

Pioneering the Intersection of Sustainability and Profitability

SUSTAINABLE SOLUTIONS

Wafer Level
Packaging

Semiconductor
Assembly

Circuitry

Circuit Board
Assembly

Film & Smart
Surface



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Sustainability
ENVIRONMENTALLY FOCUSED

Our Focus

Our primary focus is to pioneer chemistry and advanced material formulations that break technology barriers with greener chemistries and improve manufacturing processes.

All while enhancing our customers' profitability and enabling next generation electronic devices.

“ The intersection of sustainability and profitability is well established in our business and has become more significant over time.

Our vision is for our chemical technology to enable sustainability in the markets we serve with environmentally and socially conscious innovation.”



Empowering Sustainability: MacDermid Alpha Electronic Solutions Drive Sustainable Development Goals Achievements

 1 NO POVERTY No poverty	 7 AFFORDABLE AND CLEAN ENERGY Affordable and clean energy	 13 CLIMATE ACTION Climate action
 2 ZERO HUNGER Zero hunger	 8 DECENT WORK AND ECONOMIC GROWTH Decent work and economic growth	 14 LIFE BELOW WATER Life below water
 3 GOOD HEALTH AND WELL-BEING Good health and well-being	 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE Industry, innovation and infrastructure	 15 LIFE ON LAND Life on land
 4 QUALITY EDUCATION Quality education	 10 REDUCED INEQUALITIES Reduced inequalities	 16 PEACE, JUSTICE AND STRONG INSTITUTIONS Peace, justice and strong institutions
 5 GENDER EQUALITY Gender equality	 11 SUSTAINABLE CITIES AND COMMUNITIES Sustainable cities and communities	 17 PARTNERSHIPS FOR THE GOALS Partnerships for the Goals
 6 CLEAN WATER AND SANITATION Clean water and sanitation	 12 RESPONSIBLE CONSUMPTION AND PRODUCTION Responsible consumption and production	

Reclaim and Recycling Services

MacDermid Alpha offers comprehensive and efficient recycling services*, tailored to assist companies in meeting both environmental regulations and operational needs. Our commitment to sustainability ensures that waste materials are managed responsibly, maximizing value while minimizing environmental impact.



Waste Management

We specialize in the management of various waste streams including:

- Wave Solder Dross
- Solder Paste, Solder Bar and Wire
- Scrap Populated and Unpopulated Circuit Boards
- Empty Paste Jars and Cartridges
- Solder Ingots and Industrial Alloys
- Pot Dump and Contaminated Solder Bath
- Hot Air Solder Level (HASL Dross)
- ALPHA® Argomax® Sintering Material Scrap

*Full reclaim and recycling services available in North America. In Europe and South America, reclaim services are broadly available.



An Easy Step-by-Step Process

We provide customers an easy step-by-step process guided by our experienced staff. We provide pre-labeled, tough, sealable and disposable metal recycling buckets and drums. All shipments are lot traceable and certification can be provided on request. Our staff can help customers with process logistics to meet desired schedule. This process allows for prompt and accurate settlement by bank transfer once materials are received and recycled at our reclamation facility.



Environmental Compliance

Our services ensure environmental compliance through:

- Certified recycling practices
- Lot traceability for accountability
- Cradle-to-grave disposal management

Partner with MacDermid Alpha for expert recycling solutions that addresses your waste management needs and environmental responsibility. Together, let's maximize the value of waste streams while minimizing environmental impact.

Halogen-Free Materials

Green Chemistry

Our Green Chemistry solutions are specifically designed to address the inherent risks associated with halogens in electronics. By effectively mitigating these risks, we safeguard human health and protect the environment from potential harm arising from direct exposure or improper disposal practices.

