

DEVICE CARRIERS & ELASTOMERS THAT MAXIMIZE
EFFICIENCY, PRODUCTIVITY AND YIELD

Gel-Pak®

Protecting the World's Valuable[®] Devices

CUSTOMIZED ELASTOMERS

MATERIAL TECHNOLOGY

Gel-Pak® carriers and films are made using proprietary elastomers that are customized for a wide range of industries and applications.

Our technology library includes our traditional silicone-based products (Gel) as well as a variety of alternative non-silicone elastomers (Vertec®).

GEL

- High-Purity Silicones
- ESD Silicones
- High Temperature Silicones

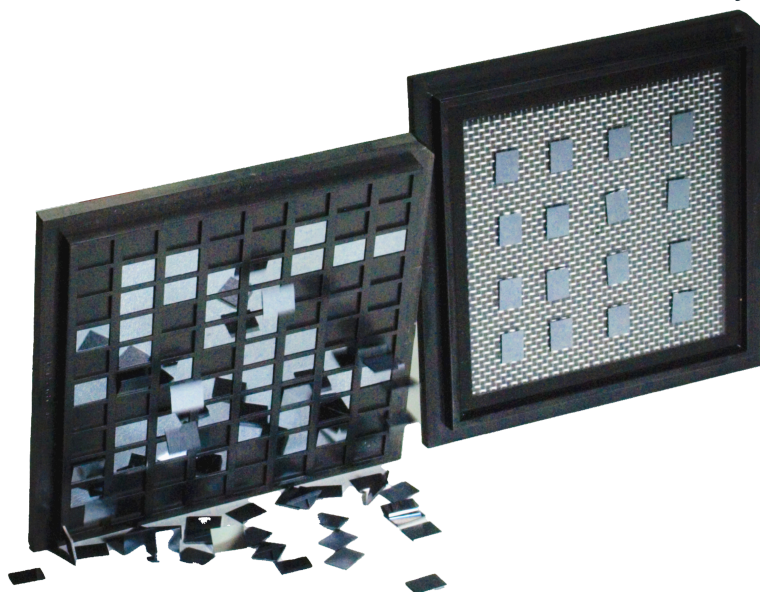


Vertec®

- Thermoplastics (TPU/TPE)
- Polyurethanes
- ESD Thermoplastics
- ESD Polyurethanes

Our elastomers are engineered for the stringent demands of customer-specific applications. The highly purified Gel meets strict "space grade" standards. All of our materials are available in either a device carrier or a film sheet/roll format. The optimum elastomer technology for an application is determined by a number of factors including:

- Device Size/Thickness
- Device Material/Surface Roughness
- ESD Sensitivity
- Operating Temperature
- Sensitivity to In-Process Chemistries



ELASTOMER "TACK" LEVELS

Over the years, Gel-Pak® has refined its chemistries to provide a wide range of tack levels.

Gel Tack Levels			
	 	  	
ULTRA-LOW	LOW	MEDIUM	HIGH
Vertec® Tack Levels			
			 
ULTRA-LOW	LOW	MEDIUM	HIGH

PROTECTIVE DEVICE CARRIERS & FILMS

GEL-PAK®

For more than 45 years, Gel-Pak® has been an industry leader in creating innovative device handling and film products for a wide range of unique applications.

The Gel-Pak® device carrier products are used to securely hold fragile components in place while the film products consist of extruded or coated elastomer materials that are customized to satisfy a diverse set of customer requirements.

GEL-PAK® DEVICE CARRIER APPLICATIONS

- Protecting Valuable Devices
- Shipping and Handling Components
- Device Storage
- In-Process Component Handling

GEL-FILM®/Vertec® FILM APPLICATIONS

- Surface Protection
- Stretchable Electronics
- Wearable Medical Devices
- Wafer Backgrinding and Dicing
- Inspection and Test
- Disk Drive Lapping
- Universal Fixturing
- High Temperature Processing
- Fingerprint Recognition
- Graphene Exfoliation

INDUSTRIES

Gel-Pak® serves thousands of customers worldwide, ranging from Fortune 500 companies to small startups and universities.

