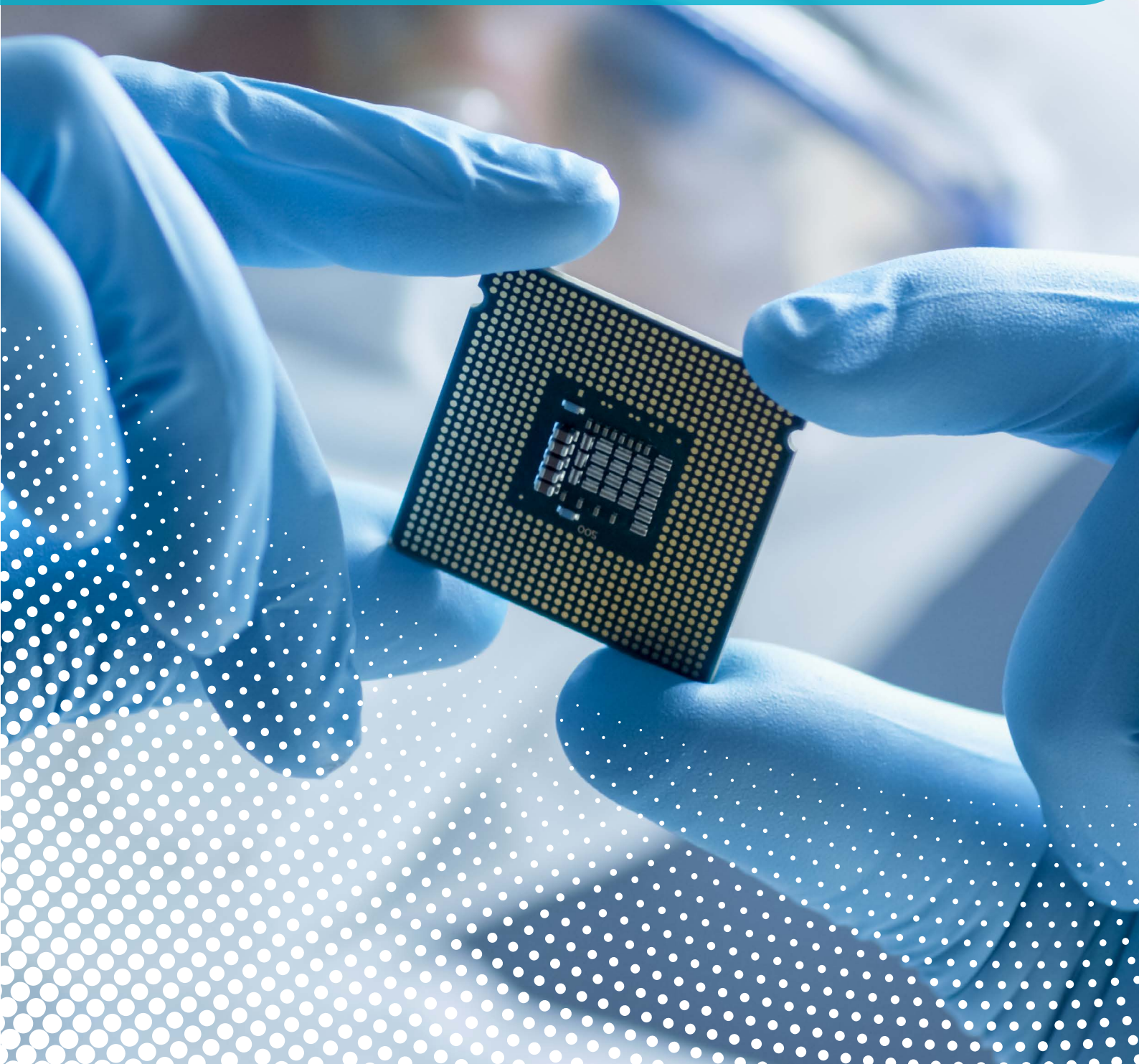
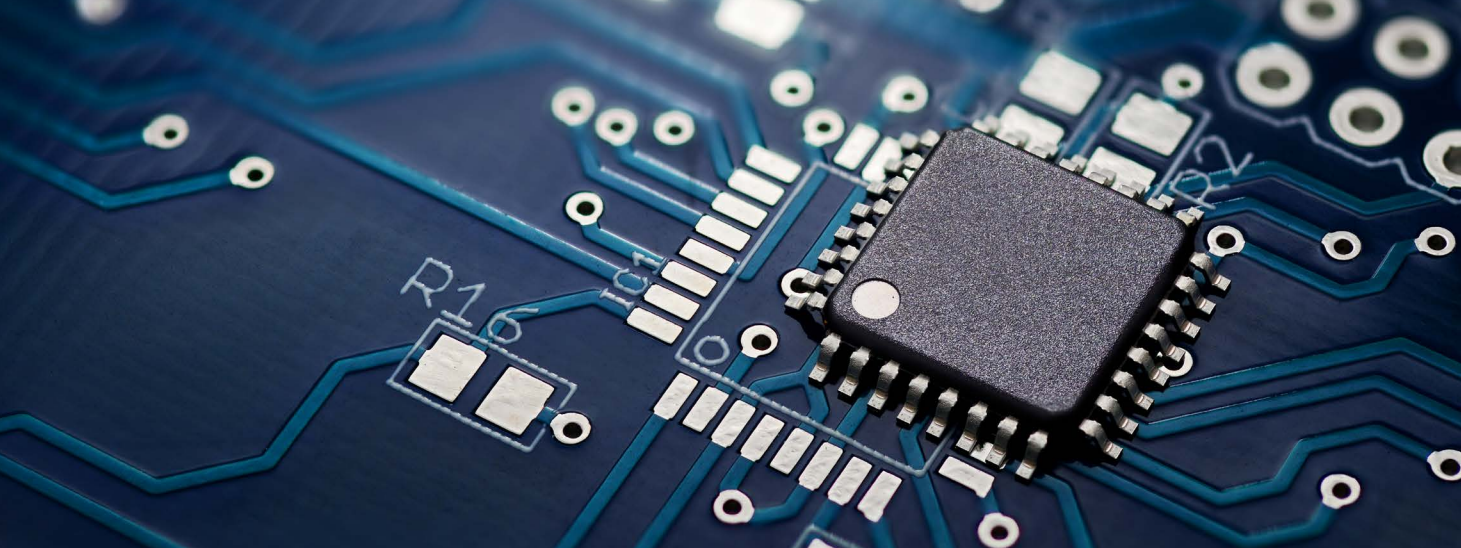