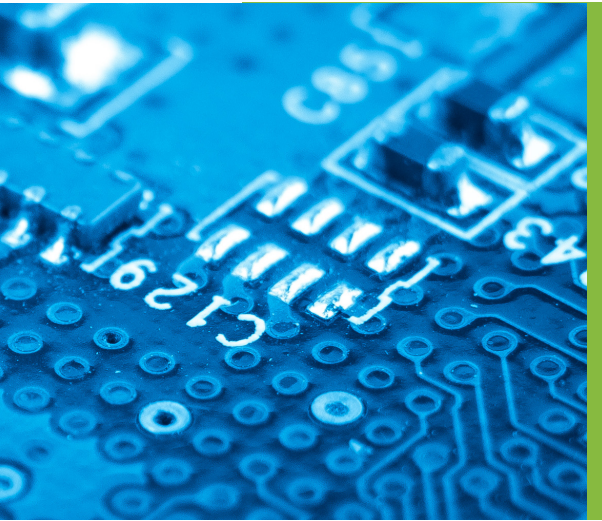
Compliance with stringent regulations such as REACH and RoHS is integral to our practices. We ensure that sustainable solutions are available for our valued customers throughout the supply chain including end-of-life treatment to promote safe e-waste disposal practices. This, in turn, significantly reduces the likelihood of hazardous chemical releases into the environment.

At the core of our approach lies a commitment to Green Chemistry principles. By embracing these principles, we integrate environmental responsibility and safety considerations into every aspect of our operations. This ensures that sustainability remains a cornerstone of our business ethos, driving our efforts towards a more sustainable future for all.

Halogen-Free Materials

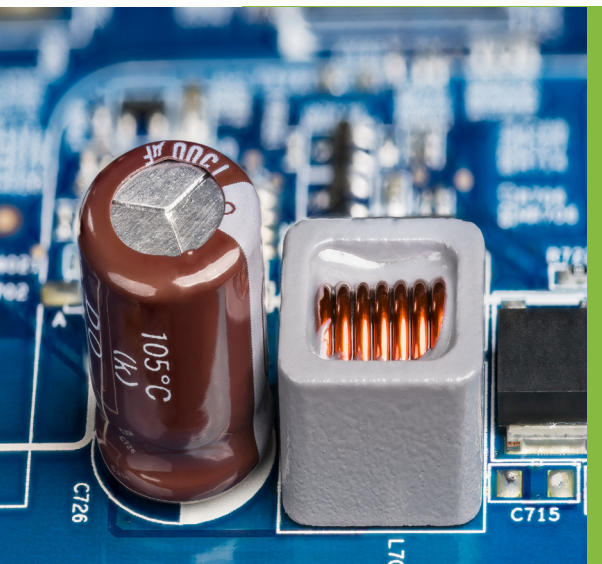
- Solder Paste, Paste Flux, Liquid Fluxes, Cored Wire
- Water Soluble, No Clean and RMA options
- Highly active, fast wetting, stable flux formulations
- All ALPHA HiTech® products are Halogen-free
- Superior mechanical performance

Low Temperature Solutions



Low Temperature Solder Pastes

MacDermid Alpha range of low temperature alloy and flux combinations are engineered to meet increasingly challenging assembly requirements and can lower peak reflow temperatures up to 100°C compared to SAC305. Low temperature solutions minimize the risk of Coefficient of Thermal Expansion (CTE) mismatches, enable the use of low-cost components and substrates, and can significantly reduce Scope 2 emissions and energy consumption related to the reflow process.



Low Temperature Reinforcing Adhesives and Encapsulants

The ALPHA® HiTech® line offers adhesives, underfills, and edge bonding materials that cure at low temperatures, ensuring enhanced board-level reliability. Formulated to adhere seamlessly to both plastic and metal surfaces, these products are easy to apply and minimize the impact of curing on temperature-sensitive components. Moreover, they significantly bolster mechanical reliability, ultimately extending the lifetime of the device.



Key Benefits of Low Temperature Solutions:

- Dropping oven temperature by 55°C lowers energy consumption by 36,274 kWh or 13,484 kg of CO₂e emissions by per oven annually.

