

Inspiring innovation

INVENTEC
PERFORMANCE CHEMICALS

ELECTRONIC ASSEMBLY MATERIALS

Soldering, Cleaning & Coating



ABOUT

Inventec
Electronic
Business Unit

Soldering Cleaning & Coating solutions Wherever you are in the world

The Dehon Group has distributed quality chemical products across Europe and the rest of the world since 1874. Throughout these years the group has gained confidence and recognition from major leading global manufacturers.

INVENTEC Performance Chemicals, merger of Promosol and Sotragal Companies of the Dehon Group, has been serving the manufacturing industry over 40 years. Today is one of the major European companies producing specialty chemicals.

Our mission: to provide sustainable solutions through our chemical products and services

We focus on:

■ The **technical performance** of our products through permanent innovation.

■ The **environment and health protection** by the substitution of hazardous substances, even before regulation requires it, and by developing risk management solutions for non substitutable hazardous substances.

■ The **proximity of our experts** in over 30 countries to implement our assembly material solutions and to support the requirements of our customers. Trust between people is the only way to build up progress.

INVENTEC is organized in 3 business units (BU): Electronics, Surface Treatment and Fine Chemicals

The Electronic Business Unit is the unique materials company specialized in developing, manufacturing and marketing soldering, cleaning and coating products for the assembly of printed circuit boards and semiconductors in high tech industries.



Our products apply to large sectors including automotive, aerospace, energy, LED lighting, solar, military and telecom. Our materials deliver a **balanced added value involving reliability, compatibility and sustainability**, key elements for high end electronics.



Our main brands:

ECOREL™ solder pastes

ECOFREC™ solder fluxes

TOPKLEAN™ solvent cleaners

PROMOCLEAN™ detergent cleaners

Inventec has 11 subsidiaries around the world and a large distribution network. Production sites in France, Switzerland, Malaysia, China, United States and Mexico; all ISO 9001 certified and equipped with control and application laboratories to guarantee traceability for lot certification according to industry standards

GREENWAY™

The sustainable development is a continuous effort

We think that this approach goes beyond Inventec products and services. This is a permanent evolution due to a « sustainable » mindset of the whole company. It means thinking about sustainable development right from the design phase and also in all implementation details of production, logistics, customer service etc...

In the long run, 30% of our products and services should meet the Greenway objectives. The extension to other activities of the Dehon group is expected.

This simple, focused and honest approach corresponds to the state of mind of an international family owned SME in High Tech markets.



Can a materials formulator and supplier stay committed to continuous improvement while assessing sustainability? **YES!**

We measure the parameters of our products that impact the **Health and the Environment**.

Our R&D engineers target to improve significantly 33% of those parameters without degrading any other. When this is achieved the product can be granted with the **Greenway** label.

A state of mind A PROACTIVE WAY!

Some of the parameters are :

Toxicity

VOCs

Storage

Chemical
reliability

Flammability

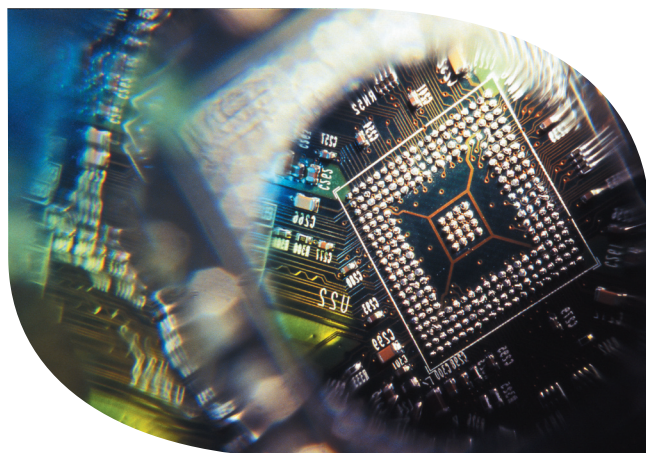
Renewable
materials

Energy

Water

Greenway will represent a new Inventec corporate identity and a real opportunity of « green growth » for our « High Tech » customers.

For more information about Greenway go to <http://greenwaybyinventec.com>



SUMMARY

P 5 SMT Soldering

- Lead free solder pastes
- Alternative Alloys
- Leaded solder pastes

P 8 PoP Assembly

- Solder paste
- Tacky flux

P 9 Wave Soldering

- Soldering flux range

P 10 PCBA Cleaning

- Solvent based cleaning
- Water based cleaning

P 13 Process and Maintenance Cleaning

- Stencil & Misprint
- Pick & Place Nozzles
- Reflow Oven & Wave system parts
- Manual cleaning

P 16 Cleaning Materials Guide Table

P 17 Coating Materials

- Conformal Coatings
- Electronic Grade Coatings

P 19 Rework & Repair

- Dispensing solder paste
- Liquid and tacky flux

P 20 LED Lighting Materials

- Solder paste
- Cleaning
- Coating

P 22 Semiconductor Packaging Materials

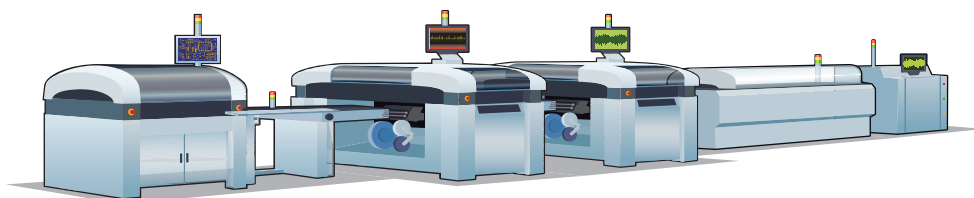
- Flip Chip and CSP
- Die Attach
- Defluxing

P 24 Tinning

- No Clean Water based flux - No halide - No halogen
- Water Soluble flux - To clean

P 25 Contacts all around the world

SMT soldering



ECOREL™ solder pastes meet the increasing number of challenges in the electronics industry due to both the evolution of the technology itself, and new legislations. Halogen free, lead free, embedded technologies, hybrid assembly, miniaturization, and other requirements are covered.

