

Automotive Material Solutions

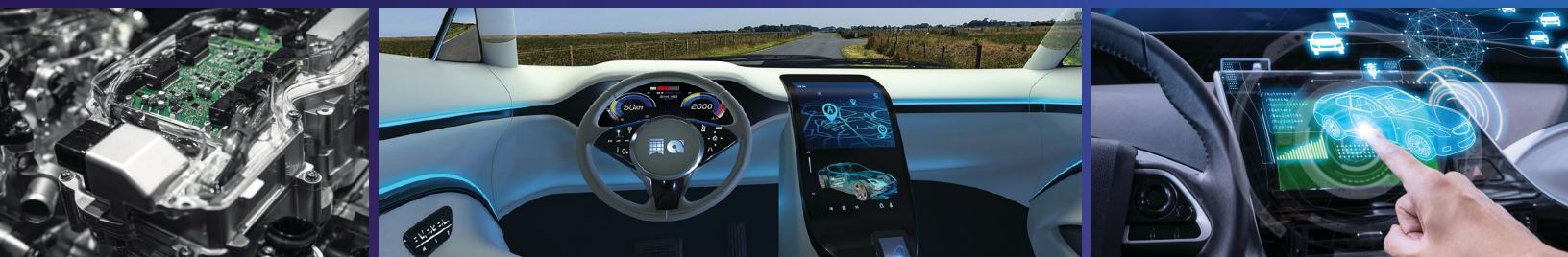
ALPHA® Product Offerings for Automotive

AUTOMOTIVE MARKETS



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.

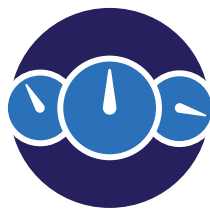
For example: ALPHA® CVP-390V Innolot MXE is a lead-free, no clean solder paste designed for high reliability applications, to maximize the thermomechanical performance of a solder joint and provide excellent electrochemical reliability in harsh operating conditions.

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.