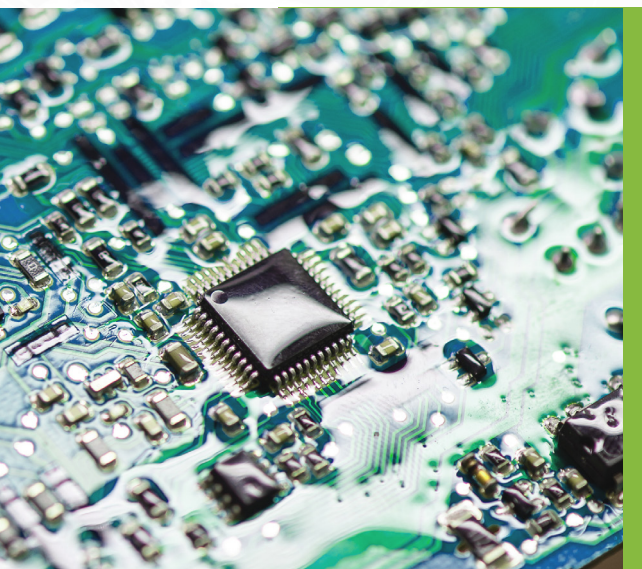
Low VOC and VOC-Free Chemistries



Chemistries

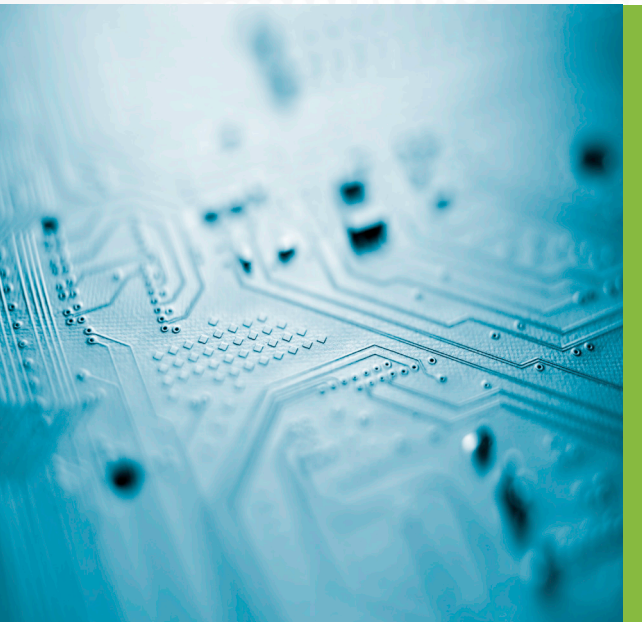
Volatile Organic Compound (VOC) emissions undergo chemical reactions in the atmosphere, posing adverse effects on human health, the environment, while contributing to global warming.

MacDermid Alpha customer sustainability initiatives aim to deliver multifaceted benefits. By enhancing regulatory compliance, we mitigate risks associated with the storage and handling of hazardous materials, ensuring a safer working environment. Furthermore, our efforts to reduce harmful emissions contribute to promoting cleaner air quality, aligning with our commitment to environmental stewardship. Together, these measures foster a healthier ecosystem and demonstrate our dedication to sustainable practices and social responsibility.



Conformal Coatings

Discover the Electrolube® line of low VOC and VOC-Free conformal coatings, offering eco-friendly alternatives without sacrificing performance. The range includes solvent-free options such as single-part UV cure and 2k formulations, ensuring reliability in harsh environments and resistance to moisture, corrosive gases, chemicals, salt spray, and extreme temperatures. By preventing corrosion and electrochemical failures, our coatings extend the life of electronic systems, exemplifying commitment to sustainability and reliability.



Liquid Fluxes

Discover ALPHA® liquid flux solutions designed for customer sustainability, offering low and VOC-free options for wave, spray, or dip applications. Choose from various formulations, including no-clean and water-soluble types, with halide-free, zero halogen, and non-toxic chemistries available. These liquid fluxes ensure high electrochemical reliability, exceptional wetting for optimal hole-fill, and low-defect soldering in lead-free assemblies. Engineered for performance comparable to alcohol fluxes, MacDermid Alpha prioritizes environmental responsibility without compromising on quality.

CircularSolder™ Pastes

Join the CircularSolder Community: Close the Loop on Solder Supply Chain!

