

## 1.0 Introduction

Vacuum Release Trays are “pocketless” carriers which hold devices securely in place during shipping or handling, and offer the unique ability to release the devices on demand for unloading. Use the recommended process parameters and procedures below for best device handling results.

## 2.0 Overview

The patented Vacuum Release process relies on changing the surface contact area between the device and the tray elastic Gel membrane placed over a mesh material. This change in surface contact directly affects the magnitude of the Gel holding force.

In the normal “**Hold Mode**” (Figure 1), the surface contact is maximized and devices are held firmly in place for shipping, handling, and storage.

In the temporary “**Release Mode**” (Figure 2), the surface contact is minimized by applying vacuum thru a hole in the underside of the tray which causes the Gel membrane to conform to the shape of the mesh. This reduces the holding force between the Gel and device (fewer points of contact) which allows for easy vertical device removal using a vacuum pick-up tool. Follow the guidelines below for best results.

Once vacuum is removed, the elastic Gel membrane returns back to its original position and securely hold the remaining devices. The trays are reusable therefore this Hold and Release process can be done repeatedly on the same tray.

Please note that applying vacuum to underside of tray is only required during the actual device unloading process. Vacuum is not used when loading devices on Gel surface.

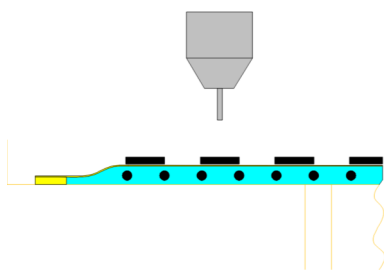


Figure 1: Hold Mode

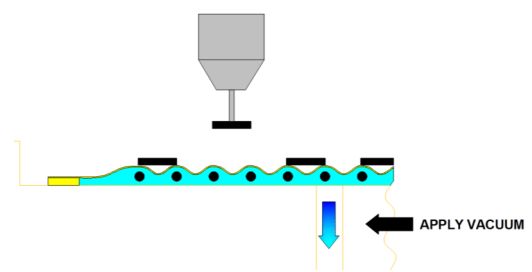
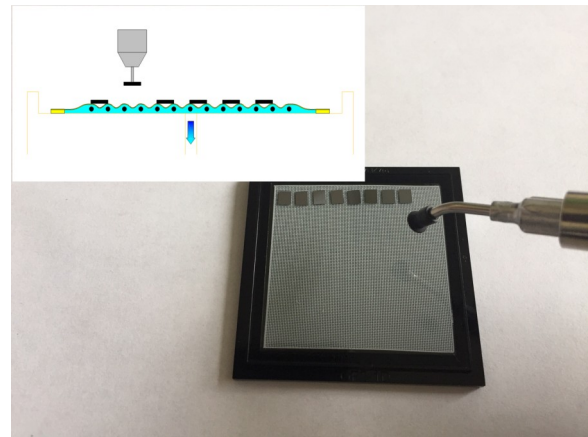


Figure 2: Release Mode

### 3.0 Device Unloading

Slide off the clip and remove the lid from the tray. Place the tray on a vacuum plate and make sure the tray is aligned with the vacuum plate o-ring to obtain a tight backside seal and hold vacuum. Apply 25" Hg of vacuum. This will put the Tray into "Release Mode" and allow devices to be easily unloaded. While in "Release Mode," carefully remove the devices using a vacuum pick-up tool (figure 2). After removing the selected devices from the Gel surface, release the vacuum from the tray to allow the Gel to return to its original Hold Mode. Place the lid and clip back on the Tray and store for future use.

Note: It is not necessary to remove all devices from Tray. Trays are reusable.



### 4.0 Device Unload Precautions

For best unload results apply 25" Hg of vacuum to backside of the VR tray to put into Release Mode. The Gel membrane may appear to be in the release mode under relatively low vacuum conditions, however **full vacuum is recommended for optimal device release**. Unload the device simulating the actual production environment: dull-tip tweezers, manual vacuum pick-up tool, or automated die handling equipment. Take care to ensure the vacuum pick-up tip parameters are compatible with the specific device size and material. For automated equipment, set-up adjustments such as pick-up speed may be required to optimize the unload process. The pick-up tools overdrive (contact downforce) during unload should be minimized to prevent the device from being driven or pushed into the Gel surface. This can damage your device and/or cause increased device unload forces. Tweezers can be used if required, however are not recommended as they can puncture the Gel membrane resulting in tray damage. Pick-up tools with continuous vacuum supply are recommended. If the device is difficult to unload from the Gel surface, confirm that the correct mesh size is being used. Using a tighter than needed mesh geometry will result in excessive points of contact that can substantially increase the required unload force. If mesh size is correct, repeat unload test using a lower Gel Retention Level.

## 5.0 Recommended Mesh Sizes

The recommended Mesh Geometry can be easily determined using the Table below, based on device size.

Device Size (X)		Recommended Mesh Size	Suggested GEL Retention Level		
(mils)	(microns)		Polished	Etched	Porous
X < 10	X < 254	Consult Factory	XT	ST	Consult Factory
10 ≤ X < 15	254 ≤ X < 381	195	XL	XL	Consult Factory
15 ≤ X < 20	381 ≤ X < 508	137	XL	X4	Consult Factory
20 ≤ X < 35	508 ≤ X < 889	103	XL	X4	Consult Factory
35 ≤ X < 60	889 ≤ X < 1524	76	XL	X4	Consult Factory
60 ≤ X < 110	1524 ≤ X < 2794	33	XL	X4	X8
110 ≤ X	2794 ≤ X	16	XL	X4	X8

### Notes:

a) X = Smaller side dimension (example: for a 15 x 10 mil die, reference will be 10 mils) Recommended.

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