

S.P.M. s.r.l.

Company Profile



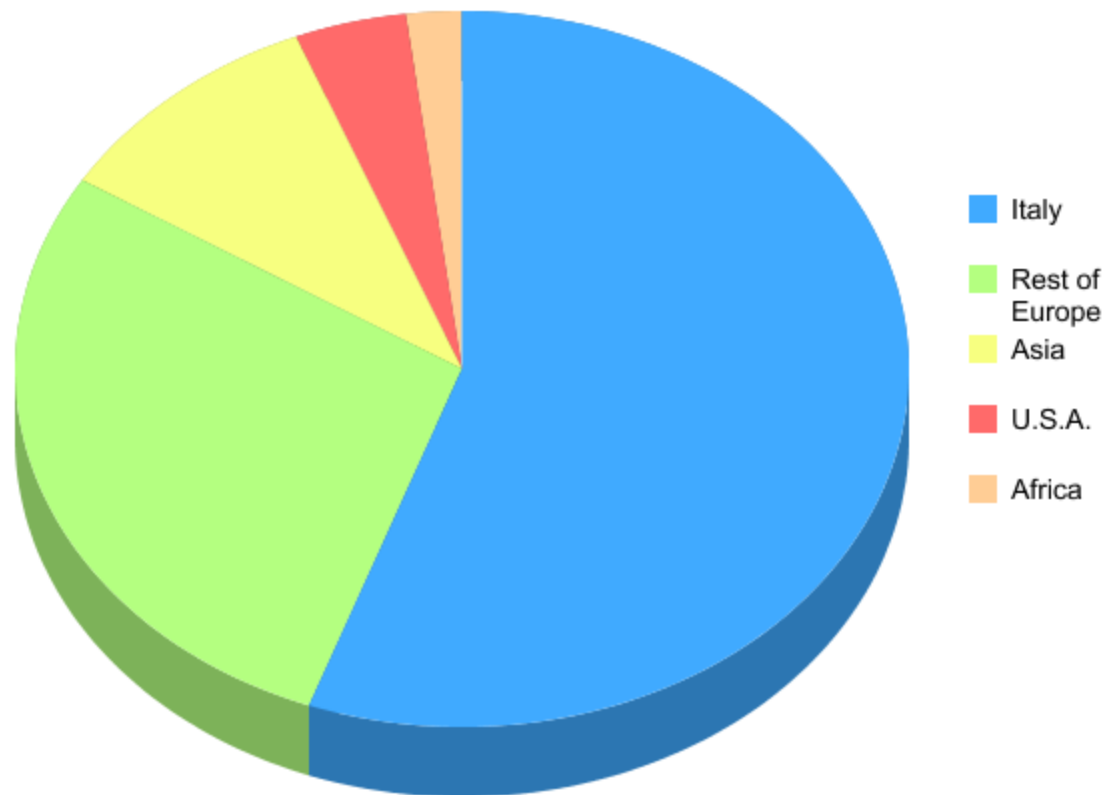
Special Plastic Module for
semiconductor industry



- ▣ SPM, acronym of Special Plastic Module for semiconductor industry, is an Italian company engaged to provide help to semiconductor and solar cell industries, universities, medical, chemical and research labs
- ▣ Combining expertise and latest technology with extreme cleanness, SPM obtain some of the most highly qualified equipment performances.
- ▣ SPM has 31 YEARS of experience in this sector and is every day up to date spending much time founding new technology and innovative solutions to perform better things at lower possible costs.
- ▣ The company spirit is to build machines perceiving real needing, to completely satisfy our customers.



SPM has customers all over the world, best sales are in Europe, especially in Italy, following in Southern Asia, primary in Singapore and Philippines, U.S.A. and Africa.





U.S.A. Main Customers



Hillsboro-Oregon U.S.A.



Dallas – TEXAS U.S.A.



Boston – U.S.A.



(General Semiconductor)
Long Island – U.S.A.



ITALY Main Customers

olivettiJet

Arnad (AO)

AVAGO
TECHNOLOGIES

Torino

VISHAY

LPE

Bollate (MI)



Milan University

oclaro

San Donato (MI)



CNR - Milan

SM

Siae M. - Milan

saes
getters

Lainate (MI)

ST

Agrate B.za (MB)

DNP

Agrate B.za (MB)

CORECOM
Milan

RSE
Milan

Micron

Agrate B.za (MB)

Laboratory MDM

MDM Labs Agrate B.za

Alcatel-Lucent
Vimercate (MB)

TECHNOPROBE
Water Probing Technologies
Cernusco Lombardone (LC)



F&K
FONDAZIONE
BRUNO KESSLER

Trento

MEMC
TECHNOLOGY IS BUILT ON US
Novara

AVE
INDUSTRIES

Mestre (VE)



Bologna University



Modena University

LFoundry

Avezzano (AQ)

ThalesAlenia
Space

L'Aquila

ENEA

LEONARDO

Roma

iit istituto
italiano di
tecnologia

Lecce

ST

etc

Catania

3SUN

EUROPE - AFRICA Main Customers



ASIA Main Customers



Shanghai - China

Singapore



Taiwan



Taiwan



Philippines



Hanoi - Vietnam



Ho Chi Minh city - Vietnam



Saigon HIGH TECH PARK - Vietnam



VNU (Vietnam NATIONAL University)
Ho Chi Minh city - Vietnam



SEMICONDUCTOR INDUSTRIES



Front End

CDS, Premixing systems, wet benches (automatic, semiautomatic, manual), lift-off tools, spray processing tools, carrier and box clean up equipments, quartz parts cleaners, storages, trolleys, dryers, exhaust scrubber systems, pass-through, spinners, clean rooms accessories...

Back End

CDS, Deflashing and plating equipments.



SOLAR INDUSTRIES



CDS, Premixing systems, Texturing wet benches, Cells recycling automatic systems, TCO parts cleaner, dryers, THIN FILM panels insulation test equipments, exhaust scrubber systems.