The CircularSolder Program champions a Circular Economy. Partner with MacDermid Alpha, a certified, trusted recycler, to recover your solder scrap, solder dross or various forms of solder waste. Together, we transform it into high-performance R9 solder paste, meeting /exceeding IPC J-STD-001 alloy purity specifications.

Benefits of Recycled Metal:

- Reduces dependence on mining and Green House Gas (GHG's) emissions
- Eliminates land-fill disposal of solder waste
- Operates independent of "conflict" metal sourcing and supports human rights globally
- Minimizes natural resource consumption



Key Benefits of CircularSolder™*:

- Avoids 3.94 kgs of CO₂e emissions per kg of paste
- Consumes 44% less energy per kg of tin
- Lowers ozone formation by 61% per kg of tin
- Recycled tin meets or exceeds IPC J-STD-001 purity specifications
- Solder pastes using recycled tin exhibit the same overall performance as pastes made with primary sourced tin

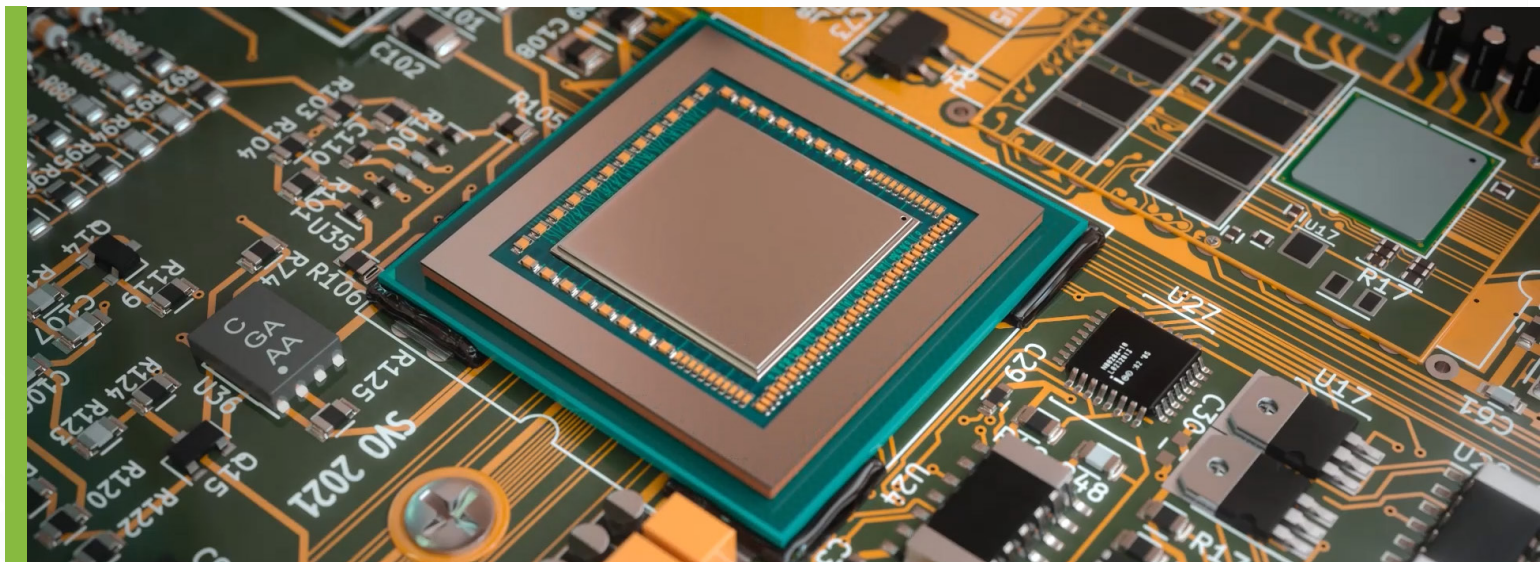


Lowering Carbon Footprint

- Utilizing recycled metals in solder paste is instrumental in reducing carbon emissions associated with mining, processing, and transporting raw materials, significantly lowering the carbon footprint.¹