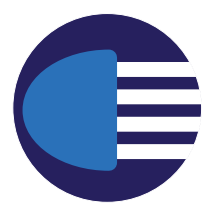
Underhood



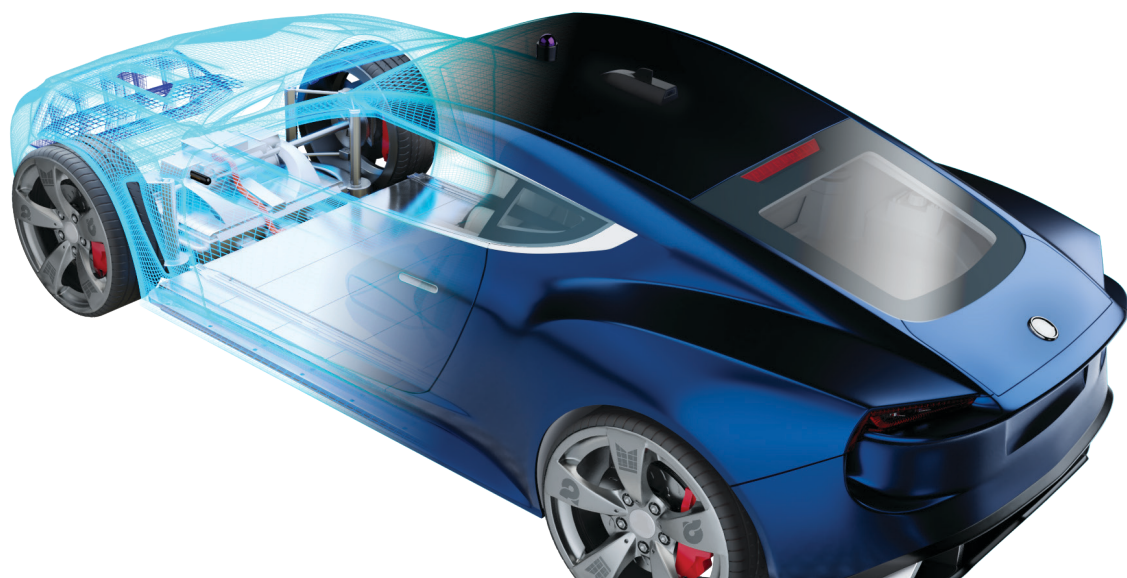
In-Cabin



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			
	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)			
		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)			
SMT / PTH – Pick and Place	Preforms	ALPHA® BTC-578 Accuflux Preforms <i>Innolot / SAC305 / Low-temp</i> - Increasing thermal conductivity and heat dissipation through void reduction - Low flux residue improves electrochemical reliability - Prevents mechanical stackup issues through increased solder volume			
		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)			
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			
		ALPHA® Telecore® XL-825 SAC305 - Best for difficult to solder surfaces - Can be used in both robotic and manual soldering processes - ROL1			
		Kester® 268 SAC305 - Optimized for low spatter robotic soldering - Can be used for manual and automated soldering processes - Zero halogen - ROL0			
		Kester® 285 SAC305 - Highly active for soldering difficult surfaces while retaining ROL0 class - Can be used for manual and automated soldering processes - ROL0			
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)			

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			
		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			
	Liquid Flux	ALPHA® EF-2210 • ORLO • Passes IPC J-STD-004A • VOC free			
		ALPHA® EF-6000 • ORLO • Passes IPC J-STD-004A • High activity, rosin-free formula can be cleaned with DI water			
		ALPHA® EF-6808HF • ROLO • Passes IPC J-STD-004B • Excellent for most standard complexity assemblies		HF	
		ALPHA® EF-8800HF • ORLO • Passes IPC J-STD-004B • Designed for thick boards		HF	
		Kester® 951 • ORLO • Passes SIR IPC J-STD-004 • Rosin-free formula for clean post-soldering surface		HF	
		Kester® NF1060-VF • ORM0 • VOC free • Passes SIR IPC J-STD-004B • Exceptional wetting with excellent hole-fill		HF	
		Kester® 985M • ORM0 • Passes SIR IPC J-STD-004B • Excellent solderability even on high density board			
		Kester® NF372-TB • ROLO • Passes SIR IPC J-STD-004B • Sustained flux activity in challenging heating profile		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			
	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			
		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			
		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			
SMT / PTH – Pick and Place	Preforms	ALPHA® BTC-578 Accuflux Preforms <i>Innotec / SAC305 / Low-temp</i> - Increasing thermal conductivity and heat dissipation through void reduction - Low flux residue improves electrochemical reliability - Prevents mechanical stackup issues through increased solder volume			
		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)			
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			
		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			
		Kester® 268 SAC305/K100LD - Optimized for low spatter robotic soldering - Can be used for manual and automated soldering processes - Zero halogen - ROL0			
		Kester® 285 SAC305 - Highly active for soldering difficult surfaces while retaining ROL0 class - Can be used for manual and automated soldering processes - ROL0			

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			
		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			
		ALPHA® SACX Plus 0307 • Low Silver (0.3%) for improved value vs. SAC305 • Low Copper dissolution and low drossing • Excellent for most standard assemblies			
	Liquid Flux	ALPHA® EF-2210 • ORLO • Passes IPC J-STD-004A • VOC free			
		ALPHA® EF-6000 • ORLO • Passes IPC J-STD-004A • High activity, rosin-free formula can be cleaned with DI water		HF	
		ALPHA® EF-6808HF • ROLO • Passes IPC J-STD-004B • Excellent for most standard complexity assemblies		HF	
		Kester® 951 • ORLO • Passes SIR IPC J-STD-004 • Rosin-free formula for clean post-soldering surface		HF	
		Kester® NF1060-VF • ORM0 • VOC free • Passes SIR IPC J-STD-004B • Exceptional wetting with excellent hole-fill		HF	
		Kester® NF372-TB • ROLO • Passes SIR IPC J-STD-004B • Sustained flux activity in challenging heating profile		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			
	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)			
		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)			
		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			
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			
		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)			
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			
		ALPHA® Telecore® XL-825 SAC305 - Best for difficult to solder surfaces - Can be used in both robotic and manual soldering processes - ROL1			
		Kester® 268 SAC305 - Optimized for low spatter robotic soldering - Can be used for manual and automated soldering processes - Zero halogen - ROL0			
		Kester® 285 SAC305 - Highly active for soldering difficult surfaces while retaining ROL0 class - Can be used for manual and automated soldering processes - ROL0			