RESEARCH LABS



CDS for bottles and canisters, Storages, Hoods, Tables, Trolleys, exhaust scrubber systems, handlings, dry boxes, dryers, racks, clean rooms accessories...



Chemicals
management



Processing and
clean up



Quartz
treatment



Cleanroom
equipments

Semiconductor industries (frontend and backend), Photovoltaic industries (cells and thin film), Research centers, Universities.





Chemicals Management



Chemicals



Transport trolley



external



Chemicals
passthrough

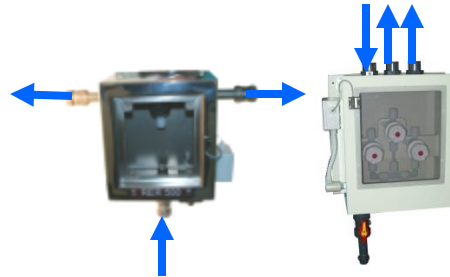
Chemical
building –
Clean room



CDS



Double or triple
piping lines
installation and
test



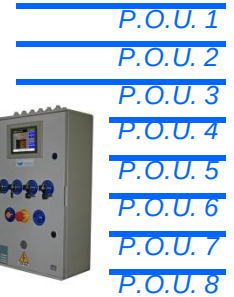
Derivation boxes
and TEE boxes for
piping lines split
in multiple
directions



Union boxes for
piping lines
junction



VMB for multiple P.O.U.
connection





Trolleys for Chemicals transportation

Trolleys are designed to transport drums, canister or bottles according to safety rules. Specific rollers warrant easy loading-unloading operations and with integrated lifter drums can reach CDS and passtrought without any difficulties. SPM trolley can operate also in clean room with the specific version realized in stainless steel 316L.





CDS - Chemical Delivery system

SPM realizes since long time equipment that transfer chemical from bottle, canister, drum or IBC bulk container to P.O.U. Each CDS is designed following safety rules, ambient regulations and space.

Solvent or acids-bases chemicals: there are no problems. SPM can design the system more appropriated with your needs.





Premixing – Dosing systems

Chemicals mixtures are prepared by Premixing units and automatically distributed to process machines.

Our premixing systems can operate from bottle or connected to existing CDS.

Dosing is ruled by PLC and managed by touch screen, allowing to easily modify fluid quantities.



Dosing methods:

- | | |
|-----------------------------|-------------------------|
| ▣ Electromagnetic flowmeter | ▣ Paddlewheel flowmeter |
| ▣ Coriolis Mass flowmeter | ▣ Volumetric principle |
| ▣ Karmann Vortex flowmeter | ▣ High precision Scale |
| ▣ Ultrasonic flowmeter | ▣ Syringe |





Chemicals transformation from SOLID to LIQUID

Equipments capable to dilute solid chemicals like SODA into liquid solution diluted with H₂O DI. That permits to reduce cost for buying and transport chemicals.



These systems perform chemical residual dilution inletting H₂O DI and after that the complete drum emptying.

DRUMS Cleaning stations

SPM can realize systems for emptying and cleaning drums automatically. According to chemical nature we can realize the structure in plastic or stainless steel material. Also available for outdoor installation and or ATEX version.





These systems perform chemical waste recovery into several drums.

Waste chemicals recovery systems

SPM can realize systems for recovery wasted chemicals connected directly to the process equipment drains.

According to chemical nature we can realize the structure in plastic or stainless steel material. Also available in ATEX version.





VMB

Valve manifold Boxes: they are used to serve P.O.U.s starting with a unique piping line from CDS. With several automatic valves it is possible to control automatically the distributions to all connected POU's. VMBs are ruled by a remote control managed by PLC and touch screen. Several configurations are available in order to fit into cleanroom space.





Components for distribution lines



Derivation
boxes, TEE
boxes, union
boxes

Transferring chemicals into clean rooms is sometimes difficult because of space problems. With derivation, TEE and union boxes it's possible to reduce the amount of double piping lines and divide into section the lines for easier management and maintenance operations.



Double or triple piping installation and test

Installation of double piping lines: external transparent PVC (acids) or SS304 (solvents) for safety, internal PFA for ultra pure chemicals.

*N₂ sealing test to ensure no leak presence on piping.
Chemical resistant labels according to international standards.*



