MacDermid Alpha
ELECTRONICS SOLUTIONS

Automotive Material Solutions

ALPHA® Product Offerings for Automotive

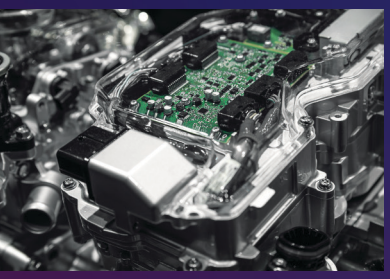
AUTOMOTIVE MARKETS

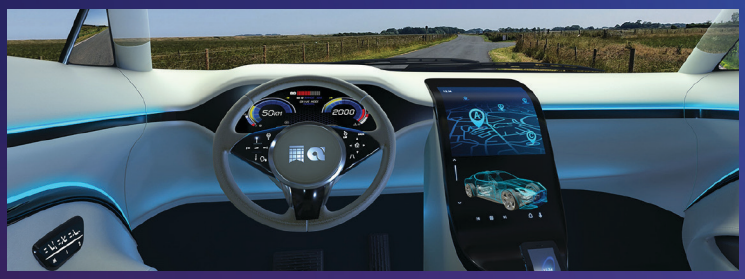
macdermidalpha.com

Rev 12192024

Automotive Material Solutions

ALPHA® Product Offerings for Automotive





MacDermid Alpha Electronics Solutions, a prominent business of Element Solutions Inc, holds a distinguished position as a global leader in the field of **fully integrated materials**; helping to deliver enhanced performance, reliability, and sustainability to electronic manufacturers worldwide. Our Semiconductor & Assembly Solutions specialize in delivering cutting-edge solutions for semiconductors and assembly processes, driving innovation and reliability in these critical sectors.

The use of **electronics in vehicles** is expanding rapidly. From systems used by electric and hybrid vehicles to those used to control vehicle operations like steering and braking to systems that improve occupant safety and comfort, vehicle electronics growth is astonishing. Regardless of which system the electronic assembly is used in, it is expected to be highly reliable under some of the most extreme conditions. MacDermid Alpha has been providing proven thermomechanical and electrochemical reliability to the automotive industry for many years.

Our innovative products meet the current reliability demands and cater for the next generation in automotive electronics.

For example: ALPHA® CVP-390V Innolot MXE is a lead-free, no clean solder paste designed for high reliability applications, to maximize the thermomechanical performance of a solder joint and provide excellent electrochemical reliability in harsh operating conditions.

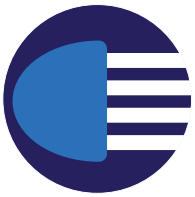
This next-generation, high reliability solder alloy that provides advanced thermal cycling performance and significantly improved drop shock and vibration resistance.

Engineered with an enhanced microstructure, enabling high resistance to creep-fatigue. The compatibility of Innolot MXE with advanced ALPHA flux chemistries makes it an ideal candidate for high reliability applications operating in harsh conditions.

