

MA6Gen3 – thin film masks

Version of 2017-05-08. Get the latest one at <https://cmi.epfl.ch/photo/files/ma6gen3/ma6gen3.thinfilm.pdf>

1. Introduction

This manual shows how to use on the MA6Gen3 **thin film masks** and **transparency sheet masks**

They are low cost products, typically printed on a laser printer directly onto transparency films.

At EPFL, [ACI Atelier pour le routage et la fabrication de circuits imprimés](#) prints them for you on a [high precision raster photoplotter "First EIE"](#) films according to these specifications:

- spotsize: 8.5um (red LED at 667nm)
- minimum line width 25um
- maximum linewidth variation: 4um
- formats: RS274D, RS274X, EIE RPL, DPF
- resolution 3000, 6000, 12000 dpi
- maximum area: 500x650mm

2. Situation to avoid / forbidden.

In a straightforward way, a typical transparency mask is scotch-taped to the bottom side of a 5"x5", stripped photomask.

Upon WEC and exposure, this destroys the rubber lip of the chuck and makes it unusable for future vacuum contact users. Don't do this.

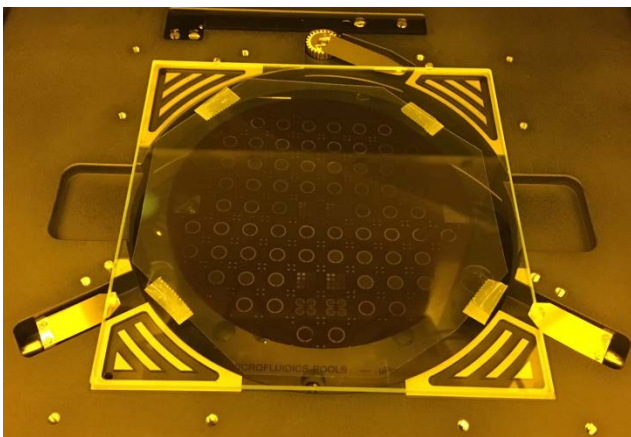


Figure 1: 5"x5" mask with thin film on mask holder.

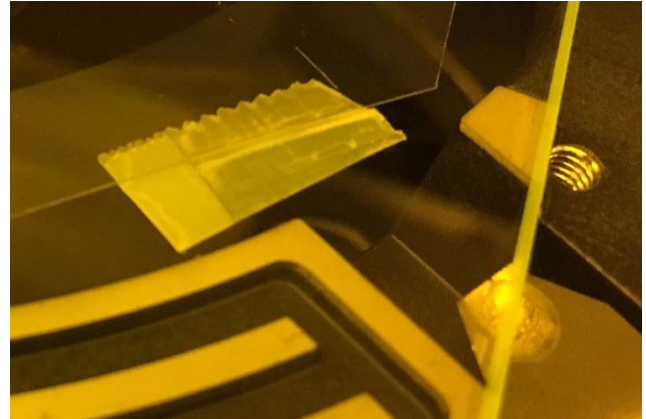


Figure 2: scotch tape tries to be as close as possible to border to avoid touching the wafer on hard contact.

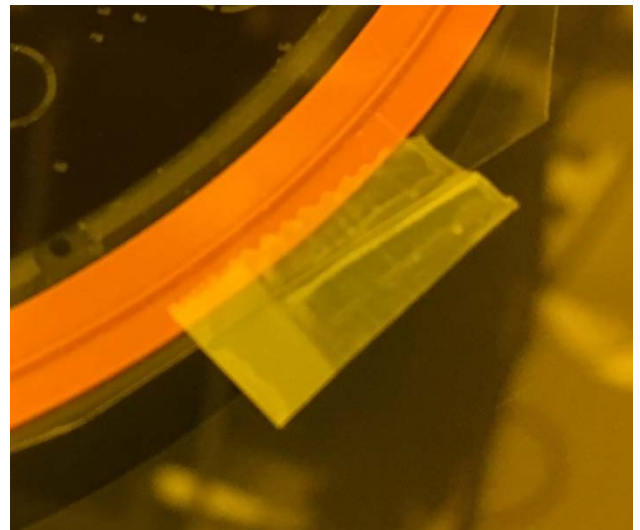


Figure 3: When during WEC, the wafer is pressed against the transparency mask, the scotch tape locally exerts locally high pressure which ages, and ultimately destroys the rubber lip of the vacuum contact chuck. If no damage is done, then traces of the adhesive are deposited on the rubber lip. To avoid these problems, do not use adhesive tape.

3. Mask holder to use with thin films

In general, the size of the transparency masks corresponds to the sheets that are fed to a laser printer, which is A4. Cut your mask to a size equal or smaller than 7"x7", which is the specification of the transparency mask holder of the MA6Gen3, but bigger than the rubber lip of the chuck you intend to use. Read entire manual before cutting.