PURASOLV[®] ELECT

EXCEPTIONAL BIOBASED SOLVENTS FOR THE MICROELECTRONICS INDUSTRY





Exceptional biobased solvents for the microelectronics industry

Manufacturers in today's global microelectronics industry continually strive to maintain some of the most rigorous quality standards in the world. They also feel pressure to reduce their reliance on fossil-based solutions.

Based on lactate esters, Corbion's PURASOLV® range of biobased solvents offer high performance and a good safety profile, making them an excellent alternative to conventional solvents. Our PURASOLV ELECT is a superior-grade ethyl lactate of the highest purity that's ideally suited to the most advanced micro-electronics applications. But what's "outstanding" today may not be tomorrow, so we remain committed to continuously improving the specifications and efficacy of PURASOLV ELECT to stay ahead of evolving industry standards.

Proven and versatile

Best-in-class ethyl lactate PURASOLV ELECT has a long track record of success in microelectronics, giving formulators and manufacturers the confidence to leverage its outstanding solvency for many polymers in a wide variety of applications. For key properties, please refer to Table 1.

Primary applications in semiconductor production include:

- Photoresist solvent
- Thinner
- Edge bead removal

PURASOLV ELECT also delivers significant benefits in other applications, such as:

- LCD cleaning
- Capacitors (electronics binders)

Trusted by manufacturers across the industry, PURASOLV ELECT represents the current quality standard for ethyl lactate in microelectronics applications.

Our solution for next-generation photolithography

PURASOLV ELECT Ultra, our highest-quality ethyl lactate, reduces metal content to the ultra-low levels that are essential in the next-generation semiconductor production.

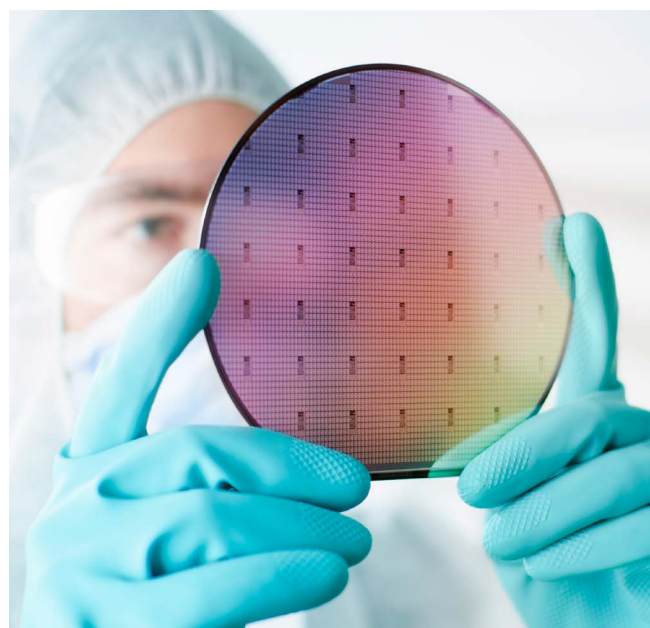
Consistent high product quality



Corbion provides a differentiating combination of best-in-class product quality, highest-level service and a reliable, trustworthy supply chain.

