

Engineered Solutions and Manufacturing Expertise



# Engineered Solutions and Manufacturing Expertise



## Presentation

Esterline Connection Technologies has a proven history in the industrial, defense and aerospace markets. This diversity of segments has allowed us to develop a broad range of manufacturing capabilities.

The goal of this brochure is to divest from “traditional” catalogs where products are the main focus; instead we want to highlight our culture of operational excellence and our innovative spirit by showing you our core processes and capabilities.

Each section has been carefully designed to:

- Describe our range of manufacturing processes
- Illustrate technical features and capabilities
- Highlight unique applications
- Outline key internal know-how

In addition to the various examples you will discover in this catalog, Esterline Connection Technologies supports customer specific needs, from a connector, backshell, conduit to even more complex and innovative solutions.

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## Core Processes



Die Cast



Machining



Welding



Plating



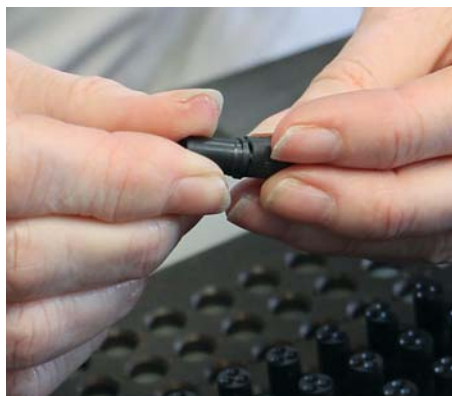
Injection Molding



Plastic Extrusion



Braiding



Assembly



Overmolding

## Features & Benefits

**VERTICALLY  
INTEGRATED**

### Complete Solutions

Esterline Connection Technologies has integrated its supply chain in order to deliver value added products and services that complement their recognized connector and backshell product lines.

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**TEAM WORK  
APPROACH**

### Different Cultures Same Goal

Our cultural diversity allows us to take multiple approaches in order to reach a solution. Our quality standards and service are the same anywhere.

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**WORLDWIDE  
PRESENCE**

### Different Locations to Meet Your Supply Chain Expectations

With more than 3000 employees and production sites worldwide, we take advantage of our multinational presence to offer competitive cost and lead times.

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**CUSTOMER  
FOCUS**

### Quality & On Time Delivery is What We Strive For

Esterline Connection Technologies America shares the same goals in terms of quality and on time delivery, allowing these two elements to become a standard in the way we operate.

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**ENGINEERED  
SOLUTIONS**

### Custom Designs for Your Special Applications

Our design and manufacturing teams are always ready to work with our customers, going beyond the current standards and ready to create your customized solution.

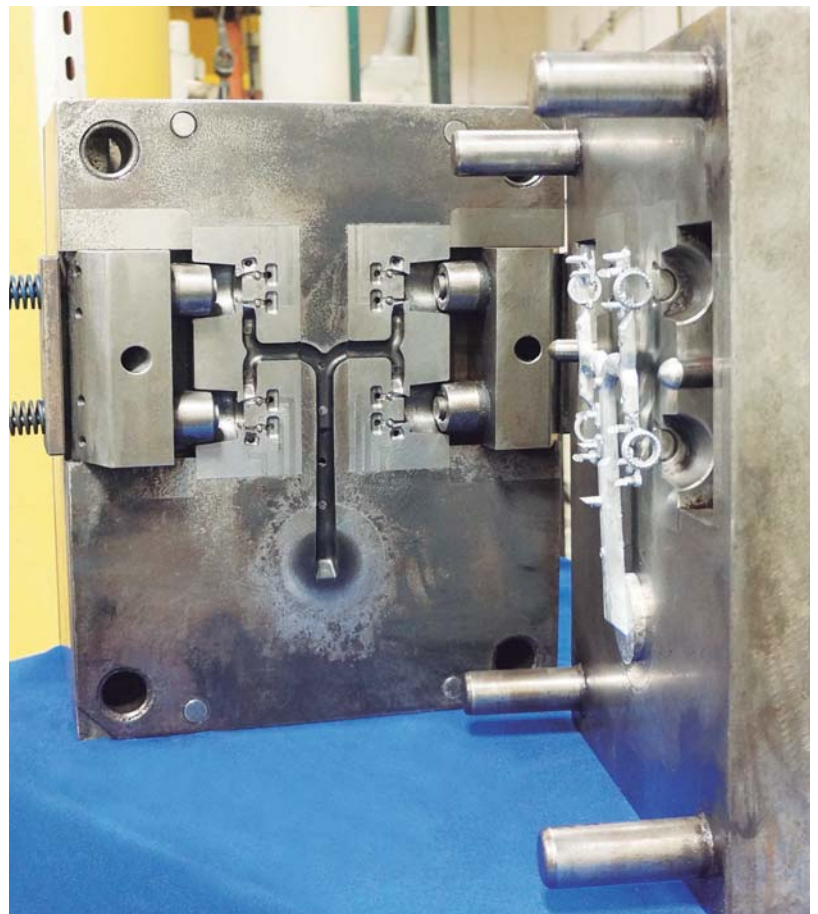
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Die Cast is a process where molten metal is injected under high pressure into a mold cavity, similar to a plastic injection molding process.



