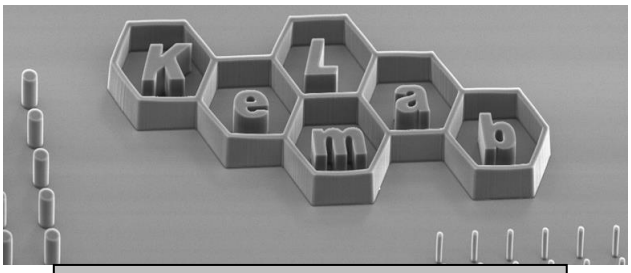
# HARE SQ™

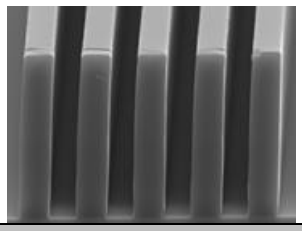
## Negative High Aspect Ratio Epoxy Photoresist

### DESCRIPTION

HARE SQ™ is an epoxy-based negative photoresist designed for polymeric MEMS, microfluidics, micromachining and other microelectronic applications. The HARE SQ™ system is designed for use in thick film applications of 2 to 100 microns, and is ideal for use in permanent applications.



Logo and posts in 50 µm film



5 µm dense line/space in 25 µm film

### ADVANTAGES

- HARE SQ™ photoresist uses an epoxy resin with superior cleanliness and excellent reproducibility
- Consistent surface energy of crosslinked resist which is critical for microfluidic applications
- Fully compatible with SU-8 processes

Tone: Negative
Film Thickness: Up to 100 µm single coat
Sensitivity: NUV, Broadband, i-line
Developer: HARE SQ™ Developer

### PROCESSING GUIDELINES

| Process Guide<br>Product:<br>Film Thickness | SQ-2<br>2 µm | SQ-5<br>5 µm | SQ-10<br>10 µm | SQ-25<br>25 µm | SQ-50<br>50 µm | SQ-50<br>100 µm |
|---|---|---|---|---|---|---|
| Softbake (2 step) | 65°C for 1 min<br>95°C for 1 min | 65°C for 1 min<br>95°C for 3 min | 65°C for 2 min<br>95°C for 5 min | 65°C for 3 min<br>95°C for 7 min | 65°C for 5 min<br>95°C for 15 min | 65°C for 10 min<br>95°C for 30 min |
| Expose (broadband) on Si | 200 mJ/cm$^2$ | 180 mJ/cm$^2$ | 180 mJ/cm$^2$ | 180 mJ/cm$^2$ | 180 mJ/cm$^2$ | 180 mJ/cm$^2$ |
| Post Exposure Bake (2 step) | 65°C for 1 min<br>95°C for 1 min | 65°C for 1 min<br>95°C for 1 min | 65°C for 1 min<br>95°C for 2 min | 65°C for 1 min<br>95°C for 3 min | 65°C for 1 min<br>95°C for 5 min | 65°C for 2 min<br>95°C for 10 min |
| Develop (immersion) | 1 minute | 1 minute | 2.5 minutes | 3.5 minutes | 6 minutes | 15 minutes |

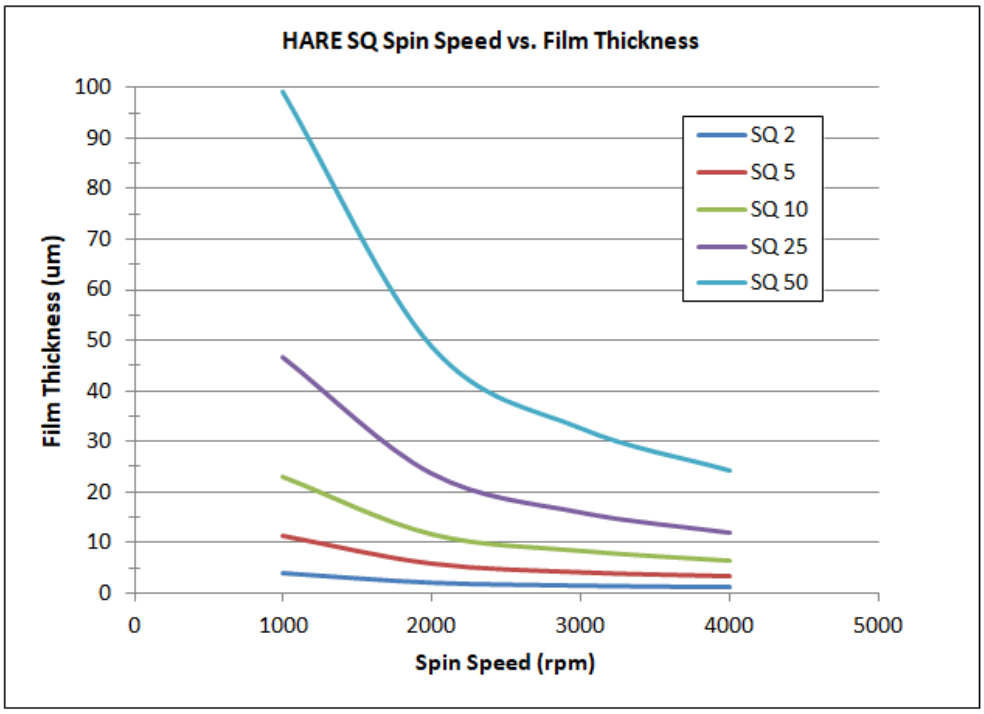
## SUBSTRATE PREPARATION

HARE SQ™ adheres to variety of substrates; including silicon, gold, aluminum, chromium, and copper. For maximum adhesion, substrates should be clean and dry prior to applying HARE SQ™ photoresist.