- Chemical reliability of residues after reflow
- Thermal cycling performance
- Compatibility with Conformal Coating in No Clean process
- Robust assembly process

ECOREL™ Free Lead Free Solder Pastes



| Product Name | Alloy | Main Features | Halogen Free | Bono Test | Squeegee printing | Closed Head Printing | Jet Printing | Dispensing | Pin in Paste | Packaging | | | |
|-----------------------|------------------|---|--------------|-----------|-------------------|----------------------|--------------|------------|--------------|----------------|--------|-----------|-------|
| | | | | | | | | | | Jar | | Cartridge | |
| | | | | | | | | | | 250 g 500 g | 1,2 Kg | 30 g | 100 g |
| Ecorel™ Free 305-21 | SAC305 | Pass Bono corrosion test High reliable residues Multiple reflow cycles Anti-graping | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | | |
| Ecorel™ Free 305-16 | SAC305 | Very low solder voids High First Pass Yield during ICT and FP Very good wetting on different boards including OSP Transparent residues, good cosmetics | ✓ | | ✓ | ✓ | | | ✓ | ✓ | ✓ | | |
| Ecorel™ Free 305-6D33 | SAC305 | Compatible with a large range of conformal coatings Very low ionic contamination | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | |
| Ecorel™ Free 405Y | SAC405 + dopants | High reliability for high operating temperatures Thermal cycling resistance Multiple reflow cycles | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | | |
| Ecorel™ Free 305-1-85 | SAC305 | Great repeatability dot by dot | ✓ | | | | | ✓ | | | | ✓ | ✓ |
| Ecorel™ Free HT245-16 | SnSb8.5 | Higher melting point than SAC alloy suitable for electronics operating close to 200°C, hybrid or stacking assembly including board on board | ✓ | | ✓ | | | | | ✓ | ✓ | | |
| Ecorel™ Free JP20 | SAC305 | Minimum dot diameter of 0.33 mm, T5 particle size Large process window. Easy cleanable Compatible with jet printer | ✓ | | | | ✓ | | | | | | ✓ |
| Ecorel™ Free FR2 | SAC305 | Reflow process by laser or induction | ✓ | | | | | ✓ | | ✓ | | | ✓ |

All Ecorel™ Free Solder paste fluxes are class ROL0 according to J-STD-004.

Solder pastes are available in T3 and T4 particle size. Other types are available upon request.

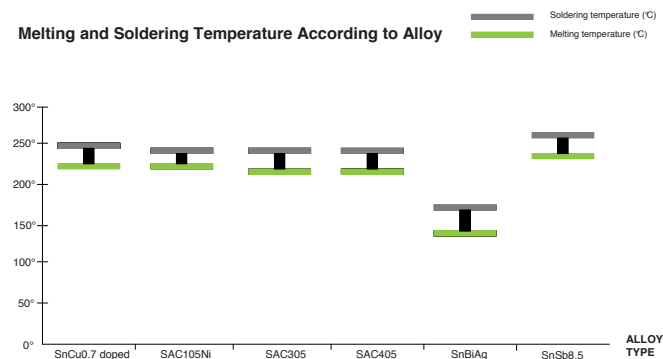
Alternative Alloys

- Cost reduction projects
- Sensitive components soldering
- Improved drop shock performance

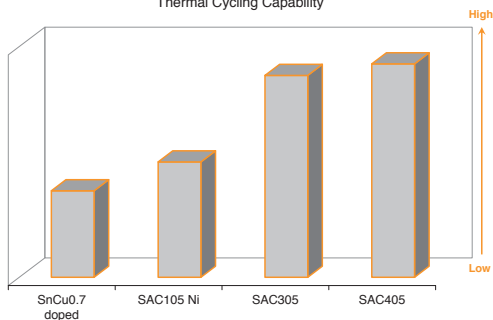


| Product Name | Alloy | Main Features | Halogen Free | Bono Test | Squeegee printing | Dispensing | Pin in Paste | Packaging | | | |
|-----------------------|-------------------|--|--------------|-----------|-------------------|------------|--------------|----------------|----------------|---------|-------|
| | | | | | | | | Jar | Cartridge | Syringe | |
| | | | | | | | | 250 g 500 g | 600g 1,2 kg | 30 g | 100 g |
| Ecorel™ Free 105-16 | SAC105Ni | Very Low solder void percentage Excellent visual cosmetic solder joint High first pass yield testability in ICT and FP Very good wetting in different board finishes including OSP. | ✓ | | ✓ | | ✓ | ✓ | ✓ | | |
| Ecorel™ Free 105-21 | SAC105Ni | Pass Bono corrosion test. High reliable residues Multiple reflow cycles | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | |
| Ecorel™ Free 007-15 | SnCu0.7 + dopants | For dispensing application Standard reflow and selective soldering | ✓ | | | ✓ | | | | | ✓ |
| Ecorel™ Free 007-16 | SnCu0.7 + dopants | Very Low solder void percentage Excellent visual solder joint cosmetics High first pass yield testability in ICT and FP | ✓ | | ✓ | | ✓ | ✓ | ✓ | | |
| Ecorel™ Free 007-21 | SnCu0.7 + dopants | Pass Bono corrosion test. High reliable residues Multiple reflow cycles | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | |
| Ecorel™ Free LT140-18 | SnBiAg | Recommended for temperature sensitive components Excellent solder joint strength Low energy consumption during reflow process | ✓ | | ✓ | ✓ | | ✓ | | | ✓ |

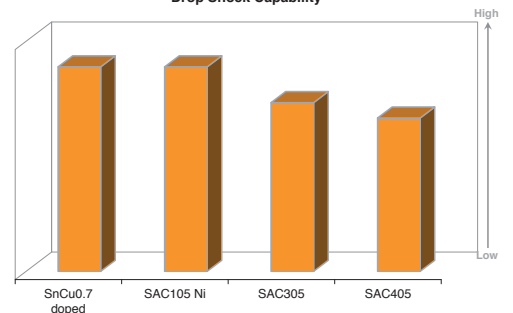
Melting and Soldering Temperature According to Alloy



Thermal Cycling Capability



Drop Shock Capability



Water soluble

| Product Name | Alloy | Main Features | Squeegee printing | Dispensing | Pin in Paste | Packaging | |
|-----------------------|--------|--|-------------------|------------|--------------|----------------|----------------|
| | | | | | | Jar | Cartridge |
| | | | | | | 250 g 500 g | 1,2 Kg 600g |
| Ecorel™ Free 305-WS12 | SAC305 | Suitable for fine pitch applications Low solder voids Requires aqueous cleaning of residues after reflow | ✓ | | | ✓ | ✓ |

ECOREL™ Easy and Solderel™ Leaded Solder Pastes



| Product Name | Main Features | Halogen Free | Bono Test | Squeegee printing | Proflow cassette | Dispensing | Jet Printing | Alloy | Flux class J-STD-004 | Packaging | | | |
|--|---|--------------|-----------|-------------------|------------------|------------|--------------|-----------|----------------------|----------------|----------------|---------|-------|
| | | | | | | | | | | Jar | Cartridge | Syringe | |
| | | | | | | | | | | 500 g 250 g | 1,4 Kg 700g | | |
| Ecorel™ Easy 803M | Large thermal process window Compatible with conformal coating | ✓ | ✓ | ✓ | ✓ | | | Sn63Pb37 | ROL0 | ✓ | ✓ | | |
| Ecorel™ Easy 802M2 | | SnPb36Ag2 | ✓ | ✓ | | | | | | | | | |
| Ecorel™ Easy 802S-85 | High dispensing stability No slump by preheating For needle diameter > 0.2 mm | ✓ | | | | ✓ | | SnPb36Ag2 | ROL0 | | | 30 g | 100 g |
| Ecorel™ Easy JP22 | Minimum dot diameter of 0.33 mm T5 particle size. Large process window. Easy cleanable Compatible with jet printers | ✓ | | | | | ✓ | SnPb36Ag2 | ROL0 | | | 100 g | |
| SOLDEREL™: rosin based mildly activated solder paste - Easy cleaning | | | | | | | | | | | | | |
| Solderel™ DMH 0524 | Excellent residue cleanability Residue must be cleaned Recommended for military and aerospace ap- plications | | | ✓ | | | | SnPb36Ag2 | ROM1 | ✓ | ✓ | | |

More than 20 years of experience in high reliability markets such as Automotive, Energy, Military and Aerospace.

