in order to calibrate cross sections. If possible we would like to know the thickness within 1% accuracy. We will place only one foil into this cell at a time. The 40-mil-thick foil will be used in 2.5T target field runs and the 100-mil-thick foil will be used in 5.0T runs. Note that the foil should be placed at the center of the insert stick, namely the same Z location as those foils in the small holes.

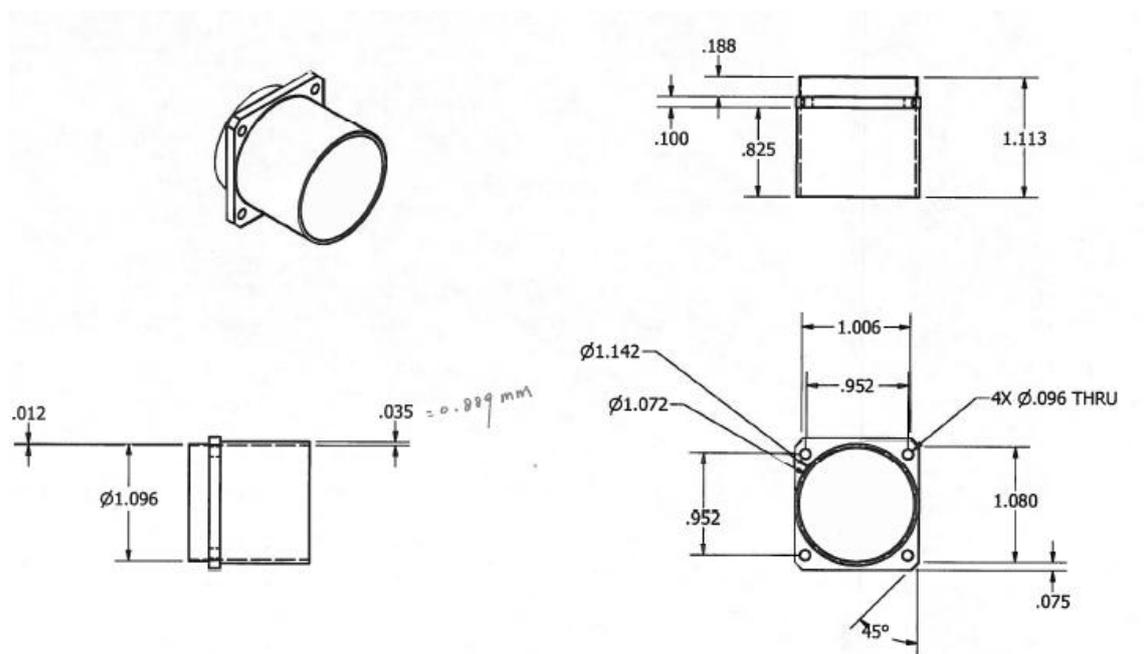


Fig 2: The current design of the target cell by target group. The material is PCTFE.

Although we choose the thickness to be 40 mil and 100 mil, 1.0 +/- 0.2 mm and 2.5 +/- 0.5 mm are still acceptable if the vender does not have foils exactly in these thickness. No matter what thickness they are, we request the accuracy of the C12 foils in cell 4 as good as 1% (if possible). Should there be any question feel free to contact Jian-Ping Chen (jpchen@jlab.org), Karl Slifer (slifer@jlab.org) or Jixie Zhang (jixie@jlab.org).