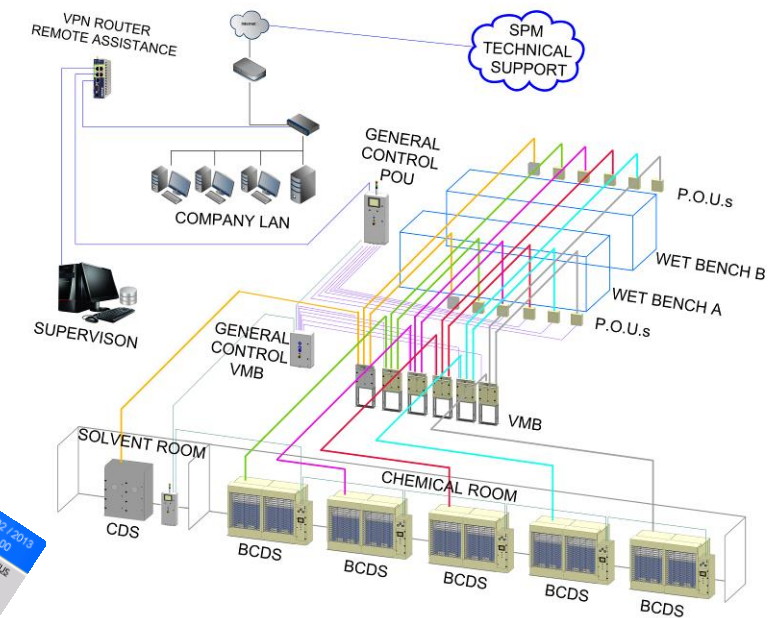
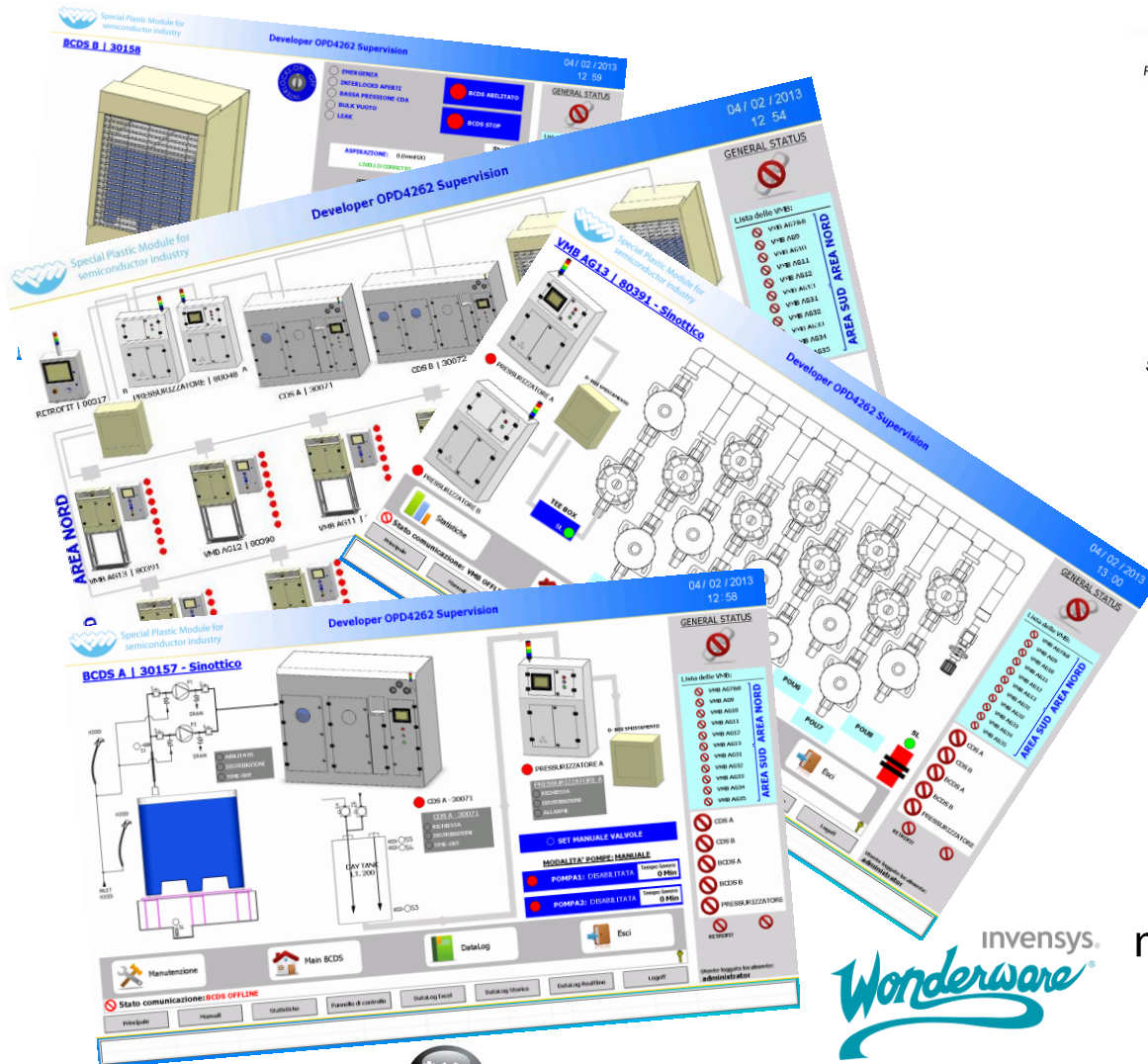


P.O.U. modules

POU modules are realized with the scope to have a chemical reserve next to the pou machine. Normally there is a reserve tank with level sensors. These modules are very useful in case you plan to serve a pou machine that has no reserve tank or in case the machine has no automatic CDS chemical request signals. POU modules are available also with integrated feature of dosing/mixing chemicals.



In-line chemical heating/chilling OPTIONAL



Chemicals distribution Supervision architecture - software developed by SPM with Wonderware Intouch or Progea Movicon. System capable to manage different PLCs collecting status data, statistics and advanced datalogging.







Processing & Cleaning



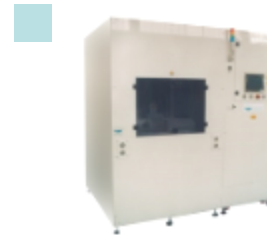
Wet benches



Lift-Off



Spray
Processing



Wafer Carriers
and Boxes
cleaning



Deflashing
equipment



Laboratory Hoods



Plating
equipment



Standalone
dryers



Thin Film TCO
equipment parts
cleaning



Photo-mask
cleaning

SEMICONDUCTOR Front-end

SEMICONDUCTOR Back-end

PHOTOVOLTAIC

LABS



AUTOMATIC WET BENCHES

Automatic Wet Benches can be realized in different versions according to customer needs and chemical types. For solvents we normally adopt stainless steel materials according with safety rules in term of anti-fire protection. With Acids-Alkalines we use specific corrosion resistant plastics materials. In both case we use just high performance material that guaranteed no chemical contamination or degradation. SPM robot transfer carriers from process to rinse tanks and in the end to the dryer.

Dedicated versions for
Semiconductor Front-end and
for Solar cells texturing.