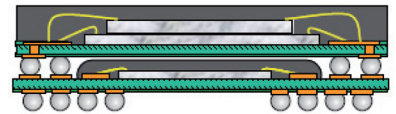
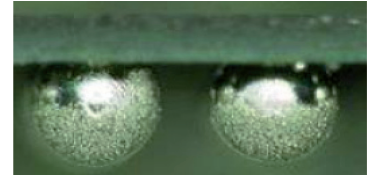
INVENTEC also offers cleaning solutions for Stencils and misprinting, pick & place nozzles and reflow ovens parts.

PoP Assembly

Solder paste

Ecorel™ Free PoP 10

- SAC 305
- Type 5 (15/25 microns)
- Application by dipping or dispensing
- Efficient and stable Bump Transfer by dipping
- Warpage defects are reduced
- No Halide, no Halogen



Tacky flux

ECOFREC™ PoP 50

- ROL0
- Application by dipping or dispensing
- Efficient and stable Bump Transfer by dipping
- Air Reflow
- No Halide, no Halogen

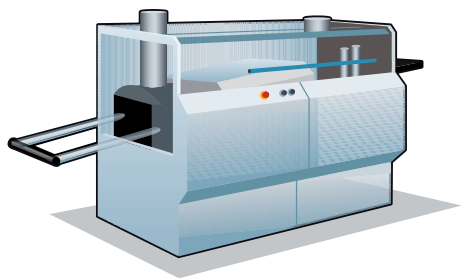
Soldering materials for Package on Package and chip Scale package assembly compatible with Siplace LDU X and Fuji Dipping modules.

ECOFREC™ PoP 50 Black

- ROL0
- Application by dipping or dispensing
- Efficient and stable Bump Transfer by dipping
- Air Reflow
- No Halide, no Halogen
- Black color detected by optical inspection



Wave soldering



ECOFREC™ 303 VOC-Free flux

- Real VOC-Free flux
- Non-flammable
- Excellent soldering performance on any PCB finish
- High SIR values
- Complies with the Bono test
- Lower cost per PCB compared to alcohol based fluxes
- Ecofrec™ 303 can also be used for Tabbing & Stringing process for solar panel assembly



Soldering flux range

| Flux type | Product Name | Main Features | Halogen Free | No Clean | Solid content | Bono test | Flux Class J-Std-004 |
|---------------|------------------|--|--------------|----------|---------------|-----------|----------------------|
| Water based | Ecofrec™ 303 | Improved wettability Low residues High SIR values High reliability | ✓ | ✓ | 3,5% | ✓ | ORL0 |
| Low VOC | Ecofrec™ 405 | Excellent wettability Combines alcohol wetting and water activation Reduced VOC emissions up to 50% | ✓ | ✓ | 4,7% | | ORL0 |
| Alcohol based | Ecofrec™ 200 | Reduced solder balling No false failure | ✓ | ✓ | 2% | ✓ | ORL0 |
| | Ecofrec™ 202 | High SIR values Good cosmetic aspect residue Low residues High reliability High ICT first pass yield | ✓ | ✓ | 1,9% | ✓ | ORL0 |
| | Ecofrec™ 209 | Low odour High activation. Outstanding wettability even after SMT reflow | ✓ | ✓ | 3% | | ORL0 |
| | Ecofrec™ VLR 129 | Low residues Excellent solderability | ✓ | ✓ | 1,9% | | ORL0 |
| | Ecofrec™ CMA 155 | Easy to clean flux Good balance of activation | | | 18% | | ROL1 |

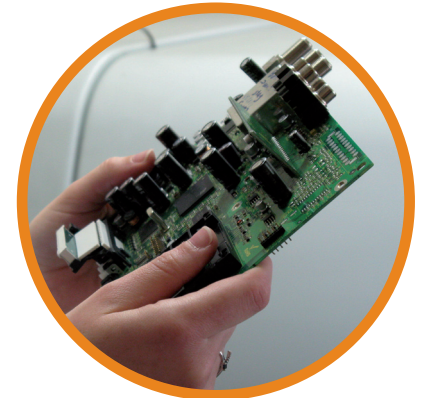
INVENTEC also offers cleaning solutions for wave systems & wave pallets.

PACKAGING: our wave soldering fluxes are available in 20L plastic drums all around the world.

PCBA Cleaning



INVENTEC can assist you in setting up the best cleaning process for PCBA and components considering the parts to clean, the machinery, environmental legislations, flux and residues to clean, cycle time and cleaning chemistry to be used: solvent based **TOPKLEAN™** by immersion or water based **PROMOCLEAN™** by aspersion cleaning solutions.



Solvent based cleaning

INVENTEC has designed **non flammable solvent based processes** in vapor phase equipment for cleaning of PCBAs (defluxing) and components after reflow:

CO-SOLVENT and **MONO-SOLVENT** (Azeotropic) cleaning systems.

NEW! Topklean™ EL20P
Defluxing cleaner to remove challenging baked-on flux residues and contaminants. High wetting performance to clean in miniaturized spaces.



TOPKLEAN™ EL20 series + 3M™ Novec™ 71IPA ^[1]

Co-solvent cleaning

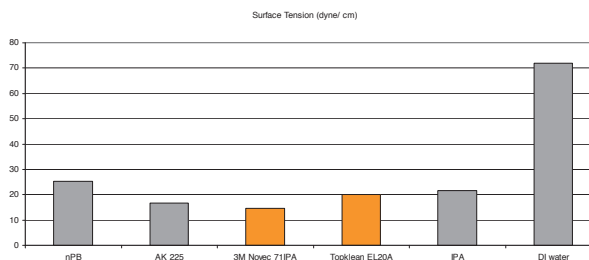
- Topklean™ EL20 series is best co-solvent for Novec™ 71IPA in the market
- Great materials compatibility
- Environmental friendly cleaning solution
- No use of water
- Efficient PCBA cleaning before conformal coating application
- Dielectric chemistry can safely clean pre-charged parts (i.e. complex systems, power modules, batteries, etc)
- High defluxing power removes a large range of No Clean fluxes
- No white residues
- Fast cleaning cycle
- Rinsing with pure Novec™ 71IPA
- Non Toxic
- Non flammable
- Excellent cost of ownership
- Cleaned, rinsed and dried PCBAs under 20 min cycle time

Packaging: 20l and 200l drums

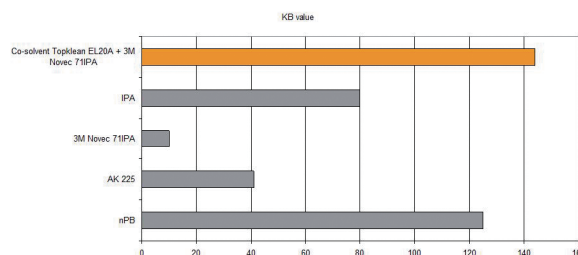


[1] Novec™ is a brand of 3M™

Surface Tension and Kauri-butanol (KB) values cleaning with Co-solvent



Wetting Index is a variable of surface tension, density and viscosity of a solvent. The higher the wetting index, the more wetting capacity for tight areas and miniaturized surfaces



KB value is a standard measure of solvent power for hydrocarbons. For electronics and semiconductor components a high KB is recommended to suit the critical cleaning needs removing particles polar and non polar residues.

