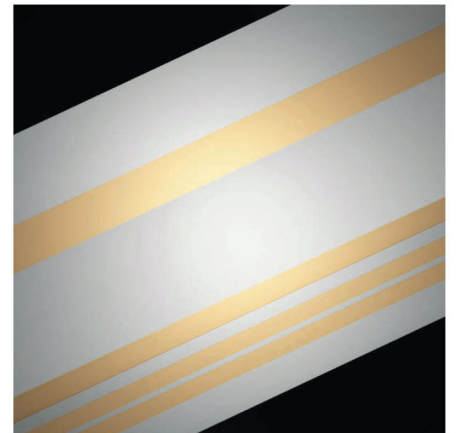
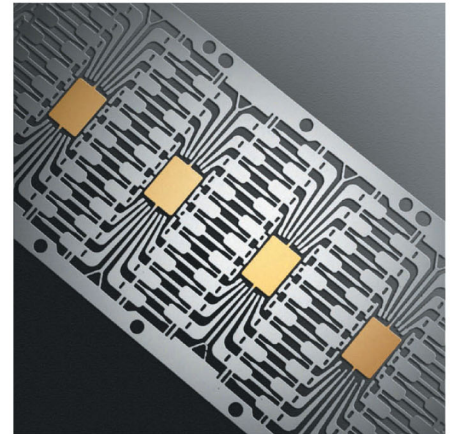


Advanced Reel to Reel Processing Equipment



Technic Advanced Reel to Reel Technology

Continuous Surface Finishing

Continuous Systems have long been recognized by industry as a very effective means of optimizing production, productivity and quality. Surface finishing is no exception. These systems provide the opportunity to process large quantities of material at high speeds in exceptionally well controlled environments. Technic manufactures a number of continuous systems for the surface finishing of many industrial products and a variety of materials, including tubes, wire, metal and plastic webs, discrete parts and stamped and bandoleered components.

Products pass through processes in a carefully determined sequence without intermediate work accumulation. Since all the work is processed at the same speed, exposed to the same process conditions and requires no routine operator intervention, there is little part to part variation. Chemical processes supported in these systems include cleaning, descaling, oxide removal, surface activation, electroplating, electropolishing, electrophoretic coating, passivation and anodizing. Technic's continuous systems are important tools for surface finishing when yield, productivity and final product cost are important.

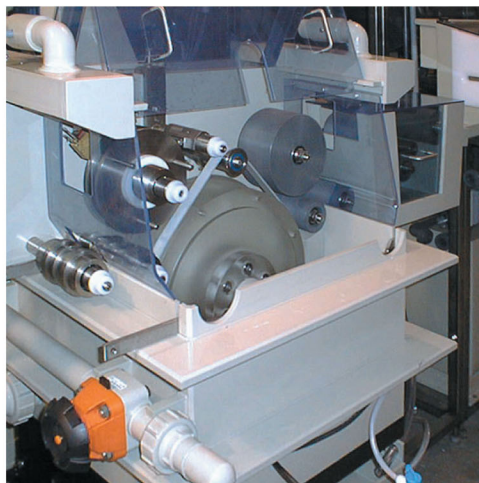
Reel-to-Reel Systems

Continuous equipment for finishing stamped connectors, bandoleered components and web materials up to five inches, has been classified by the Surface Finishing Community as reel-to-reel systems. This line in Technic's family of continuous processing systems was developed through many years of practical experience and extensive research.

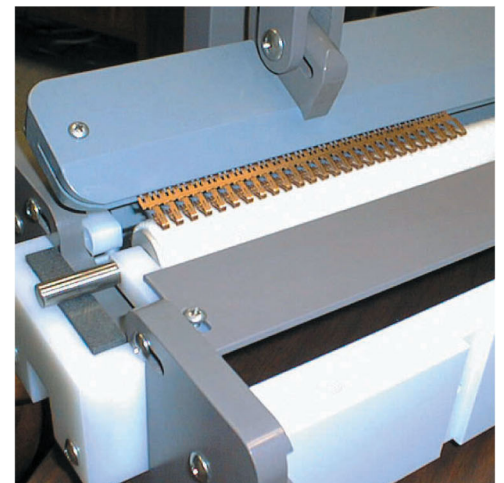
As a completely integrated family, the same high quality, precision components may be used interchangeably in many applications.



Controlled depth electropolishing station



450 Wheel Plater



Rotary Brush Plating Station

Modular construction permits easy expansion as well as process modification and customization. The most demanding requirements can be accommodated.

Although the entire surface of the material processed in reel-to-reel systems may be finished, a unique characteristic of these systems is the availability of selective tools. They are used to mask selected areas. These tools can be as simple as controlled immersion or as complicated as product specific conformal masks.