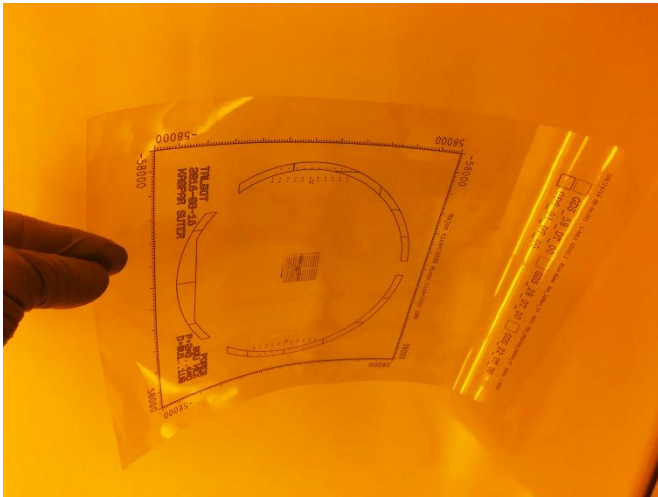
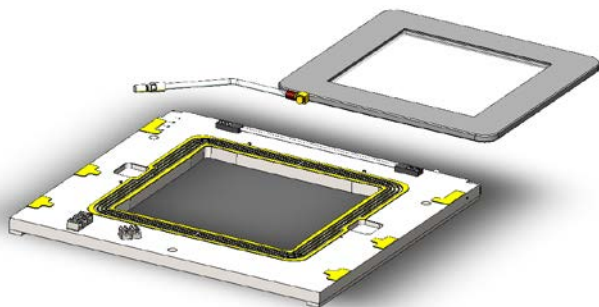


Figure 4: random mask, printed on a A4 size thin film

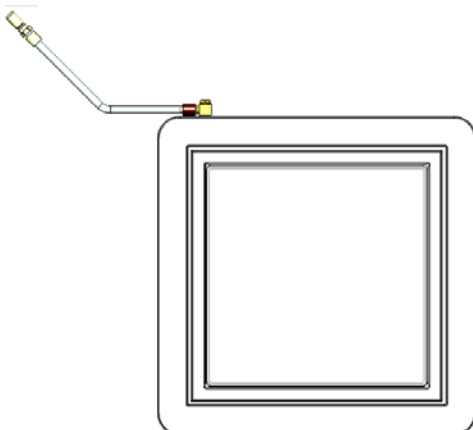
Here the manufacturer's information, and there are two parts to it: holder and glass plate.

100073420 **MASK HOLDER**
MA8BA8GEN3/TL/CONT/M-9/F-7/S-6/SPEC

- Top load maskholder
- for mask 9"x9" and includes adapter glass 9" for thin film Mask 7"x7"
- for chuck for pieces, wafer 100mm and 150mm
- for contact levelling



9"x9" insert for 7"x7" film mask (connection on permanent vacuum at front panel of front panel)



Attach the thin film to the glass plate. Make sure that the adhesives are away from the area where the chuck will be touching and pressing the substrate against the thin film.



Figure 5: glass plate top view (right), bottom view (left).

Put the adhesive in places where it cannot touch the chuck, typically in the corners. The film must not overlap the vacuum channel running around the glass plate, otherwise the holder cannot hold the plate.

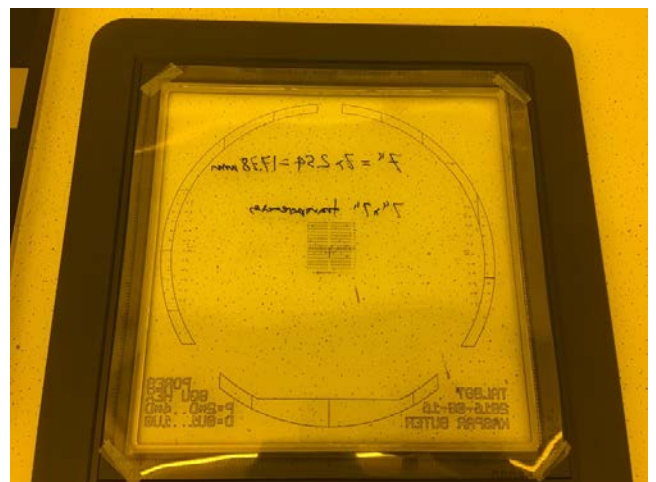


Figure 6: film attached with adhesives to glass plate

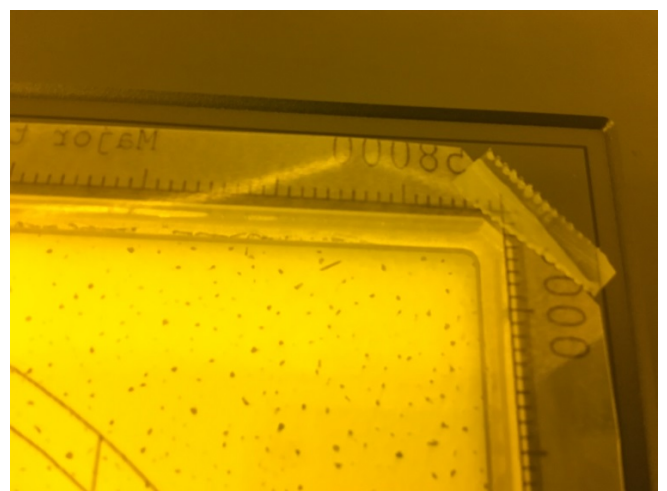


Figure 7: detail of adhesive

Then place the mask holder in the mask aligner.