PROMOSOLV™ 70ES or 3M Novec™ 71 DA : Mono-solvent (azeotropic) cleaning

- No white residues
- Fast cleaning cycle, approx 10 min
- Good rinsing performance
- Fast evaporation
- No need to use elevated process temperatures: fast machine set up and easy pre-heating
- Non flammable

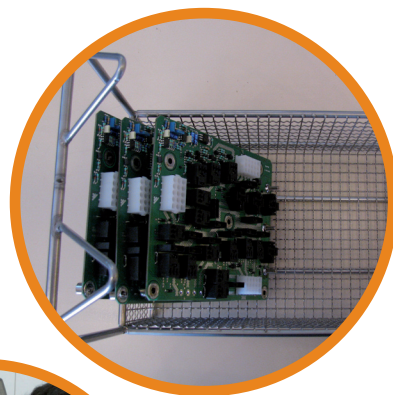
Packaging: 30 kg and 233 kg drums

TOPKLEAN™ EL20D : Under vacuum cleaning system

Homogeneous distillation suited to vapour phase rinsing in closed equipment « under vacuum » cleaning process :

- Process for low solvent consumption
- No contact with parts to be cleaned
- No surfactants
- Spotless dried surfaces
- A3 class solvent

Packaging: 20l and 200l drums



All cleaning performances have been validated applying:

- ROSE test for ionic contamination/ cleanliness measurement, according to IPC-TM-650 (2.3.25 rev C)
ROSE test Condition of validation MIL and IPC J-STD-001 standards: $< 1.3 \mu\text{g eq NaCl per cm}^2$
- SIR test for electrical functionality correlation, following IPC-TM-650 (2.6.3.3). $\text{SIR} > 1.0 \times 10^8 \text{ Ohms}$

Electronic assemblies meet the following cleaning standards:
IPC-A-610E, Visual cleanliness
J-STD-001 Cleaning Process Requirements
SIR IPC-TM 650 2.6.3.3 & DIN 32513

PCBA Cleaning

Water based cleaning

PROMOCLEAN™ DISPER 607

- High wetting performance permits to efficiently remove lead free soldering pastes and fluxes.
- High cleaning efficiency at low concentration (25%)
- Non toxic, non-flammable
- Pleasant smell
- Low VOCs
- High rinsing capacity
- No foaming
- Compatible with most plastics and all metal parts
- Environmental friendly, formulation based on natural resources, biodegradable
- For automated process using spray-in-air or by dipping, using ultrasonic or jetting systems

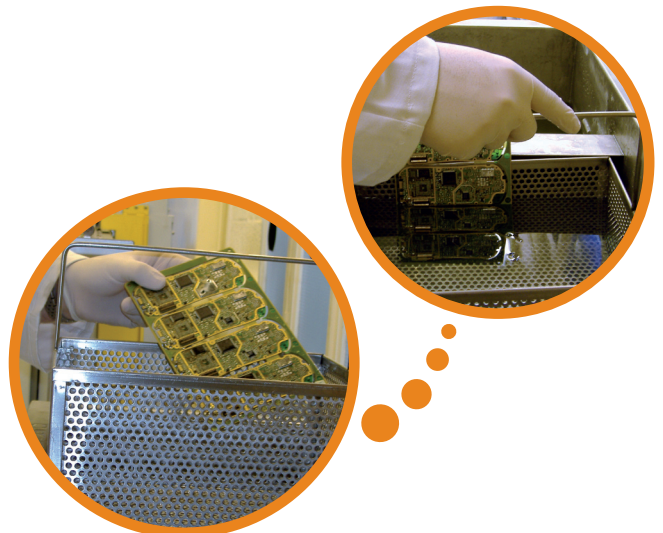
Packaging: 20l and 200l drum



PROMOCLEAN™ TP60

- For ultrasonic machine
- For all types of solder paste and flux
- Rinsing with DI water is required
- Dilution is required. Recommended at 30%
- Compatible with plastics

Packaging: 20l and 200l drum



Process and Maintenance Cleaning

Stencil & Misprint

TOPKLEAN™ EL7

Automated stencil cleaning inside SMT printer

- Formulated to remove all types of solder pastes from printing stencils using an automatic set up routine included in most SMT printers
- Qualified for use inside MPM printing machines
- High flash point
- Compatible with all metals and alloys
- Ready to use
- Chlorine and halogen free solvent

Packaging: 20l and 200l drums



TOPKLEAN™ EL606

Water/solvent microemulsion cleaner for automated application

- No rinsing is required
- No flashpoint
- Can be used pure or diluted (25%)
- No risk for the user
- Low operating temperature < 30°C
- Recommended to be used in machine cleaning process by immersion or spray-in-air
- Qualified in Mbtech Sawa, and Pbt aqueous cleaning systems

Packaging: 20l and 200l drums

PROMOCLEAN™ DISPER 605

Water based cleaner for automated application

- For SMT glue removal
- Rinsing required – Ph alkaline
- Only for specific misprint applications
- Recommended to be used in machine cleaning process by immersion or spray-in-air

Packaging: 20l and 200l drums



Ease of maintenance is a key consideration to reduce the equipment cost of ownership. **PROMOCLEAN™** cleaning solutions from INVENTEC provide an excellent cleaning power contributing to speed up the maintenance cleaning process, which reduces equipment downtime time and loss of production.

Pick & Place Nozzles

PROMOCLEAN™ TP60 : Automatic cleaning

Water based cleaning solution recommended for P&P nozzles for electronics assemblies using miniaturization (01005) and sensitive components like LEDs and MEMS.