The high capacity of reel-to-reel systems, their reliability and precision of production make them ideally suited for the manufacture of components made and used by the electronics, medical, automotive and other consumer product oriented industries.

System Configurations

Reel-to-Reel systems may be built as single or multiple strand machines. Dual strand units are the most popular, since the addition of a second strand adds only about 30% to the system cost while doubling output. Little additional space is required. Accessibility and maintenance are only slightly more difficult than with a single strand system.

All Technic system designs are optimized for every application using SolidWorks three dimensional modeling software. This provides exemplary system documentation and allows the use of internet protocols like *Go to Meeting* for efficient client design participation and communication.

Every effort is made to provide the best use of available space while meeting the stated production requirements. Although straight lines are the most popular and easiest to operate, U" shaped lines and multi-pass festoon configurations are available when conditions warrant them.





U-Shaped Plating Line with interchangeable process stations

Materials Processed

Common materials processed are ferrous metals, copper, copper alloys, aluminum and stainless steel. Materials such as Hastelloy, titanium and Nitinol may be accommodated. Process cycles are customized to suit the family of base materials that may be processed and the end result desired.

Chemical Processes

All Technic reel-to-reel systems are designed to operate with aqueous based chemistries. Common finishes include copper, nickel, palladium, silver, gold and electropolish. Chemical treatments include soak clean, electroclean and ultrasonic cleaning; oxide removal, zincate and passivation.

For each process, ventilation and wastes generated are segregated to allow incompatible chemistries like cyanide and acid bearing chemistries to be used within the same machine.

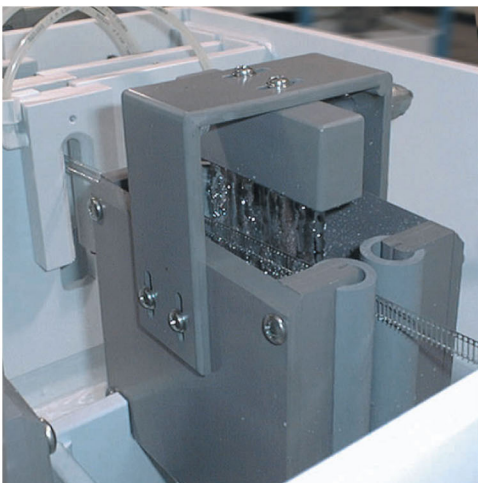
Process Cell Design

Advanced cell designs provide uniform treatment throughout each cell and over the entire product surface area. Without regard to the application, the results are uniform, providing clean, pit free surfaces and low porosity, evenly applied plated deposits.

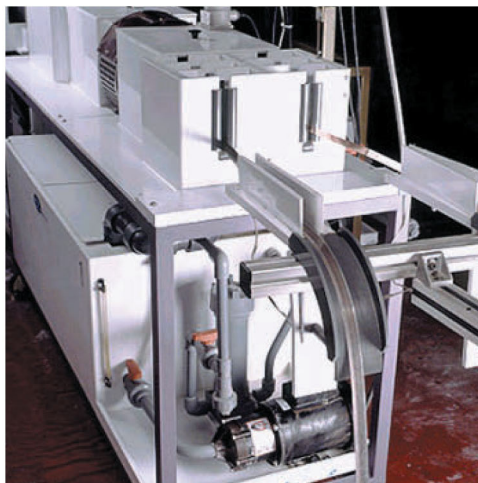
Overall and controlled depth cells are fully and rapidly interchangeable. Plating accuracy is maximized by incorporating knife edge cell walls, submerged anodes, masking shields, flow optimized solution spargers and strategically placed solution baffles in the controlled depth cell designs.

Selective Plating Tools

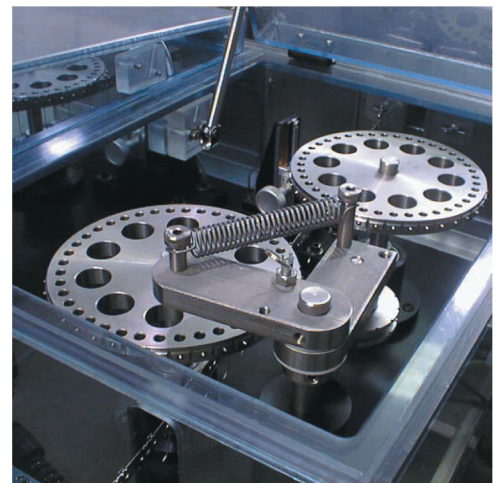
Additional tools for the more demanding selective applications are also available. Each has its own range of capability for precision and accuracy. This allows selection and optimization of tools for



