MATERION

ADVANCED
MATERIALS GROUP

Combo-Lids®

Combo-Lids®

Materion Advanced Materials Group is the leading supplier of hermetic cover lids for high reliability applications in semiconductor, hybrid, MEMS, medical and optical device industries. Package reliability and functionality in harsh service environments are enabled by Materion's unique capabilities to design and produce custom hermetic solutions. Vertically integrated manufacturing operations control quality through the entire production process: refining, casting, rolling, plating, stamping, welding and high volume packaging.

Combo-Lid® products are produced in the USA, Singapore and the Philippines. The base metal is Kovar™ or Alloy 42. They are plated with nickel and gold flash, and tack welded to a solder preform. The nickel layer inhibits corrosion, while the gold layer promotes solderability and extends shelf life.

LID COMPOSITION

- Kovar or Alloy 42 with nickel electroplate MIL-38510, 50-350 microinches
- Gold electroplate MIL-G-45204B Type III, Grade A
- Length and width dimension tolerance +/-.003"
- Thickness dimension tolerance is +/-.001"
- Flatness <.001" for lids <.500" or .002 for lids >.500", burrs <.001"

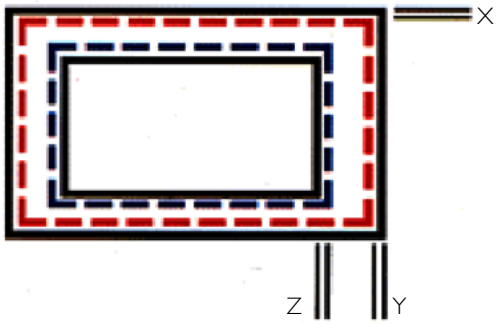
LID FRAME

- Composition 80 +/- 1% Au, balance Sn with total impurities <149 ppm
- Length and width dimension tolerance +/-.003"
- Thickness dimension tolerance +/-.0003"

TACK WELD ASSEMBLY

- Three integral welds, Alignment +/-.005"
- Weld Splatter <.003"

LID SIZE VS. SEAL RING SIZE



Seal Ring ——
Lid OD and Preform OD - - - -
Preform ID _ _ _ _

X: 0.01"
Y: 0.010" - .015"
Z: 0.010" - .015"

Materion … Materials to Advance the World's Technologies

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DESIGN GUIDELINES

Materion can assist customers with cover lid design, frame size and related tooling, and suggest process parameters to ensure maximum assembly line yields. General design guidelines include:

- Recommended cover OD should be .025" less than the package seal ring OD
- Preform ID should be .025" larger than the package seal ring ID, provided a minimum solder width of .025" is maintained
- The outside dimensions of the lid and preform are typically the same

PROCESSING INFORMATION

- Recommended typical clip force id 0.9-2.0 lbs
- Clip pressure varies depending on lid size, preform thickness, lid flatness, and seal-ring flatness
- Typical sealing profiles allow for 2-5 minutes above 280°C (melting temperature)
- Peak temperature should not exceed 340°C
- Atmosphere: dry nitrogen or hydrogen

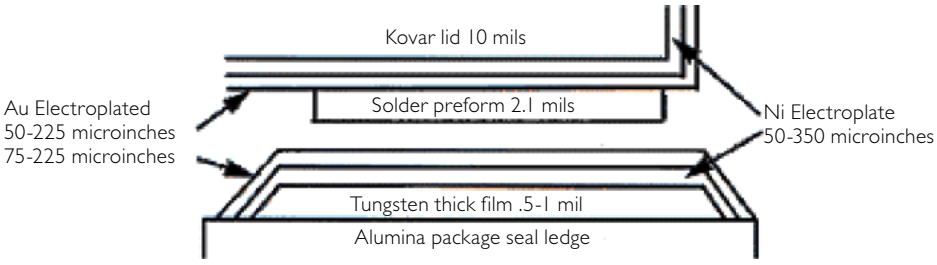
MECHANISM FOR SEALING MIRCOELECTRONIC PACKAGES

Microelectronic packages sealed with Combo-Lids®: chip carriers, side braze, PGA, dual in-line, and flat packs.