Reduced vacuum failures/ Pick up rate improvement

Packaging: 20l drum



Reflow Oven & Wave system parts

PROMOCLEAN™ Oven 4 : High cleaning power for manual use



- Recommended to clean reflow oven parts, conveyor fingers in wave systems and wave pallets
- Ready to use
- Easy maintenance, pleasant smell
- Non toxic
- Non-flammable
- No flashpoint allows the application over warm surfaces for a faster and shorter cleaning time
- Evaporation rate permits a reduced consumption even down to 50% compared to IPA and other solvents

Packaging: spray bottle and 20l drum

PROMOCLEAN™ Disper 610 Cleaning by spray or immersion; with no rinsing

- Water based cleaning solution recommended to clean reflow oven condensation traps and wave pallets
- High cleaning efficiency at low concentrations
- Compatible with all metals
- Environmental friendly, formulation based on natural resources, biodegradable
- For automated process using spray-in-air or by dipping, using ultrasonic jetting systems

Packaging: 20l and 200l drum



PROMOCLEAN™ TP1128

- Alkaline product for stainless steel parts
- Rinsing required
- To be used diluted at 10 to 30%
- To be used in immersion cleaning system with or without ultrasonics

Packaging: 20l and 200l drum



Manual cleaning

QUICKSOLV™ DEF90 EL

- Non-flammable replacement for IPA
- Can be used as a stripper to remove conformal coatings
- No flashpoint

Packaging: 30l and 217l drum



TOPKLEAN™ EL10F

- Recommended for manual cleaning of stencils, misprints and cleaning after repair
- Halogen Free
- Can be rinsed with Novec™ 7100 to speed up the drying time
- High flash point

Packaging: 20l and 200l drum

TOPKLEAN™ EL60

- Easily cleans solder paste and uncured adhesives
- Quickly dissolves contaminants from manual repairs

Packaging: 20l and 200l drum

3M™ NOVEC™ Flux remover

- Aerosol cleaner ideal for removal of a wide variety of solder fluxes used in electronic manufacturing and repair, including rosin-based and many no-clean and lead free fluxes. Fast drying
- Compatible with most plastics, with the exception of acrylics, polycarbonates, ABS and PS.
- Non-corrosive, non-flammable

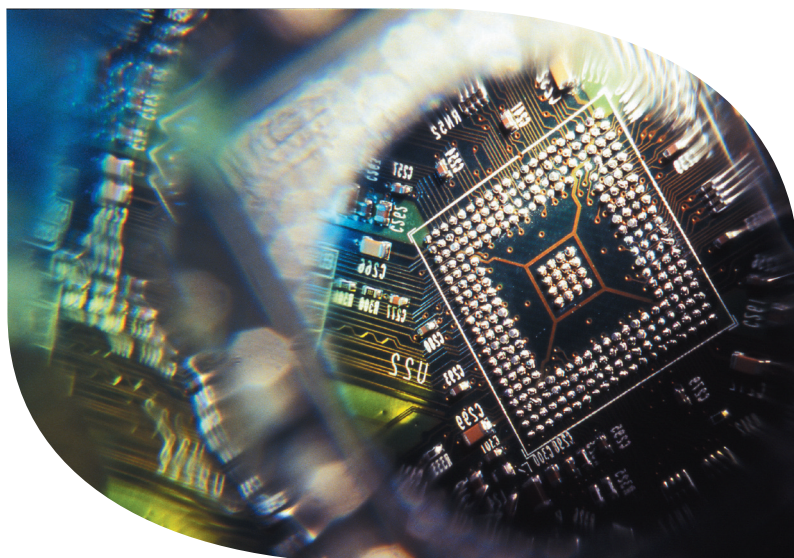
Packaging: 12 oz. Aerosol can



Cleaning Materials Guide Table

TOPKLEAN™ solvent based cleaners and **PROMOCLEAN™** water based cleaners from INVENTEC cover every cleaning need during the electronics assembly and maintenance

| PART TO CLEAN | WATER BASED | SOLVENT BASED | |
|--|---|--|---|
| | For immersion or Spray system | For Automated Systems | For Manual Use |
| Stencil & misprint cleaning of non reflowed solder paste | TOPKLEAN™ EL 606 PROMOCLEAN™ DISPER 605 | TOPKLEAN™ EL 7 | TOPKLEAN™ EL 10F TOPKLEAN™ EL 60 QUICKSOLV™ DEF90 EL 3M™ NOVEC™ flux remover |
| SMT Glues Non polymerized | PROMOCLEAN™ DISPER 605 | | |
| PCBA Defluxing | PROMOCLEAN™ DISPER 607 PROMOCLEAN™ TP 60 | Co-Solvent solution with 3M NOVEC 71IPA TOPKLEAN™ EL 20 A TOPKLEAN™ EL 20 R TOPKLEAN™ EL 20 P Azeotrop solution PROMOSOLV™ 70 ES Under vacuum solution TOPKLEAN™ EL 20 D | |
| Wave frames | PROMOCLEAN™ DISPER 610 PROMOCLEAN™ TP 1128 | | |
| Oven elements | | | PROMOCLEAN™ Oven 4 |



Coating Materials



INVENTEC offers a dedicated range of coatings for applications in electronics and semiconductor.

New generation **Conformal Coatings** based on **ABchimie** technology used to extend the working life of electrical and electronic assemblies and ensure reliability of performance, especially in harsh environments

3M Novac™ Electronic Grade Coatings as a real alternative to conformal coatings to modify and protect the surface of a component or an assembly.



Conformal Coatings

Excellent **reliability** and adhesion results **Compatibility** with **Ecorel™** solder paste range even in No Clean processes.

Used in automotive, aerospace, military, energy and transportation applications

| Properties | Product Name | Main Features |
|-----------------------------------|-------------------|---|
| Acrylic | AVR80 BA | No toxic, no toluene No toxic gases during repair Oven curing not required Quick Evaporation rate Excellent adhesion and dielectric properties Coating thickness 25 to 50 microns IPC-CC-830B, UL94V0, NF EN 61086 |
| Acrylate Urethane UV dual cure | ABchimie526UV | Best in class UV Dual cure coating Solvent-free and non-flammable No VOCs High accurate deposit and process speed Compatible with all dispensing heads Chemical resistance Coating thickness 30-150 microns IPC-CC-830B, UL94V0, NF EN 61086 |
| | ABchimie526UV LED | LED lamp curing version Process throughput comparable to UV lamp cure No temperature applied to the substrate being coated No extraction system required |
| Urethane | UVP100 | Dual cure: moisture and temperature Low VOCs Recommended for dipping application |
| Polyurethane aqueous | UVA59 | Non-flammable, very low VOCs High adhesion Low odour |
| Silicone | SVP52 | Resistant to most solvents, lubricants and cooling fluids High gloss finish and high surface resistivity. Coating thickness 25 to 50 micron |
| | SVR99 | Good adhesion Repairable Excellent surface resistivity |

Electronic Grade Coatings



- Fluoropolymer coatings for challenging components in PCBAs, LED lighting, displays, and flexible circuits
- Protection for electronic assemblies against moisture, chemicals and corrosion
- Anti-stiction performance for MEMS wafers
- Easy-to-apply recommended by dipping
- Low surface tension and high wetting for full coverage of the surface and components
- Dries to a uniform thin film coating of 1 micron
- COMPATIBILITY with ECOREL™ solder paste range achieved by the compliance with the Bono test assuring residues are chemically inert and reach excellent adhesion levels
- Non-flammable
- No curing needed for 1700, 2704 and 2708
- No masking process required
- High contact angles for water (105°) and oil (65°)
- Hydrophobic and oleophobic properties