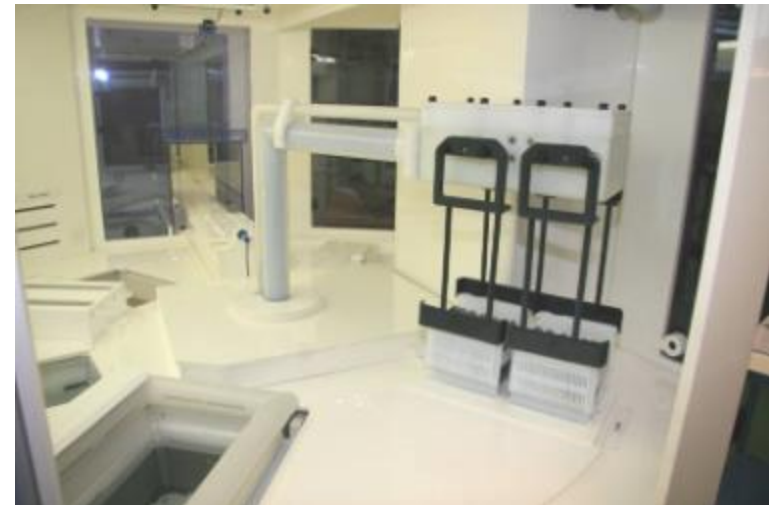


CAROUSEL WET BENCHES

Standard wet benches are manufactured in linear version but for them it's necessary to have a certain length availability. After numerous equipments realizations of standard Wet benches, we improved our experience and technological knowledge and we created Wets benches in “carousel version”.

Our Carousel systems are completely automatic and, offer many advantages:

- Compact systems
- Inferior costs either for structures, or for air consumption
- Cheaper costs in comparison with traditional automatic wet benches
- Lower contamination, because the rotational robot is completely isolated from waterworks components
- exhaust consumption reduction





SEMIAUTOMATIC WET BENCHES

Semi-automatic wet benches reduce operator's interaction, even if his presence is necessary. Usually, a small robot effectuates transfers from process to rinse tank. Semi-automatic wet benches are partially automatized, consequently processes are repeatable and controllable.





MANUAL WET BENCHES

Manual wet bench are focused to R&D, small laboratory and simple processes. Workplan is fully customizable according to specific process needs. Tanks can be also configured in dimensions, materials, heating, filtration, recirculations, ultrasounds, controls...





PLATING WET BENCHES

Plating wet bench are fully customizable according to specific process needs. Tanks with anode and cathode can be also configured in dimensions, materials, heating, filtration, recirculations, ultrasounds, controls... Precious material recovery with specific technologies.





SOLAR CELLS RECYCLING SYSTEMS

Systems for dummy solar cells recycling

The evolution of cell recycling processes brings towards systems that are compact, repeatable and that have a dedicated automation. In this case, automation will accomplish all process steps in a single tank.

Systems are composed by an hybrid tank with functionality of process and rinse tank. That is possible thanks to a special buffer tank that recover chemical after every process before inletting H₂O DI for rinse process.



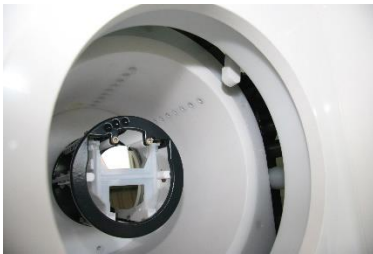


SPRAY PROCESSING EQUIPMENT

Ludovica Model is an innovative spray processing equipment.

Main features:

- Unique machine in the world capable to process in spray or immersion mode
- Capable to process up to 50 wafers (4-6-8 inches)
- Sintered PTFE chamber, rotor made in SUS316L material, covered by an innovative PFA coating to warrant absolute absence of corrosion and contamination.
- High performance Servomotor to control carrier(s) rotation
- Automatic PTFE cover
- High purity PFA nozzles with quick connections for easy maintenance
- Up to 4 chemical buffer tanks with integrated dosing system



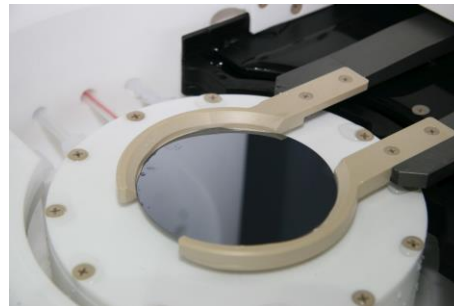
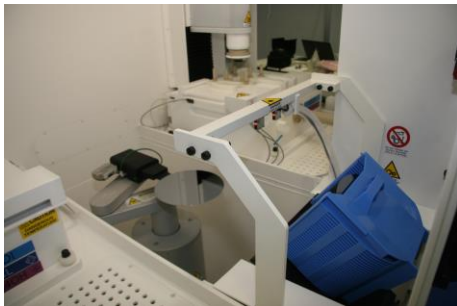
SINGLE WAFER PROCESSING EQUIPMENT

SPM produces full automatic and semiautomatic single wafer equipment tailored according customer needs.

Wafer size could be from 3" up to 8". An automatic robot handles wafers one by one loading into process chamber(s) catching them from carrier.

The complete process is executed into a single chamber:

- Chemical process from several buffer tanks;
- Rinse;
- Wafer Scrubbing (Optional);
- Megasonic (Optional);
- N2 bubble (Optional);
- Dry with high speed spinner.