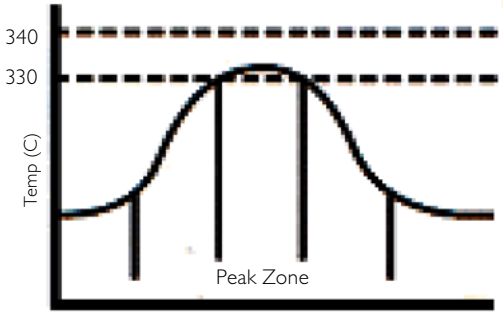
BEYOND COMPLIANCE

Our accreditations include:

- ISO 9001:2008 (for quality)
- ISO 14001:2004 (environmental & safety management systems)
- LeanSigma



AU/SN SEALING PROFILE



Rise Rate: 25° - 75° C Per Minute
Peak Zone: 330° - 340° C
2-5 minutes Above 280° C
Cool Rate: 25° - 50° C Per Minute
Atmosphere: Hydrogen and/or Nitrogen

The information presented here refers to our standard products. Plating or preform properties can be modified to meet specific needs.

Packaging Products	Applications	Illustrations	Lid Material	Preform Material
Combo-Lids™ (Flat)	High reliability hermetic packaging		Kovar or Alloy 42	Gold-Tin or other alloys
Combo-Lids™ (Drawn)	High reliability hermetic packaging where die height is higher than package cavity depth		Kovar or Alloy 42	Gold-Tin or other alloys
Non-magnetic Metal Combo-Lids™	Medical Imaging and signal noise control		Mo, CuW, Bronze, Cu	Gold-Tin or other alloys
Non-magnetic Metal Combo-Lid™	High Purity non-magnetic combo lids, does not contain Nickel or plating		Mo, CuW, Bronze, Cu	Gold-Tin or other alloys
Non-magnetic BeCu Combo-Lids™	High Purity non-magnetic combo lids, does not contain Nickel or plating		BeCu	Gold-Tin or other alloys
Nozzle Combo-Lids™	MEMS, Automotive and High reliability hermetic package sealing		Kovar	Gold-Tin
Ceramic Combo-Lids™ with edge metallization	Non-magnetic applications		Al2O3	Gold-Tin or other alloys
Tack welding services for Ceramic Lids	Non-magnetic applications		Al2O3	Gold-Tin or other alloys
Selectively plated Combo-Lids™	High reliability hermetic package sealing		Kovar or Al2O3	Gold-Tin or other alloys
Getter Tack welded Combo-Lids™	High reliability hermetic package sealing		Kovar	Gold-Tin or other alloys
Palladium Combo-Lids™	High reliability and hermetic package sealing		Kovar with Palladium	Gold-Tin or other alloys
Seam Seal-Lids™	Hermetic package sealing without preform		Kovar	–
Special Shaped Combo-Lids™	High reliability hermetic package sealing		Kovar	Gold-Tin
Epo-Lids™	Ceramic Lid for non-hermetic packages including CuPacks™		Al2O3	MEG-150 or MEG-165 Epoxy
Ceramic Air Cavity Packages	Wireless Applications - Si, GaAs and GaN RF power transistors		Plated Alloy 42 with Ni, NiCo or Au	Alumina ring frames
Etch Lids for AR Coated Glass	Double preform attached lid for Visi-Lid™ application		Kovar	Gold-Tin or other alloys

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MATERION CORPORATION
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MATERION ADVANCED MATERIALS GROUP is a global advanced materials company, dedicated to providing solutions that enable our customers' technologies and drive their growth. Our products include precious and non-precious specialty metals, precision optical filters, inorganic chemicals and powders, specialty coatings, specialty-engineered beryllium alloys, beryllium and beryllium composites, and engineered clad and plated metal systems. Materion business is structure to enhance our ability to provide customers with innovative, best total-cost solutions.