Coated
Water contact angle



Not coated
Water contact angle

| Properties | Novec™ 1700 | Novec™ 2702 | Novec™ 2704 | Novec™ 2708 |
|--------------------------------|--|--|--|--|
| Solid % | 2 wt% fluorinated polymer | 2 wt% fluorinated polymer | 4 wt% fluorinated polymer | 8 wt% fluorinated polymer |
| Coating Thickness (dip coated) | 0.1 - 1µm (depending upon application) | 0.1 - 1µm (depending upon application) | 0.2 - 1µm (depending upon application) | 0.5 - 1µm (depending upon application) |
| Drying | 5 – 30 sec | 30 – 90 sec | 5 – 30 sec | 5 – 30 sec |
| Cure time | No curing | 75° to 150°C / 15 to 60 min | No curing | No curing |
| Removable | Yes, with Novec 7100 | Permanent | Yes, with Novec 7200 | Yes, with Novec 7200 |
| UV tracer | No | No | Yes | Yes |
| Flashpoint | None | None | None | None |
| Boiling point of solvent | 61°C | 76°C | 76°C | 76°C |
| Refractive Index | 1.39 | 1.41 | 1.38 | 1.38 |

Rework & Repair



Dispensing solder paste

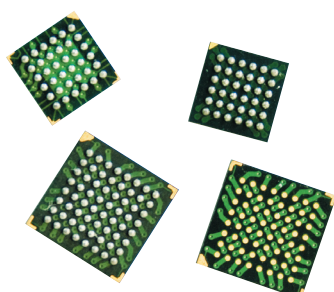


| | Ecorel™ Easy 802S-85 | Ecorel™ Free 305-1-85 |
|---------------|---|--|
| Alloy | SnPb36Ag2 | SnAg3Cu0.5 |
| Main Features | High dispensing stability No slump by preheating For needle diameter > 0.2 mm | Great repeatability dot by dot For needle diameter > 0.2 mm |
| Packaging | 30g and 100g syringes | 30g and 100g syringes |

Liquid and tacky flux



| | Ecofrec™ TF 48 | Ecofrec™ TF 49 | Ecofrec™ TF 49 RED | Ecofrec™ 204 | Ecofrec™ DD6 |
|---------------|---|--|---|---|--|
| Flux Type | Tacky | Tacky | Tacky | Liquid | Liquid |
| Flux Class | ROL0 | ROL0 | ROL0 | ORL0 | ROL0 |
| Main Features | For leaded and lead free process of ball attach and BGA repair Syringe & stencil application Excellent printing performance | For leaded and lead free process of ball attach and BGA repair Syringe & stencil application Colorless residue | Red tacky flux for easy detection by optical inspection systems | For touch-up application High reliable residue Bono test compliant Low odour | Resin based High activation Enables to replace components easily using mini-wave, hot air or hot bar soldering |
| Packaging | Syringe of 10 and 30g Jar of 100 and 500g Cartridge of 300g | Syringe of 10 and 30g Jar of 100 and 500g Cartridge of 300g | Syringe of 10 and 30g Jar of 100 and 500g Cartridge of 300g | Flux Pen of 10 ml | Flux Pen of 10 ml |



INVENTEC also offers manual cleaning solutions for repair operations including **QUICKSOLV™ DEF90 EL**, **TOPKLEAN™ EL60** and **TOPKLEAN™ EL10F**

LED Lighting Materials



ECOREL™ soldering solutions for LED assembly in Printed Circuit Boards, flexible circuits, tubes, strips and displays.

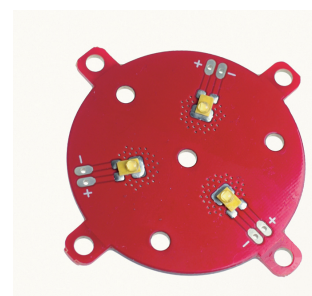
Coatings for LED module and display protection to assure best processability, reliability, brightness, cost, thermal management and lifetime of the device, and to robust the IP class of the device. Recommended for street lighting, outdoor, rail, and waterproof applications.



Solder paste

ECOREL™ Free LT 140-18 No Clean Halogen Free Solder Paste

- Low temperature melting point 139° to 140°C
- Alloy SnBiAg
- Low energy consumption during reflow process
- Excellent solder joint quality and interconnect reliability
- Low solder voids for efficient thermal management and heat dissipation



ECOREL™ Free range No Clean Halogen Free Solder Paste



| Product Name | Main Features | Alloy |
|------------------------|--|--------|
| Ecorel™ Free 305-16 | Low Voiding | SAC305 |
| Ecorel™ Free 305-21 | Residues with high reliability Compatible with a large range of conformal coatings | SAC305 |
| Ecorel™ Free 105-16 | Low silver content High ICT first pass yield | SAC105 |
| Ecorel™ Free LT 140-18 | For temperature sensitive components, melting point 139° - 140°C Low reflow energy consumption | SnBiAg |
| Ecorel™ Free 305-1-85 | Great repeatability dot by dot | SAC305 |

All ECOREL™ Free Solder paste fluxes are class ROL0 according to J-STD-004.

Cleaning



Broad range of cleaning solutions to improve the quality of LED assembly throughout all the manufacturing process.

| Special Cleaning Process for LED module assembly | Cleaner | Benefit |
|--|--------------------------------------|--|
| Pick & Place Nozzles | PROMOCLEAN™ TP60 | Reduced vacuum failures Pick up rate improvement |
| Reflow Oven | PROMOCLEAN™ Oven 4 | Easy removal of burned flux inside the reflow oven that could dropped over the LED components Non-flammable |
| LED PCBA module | TOPKLEAN™ EL20A + 3M Novec™ 711PA | Great materials compatibility Very low VOC solutions Leaves no white residues |

Coating

Sustainable and environmental friendly coating solutions to protect LED assemblies from moisture, humidity and other environmental conditions. Very low VOC solutions to assure no outgassing or degradation occurs.

Clear coatings with excellent Optical Light Transmission properties ideal for LED module protection.

| Coating Type | Product Name | Main Features |
|-------------------|----------------|---|
| Fluoropolymer | 3M Novec™ 1700 | No masking, no curing needed Fast drying Excellent transparency, haze and clarity properties Very thin coating at 1 micron, 2% solids |
| | 3M Novec™ 2702 | No masking required, fast drying Excellent transparency, haze and clarity properties Very thin coating at 1 micron Chemical resistance |
| | 3M Novec™ 2704 | No masking, no curing needed Fast drying, UV tracer Very thin coating at 1 micron, 4% solids |
| | 3M Novec™ 2708 | No masking, no curing needed Fast drying, UV tracer Very thin coating at 1 micron, 8% solids |
| Acrylic | AVR80 BA | No toxic, no toluene Oven curing not required and quick Evaporation rate Excellent adhesion and dielectric properties |
| Acrylate Urethane | ABchimie526UV | Best in class UV Dual cure coating Solvent-free and non-flammable No VOCs |

Semiconductor Packaging Materials



ECOREL™ and ECOFREC™ soldering materials for processes such as flip chip, die attach, CSP and defluxing used in the manufacturing of power semiconductors, BGA, micromodules and hybrid assemblies.