Key industries and market segments that have come to rely on Gel-Pak® solutions include:

- Semiconductor
- Photonics / Optoelectronics
- Compound Semiconductor
- MEMs
- Medical Device
- Flexible Electronics
- Aerospace



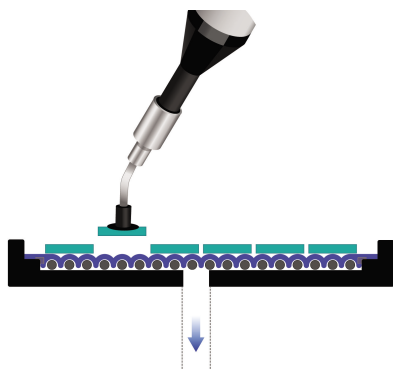
	DEVELOPMENT	PROTOTYPE	IN-PROCESS HANDLING	HVM SHIPPING/HANDLING
Gel-Box AD/APV	•	•	•	
Gel-Tray BD	•	•	•	
Gel-Slide CD	•	•	•	
Vacuum Release VR/VRP	•	•	•	•
Gel-Film	•	•	•	•
BTXF		•	•	•
BMP3			•	•

VACUUM RELEASE CARRIERS™

POCKETLESS TRAYS FOR AUTOMATED DEVICE HANDLING

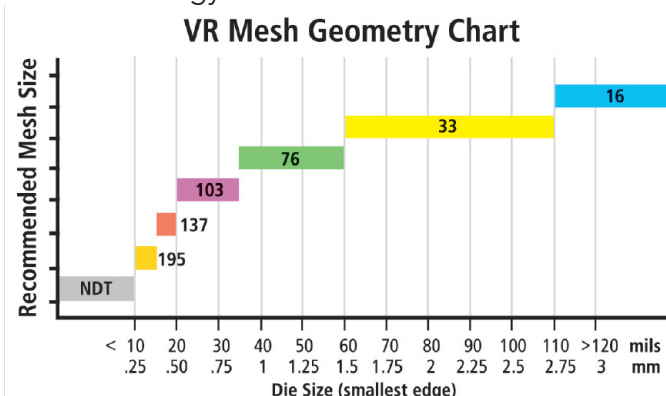
HOW DOES IT WORK?

Devices are released when vacuum is applied to underside of tray. The elastomer material conforms to the mesh layer beneath it reducing device contact area, allowing the device to easily be removed.

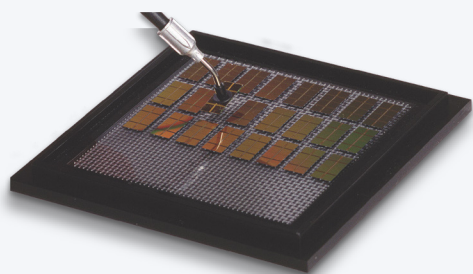


CHOOSING THE OPTIMUM VR “MESH” GEOMETRY

Choosing the right VR carrier mesh depends on the X, Y size of your device. To optimize unloading performance, we provide a range of mesh geometries that can handle devices from < 250µm up to 300mm based on the vacuum release technology.



VACUUM RELEASE TRAYS™ (2" & 4")

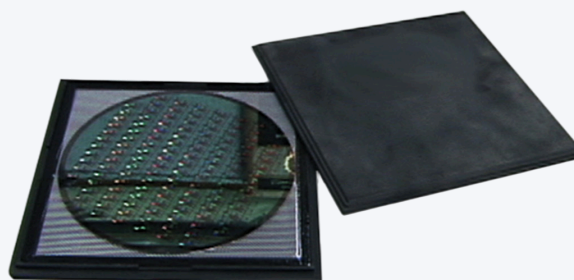


- Designed to handle components < 250µm to 75mm
- Immobilize and protect valuable devices from damage during shipping and handling
- Ideal for high-volume automated device pick & place applications
- Ideal for shipping thin die

CONFIGURATIONS

- Wide range of tack levels
- 2" 4" tray size based on JEDEC standard
- Gel or Vertec® Film membrane
- Black conductive polycarbonate (C), antistatic (AS) and clear polystyrene (T) tray, box and lid
- Available in hinged box (02) or lid/clip (00B)
- Can be customized with print or grid

LARGE SUBSTRATE VACUUM RELEASE PLATES™



- Designed for handling high-value substrates from 75mm to 300mm
- Ideal for shipping thinned wafers

CONFIGURATIONS

- Wide range of tack levels
- Gel version only
- Plates available in phenolic or transparent acrylic material
- Black conductive (C) or transparent (T) storage boxes available
- Available in single and multi-wafer custom configurations

GEL-BOX™, GEL-TRAY®, GEL-SLIDE™ PRODUCTS

CARRIERS FOR MANUAL LOADING AND UNLOADING

The traditional Gel-Box™, Gel-Tray®, and Gel-Slide™ products are part of the company's pioneer product offering developed back in 1980. These versatile "pocketless" carriers immobilize devices during shipping, handling and processing.

