Integrated Shield Design Improvements for the Material Strength Targets

**Motivation**

Target demand continues to grow. To be able to meet these demands we need to come up with a new shield design to both lower the assembly time and make sealing the targets a more robust process.

**Issues with old design**

- Physics package had to be built during the assembly of the target (Foam see multiple exposures to UV light)
- Shield was part of physics package so if shield was manufactured wrong or fell off the physics package would be ruined
- Made sealing a lot harder
- Fixing a leak almost impossible
- Mounted to movable components

**Manufacturing differences between the old and New Shield design**

- **Old design**
  - Each shield had to be machined differently depending on the physics package. The back of the shield had to be machined before leaching and once leached the front surfaces also would have the bumps machined.

- **New Design**
  - 8 shields can be machined from a purchased sheet of Au and molded using additive manufactured pushers.

**Benefits of new design and how target has become more robust**

- **Through put improvement**
  - Assembly time: 6 days ➔ 3.5 days with increased reliability on assembly
  - Metrology time: 3 days ➔ 1 day
  - New shield cut cost in half

- **Benefits of new design**
  - Physics package can be put together prior to the build (Foam not exposure to UV light)
  - Shield is mount to the hohlraum via stand offs which can be changed dependent on designs
  - Cut the cost of making in half
  - Allows room for fixing a leak
  - Shield design remains the same regardless of physics package design

**Original shield design and related issues**

- UV light exposure
- Issues with old design
- Sealing
  - The shield was so close to the hohlraum, glued to the caps, that it made it hard to get in and seal around the package. If the target did not get seal on the first try, fixing the issue was almost impossible
  - Physic package had to be build during the assembly of the target (Foam see multiple exposures to UV light)
  - Shield was part of physics package so if shield was manufactured wrong or fell off the physic package would be ruined
  - Made sealing a lot harder
  - Fixing a leak almost impossible
  - Mounted to movable components

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