Superior solvency and best-in-class product quality:

- ▶ Excellent solvency power
- ▶ High purity, low metal content
- ▶ Good wetting properties
- ▶ Safe for workers
- ▶ 100% biobased



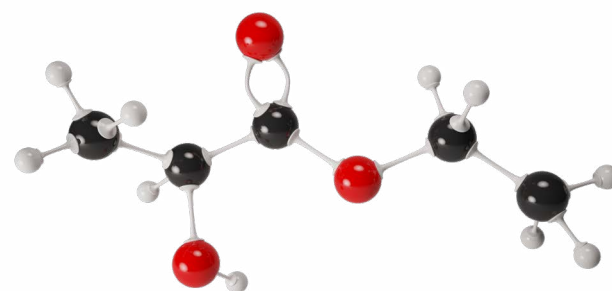
Corbion delivers products consistently high quality backed by equally outstanding service to meet microelectronics standards. PURASOLV ELECT and ELECT Ultra combine low metal specifications with rigorous Statistical Process Control (SPC) to provide consistency across all product parameters. Table 2 details which metals are measured.

Safe solvents with low toxicity profile

The EHS profile of PURASOLV solvents is among the best in the industry. They are 100% biobased, readily biodegradable and environmentally friendly, which means they are easy to use. PURASOLV solvents are registered under both REACH and EPA (TSCA).

Properties	PURASOLV® ELECT (Ultra)	Unit
INCI name	ethyl (S)-lactate	
CAS no.	687-47-8	
EC no.	211-694-1	
Molecular weight	118.13	g/mol
Formula	C ₅ H ₁₀ O ₃	
Boiling point	154/309	°C/°F
Flash point (ISO 2719)	56/133	°C/°F
Melting point*	-9/16	°C/°F
Liquid density	1.03	g/ml at 20°C/68°F
Surface tension	30.4	mN/m at 25°C/77°F
Viscosity	2.8	mPa·s at 20°C/68°F
Vapor pressure	2.2	mbar at 20°C/68°F
Relative evaporation rate	0.22	n-BuAc=1
Partition coefficient (Log P)	0.03	octanol/water
Hildebrand solubility parameter	21.7	(J/cm ³) ^{1/2}

Table 1. PURASOLV ELECT (Ultra) properties



Ethyl lactate molecule structure

Properties	PURASOLV® ELECT	PURASOLV® ELECT Ultra
Assay	≥ 99.7%	≥ 99.7%
No. of metals on CoA	28	41
Metal purity	≤ 1000 ppt	≤ 500 ppt

Table 2. Metals measured in PURASOLV ELECT (Ultra)

* The freezing point of PURASOLV ELECT is, in general, lower than its melting point (T_m = -9 °C). The crystallization temperature is not fixed; rather, it is dependent on application conditions (e.g., cooling rate and solvent purity).

Quality assurance & services

Consistency and traceability throughout production

- High-purity manufacturing process
- Dedicated ethyl lactate production plant prevents contamination
- Well-documented QA/QC processes across production steps
- Guaranteed batch traceability to raw material (incl. full backward integration into lactic acid feedstock)
- Nanofiltration capability reduces particle count in end product
- Automated packing in HEPA-filtered pressurized room



Quality Control & sampling

- High-quality sampling and analytics with clean room processing of samples for analysis on state-of-the-art ICP-MS analyzer
- Metrology that can be trusted (verified by alignment study with customers)
- Annual SPC evaluation and setting of control limits
- Quarterly SQC based on process capability
- Trend monitoring
- Qualified, well-trained personnel
- Continuous improvement program, including new methods and analytics

Customer support

- Dedicated technical and quality assurance support
- Local commercial support and logistics coordination
- Thorough Process Change Notification (PCN) process
- Customized business continuity planning
- Open to co-creation and customization



Ensuring security of supply

A global integrated supply chain

Corbion's integrated supply chain, with lactic acid facilities on four continents, enables us to offer excellent security of supply. With a global supply chain and product registrations, we are able to effectively support your global operations and deliver consistent product quality across regions. We employ multiple sourcing and stock keeping strategies as part of our commitment to Business Continuity Planning (BCP). In practical terms, this means we offer reliability, even when the unexpected happens and our customers need it most.