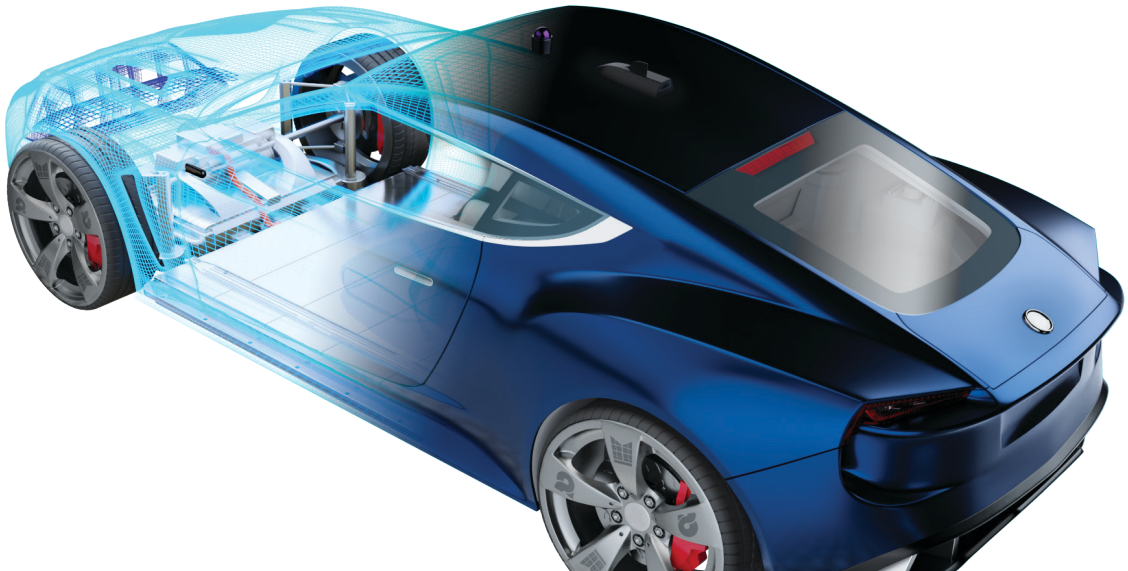
Underhood

In-Cabin

Safety



Lighting/LED



Underhood

Junction Box, Chassis, Braking, Powertrain

AUTOMOTIVE: **Underhood**

APPLICATION	PRODUCT TYPE	PRODUCT	LOW TEMP	PB FREE	HALOGEN FREE
SMT – Printing and Dispensing	Next Generation Solder Paste	**ALPHA® CVP-390V** *Innolot* • High SIR performance, thermomechanical reliability • Fine feature print and reflow • Available in powder Type 4 and Type 5 • Zero-Halogen, ROL0 no-clean solder paste • Improved vibration and drop shock performance		Pb	HF
	Solder Paste	**ALPHA® OM-353** *Innolot* • Lowest post reflow residue spread of Alpha's chemistries • Excellent electrochemical reliability down to 0.200mm spacing • Low HIP and NWO Defects • Highest thermo-mechanical reliability at temperatures above 120°C (Innolot)		Pb	HF
		ALPHA® OM-362 *Innolot* • Ultralow voiding including bottom terminated components • Excellent electrochemical reliability on bottom terminated components • Highest thermo-mechanical reliability at temperatures above 120°C (Innolot)		Pb	HF
SMT / PTH – Pick and Place	Preforms	**ALPHA® BTC-578 Accuflux Preforms** *Innolot / SAC305 / Low-temp* • Increasing thermal conductivity and heat dissipation through void reduction • Low flux residue improves electrochemical reliability • Prevents mechanical stackup issues through increased solder volume	LTS	Pb	HF
		ALPHA® Tape and Reel Preforms • High solder volume precision and production yields using pick and place • Available in many alloys, sizes and shapes • Flux coated versions available (*some fluxes contain halogens)	LTS	Pb	HF*
SMT / PTH – Point Soldering, Rework and Repair	Cored Wire	**ALPHA® Telecore® HF-850** *Innolot / SAC305* • Performs well with all standard pad finishes • Can be used in both robotic and manual soldering processes • ROL0		Pb	HF
		ALPHA® Telecore® XL-825 *SAC305* • Best for difficult to solder surfaces • Can be used in both robotic and manual soldering processes • ROL1		Pb	
		Kester® 268 *SAC305* • Optimized for low spatter robotic soldering • Can be used for manual and automated soldering processes • Zero halogen • ROL0		Pb	HF
		Kester® 285 *SAC305* • Highly active for soldering difficult surfaces while retaining ROL0 class • Can be used for manual and automated soldering processes • ROL0		Pb	
SMT – Printing	Adhesive	**ALPHA® HiTech™ SM42-120P** • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)			HF

Powertrain related electronic systems are regularly exposed to high temperature (>120°C) and vibration. Joining materials used in these systems must exhibit the highest level of thermomechanical and electrochemical reliability under these extreme conditions.

Key Requirements:

- Reliability in high temperature, high vibration conditions
- Excellent electrochemical reliability alone and in combination with other joining materials
- High thermal and electrical conductivity