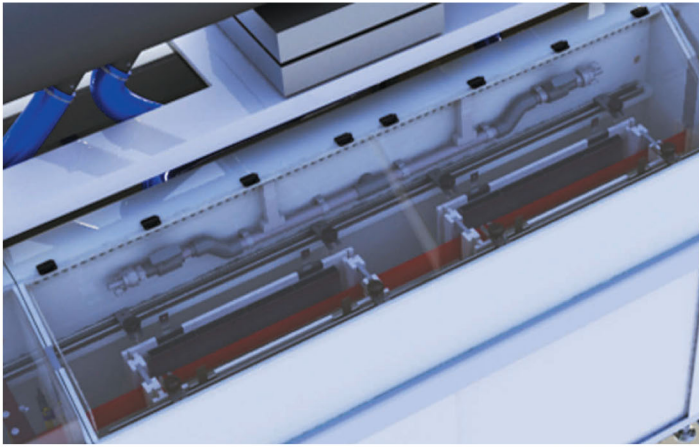
Rinse Cell



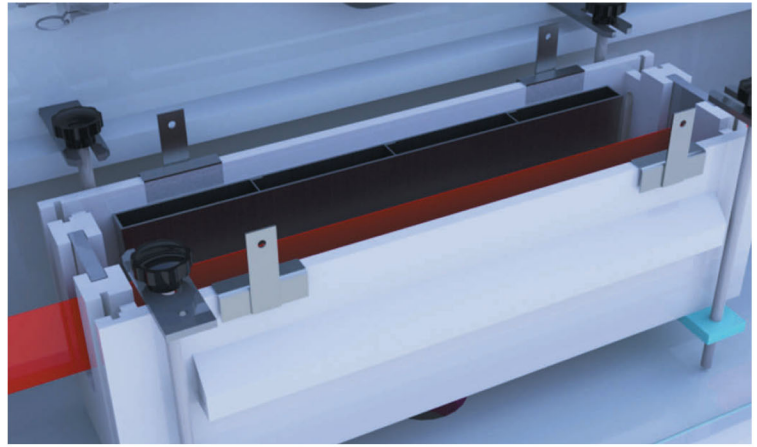
Dual-Strand, 360° Ultrasonic



Stainless Steel Pin Drive for Formed Stock



SolidWorks rendering of an Inline Cell



SolidWorks rendering of a Flood Plating Cell

applications like the plating of precious metals. Spot systems can be made accurate to ± 0.1 mm and include the capability of east/west plating on pins. Stripe systems may operate with a similar accuracy and allow stripes applied on stripes and edge of strip placement. Critical cleaning and rinsing applications can be improved with the use of ultrasonic technology. Tin whiskering can be mitigated with inline reflow. Technic provides experienced advisors for application assistance to aid in the selection of the best tools for each and every application.

Accessibility & Reconfiguration

During design and construction of these systems, issues such as access for maintenance and the simplicity of adjustment are always taken into consideration.

Modular construction techniques allow process segments to be removed from the machine using an innovative cart

system. Plug-in electricals and quick disconnect fittings make relocation and service simple and quick. System reconfiguration, process substitutions, tool changes and maintenance are quick and easy. Under most circumstances they can be done by personnel with little specialized training or previous experience and without tools.

System Wiring and Controls

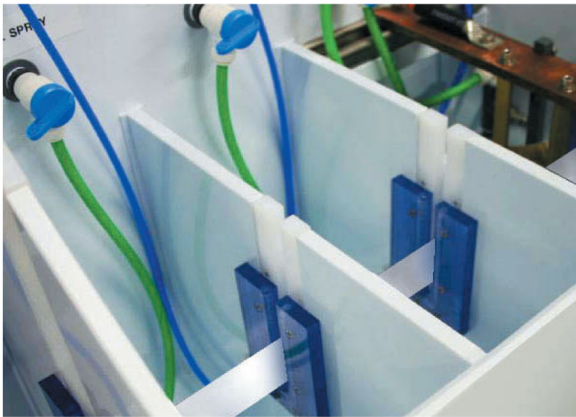
Technic offers many automation control options. Allen-Bradley, General Electric, Siemens, Eaton and other popular brand PLCs are offered. Robust control cabinet, wiring and electrical designs reflect wet and corrosive environments in which these systems need to function. Industry specifications commonly applied to system designs include ISA, NEC, NEMA, JIC, CE, UL and CSA. Our project management, design and manufacturing teams can convert custom concepts and specifications into hardware and software solutions.