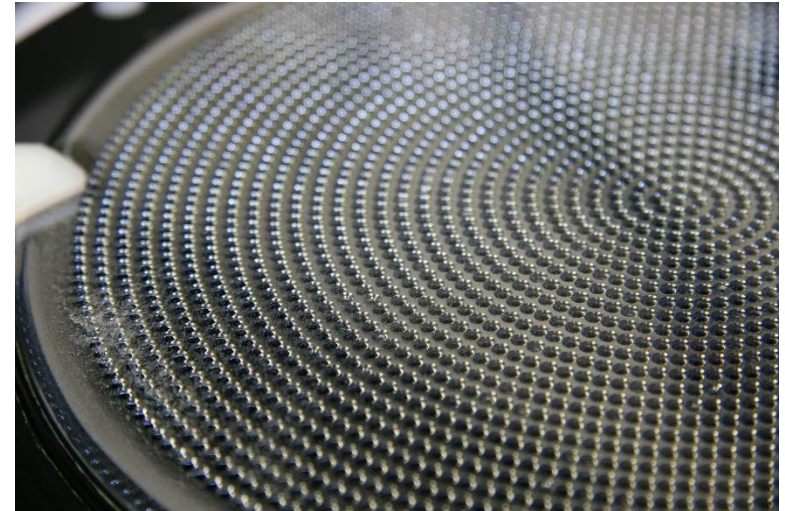




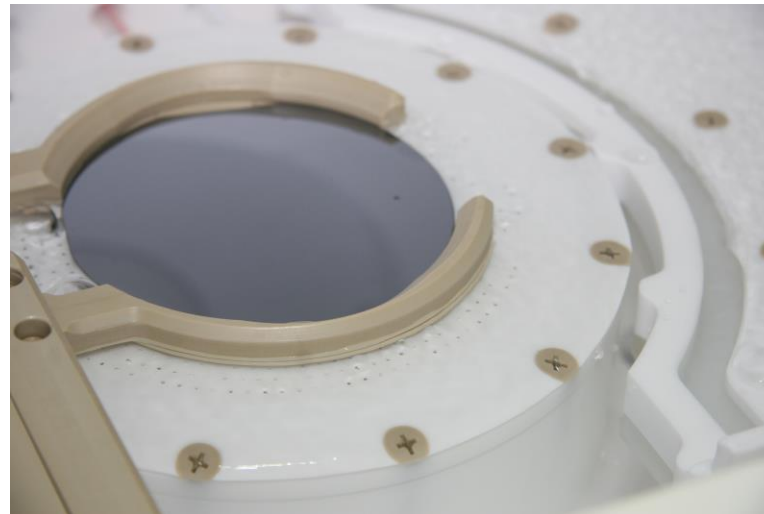
SPM Patented "Floating Process"

*The "Floating effect" permits to liquid to keep a constant level and a **perfect homogeneity** of chemical distribution.*

With the floating technology used for wafers 4"-8", for the Si cells 125x125 and 200x200 and for substrates 5"x5", we have found a very interesting and positive solution for wafers up to 450mm.



Floating Process can be applied for Semiconductor manufacturing, like: **oxide etch, metal etch and electrolytic processes.**



It's possible to process one side only of the wafer without any need of masking.



LIFT OFF EQUIPMENT

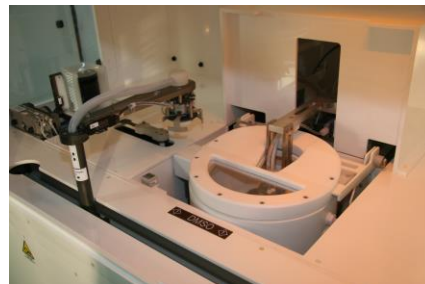
Thanks of the use of high performance Megasonic we developed new equipment for metals lift-off.

The concept of metallic removal on multilayer (for example: Ti, Pt, AU) can enter in this new technology too.

Equipment could be in different versions:

- full automatic process, cassette to cassette
- semiautomatic process, with load/unload of the single wafers in manual model (proposal for R&D areas)

Equipment can be configured to process wafers of 4"-5"-6"-8"-12" sizes.





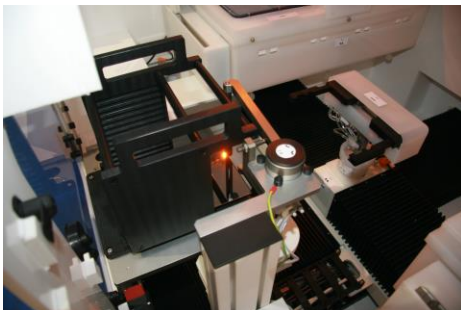
PHOTOMASK CLEANING EQUIPMENT

SPM has experience in developing photomask cleaning equipment. Single photomask is processed in several tanks with spray chemical injection.

Equipment can be in different versions:

- full automatic process, cassette to cassette
- semiautomatic process, with load/unload of the single photomask in manual model (proposal for R&D areas)

Equipment can be configured to process photomask of 6" to 9" sizes.





STANDALONE DRYER

SPM produces dryer since long time for integration into full automatic wet benches or for standalone applications.

Our dryers follow customer's request and year by year we added features to reach the objective of: reducing timing, N2 consumption and reduce particle added. Available different tanks dimensions, materials and options.



HOODS

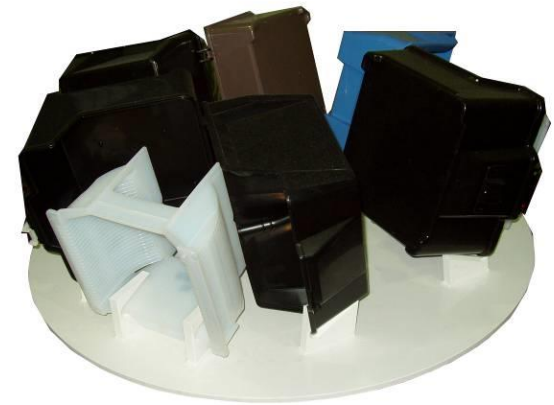
Hoods are specific designed for universities and research labs. Customizable workplan with safety tank, spray guns, hot plate, sinks, power plugs...





