

## Specification of GLC-CAL Mega-Tile and Scintillator to use for Mega-Tile

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### 1. Mega-Tile ; See attached drawings ('Individual Tile' , 'Layout of Mega-Tile' , and 'Schematic Drawing around Gap').

The Mega-Tile is a 5 x 5 array of 25 tiles. The dimension of each tile is described in the drawing 'Individual Tile'. How they should be arranged into 5 x 5 array is specified in the drawing 'Layout of Mega-Tile'. Magnified view around the tile boundary are schematically shown in the drawing 'Schematic Drawings of Tile Boundary of Mega-Tile', with two options of gluing individual tiles into a Mega-Tile and machining a large plate into isolated sections.

The key values in the arrangement are locations of through-holes used to fix the Mega-Tile to a supporting plate. Therefore they are specified precisely in the both drawings. On the other hand, tile size itself is not a precision parameter. The nominal tile size and tile gap are 40.0mm and 0.5mm, respectively, and they can be tuned within error specified in the drawing. If narrower gap is preferred for ease of gluing, for example, tile size can be larger by corresponding amount.

Another important dimensions are diameter (or depth and width) of a groove to accommodate a WLS fiber. The cross section of the fiber groove is shown as A-A' cross section except for fiber-insertion point, which cross section is shown as B-B' cross section. The acceptable errors are smaller for those values. The groove must be milled with a ball-point drill.

- The thickness of the tiles be 1.0mm +/- 0.05mm.
- Two faces should be flat and smooth. Usual fabrication procedure satisfies this condition.
- Four sides need not be polished. Smoothness achieved by slow milling should be acceptable.
- Inside of groove need not be polished. Smoothness achieved by slow milling should be acceptable.
- Each tiles must be optically isolated when Mega-Tile is formed.

If the Mega-Tile is made by gluing individual tiles, glues must not be transparent. White glues are preferred.

If the Mega-Tile is made by machining isolation grooves on a large (202mm x 202mm) plate, the isolation grooves must be deep enough and be filled with non-transparent (hopefully white) paint.

### 2. Specification of scintillator to use for fabrication

In general, we take BC-408 as reference material.

- a) Light Yield ; 60% Anthracene or better.
- b) Emission Wavelength ; around 420 ~ 450 nm, in order to couple with Y-11.
- c) Decay Time Constant ; a few ns.
- d) Attenuation Length ; 100cm or better. This is not very important because the tile size is small.
- e) Reflective Index ; higher than 1.50 for better trap of light, but this is not very important.
- f) H/C ratio ; do not care.
- g) Density ; do not care.
- h) Softening Temperature ; do not care.