Die cast parts with different shapes and sizes



# Die Cast



From left to right:  
die cast part, die cast part after machining, complete assembly

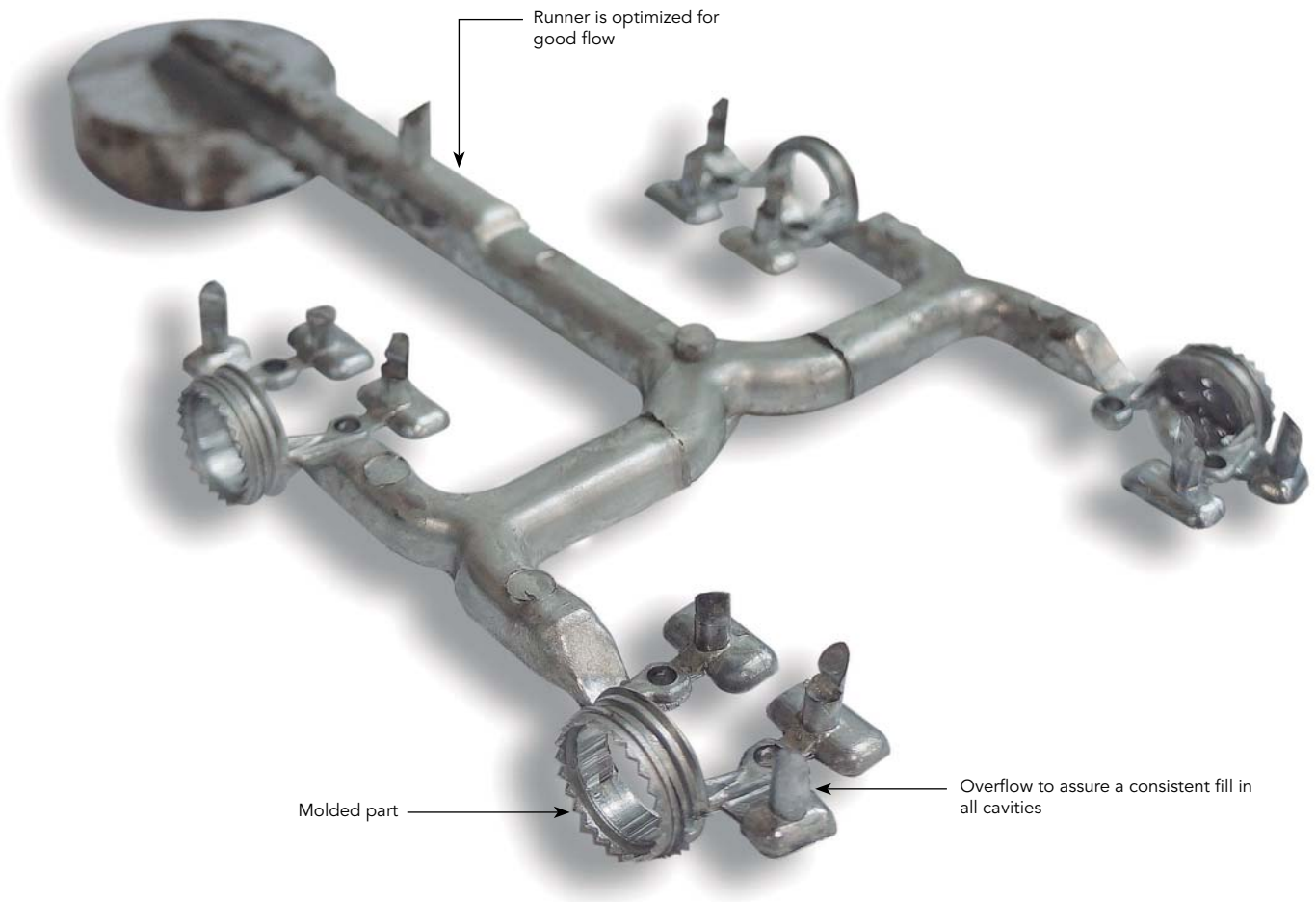
Aluminum is melted in a separate furnace while a robot feeds the precise amount of molten material to the machine to eliminate variability in the shot size.