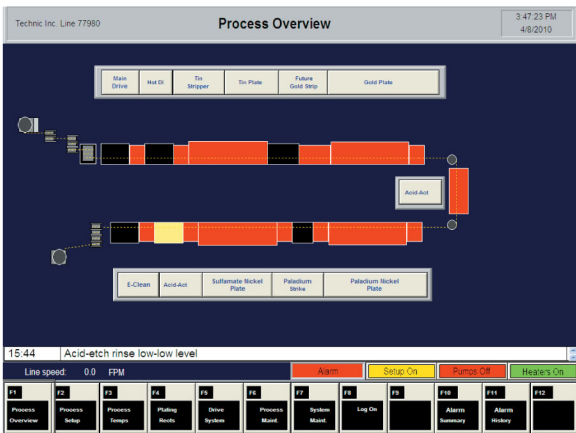
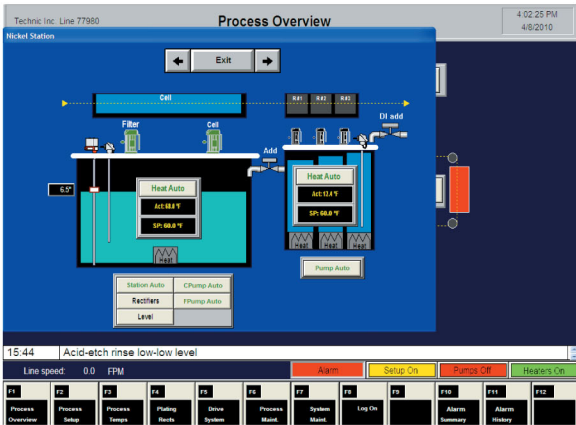
Multi-Strand, Multi-Lane Plating Line



Integrated Exhaust



Rinse and Air Blow-off Station



Environmental Controls

The various shapes and large quantities of material being processed make it extremely important to control solution losses and minimize rinse water usage and discharges. Proprietary wiper systems, brushes and air blow-offs prevent most dragout. These features remove residual solution from the product, allowing it to be drained back into the process. The designs employed automatically compensate for changes in thickness of the material being plated without springs or manual adjustments. Where blow-offs are employed, carefully controlled pressures and proprietary nozzle designs deliver just the right amount of air to remove solution without drying, staining or passivating component surfaces. All methods prevent “back spray”, dragout and reduce cross-contamination. This careful control of dragout results in more precise process control and reduced rinse water and chemical consumption. Properly designed dragout and running counterflow rinses complete the process, minimizing discharge and maximizing the opportunities for water recycling.

Analytical Tools, Instrumentation and Replenishment

High speed production, sophisticated products, narrow ranges of control requirements and quality assurance may necessitate many different levels of process monitoring, data collection and bath replenishment. Technic offers the tools to accomplish them. Understanding and characterizing organic bath components are amongst the most challenging. Today’s electronic technologies have continued to reduce analytical cycle time and cost per analysis, allowing direct voltammetry to be used on the factory floor (RTA) and in the laboratory (EBA). Other bath components may be analyzed by more traditional methods such as titration, potentiometry and spectroscopy. Technic control systems can routinely maintain precise process windows with integration of these instrumental methods. With real-time process observations key components may be replenished, reaction by products may be removed and operating windows narrowed. Data collection is available for process and product certification and historical records. The use of current totalization allows users to track the consumption and replenishment of precious metals and other bath additives. With their judicious application product quality can be improved, costs can be reduced and lot to lot variation can be virtually eliminated.



System Service, Support and Training

At Technic we do not believe that our responsibility ends with the acceptance of your system at our facility. Extended customer care can include installation, software customization, scheduled maintenance, expansions and emergency field service. We maintain permanent documentation for the systems that we build and have a dedicated service desk to support your system for years to come.

Technic also can provide formal classroom based training designed to provide a better understanding of your system and its tools and the basic principles of electroplating, electropolishing and other surface finishing practices. Sessions on the theory, methods and practices can be provided onsite and geared to provide a solid foundation for new entrants or upgrade the skills of veterans.



Technic Corporate Headquarters, Cranston, RI USA

About Technic

Since its inception in 1943, Technic Inc. has remained a financially strong private corporation and has established a global reputation for technical excellence in the electro-deposition of precious metals. Following the expansion of our product lines through organic growth, strategic partnerships, and acquisitions, Technic has grown to be a global leader in:

- Specialty Chemicals
- Surface Finishing Equipment
- Engineered Powder and Flake
- Analytical Control Tools

Our primary end use markets include:

- Semiconductors
- Electronic Connectors
- Photovoltaic Cell Manufacturing
- Electronic Components
- Printed Circuit Boards
- Industrial Finishing
- Decorative Applications

Technic currently operates over 20 global facilities in 14 countries within North America, Asia, and Europe. Our Advanced Engineered Solutions approach to customer projects allows Technic to add substantial and differentiated value to the markets and customers we serve. We look forward to helping you realize the maximum potential from your new product development goals.



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