IDEAL FOR

- Shipping, handling and storage of components
- Manual loading and unloading with tweezers or by fingers
- Multiple device sizes on same carrier (no pockets)
- Accommodates a wide range of device sizes from small components to large assembled modules

AVAILABLE IN VARIETY OF CONFIGURATIONS

- Wide variety of box sizes and material configurations
- Available in standard or static dissipative Gel or Vertec®
- Black conductive polycarbonate (C), transparent (T), and antistatic (AS) boxes
- Can be customized with print or grid



GEL-BOX™

- Plastic hinged box coated with Gel or Vertec®
- Standard Gel-Box™ sizes from 1"x1" up to 7"x5"
- Custom sizes available on request or Gel-Pak® can apply elastomer in customer provided boxes

GEL-TRAY®

- 2" X 2" Plastic tray coated with Gel or Vertec® inside a plastic hinged box
- Tray can be removed from box for use with holding fixture
- Compatible with device loading process in automated equipment

GEL-SLIDE™

- 2"x 2" glass slide coated with Gel inside a plastic hinged box
- Ideal for high temperature applications, glass slide can withstand temperatures up to 220°C
- Glass slides are ideal for backside inspection

BTXF AND BMP UNIVERSAL HANDLING TRAYS AND FILMS

BTXF TEXTURED CARRIERS

The BTXF carrier product line utilizes an advanced microtextured surface to securely immobilize devices with minimal contact area. This innovative design delivers reliable protection, reduces the risk of damage, and eliminates the need for custom pocketed trays. BTXF carriers are engineered to be silicone-free and ESD-safe, offering consistent performance for sensitive device handling. The result is a flexible, cost-effective solution that streamlines workflows and enhances yield.

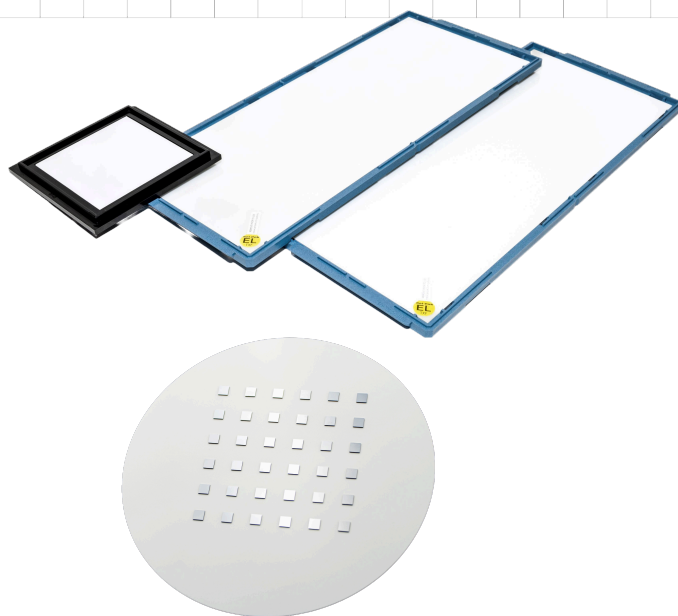
Form Factors: Available in 2", 4", JEDEC-standard trays, and wafer formats, as well as film sheets and custom formats.

Key Features:

- Securely holds components $>800\ \mu\text{m}$ with less than 2% of device area in contact with the film.
- Available in various tack levels (check with factory)
- Allows for easy manual or automated removal.
- Silicone-free, ultra-low outgassing, and available in ESD-safe versions
- No vacuum required
- Film can be laminated on any substrate.

Applications:

- In-process handling or shipping of bare die and leadless packaged devices.
- Die handling during singulated die test, retest, pre-assembly kitting, flex circuit assembly, LED diodes, medical component handling, and more



BMP BUMPED DIE CARRIERS

The BMP product line is engineered for the safe handling and transport of bumped die, flip chip, and BGA packages. Featuring a flat film surface, BMP carriers securely hold bumped devices during handling and shipping. These carriers are silicone-free, ESD-safe, and offer ultra-low outgassing, ensuring reliable performance for sensitive components in advanced packaging environments.