Esterline Connection Technologies currently has Die Casting machines with the following capabilities:

- 150 Tons
- 180 Tons
- 250 Tons

Our design team has the capability to design and fabricate new molds to address any custom design.

A good alternative to bar stock machining for medium to high volume environments due to the low manufacturing cost involved as a result of a shorter cycle time and multiple cavity tool options.





Esterline Connection Technologies has a broad range of machining capabilities that include turning, milling, broaching and drilling to name a few.

Our wide material portfolio includes aluminum, stainless steel, bronze, titanium and composite. Our design team is always available to help you select the correct material for your application.

A team of designers, engineers, drafters and programmers will take an idea from conceptual design to finished product.

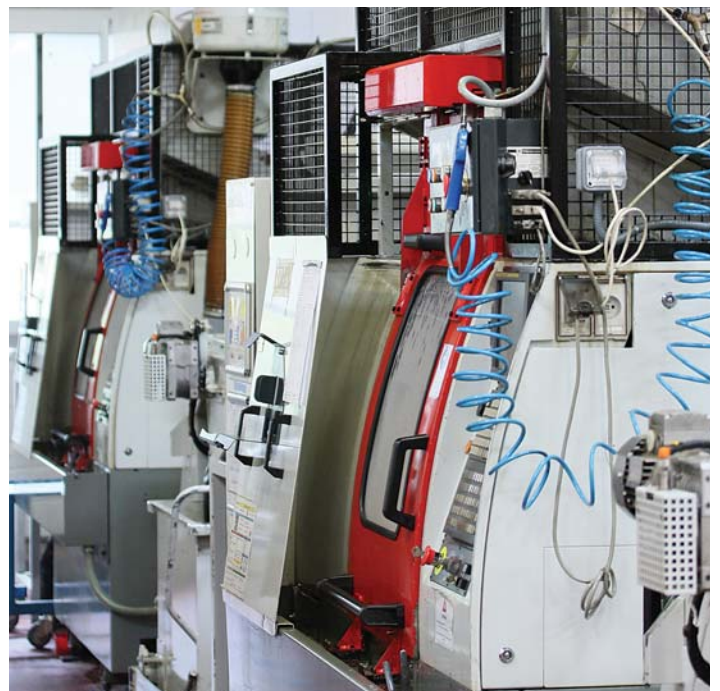
Our machining work cell layout approach allows us to offer flexible daily production schedules to better service our customers and quickly fulfill demand.



Aluminum or stainless steel



Live tooling capability enables Esterline Connection Technologies to machine in multiple axis, this means a shorter cycle time



CNC lathe





Automated lathes operate with revolving technology and are ideal for machining any type of circular part; they can also be used to add threads or helices.

Extra features can be added in different axis using our live tooling capability.