¹ International Tin Association. (2024, January 15). internationaltin.org

Bio-Based Polymers



Revolutionizing Sustainability: Electrolube® Bio-Based Resins and Conformal Coatings

Electrolube® Bio-Based Resins and Conformal Coatings utilize naturally occurring polymer building blocks derived from renewable resources such as corn husk, rice husk, vegetable oil, and eggshells. Here is how Electrolube® bio-based polymers deliver:

- **Reduced Environmental Impact:** By integrating biogenic ingredients into our synthetic polymers, we significantly minimize the environmental impact associated with oil mining and processing, ensuring a sustainable future for generations to come.
- **Pollution Mitigation:** With bio-based polymers that actively mitigate air, water, and land pollution, aligning with our commitment to environmental stewardship and supporting the Circular Economy.
- **Regulatory Compliance:** Compliant with stringent regulations like REACH and RoHS, MacDermid Alpha offerings meet regulatory standards and contribute to carbon neutrality, amplifying our sustainable endeavors.

Unlocking Sustainability: Key Benefits of Bio-Based Polymers

- **Supports Carbon Neutrality:** Bio-based polymers contribute to carbon neutrality by utilizing renewable resources and reducing reliance on fossil fuels.
- **Reduces Scope 3 Upstream Emissions and Natural Resource Consumption:** By diminishing the need for oil mining, bio-based polymers help mitigate Scope 3 upstream emissions and lessen the strain on natural resources.
- **Utilization of Renewable Resources:** Bio-based polymers are derived from renewable resources, offering a sustainable alternative to traditional petroleum-based polymers.