WAFERS CARRIERS AND BOXES CLEANING

Our last system for Carriers and Boxes clean up is quite original and compact, moreover it doesn't utilize solvents but just hot H₂O DI, that is produced on-line.
Hot H₂O DI can be re-used for many times thanks a buffer tank. Perfect clean up is warranted by indirect ultrasound in vertical version.
Final drying is accomplished using hot H₂O DI and hot N₂ produced on-line. Boxes and carriers are positioned in a rotational carousel, in closed environment.





LEADFRAMES DEFLASHING

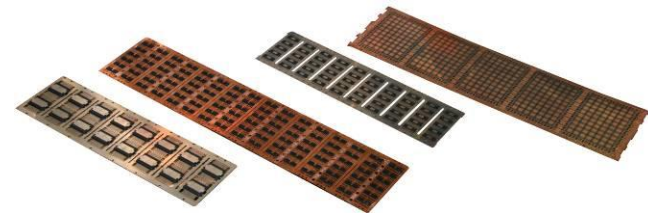
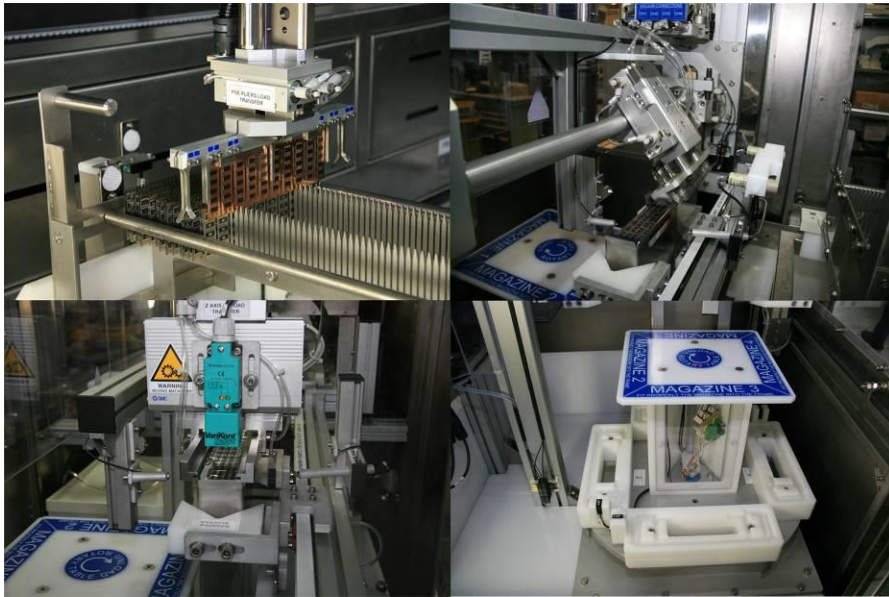
SPM manufactures Deflashing equipments in different versions according with customer requirements.

We realize various types of tools from chemical only processing to full automatic deflashing including hi-pressure waterjet pump.

SPM deflashing equipments handle multiformat lead-frames. They can be configured in different versions tanks to a modular development.

Equipments are highly flexible comparing to other systems. All process timings, temperatures, recirculations can be changed from recipes independently from other stations.

This flexibility makes Laguna Model the only eflashing equipment that can be used with different lead-frames size from 20mm to 100mm of width without any conversion.





THIN FILM TCO EQUIPMENTS PARTS CLEANING

Turnkey project to guarantee cleaning of TCO parts

The project include equipments to clean parts in different models and configurations, CDS for chemical distribution, Trolleys, Baskets, Acid recovery systems, Scrubbers, Ovens and sand blasters. We offer also installation of piping lines, facility connections and service.





WASTED WAFERS AND MASK DESTRUCTION SYSTEM

Tool for chemical destruction of wasted wafers and masks

Tiger Shark is an automatic system of wafers destruction. It is dedicated to wafers that don't pass the final test (flash technology).

Tiger Shark destroys wafers using chemicals and can be used also for masks destruction, using specific solutions.

This system is in automatic version, for 25 wafer single carrier, 8"-12". Inside the process tank, after chemical treatment, there will be a rinse phase. Etch solution is recovered and stored into another tank, underneath, for re-use.







EPI Quartz parts
cleaning



Oxidation/Doping
Quartz parts cleaning



Quartz handling



Quartz storage



EPI QUARTZ PARTS CLEANING SYSTEMS

SPM has an high experience on quartz parts cleaning. We realized several models dedicated to EPI quartz parts cleaning. That system are fully automated and very easy to use and install.

With SPM quartz cleaner equipments you can clean:

- ▣ LPE 2061 QUARTZ BELL JAR
- ▣ LPE 3061 QUARTZ CHAMBER
- ▣ LPE 3061 QUARTZ CHAMBER
- ▣ ASM QUARTZ CHAMBER
- ▣ AMC 7810-7820 QUARTZ BELL JAR
- ▣ QUARTZ TUBES
- ▣ THERMOCOUPLES
- ▣ QUARTZ SMALL PARTS





EPI QUARTZ PARTS CLEANING SYSTEMS

▣ Athens Model	LPE 2061 QUARTZ BELL JAR CLEANING SYSTEM
▣ Cairo Model	LPE 3061 QUARTZ CHAMBER & PROCESS KIT CLEANING SYSTEM
▣ Manila Model	LPE 3061 QUARTZ CHAMBER & LPE 2061 QUARTZ BELL JAR AND PROCESS KIT CLEANING SYSTEM
▣ Monaco Model	ASM QUARTZ CHAMBER AND PROCESS KIT CLEANING SYSTEM
▣ Nice Model	LPE 2061 QUARTZ BELL JAR, ASM CHAMBER AND PROCESS KIT CLEANING SYSTEM
▣ Piraeus Model	LPE 2061 OR AMC 7810-7820 QUARTZ BELL JAR AND PROCESS KIT CLEANING SYSTEM
▣ Agrigento Model	CHAMBER LPE 3061, SMALL PARTS, BELL JAR AND QUARTZ TUBES CLEANING SYSTEM
▣ Sunnyvale Model	LPE 3061, ASM QUARTZ CHAMBERS AND PROCESS KIT CLEANING SYSTEM
▣ Agrate Model	ASM QUARTZ CHAMBERS CLEANING SYSTEM



Oxidation/doping QUARTZ PARTS CLEANING SYSTEMS



The progressive passage from 6" wafers to 8" and even larger (12") created the problem of furnace quartz parts cleaning, that come in contact with wafer gases. Keeping all chambers and connections clean is very important.