## COAT

Spin Coat: Film thickness is targeted using the spin speed curve shown below. The coat program uses a 5 - 10 second spread cycle. Spin time at final speed is 30 seconds. Additional spin curves are available online at kemlab.com

Coat techniques such as spray coat, slot coating, and other additive techniques are possible; please contact techsupport@kemlab.com for more information.




## SOFTBAKE

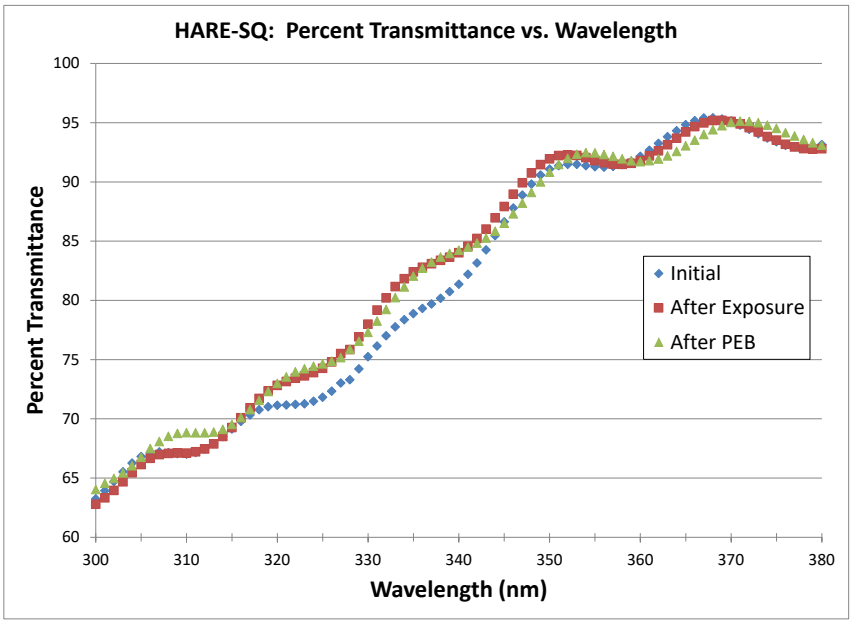
The recommended softbake for the HARE SQ™ utilizes a two-step bake on a contact hot plate in order to minimize film stress and adhesion issues. See Process Guide Table for details.

PHOTORESIST
MANUFACTURING & INNOVATION

# HARE SQ™ NEGATIVE EPOXY PHOTORESIST

## EXPOSURE & OPTICAL PARAMETERS

HARE SQ™ is designed for near UV (300-400nm) exposure wavelengths. Exposure dose will vary depending on the exposure tool set, film thickness, and process conditions. Nominal exposure doses are shown in the Process Guide for broadband exposure with a 360nm cutoff filter at the thicknesses and processes shown.




## POST-EXPOSURE BAKE (PEB)

Recommended PEB time is adjusted according to film thickness in order to ensure sufficient crosslinking of the resist film. A two-step PEB is recommended to reduce film stress which can lead to cracking and/or adhesion loss. See Process Guide Table for details.

## DEVELOP

HARE SQ™ is designed for use with KemLab HARE SQ™ Developer. It can be developed using immersion, puddle or spray puddle. Thicker films benefit from refreshing developer during the develop step; such as with a double puddle.

Rinse developer off substrate with isopropyl alcohol (IPA) and dry. See Process Guide Table for details.

## HARDBAKE

HARE SQ™ can be hardbaked for permanent applications that would benefit from further crosslinking.

Bake at > 120°C for at least 5 minutes (hot plate). A short hardbake can fuse cracks caused by film stress.

For permanent structures, temperatures above 150°C are recommended. Oven bake will increase crosslinking with minimal increase in stress.

## STORAGE

Avoid light and store in an upright airtight container at 4 – 21°C or room temperature. If refrigerated, bring up to room temperature before opening. Keep resist away from oxidizers, acids, bases and sources or ignition.

## HANDLING & DISPOSAL

Consult the SDS for handling and appropriate PPE. HARE SQ™ photoresist contains a combustible liquid; keep away from ignition sources, heat, sparks and flames. This HARE SQ™ photoresist is compatible with typical waste streams used with photoresist processing. It is the user's responsibility to dispose in accordance with all local, state, and federal regulations.

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