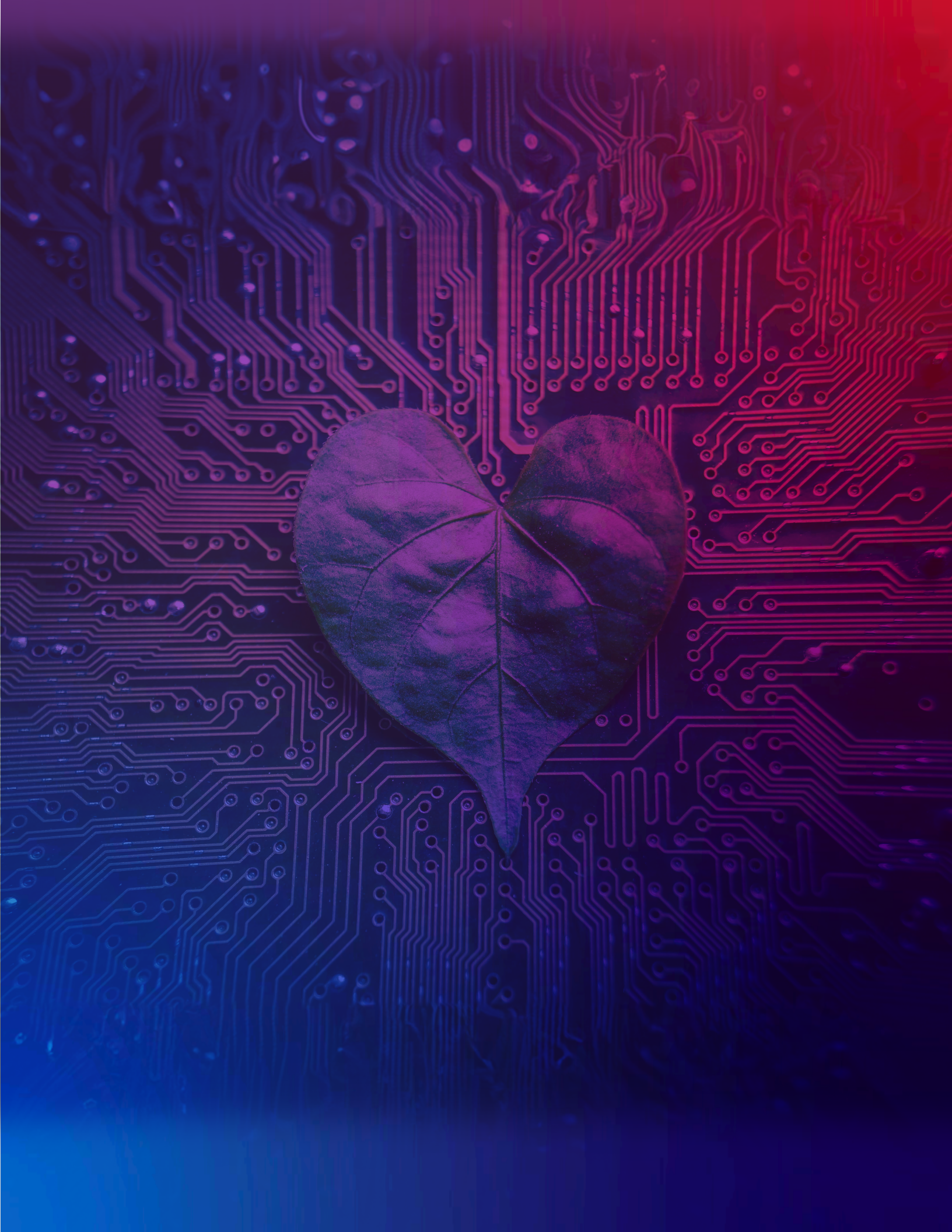
Sustainability Enabling Alloys

PB-Free and Low/No Silver Alloys

MacDermid Alpha Pb-Free and Low/No Silver Alloys adhere to relevant Pb-Free directives such as RoHS, ensuring compliance with industry standards. By opting for these alloys, customers can promote worker safety and reduce environmental impact while benefiting from lower total cost of ownership, particularly with Low/No Silver options that effectively cut soldering material costs. Moreover, these alloys contribute to reducing Scope 3 Upstream Emissions and conserving natural resources, specifically by lowering energy consumption and emissions associated with silver mining. Embracing these advanced, conflict-free alloys signifies a commitment to sustainability, efficiency, and responsible resource management in soldering applications.

Key Benefits of Sustainable Solder Alloys

- Certified “Conflict-Free”
- Alloys are recoverable - reducing material waste
- Regulatory compliance: REACH/RoHS
- Improves Safety
- Reduces Environmental Impact



ABOUT:

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 electronics manufacturers worldwide.

With a legacy spanning over a century of innovation, MacDermid Alpha has garnered the trust of manufacturers spanning more than 50 countries. What sets MacDermid Alpha Electronics Solutions apart is our unique ability to promptly deliver high-quality solutions and provide technical services that comprehensively cover the entire electronics supply chain.

We are actively shaping industries such as automotive, consumer electronics, mobile devices, telecom, data storage, and infrastructure.

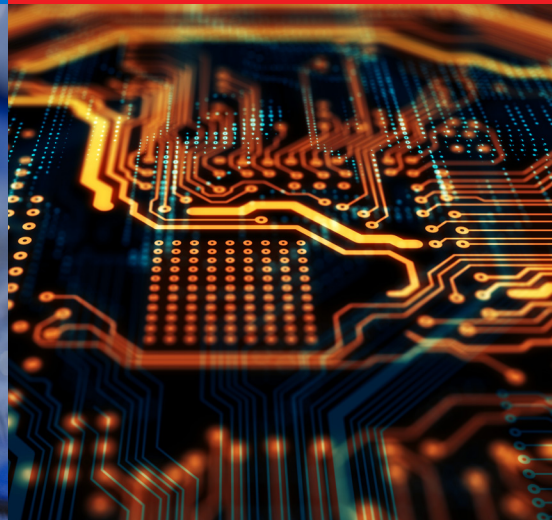
Wafer Level Packaging



Semiconductor Assembly



Circuitry Solutions



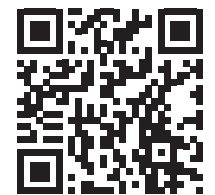
Circuit Board Assembly



Film & Smart Surface Solutions



macdermidalpha.com



MacDermid Enthone and Alpha are product brands of MacDermid Alpha Electronics Solutions.

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