In the past, this clean up problem was a bit disregarded, or at least it was not considered as a process integrating phase, since semiconductor processes were less sophisticated.

Nowadays, considering actual process equipments, quartz parts cleaning becomes more important, and consequently customers require different systems.



SPM can provide equipments to clean quartz tubes, furnace thermocouples, quartz small parts and boats.



QUARTZ PARTS HANDLING



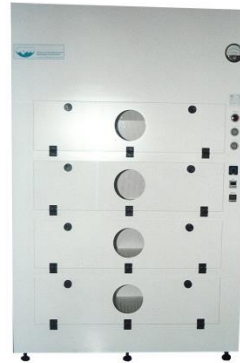
Complete manufacturing of transportation tools for quartz parts. Different model available according to customer needs.



Automation systems for automatic quartz tubes loading-unloading into cleaners equipments.



QUARTZ PARTS STORAGE



Cabinet dedicated on quartz tubes , bells, boats and quartz-wares storage.







Exhaust under control

Exhaust scrubbers

Carbon filter units

Exhaust control systems

Storages-Tables-Racks

Glow rack for clean room

Storage for wafer carriers and boxes

Clean room storages with Laminar flow for wafer carriers and boxes

Plastic or stainless steel Dry boxes

Plastic or stainless steel Tables

Handling systems

Fully automated wafer transfer systems

Clean room trolley for wafer carriers and boxes

Sample chemicals transport suitcases for testing

Holders for single wafer from 1" up to 18"

Electroplating holders

Custom process carriers for mask, wafer, solar cells, leadframes...



Scrubber for single equipment connection

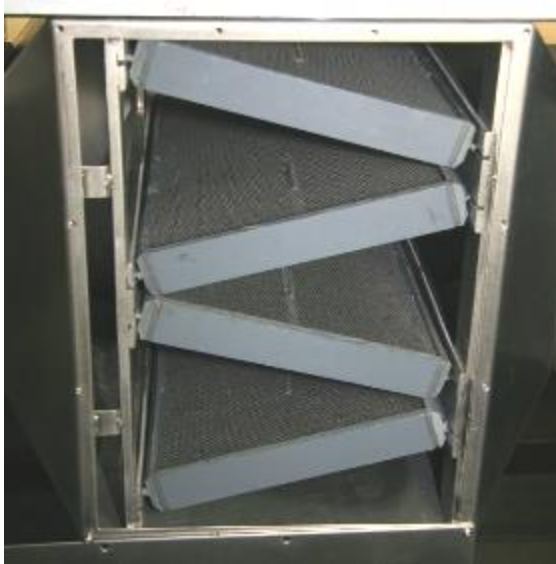


Scrubber for 12.000m³/h

EXHAUST SCRUBBERS

Our scrubbers provide a maximum degree of reduction of toxic vapours, gases and fine particulates preventing the spread uncontrolled and dangerous in the workplace and in the atmosphere, thus ultimately to protect human beings and the environment for a better quality of life.





CARBON FILTER UNITS

Carbon filtering is a method of filtering that uses a bed of activated carbon to remove contaminants and impurities, using chemical adsorption.

Each particle/granule of carbon provides a large surface area/pore structure, allowing contaminants the maximum possible exposure to the active sites within the filter media.

SPM can integrate into SOLVENT wet benches a cascade of carbon filters in order to have an uncontaminated exhaust.



EXHAUST CONTROL SYSTEMS

SPM has an high experience on exhaust control.

We can install in our wet benches, or as a integrative module, special systems that include an automatic controlled shutter.

Opening/close of the shutter will reflect the exhaust set value.

The system constantly read depressure value and keep in constant into the work area, balancing with other equipments installed on the same exhaust connection.

Possibility to add sensors to monitor also air flow to warrant a total safe area for operators in manual wet benches.

We can also add inverter control speed to reduce power consumption when equipment is in standby mode.



Automatic motorized valve to maintain constant exhaust value.





STORAGES – TABLES – RACKS

SPM realizes custom tables, storage for chemicals and parts, pass-through, racks, **dry boxes and glove boxes** according to customer requests.

All tools are realized with cleanroom compatible materials.



TROLLEYS FOR CLEANROOMS

SPM realizes custom trolleys in different configurations and scopes.

All tools are realized with cleanroom compatible materials.

HANDLING SYSTEMS

SPM realizes custom handling systems for small components. Our experience is focused on wafers, glass masks, strips and leadframes.

We can create special holders to handle components easily and to be used in electro-plating processes.

We can also design and realize custom carrier for wafers, photo-masks, solar cells or other components for batch processing.

Materials, dimensions, electric contact option can be configured with SPM engineers. We normally create prototypes to test holder efficiency, ergonomics, and process results with customer process.