AUTOMOTIVE: **Underhood continued**

APPLICATION	PRODUCT TYPE	PRODUCT	PB FREE	HALOGEN FREE	VOC FREE
SMT – Dispensing	Underfill	**ALPHA® HiTech™ CU21-3240** • High Tg and low CTE • Excellent thermal cycling, surface insulation resistance test performance • Compatible with ALPHA OM-340, OM-353, OM-358 and CVP-390		HF	
	Adhesive	**ALPHA® HiTech™ SM42-1311** • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)		HF	
PTH – Wave / Selective Soldering	Bar and Solid Wire Solder	**ALPHA® SAC305** • Excellent soldering performance • High thermal fatigue resistance • Widely used	Pb		
		ALPHA® SACX Plus 0807 • Low Silver (0.8%) for improved value vs. SAC305 • SAC305-like soldering and reliability performance on complex assemblies • Low Copper dissolution and low drossing	Pb		
	Liquid Flux	**ALPHA® EF-2210** • ORL0 • Passes IPC J-STD-004A • VOC free	Pb		VOC
		ALPHA® EF-6000 • ORL0 • Passes IPC J-STD-004A • High activity, rosin-free formula can be cleaned with DI water	Pb		
		ALPHA® EF-6808HF • ROL0 • Passes IPC J-STD-004B • Excellent for most standard complexity assemblies	Pb	HF	
		ALPHA® EF-8800HF • ORL0 • Passes IPC J-STD-004B • Designed for thick boards	Pb	HF	
		Kester® 951 • ORL0 • Passes SIR IPC J-STD-004 • Rosin-free formula for clean post-soldering surface	Pb	HF	
		Kester® NF1060-VF • ORM0 • VOC free • Passes SIR IPC J-STD-004B • Exceptional wetting with excellent hole-fill	Pb	HF	VOC
		Kester® 985M • ORM0 • Passes SIR IPC J-STD-004B • Excellent solderability even on high density board	Pb		
		Kester® NF372-TB • ROL0 • Passes SIR IPC J-STD-004B • Sustained flux activity in challenging heating profile	Pb	HF	

In-Cabin

Touch Panel, Infotainment

AUTOMOTIVE: **In-Cabin**

APPLICATION	PRODUCT TYPE	PRODUCT	LOW TEMP	PB FREE	HALOGEN FREE
SMT – Printing and Dispensing	Next Generation Solder Paste	**ALPHA® CVP-390V** *SAC305* • High SIR performance, thermomechanical reliability • Fine feature print and reflow • Available in powder Type 4 and Type 5 • Zero-Halogen, ROL0 no-clean solder paste • Improved vibration and drop shock performance		Pb	HF
	Solder Paste	**ALPHA® OM-362** *SAC305* • Ultralow voiding including bottom terminated components • Excellent electrochemical reliability on bottom terminated components • Good thermal cycling performance at temperatures <105°C		Pb	HF
		ALPHA® OM-353 *SAC305 / SACX Plus 0807* • Repeatable printing down to 0.3mm/.012" pitch and 01005 passives • Lowest post reflow residue spread of Alpha's chemistries • Low HIP and NWO Defects • Available in low silver SACX Plus alloy(s) for improved value		Pb	HF
		ALPHA® OM-565 *HRL3* • Best mechanical performance of Alpha's low temperature solder alloys • Repeatable printing down to 0.3mm/.012" pitch and 01005 passives • Significant reduction in warpage-induced defects such as HIP and non-wet opens	LTS	Pb	HF
SMT / PTH – Pick and Place	Preforms	**ALPHA® BTC-578 Accuflux Preforms** *Innolot / SAC305 / Low-temp* • Increasing thermal conductivity and heat dissipation through void reduction • Low flux residue improves electrochemical reliability • Prevents mechanical stackup issues through increased solder volume	LTS	Pb	HF
		ALPHA® Tape and Reel Preforms • High solder volume precision and production yields using pick and place • Available in many alloys, sizes and shapes • Flux coated versions available (*some fluxes contain halogens)	LTS	Pb	HF
SMT / PTH – Point Soldering, Re-work and Repair	Cored Wire	**ALPHA® Telecore® HF-850** *SAC305 / SACX Plus 0807* • Performs well with all standard pad finishes • Can be used in both robotic and manual soldering processes • ROL0		Pb	
		ALPHA® Telecore® XL-825 *SAC305 / SACX Plus 0807* • Best for difficult to solder surfaces • Can be used in both robotic and manual soldering processes • ROL1			HF
		Kester® 268 *SAC305/K100LD* • Optimized for low spatter robotic soldering • Can be used for manual and automated soldering processes • Zero halogen • ROL0		Pb	HF
		Kester® 285 *SAC305* • Highly active for soldering difficult surfaces while retaining ROL0 class • Can be used for manual and automated soldering processes • ROL0		Pb	

In-cabin electronics are becoming increasingly important in the control of the vehicle and the comfort of its occupants. Due to all the functions they provide, in-cabin electronics have become similar in complexity to a modern computer. As a result, joining materials must exhibit the highest level of thermomechanical and electrochemical reliability due to the variability in temperature fluctuations they experience.