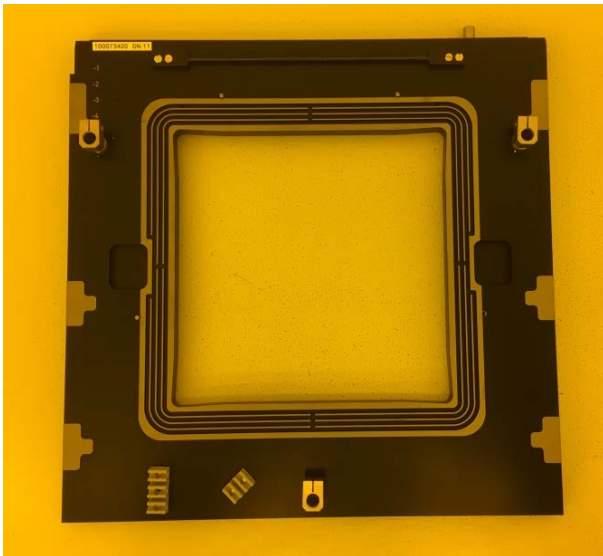


Figure 8: MA8BA8GEN3/TL/CONT/M-9/F-7/S-6/SPEC. Means TL topload, CONT contact mode, M9 mask 9", F7 thin films 7", S6 ?, SPEC special formats such as chips and pieces.

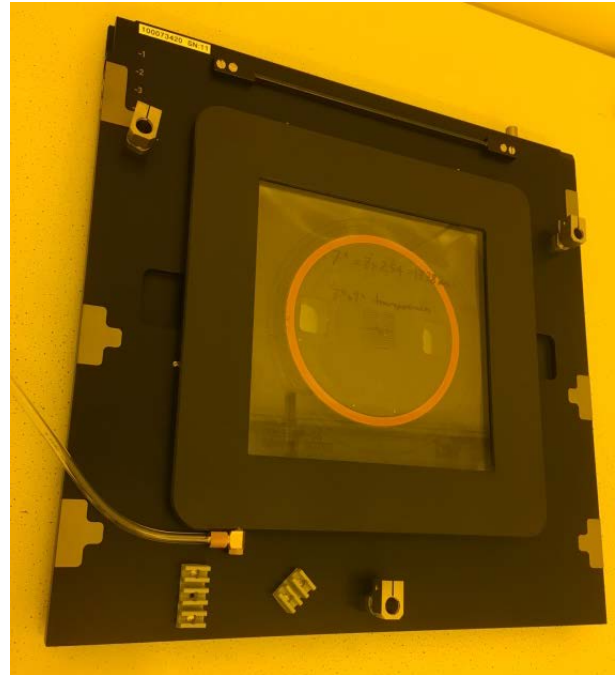
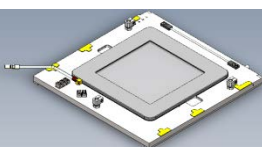


Figure 9: Mask holder with glass plate, which has a film mounted, sitting on top of 4" chuck.

To get a visual confirmation, and for demo only, below in Figure 9 is shown the 4" chuck, having the mask holder around it, and the glass plate with the thin film laying on top of it, and there is no contact between chuck and glass plate other than where there is a the thin film, no interference with adhesives.

Below the compatibility matrix of of 9x9 mask holder with available chucks, but you are responsible for the chuck rubber lips not touching adhesives.

P/N	Description and usual application	Encoding			Sample size	Mask size (square) for photolitho					Hard Stamp size for imprint																
		Z piezo	X, Y piezo			2.5"	5"	5" / 4 fields	6"	7"	7" film	8"	9"	9" / 4 fields													
	Tooling for film mask 7"x7"				10x10 mm																						
100073420	MASK HOLDER MA8BA8GEN3/TL /CONT/M-9/F-7/S-6/SPEC 				15x15 mm	1"x1"	2"x2"	70x70 mm	3"x1"	¼ of Wafer 2"	¼ of Wafer 3"	¼ of Wafer 100mm	Wafer 1"	Wafer 1.5"	Wafer 2"	Wafer 3"	Water 100mm	Water 150mm	2.5"	5"	5" / 4 fields	6"	7"	7" film	8"	9"	9" / 4 fields