Committed to supply your long-term business growth

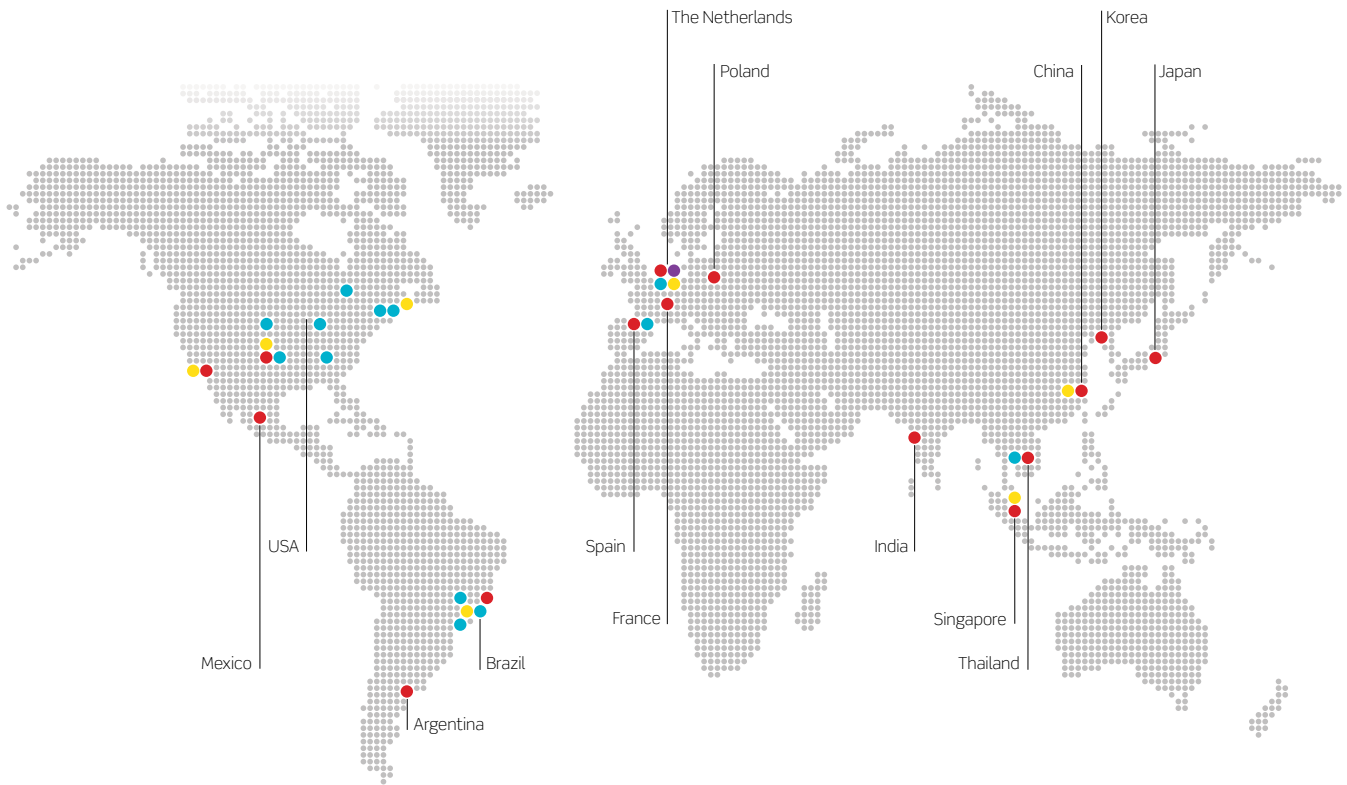
Corbion continues to expand production capacity to support our customers in the fast-growing microelectronics industry. We are dedicated to ensuring long-term security of supply for key lactic acid derivatives like ethyl lactate.



Production site at Gorinchem, The Netherlands

Let us know how we can help you

● Corbion Headquarters ● Corbion Production Location ● Corbion Sales Office ● Corbion Innovation Center



corbion.com/contact

About Corbion

Corbion is the global market leader in lactic acid, lactic acid derivatives, and a leading company in emulsifiers, functional enzyme blends, minerals, vitamins and algae ingredients. We develop sustainable ingredient solutions to improve the quality of life for people today and for future generations. For over 100 years, we have been uncompromising in our commitment to safety, quality, innovation and performance. Drawing on our deep application and product knowledge, we work side-by-side with customers to make our cutting edge technologies work for them. Our solutions help differentiate products in markets such as food, home & personal care, animal nutrition, pharmaceuticals, medical devices, electronics and bioplastics.

Interested in solutions for Electronics? [Go to corbion.com/electronics](http://corbion.com/electronics)



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