Key Requirements:

- High mechanical and electrical reliability
- Fine feature capable
- Product options to enable flexibility in board design and manufacturing process
- High throughput, low defects

AUTOMOTIVE: **In-Cabin continued**

APPLICATION	PRODUCT TYPE	PRODUCT	PB FREE	HALOGEN FREE	VOC FREE
SMT – Dispensing	Underfill	**ALPHA® HiTech™ CU31-2031** • Excellent thermal cycling, surface insulation resistance test performance • Compatible with ALPHA OM-340, OM-353, and CVP-390V		HF	
	Adhesive	**ALPHA® HiTech™ SM42-1311** • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)		HF	
SMT – Printing	Adhesive	**ALPHA® HiTech™ SM42-120P** • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)		HF	
PTH – Wave / Selective Soldering	Bar and Solid Wire Solder	**ALPHA® SAC305** • Excellent soldering performance • High thermal fatigue resistance • Widely used	Pb		
		ALPHA® SACX Plus 0807 • Low Silver (0.8%) for improved value vs. SAC305 • SAC305-like soldering and reliability performance on complex assemblies • Low Copper dissolution and low drossing	Pb		
		ALPHA® SACX Plus 0307 • Low Silver (0.3%) for improved value vs. SAC305 • Low Copper dissolution and low drossing • Excellent for most standard assemblies	Pb		
	Liquid Flux	**ALPHA® EF-2210** • ORL0 • Passes IPC J-STD-004A • VOC free	Pb		VOC
		ALPHA® EF-6000 • ORL0 • Passes IPC J-STD-004A • High activity, rosin-free formula can be cleaned with DI water	Pb	HF	
		ALPHA® EF-6808HF • ROL0 • Passes IPC J-STD-004B • Excellent for most standard complexity assemblies	Pb	HF	
		Kester® 951 • ORL0 • Passes SIR IPC J-STD-004 • Rosin-free formula for clean post-soldering surface	Pb	HF	
		Kester® NF1060-VF • ORM0 • VOC free • Passes SIR IPC J-STD-004B • Exceptional wetting with excellent hole-fill	Pb	HF	VOC
		Kester® NF372-TB • ROL0 • Passes SIR IPC J-STD-004B • Sustained flux activity in challenging heating profile	Pb	HF	

Safety

Advanced Warning Systems, Sensors, Radar, LIDAR

AUTOMOTIVE: **Safety**

APPLICATION	PRODUCT TYPE	PRODUCT	LOW TEMP	PB FREE	HALOGEN FREE
SMT – Printing and Dispensing	Next Generation Solder Paste	**ALPHA® CVP-390V** *Innolot / SAC305* • High SIR performance, thermomechanical reliability • Fine feature print and reflow • Available in powder Type 4 and Type 5 • Zero-Halogen, ROL0 no-clean solder paste • Improved vibration and drop shock performance		Pb	HF
	Solder Paste	**ALPHA® OM-353** *Innolot / SAC305* • Lowest post reflow residue spread of Alpha's chemistries • Excellent electrochemical reliability down to 0.200mm spacing • Low HIP and NWO Defects • Highest thermo-mechanical reliability at temperatures above 120°C (Innolot)		Pb	HF
		ALPHA® OM-362 *Innolot / SAC305* • Ultralow voiding including bottom terminated components • Excellent electrochemical reliability on bottom terminated components • Highest thermo-mechanical reliability at temperatures above 120°C (Innolot)		Pb	HF
		ALPHA® OM-565 *HRL3* • Best mechanical performance of Alpha's low temperature solder alloys • Repeatable printing down to 0.3mm/.012" pitch and 01005 passives • Significant reduction in warpage-induced defects such as HIP and non-wet opens	LTS	Pb	HF
SMT / PTH – Pick and Place	Preforms	**ALPHA® BTC-578 Accuflux Preforms** *Innolot / SAC305 / Low-temp* • Increasing thermal conductivity and heat dissipation through void reduction • Low flux residue improves electrochemical reliability • Prevents mechanical stackup issues through increased solder volume	LTS	Pb	HF
		ALPHA® Tape and Reel Preforms • High solder volume precision and production yields using pick and place • Available in many alloys, sizes and shapes • Flux coated versions available (*some fluxes contain halogens)	LTS	Pb	HF
SMT / PTH – Point Soldering, Rework and Repair	Cored Wire	**ALPHA® Telecore® HF-850** *Innolot / SAC305* • Performs well with all standard pad finishes • Can be used in both robotic and manual soldering processes • ROL0		Pb	HF
		ALPHA® Telecore® XL-825 *SAC305* • Best for difficult to solder surfaces • Can be used in both robotic and manual soldering processes • ROL1		Pb	
		Kester® 268 *SAC305* • Optimized for low spatter robotic soldering • Can be used for manual and automated soldering processes • Zero halogen • ROL0		Pb	HF
		Kester® 285 *SAC305* • Highly active for soldering difficult surfaces while retaining ROL0 class • Can be used for manual and automated soldering processes • ROL0		Pb	