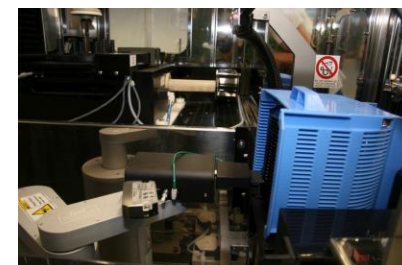
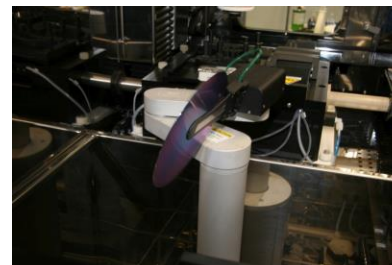
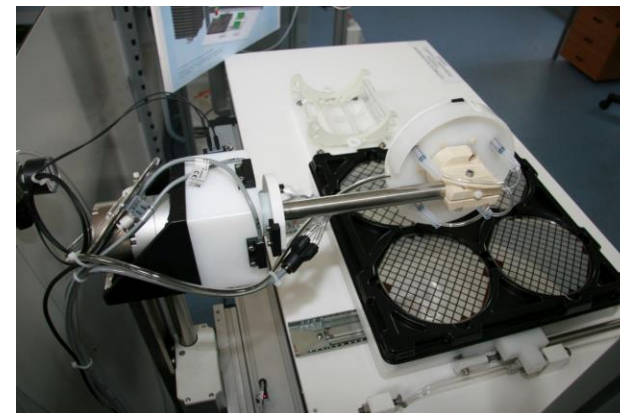
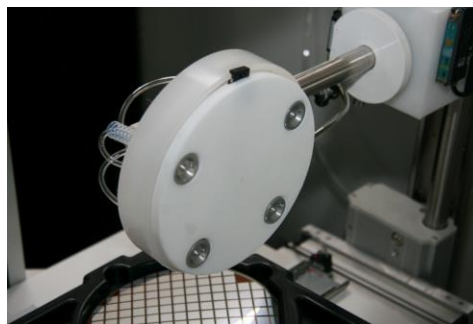
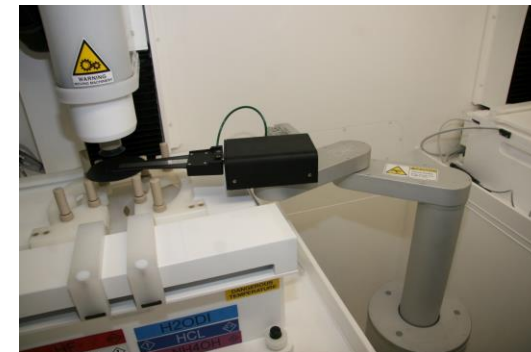
For every applications we can design a custom carrier available in different plastic or metal materials.

CUSTOM SOLUTIONS FOR AUTOMATED WAFERS MANIPULATION

SPM has great experience in automation. We are able to realize equipment with automatic single wafer load/unload station. This tool can be integrated inside our equipment or sold separately as transfer station for example from basket to process carrier.

We have experience manipulating ultra-thin wafers, photo-mask and other components. Axis technology can vary according to budget, precision, and travel stroke.

We are also able to integrate third party system like wafer handling robot that cooperate with our machines PLC.





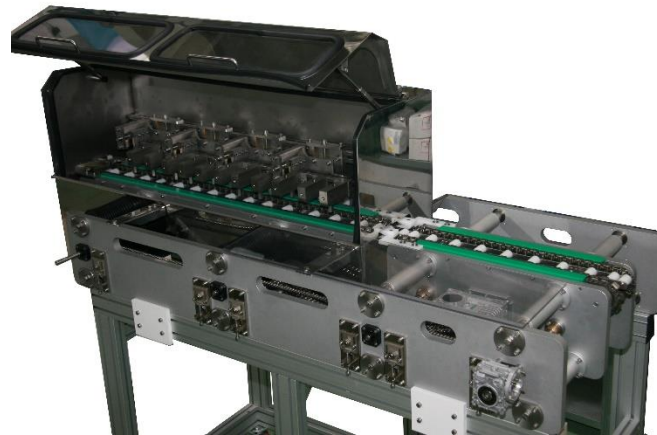
PROTOTYPES

SPM constantly invests in Research&Development focusing on the realization of innovative prototypes in order to find alternative way of processing, cleaning, handling and of chemical managing.

The creation of prototypes is very important for us since it immediately highlight strengths and limits of a project and allows us to find rapid solutions in case of issues. In addition, our customers have the possibility to evaluate how equipment works before of buying it and to personalize their order according to all their requirements.



3D Jet Plating tool



Hi-Pressure Water-jet conveyors



Last Prototypes



Icarus Model



Nautilus Model



San Diego Model



Caribbean Model



Vienna Model



Rotobarrel for
solar cells



Eucalyptus Model



Bern Model



Aconcagua Model



DEFLASHING NEW
Water-jet conveyor



Elbrus Model



Kilimanjaro Model

SEMICONDUCTOR Front-end SEMICONDUCTOR Back-end PHOTOVOLTAIC LABS



Horizontal PLASMA cleaner



Vertical PLASMA cleaner, with the possibility of an integration on wet benches lines



Our goal is to ensure that our customers are able to use our equipments to their full advantage for increased efficiency and productivity – *ensuring a return on investment*. Training and ongoing support are always at your fingertips. You can contact us for any inconvenience, also after warranty expiration. SPM service will include:

- ▣ Telephone guidance
- ▣ Remote assistance thought VPN internet connection
- ▣ Service at customer's site

SPM key strength is the **spare parts store**. In our lab we have in stock more than 10.000 articles to provide a fast response in case of machine down events.

SPM **training courses** (also at customer's site) cover all aspects of equipments utilization: electrical components and hydraulic parts overview, preventive maintenance, software utilization...



Preventive Maintenance

To warrant equipments perfect efficiency SPM engineers can perform equipments PM. This will surely extend equipment life, and will avoid unpleasant machine downs. It is possible to establish a maintenance program contract with SPM, to reduce costs and to keep equipments always in best conditions.

Refurbish

SPM offers equipments refurbish services. We can renovate old machines, changing damaged parts and transforming original configurations according to your newer needs.

Remote Assistance

We can provide our equipment with an industrial VPN router in order to establish a remote connection that permit to us to check and modify PLC software.



S.P.M. s.r.l.

Ambrogio Sala

President



Special Plastic Module for
semiconductor industry

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