For prototypes or low volume projects, machining plastic and composite is a great alternative

Esterline Connection Technologies has machining excellence centers located worldwide.

More 250 machines with different capabilities increase the range of parts that can be processed.



Multi axis lathe



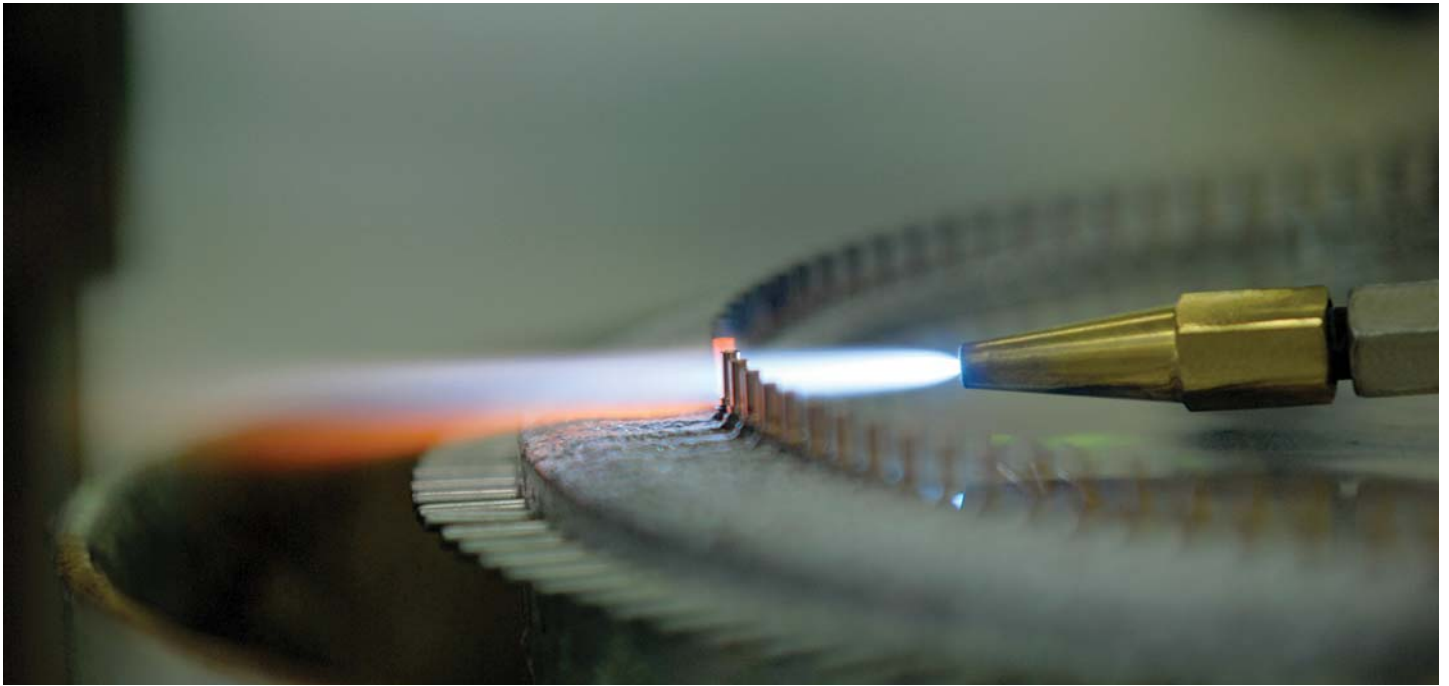
Small complex parts are part of our capability portfolio