Advanced warning systems, such as lane departure, cruise control and pedestrian detection, utilize sensors and other sensitive components that create new challenges for high reliability vehicle electronics. The integration of these systems plus radar, vision and LIDAR systems, into vehicles requires the use of joining materials that are reliable and enable increased power density on shrinking component packages.

Key Requirements:

- Fine feature capable
- Reliability in high temperature, high vibration conditions
- Excellent electrochemical reliability of fine pitch components
- Consistent low voiding levels across different components

AUTOMOTIVE: **Safety continued**

APPLICATION	PRODUCT TYPE	PRODUCT	PB FREE	HALOGEN FREE	VOC FREE
SMT – Dispensing	Underfill	**ALPHA® HiTech™ CU31-2031** • Excellent thermal cycling, surface insulation resistance test performance • Compatible with ALPHA OM-340, OM-353, and CVP-390V			HF
	Adhesive	**ALPHA® HiTech™ SM42-1311** • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)			HF
SMT – Printing	Adhesive	**ALPHA® HiTech™ SM42-120P** • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)		HF	
PTH – Wave / Selective Soldering	Bar and Solid Wire Solder	**ALPHA® SAC305** • Excellent soldering performance • High thermal fatigue resistance • Widely used	Pb		
		ALPHA® SACX Plus 0807 • Low Silver (0.8%) for improved value vs. SAC305 • SAC305-like soldering and reliability performance on complex assemblies • Low Copper dissolution and low drossing	Pb		
	Liquid Flux	**ALPHA® EF-2210** • ORL0 • Passes IPC J-STD-004A • VOC free	Pb		VOC
		ALPHA® EF-6000 • ORL0 • Passes IPC J-STD-004A • High activity, rosin-free formula can be cleaned with DI water	Pb		
		ALPHA® EF-6808HF • ROL0 • Passes IPC J-STD-004B • Excellent for most standard complexity assemblies	Pb	HF	
		ALPHA® EF-8800HF • ORL0 • Passes IPC J-STD-004B • Designed for thick boards	Pb	HF	
		Kester® 951 • ORL0 • Passes SIR IPC J-STD-004 • Rosin-free formula for clean post-soldering surface	Pb	HF	
		Kester® NF1060-VF • ORM0 • VOC free • Passes SIR IPC J-STD-004B • Exceptional wetting with excellent hole-fill	Pb	HF	VOC
		Kester® NF372-TB • ROL0 • Passes SIR IPC J-STD-004B • Sustained flux activity in challenging heating profile	Pb	HF	