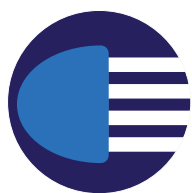
Advanced warning systems, such as lane departure, cruise control and pedestrian detection, utilize sensors and other sensitive components that create new challenges for high reliability vehicle electronics. The integration of these systems plus radar, vision and LIDAR systems, into vehicles requires 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			
	Adhesive	ALPHA® HiTech™ SM42-1311 • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)			
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)			
PTH – Wave / Selective Soldering	Bar and Solid Wire Solder	ALPHA® SAC305 • Excellent soldering performance • High thermal fatigue resistance • Widely used			
		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			
	Liquid Flux	ALPHA® EF-2210 • ORLO • Passes IPC J-STD-004A • VOC free			
		ALPHA® EF-6000 • ORLO • Passes IPC J-STD-004A • High activity, rosin-free formula can be cleaned with DI water			
		ALPHA® EF-6808HF • ROLO • Passes IPC J-STD-004B • Excellent for most standard complexity assemblies			
		ALPHA® EF-8800HF • ORLO • Passes IPC J-STD-004B • Designed for thick boards			
		Kester® 951 • ORLO • Passes SIR IPC J-STD-004 • Rosin-free formula for clean post-soldering surface			
		Kester® NF1060-VF • ORM0 • VOC free • Passes SIR IPC J-STD-004B • Exceptional wetting with excellent hole-fill			
		Kester® NF372-TB • ROLO • Passes SIR IPC J-STD-004B • Sustained flux activity in challenging heating profile			



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			
	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)			
		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)			
		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			
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			
		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)			*
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			
		ALPHA® Telecore® XL-825 SAC305 - Best for difficult to solder surfaces - Can be used in both robotic and manual soldering processes - ROL1			
		Kester® 268 SAC305 - Optimized for low spatter robotic soldering - Can be used for manual and automated soldering processes - Zero halogen - ROL0			
		Kester® 285 SAC305 - Highly active for soldering difficult surfaces while retaining ROL0 class - Can be used for manual and automated soldering processes - ROL0			

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			
		ALPHA® HiTech™ SM42-1311 • Non-Sagging • Excellent adhesion on FR4 • Resists change due to high heat post application processing (i.e., wave soldering)			
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)			
PTH – Wave / Selective Soldering	Bar and Solid Wire Solder	ALPHA® SAC305 • Excellent soldering performance • High thermal fatigue resistance • Widely used			
		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			
		ALPHA® SACX Plus 0307 <i>for interior lighting only</i> • Low Silver (0.3%) for improved value vs. SAC305 • Low Copper dissolution and low drossing • Excellent for most standard assemblies			
	Liquid Flux	ALPHA® EF-2210 • ORLO • Passes IPC J-STD-004A • VOC free			
		ALPHA® EF-6000 • ORLO • Passes IPC J-STD-004A • High activity, rosin-free formula can be cleaned with DI water			
		ALPHA® EF-6808HF • ROLO • Passes IPC J-STD-004B • Excellent for most standard complexity assemblies			
		Kester® 951 • ORLO • Passes SIR IPC J-STD-004 • Rosin-free formula for clean post-soldering surface			
		Kester® NF1060-VF • ORM0 • VOC free • Passes SIR IPC J-STD-004B • Exceptional wetting with excellent hole-fill			
		Kester® NF372-TB • ROLO • Passes SIR IPC J-STD-004B • Sustained flux activity in challenging heating profile			

Automotive Material Solutions

ALPHA® Product Offerings for Automotive

Power Your Path

WITH MACDERMID ALPHA ELECTRONICS SOLUTIONS

CONNECT WITH OUR EXPERTS

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