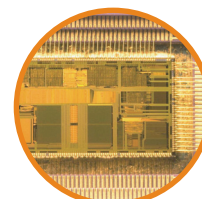
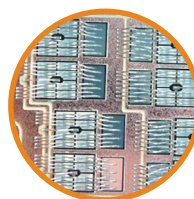
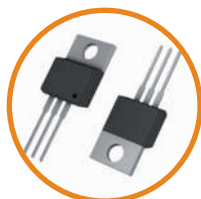
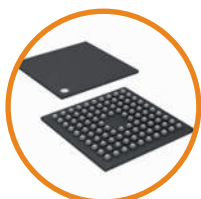
Flip Chip and CSP

| Product Range | Flux Class J-STD-004 | Application | Halogen Free | Packaging |
|--|-------------------------|---|-----------------|---|
| ECOFREC™ TF Tacky flux | ROLO | Dipping, dispensing, screen printing, pin transfer | ✓ | 10 g and 30 g syringes 100 g and 500 g jars 300 g cartridge |
| ECOFREC™ TF Water soluble Tacky flux | OR | | ✓ | 10 g and 30 g syringes 100 g and 200 g jars 150 g and 300 g cartridge |
| ECOFREC™ Water soluble Liquid flux | OR | Dipping, spray | ✓ | 20 l plastic drum |
| ECOREL™ FREE Lead Free Solder paste | ROLO | Dipping, dispensing, screen printing | ✓ | 30 g and 100 g syringe 250 g and 500 g jars |
| ECOREL™ EASY Leaded solder paste | ROLO | | ✓ | |

Die Attach

ECOREL™ solder paste exhibits good wettability on Ni, NiP, Cu lead frames with low percentage of solder voids and excellent flux residue cleanability

| Characteristics | Ecorel™ HT 296S High Temperature | Ecorel™ Free 808-1 Lead Free |
|-----------------|---|---|
| Alloy | Pb92.5Sn5Ag2.5 | Sn96.5Ag3.5 |
| Melting Point | 287° to 296°C | 221°C |
| Packaging | 30 g and 100 g syringes 250 g and 500 g jars | 30 g and 100 g syringes 250 g and 500 g jars |



Defluxing

Cleaning solutions after die attach for power semiconductors, especially when packaging is done using solder paste.

For hybrid packaging, our solutions can integrate water and solvent based chemistries to efficiently remove organic and inorganic residues remaining on the substrate.

INVENTEC has more than 10 years of experience cleaning power modules, contributing to meet the desired reliability, performance, cost and environmental requirements.

Our offer include different cleaning solutions for different cleaning steps for power modules assembly:

| | |
|-------------------------|--|
| Aqueous Cleaning | Promoclean™ Disper detergents |
| Solvent Cleaning | Co-solvent cleaning process Topklean™ EL 20A + 3M Novec™ 71IPA Azeotropic process Promosolv™ 70ES |



CO-SOLVENT CLEANING FOR POWER SEMICONDUCTORS

| Reliability & Performance | Cost Efficiency | Environmental |
|---|--|---|
| <ul style="list-style-type: none">• Low surface tension for better wetting• High wetting index by low surface tension, high density and low viscosity for better wetting• Leaves zero residues on cleaned substrates and no ionic contamination after rinse• Materials compatibility, does not attack: METALS such as Cu, Al, Ni, Ag, Sn, Rb, Bi SOLDERS such as SnAg, SAC, PbSn, other CERAMIC substrates• Effective removal of ionic and nonionic contaminants including flux rosin and resin based, oils, greases, soils, silicones, ionic surfactants, chlorides from fingerprints, etc• Removes oxides to avoid corrosion of the interconnections and does not create galvanic cell• Kauri-butanol value (KB) is high, suitable for critical cleaning needs to remove particles and light organics | <ul style="list-style-type: none">• A mature process• Fast cycle time: clean, rinse, dry• Provides high solderability yield by improving wire-bonding process• Excellent cost of ownership considering manpower, footprint, water & energy resources, cycle times | <ul style="list-style-type: none">• Nonflammable• Low Toxicity• Low Global Warming Potential (GWP)• Non ozone depleting• Less energy consumed during manufacturing (drying)• No use of water |

TINNING

Application by dipping

No Clean Water based flux - No halide - No halogen



ECOFREC™ 77

- Low residue
- Excellent solderability
- Improved residue reliability
- VOC free

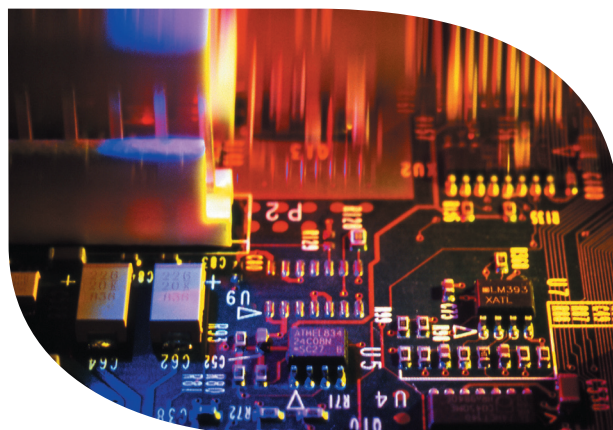
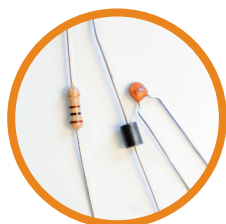
Packaging for all fluxes
20 liter plastic drum

Water Soluble flux - To clean



ECOFREC™ 82

- Outstanding solderability
- Easily cleanable residue
- VOC free



CONTACTS ALL AROUND THE WORLD

FRANCE

INVENTEC Performances Chemicals

Headquarters and Sales Department
26, avenue du Petit Parc
94683 Vincennes cedex
Tel : +33 1 43 98 75 00
Tel Sales Assistant : +33 1 43 98 76 07
Fax : +33 1 43 98 21 51

Anne-Marie LAÜGT - Electronic BU Director
amlaugt@inventec.dehon.com
Rodrigo AGUILAR - Marketing
raguilard@inventec.dehon.com

Area Sales Managers Europe
Jonathan CETIER – Southern Europe and Mediterranean Region
jcetier@inventec.dehon.com
Nathalie MESA – SME accounts France
nmesa@inventec.dehon.com
Sylvie PRODILAILO – Northern and Central Europe
sprodilailo@inventec.dehon.com

BELGIUM

INVENTEC Belgium

Avenue Carton-de-Wiart 79
1090 Brussels
Tel: +32 2 421 01 70
Fax: +32 2 426 96 62

Yves SYMKENS - Sales
ysymkens@dehon.com

THE NETHERLANDS

INVENTEC Nederland

C/O Dehon Service Nederland
Van Konijnenburgweg, 84
NL-4612 PL Bergen-op-Zoom
Tel : 31 (0) 164-212840
Fax : 31 (0) 164-212841

Yves SYMKENS - Sales
ysymkens@dehon.com

Subsidiaries

GERMANY

DKF Germany

Robert - Bosch - Strasse 14
40668 MEERBUSCH

Jan Henryk SERZISKO – Sales Manager
jhserzisko@inventec.dehon.com

SPAIN

INVENTEC Performance Chemicals España S.A.