Lighting / LED

Automotive Lighting Applications

AUTOMOTIVE: **Lighting / LED**

APPLICATION	PRODUCT TYPE	PRODUCT	LOW TEMP	PB FREE	HALOGEN FREE
SMT – Printing and Dispensing	Next Generation Solder Paste	**ALPHA® CVP-390V** *Innolot / SAC305* • High SIR performance, thermomechanical reliability • Fine feature print and reflow • Available in powder Type 4 and Type 5 • Zero-Halogen, ROL0 no-clean solder paste • Improved vibration and drop shock performance		Pb	HF
	Solder Paste	**ALPHA® OM-353** *Innolot / SAC305* • Lowest post reflow residue spread of Alpha's chemistries • Excellent electrochemical reliability down to 0.200mm spacing • Low HIP and NWO Defects • Highest thermo-mechanical reliability at temperatures above 120°C (Innolot)		Pb	HF
		ALPHA® OM-362 *Innolot / SAC305* • Ultralow voiding including bottom terminated components • Excellent electrochemical reliability on bottom terminated components • Highest thermo-mechanical reliability at temperatures above 120°C (Innolot)		Pb	HF
		ALPHA® OM-565 *HRL3* • Best mechanical performance of Alpha's low temperature solder alloys • Repeatable printing down to 0.3mm/.012" pitch and 01005 passives • Significant reduction in warpage-induced defects	LTS	Pb	HF
SMT / PTH – Pick and Place	Preforms	**ALPHA® BTC-578 Accuflux Preforms** *Innolot / SAC305 / Low-temp* • Increasing thermal conductivity and heat dissipation through void reduction • Low flux residue improves electrochemical reliability • Prevents mechanical stackup issues through increased solder volume	LTS	Pb	HF
		ALPHA® Tape and Reel Preforms • High solder volume precision and production yields using pick and place • Available in many alloys, sizes and shapes • Flux coated versions available (*some fluxes contain halogens)	LTS	Pb	HF*
SMT / PTH – Point Soldering, Re-work and Repair	Cored Wire	**ALPHA® Telecore® HF-850** *Innolot / SAC305* • Performs well with all standard pad finishes • Can be used in both robotic and manual soldering processes • ROL0		Pb	HF
		ALPHA® Telecore® XL-825 *SAC305* • Best for difficult to solder surfaces • Can be used in both robotic and manual soldering processes • ROL1		Pb	
		Kester® 268 *SAC305* • Optimized for low spatter robotic soldering • Can be used for manual and automated soldering processes • Zero halogen • ROL0		Pb	HF
		Kester® 285 *SAC305* • Highly active for soldering difficult surfaces while retaining ROL0 class • Can be used for manual and automated soldering processes • ROL0		Pb	

Automotive lighting creates unique challenges on assembly materials. High power automotive lighting applications require excellent thermal management in harsh operating conditions to ensure consistent light output and minimum system degradation.

Key Requirements:

- High thermo-mechanical reliability
- High value, lowers total cost per lumen
- Maximize light output with minimal degradation over time
- Transparent and minimal residues

AUTOMOTIVE: **Lighting / LED continued**

APPLICATION	PRODUCT TYPE	PRODUCT	PB FREE	HALOGEN FREE	VOC FREE
SMT – Dispensing	Adhesive	**ALPHA® HiTech™ AD43-9600W** • Good adhesion on FR4 and PMMA lens • Fast curing enabling high throughput manufacturing • White coloring eliminates 'flaring' during initial LED illumination		HF	
		ALPHA® HiTech™ SM42-1311 • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)		HF	
SMT – Printing	Adhesive	**ALPHA® HiTech™ SM42-120P** • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)		HF	
PTH – Wave / Selective Soldering	Bar and Solid Wire Solder	**ALPHA® SAC305** • Excellent soldering performance • High thermal fatigue resistance • Widely used	Pb		
		ALPHA® SACX Plus 0807 • Low Silver (0.8%) for improved value vs. SAC305 • SAC305-like soldering and reliability performance on complex assemblies • Low Copper dissolution and low drossing	Pb		
		ALPHA® SACX Plus 0307 *for interior lighting only* • Low Silver (0.3%) for improved value vs. SAC305 • Low Copper dissolution and low drossing • Excellent for most standard assemblies	Pb		
	Liquid Flux	**ALPHA® EF-2210** • ORL0 • Passes IPC J-STD-004A • VOC free	Pb		VOC
		ALPHA® EF-6000 • ORL0 • Passes IPC J-STD-004A • High activity, rosin-free formula can be cleaned with DI water	Pb		
		ALPHA® EF-6808HF • ROL0 • Passes IPC J-STD-004B • Excellent for most standard complexity assemblies	Pb	HF	
		Kester® 951 • ORL0 • Passes SIR IPC J-STD-004 • Rosin-free formula for clean post-soldering surface	Pb	HF	
		Kester® NF1060-VF • ORM0 • VOC free • Passes SIR IPC J-STD-004B • Exceptional wetting with excellent hole-fill	Pb	HF	VOC
		Kester® NF372-TB • ROL0 • Passes SIR IPC J-STD-004B • Sustained flux activity in challenging heating profile	Pb	HF	

Automotive Material Solutions

ALPHA® Product Offerings for Automotive

Power Your Path

WITH MACDERMID ALPHA ELECTRONICS SOLUTIONS

CONNECT WITH OUR EXPERTS

techinfo@macdermidalpha.com

macdermidalpha.com

MacDermid Alpha ELECTRONICS SOLUTIONS

ALPHA and Kester are product brands of MacDermid Alpha Electronics Solutions. ©2024. MacDermid, Inc. and its group of companies. All rights reserved. "(R)" and "TM" are registered trademarks or trademarks of MacDermid, Inc. and its group of companies in the United States and/or other countries.