Questions to the new Cradle Design Concept

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Let me ask several questions about the new cradle design ("Cradle Design Concept": Nathan Rodning (1 May 2000), E614Mechanical@phys.ualberta.ca).

1.It is not so clear how the modules can be aligned each other in horizontal and vertical direction.

2.It is not so clear how the detector can be aligned respect to the magnet. How much ranges of the alignment are needed?

3.According to my estimation a stability of the alignment must be better than 0.1mr in order to reconstruct helix without a systematic error. The misalignment itself can be measured with statistic error about 0.1mr at total muon decay statistics of 10^8 (estimation). It means the alignment stability must be better than 0.1mr during 24 hours as minimum. Is it possible? More detailed estimation is required to do the needed alignment stability conditions (the 0.1mr is enough? the total statistics of 10^8 is enough?)

4.Possible G shock on the cradle from the bottom will bend the cradle up on 20μ for example. Can this instant bending moves some modules to a new permanent vertical position? How much fiction force must be between modules to prevent the permanent shift at 3G shock for example? How much G shock can destroy module sealing?

5.Temperature:
Thermal expansion coefficient of: cital - $3{\cdot}10^{-7}$, glass - $1{\cdot}10^{-5}$, Al – $2.4{\cdot}10^{-5}$.
Thermal expansion (l=1m, $\Delta T=10°C$) of: cital - 3μ, glass - 100μ, Al - 240μ.
5.1.Axial direction:
Relative lengthening between ledges and the detector is 240-3=237μ. How small must be a friction force between the ledges and the modules to prevent a crucial bending of G10 support of a module? Can we guarantee lack of hooks between ledges and the detector, which can gain the friction force?
5.2.Vertical direction:
Relative lengthening between the cradle and the detector is (0.5m/1m)·(240-100)=70μ. How much friction force between modules (how small friction force between end modules and endcaps) must be to prevent shift of the modules to a new permanent position respect to each other?

6.Assembling of the modules on the cradle:
Some original tilt angle can exist between the left endcap and the first module (or between modules). For example the initial gap between upper cital spacer and the endcap is zero, but the gap between lower cital spacer and the endcap is 20μ. We can press the upper screw of the right endcap first of all to provide an optical contact between spacers. Remarkable friction forces arise between the upper spacers. What will happen during the pressing of the lower screw after that? G10 support of the tilted module will be bent? Optical contact can be reached? How pressure on the ledges will be distributed between the modules? Can appear a case when only several modules lean on the ledges? If yes, a friction force in #5.1 can rise sufficiently.