Perez Pujol, 4 - 2º
46002 VALENCIA
Tel : (34) 96 353 51 93
Fax : (34) 96 353 51 92

Mercedes CERQUERA – Subsidiary General Manager
mcerquera@inventec.dehon.com
José Ignacio RODRIGUEZ – Sales
jirodriguez@inventec.dehon.com

HUNGARY

CLIMALIFE Kft

2040 Budaörs, Rét utca 2,
Tel / Fax : (36) 23 431 660 / 661

Laszlo TOKOZY - Sales
ltokozy@inventec.dehon.com

SWITZERLAND

INVENTEC Performance Chemicals Switzerland SA

15 Petits Champs
CH - 1400 Yverdon les Bains
Tel : 41(0) 24 424 80 90
Fax : 41(0) 24 424 80 99

Patrick DUCHI – Subsidiary General Manager
pduchi@inventec.dehon.com

USA

INVENTEC Performance Chemicals USA LLC

500 Main Street, Suite 18
PO Box 989
Deep river, CT 06417 USA
Tel: 860 526 8300
Fax: 860 526 8243

Jean-Noel POIRIER – CEO
jnpoirier@inventec.dehon.com
Leigh GESICK – Director US operations
lgesick@inventec.dehon.com
Gilbert ROBERGE – Sales & Technical Manager
groberge@inventec.dehon.com

MALAYSIA / INDIA

INVENTEC Performance Chemicals South East Asia Sdn. Bnd
4, Jalan P/17 - Selaman Industrial Park Bandar Baru Bangi
43650 SELANGOR
Tel : (60) 3 89 26 38 55/58
Fax : (60) 3 89 26 38 78

Danny LINMANS – Subsidiary Manager
dlinmans@inventec.dehon.com

Customer Service
customerservice.iseal@inventec.dehon.com

CHINA

INVENTEC Performance Chemicals (Shanghai) Co., Ltd
1-2/F Building 6 No. 185 Yuanke Road Xinzhuang Industrial Park
201108 SHANGHAI
Tel : +86 21644 23962
Fax : +86 21644 23952

Danny LINMANS – Subsidiary Manager
dlinmans@inventec.dehon.com

Customer Service
customerservice.ish@inventec.dehon.com

MEXICO

INVENTEC Performance Chemicals Mexico
Rio Conchos 1757 Fraccionamiento Industrial El Rosario
Guadalajara, Jalisco C.P. 44890
Tel : +52 33 3838 8866
Fax : +52 33 3838 8867

Rodrigo SANCHEZ – Subsidiary Manager
rsanchez@inventec.dehon.com
Gabriel GUTIERREZ – Technical Sales
ggutierrez@inventec.dehon.com
Ernesto SANCHEZ – Sales North Mexico and South USA
esanchez@inventec.dehon.com

DISTRIBUTORS

CZECH REPUBLIC

JAMI ELECTRONICS s.r.o.
Dubenecka 827,
CZ-19012 Praha 9
Tel: +420 28 19 33 015
Fax +420 28 19 30 559
Michal VISEK
michal.visek@jamiel.cz

IRELAND

QUIPTECH INTERNATIONAL LTD
Riverside Commercial Estate
Ir - GALWAY
Tel: +353(0)91 757 800
Fax: +353(0)91 751 299

Donal MURNANE
dmurnane@quiptech.com

FINLAND

TIM-NORDIC
Hirsalantie 11
FI - 02420 Jorvas
Tel: +358 2 0763 9190
Fax: +358 2 07 639199

Jan FAGERSTROM
jan.fagerstrom@timnordic.fi

POLAND

ESSEMTEC PL
Ul. Wrzeciono 16/24
PL - 01-961 Warszawa
Tel: +48 661 922 962
Fax: +48 22 119 34 58

Mirek BOROWSKI
mib@essemtec.com

SWEDEN

DESAB ELEKTRONIKSYSTEM AB
Häradsvägen 29
SW - 14143 Huddinge
Tel : +46 8711 7000
Fax : +46 8711 7010

Mikael ROOTS
mikael.roots@desab-elektronik.se

SLOVENIA/CROATIA/BOSNIA/ MACEDONIA

PROES, TECHNOLOGY CONSULTING AND SALE, d.o.o.
Tehnološki park 24
SI-1000 Ljubljana
Slovenija
Tel: +386 (0)1 81 00 328
Fax: +386 (0)8 20 08 801

Slavica PAVLIC
slavica.pavlic@proes.si

UNITED KINGDOM

ACOTA Limited

Centrepont, Knights Way,
Battlefield Enterprise Park.
Shrewsbury
SY1 3BF Shropshire.
United Kingdom.
Tel: +44 1743 466200
Fax: +44 1743 466555

Mark DUGGAN
Mark@acota.co.uk

ISRAEL

AMZA Ltd

90 Jabitinski st., P.O Box 3068,
Petach - Tikva 49513
Tel : +972-3-7212777
Fax : +972 3 921 21

Rafi ALTER
rafi@amza-ltd.com

MOROCCO

PROCOP

31, Rue Ibn Toumert
CASABLANCA
Tel : (212) 22 96 42 08
Fax : (212) 22 96 43 57

Abdelkrime SENTISSI
absprocop@iam.net.ma

ITALIA

Phoenix Chem S.r.l

Via Burolo, 22
10015 IVREA
Tel : 0125 627972
Fax : 0125 648845

Marcello NEBBIA
marcello.nebbia@phoenixchem.it

TUNISIA

SNE SOMETEL

Centre Said
Avenue Habid Bourguiba
2033 - MEGRINE - TUNIS-sud
Tel : (216) 71 434 154
Fax : (216) 71 434 074

Abderrazak BESROUR
sne.sometel@gnet.tn

SOUTH AFRICA

TECHMET

402 Murray Road, Wadeville, 1407
P.O. Box 14262,
WADEVILLE 1422
Tel : +27 11 824 14 27
Fax : +27 11 824 31 50

Hannes LIEBENBERG
sales@techmet.co.za

Grant LANGLEY
grant@techmet.co.za

AUSTRALIA

ONBOARD SOLUTIONS

2 Salisbury Street
Botany NSW 2034 Australia
Tel : (61) 2 9695 1030
Fax : (61) 2 9695 1944

Peter A. RUEFLI
peter@onboardsolutions.com

PHILIPPINES

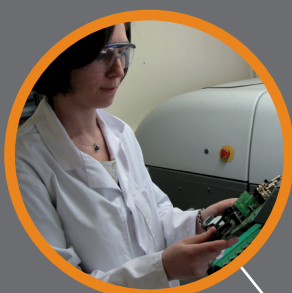
Globaltech Automation, Inc.

3rd floor, Unit 5, VFP-MDC Buildings II
Veterans Industrial Compound, Taguig City
Philippines 1603
Tel : (632) 821 2177
Fax : (632) 821 2178

marketing@globaltechphil.com

STAY CONNECTED WITH US





**INVENTEC**
PERFORMANCE CHEMICALS

26, avenue du Petit Parc - 94683 Vincennes Cedex - France
Tel : +33 (0) 1 43 98 75 00 - Fax : +33 (0) 1 43 98 21 51 - web : www.inventec.dehon.com