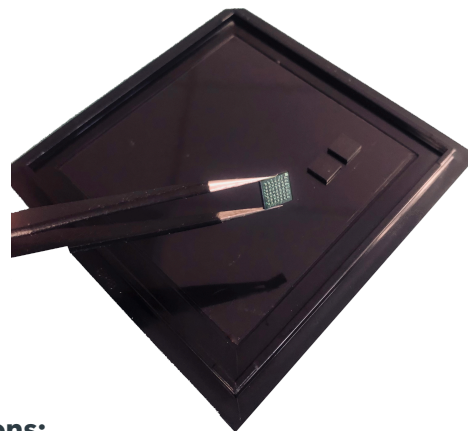
Form Factors: Available in 2", 4", JEDEC-standard trays,

Key Features:

- Securely holds bumped components bumped side down during handling
- Protects delicate solder bumps during handling and transport
- Allows for easy manual or automated removal

Applications:

- Handling, transport of bumped die, BGA, Flip Chip



GEL-PAK® FILMS

GEL-FILM® SHEETS AND ROLLS

Gel-Pak's Gel-Film®, based on our proprietary silicone Gel or silicone-free, static dissipative Vertec® technologies, is designed to support, protect and handle fragile substrates used in the Semiconductor, Medical, and Electronics industries.



Gel-Film® Products can be customized for specific applications.

APPLICATIONS

- Surface Protection
- Fixturing
- Lapping
- Scribe and Break Coversheet
- Particle Measurement
- Vacuum Coating
- Medical Patches
- Peel and Stick
- Graphene Exfoliation
- DNA Retrieval
- Wafer Handling
- Medical Devices
- Stretchable Electronics

Gel-Pak® can modify its Gel or Vertec® material properties to meet the performance requirements of specific applications:

GEL-FILM® PROPERTIES

- Tight Thickness Control
- Low Hysteresis
- Durometer
- Adhesion Levels
- Low Outgassing
- Low Tranference
- Biocompatibility

STANDARD GEL-FILM® CONSTRUCTIONS

Our standard WF, WF-A, WPV, WPV-A, PF, PPV, and DGL film constructions are offered in a variety of tack levels and thickness combinations.

WF, WF-A, WPV, WPV-A FILM

- Elastomer bonded to metalized polyester substrate
- Available with optional pressure sensitive adhesive backing (-A)
- Operating temperature up to 150°C
- Ideal for lapping, fixturing and surface protection

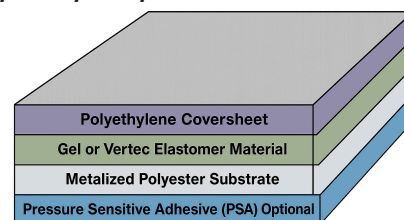
PF, PPV FILM

- Elastomer coated on a clear removable polyester substrate also referred to as "Free Gel"
- Silicone version (PF) operating temperature up to 220°C
- Ideal for high temperature processes

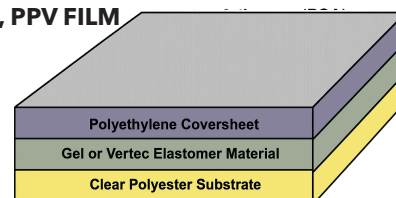
DGL FILM

- Highly purified free gel laminated onto a flexible polyethylene backing with polycarbonate coversheet
- Meets "Space-Grade" ASTM 595-E requirements for outgassing
- Withstands operating temperatures of 220°C
- Ideal for vacuum coating and temporary wafer bonding

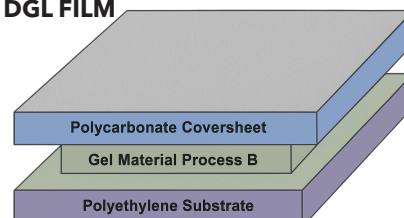
WF, WF-A, WPV, WPV-A



PF, PPV FILM



DGL FILM



ABOUT DELPHON

For more than 45 years, Delphon has developed breakthrough products that provide solutions for manufacturing processes in a wide range of industrial markets.

Delphon's high value brands have provided customers within the semiconductor, optoelectronics, data storage, medical, pharmaceutical, aerospace, defense and telecom industries with innovative solutions for a variety of process applications.

In addition to Gel-Pak®, Delphon also operates two other divisions, Touch-Mark and UltraTape.

UltraTape manufactures high quality cleanroom tape and labels using the most advanced materials and adhesive technologies. The company also manufactures high-performance graphic overlays and nameplates for use in even the harshest environments.

TouchMark provides high quality, precision pad printing services to the medical device, diagnostic and electronics industries.

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A Delphon Company

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