

# Thin Film (Tent) Preparation and tenting in support of Novel and R&D Targets

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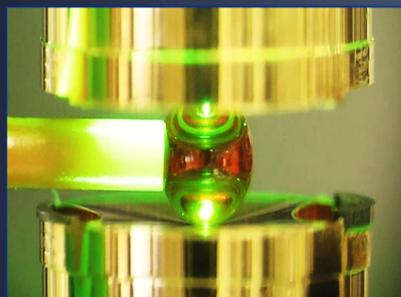
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## INTRODUCTION & BACKGROUND

Thin formvar "tent" films are made to specification and are typically used to cradle the target capsule between two hohlraum halves.

However, the application of tents has expanded over several years within target fabrication in support of research and development.



## TENT FABRICATION & QUALITY ASSURANCE

**Meniscus Coater**

**Coated Wafer Sliced**

**Tent Lift Off**

**Indentation Tests**

45 nm QA Results

## TENTING PROCEDURE AND COMMON CHALLENGES

**Tent to Hohlraum Application**

Tent hoop parallel to Hohlraum

TMP subassembly

Glue on outer diameter is used to secure the tent

Good glue application

Bumped HDC window

Bad glue application

Hohlraum particles

### Common Challenges:

- ❖ Hohlraum particle removal
- ❖ HDC knockoffs
- ❖ Glue application
- ❖ Post pattern burn defects

### Cleanliness Factor:

- ❖ The highest concern on the tent line
- ❖ Prevent particle contamination of NIFs laser optics/ lenses

### Mitigation:

- ❖ Equipment maintenance
- ❖ Cleaning procedures.
- ❖ Hand dexterity

## CLEANING AND GLUE APPLICATION TOOLS

- ❖ Clean foam swabs for particle removal.
- ❖ Single deer hair applicators.



- ❖ A favorite are cat whiskers.



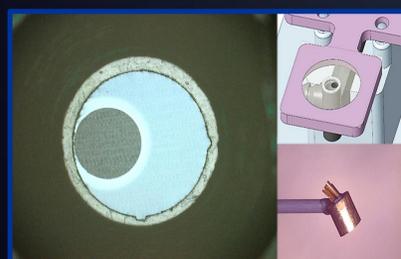
## TENT SUPPORT IN RESEARCH AND DEVELOPMENT OF NOVEL TARGETS

### Polyimide Membrane-2019



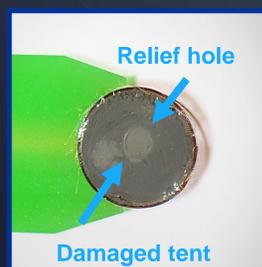
- ❖ The polyimide membrane served as a safety net in tetra cage targets

### Falcon Washer - 2020



- ❖ Tented washer used to block energy from entering the adjacent cone

### Magneto Foams- 2020

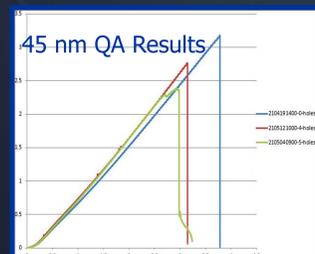


- ❖ 110 nm tents used to contain foams
- ❖ The light can cause tent and form damage
- ❖ UV glue cured at approximately one inch

### Frustraum- 2021



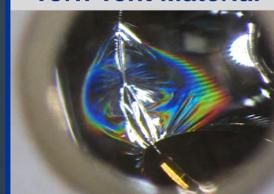
- ❖ Variety of hohlraum shapes
- ❖ Optimal use of all 192 lasers at NIF
- ❖ QA tests on multiple tent patterns



### SymMag-2021



### Torn Tent Material

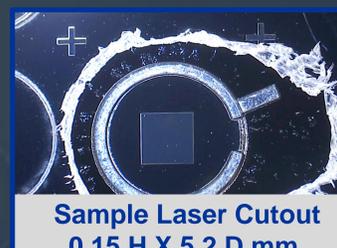


### Tent Surface Defect

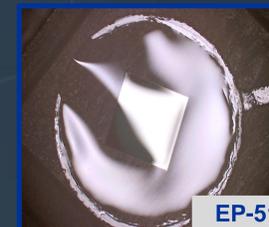


- ❖ Brittle deposition of hohlraums
- ❖ Glue treat requirement prior to tenting

### Photoion-2022-23



- ❖ Sample needed to be suspended
- ❖ Hoop support ring glued to sample cut out
- ❖ Found EP-51 was more efficient than stycast
- ❖ Successful lift offs



### Mutual Diffusion Foams-2022



- ❖ Glue applied to the foam housing outer diameter
- ❖ Otherwise, glue can damage the foam structure

### GBAR/ White-Dwarf-2023



- ❖ Larger and curved HDC windows
- ❖ Required a new tent pattern
- ❖ UV-glue eroded the tents