Stainless steel



Bronze

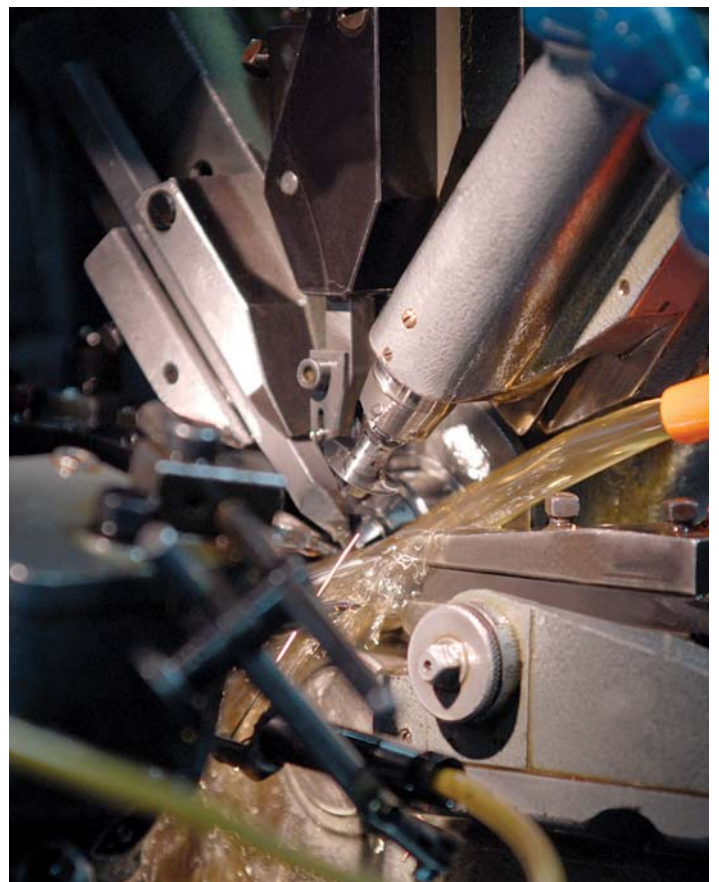


Esterline Connection Technologies has more than 50 years of experience in screw machining. Our products includes pins, sockets, and

precision components ranging from 1 to 25 mm in diameter. We commonly work with brass, copper alloys and aluminum.



Precision Swiss machines



Live tooling

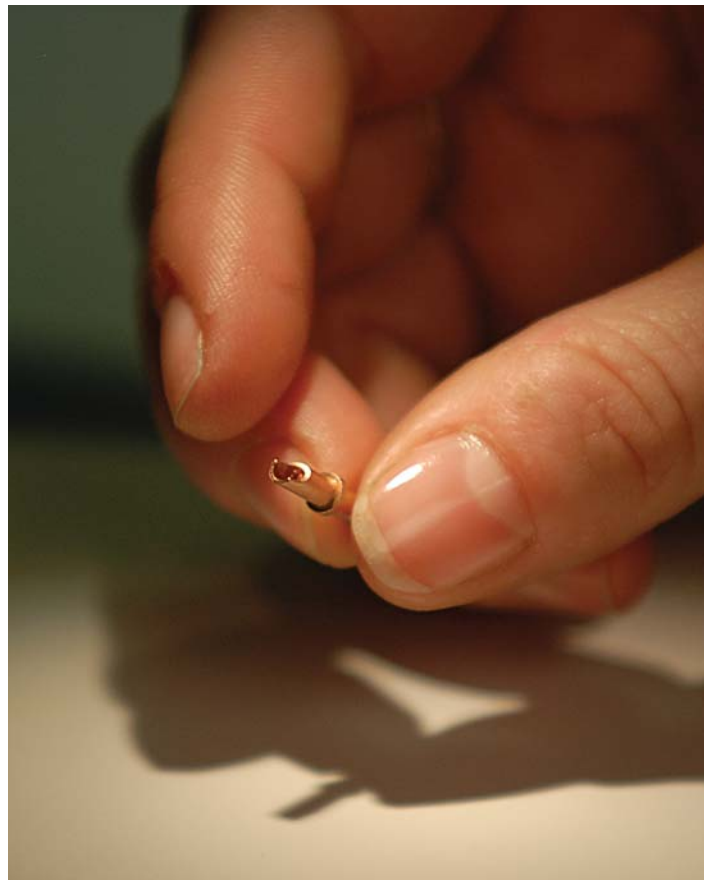


Our flexible production systems allow us to support batches as small as 100 pieces or as large as several million. We also offer heat

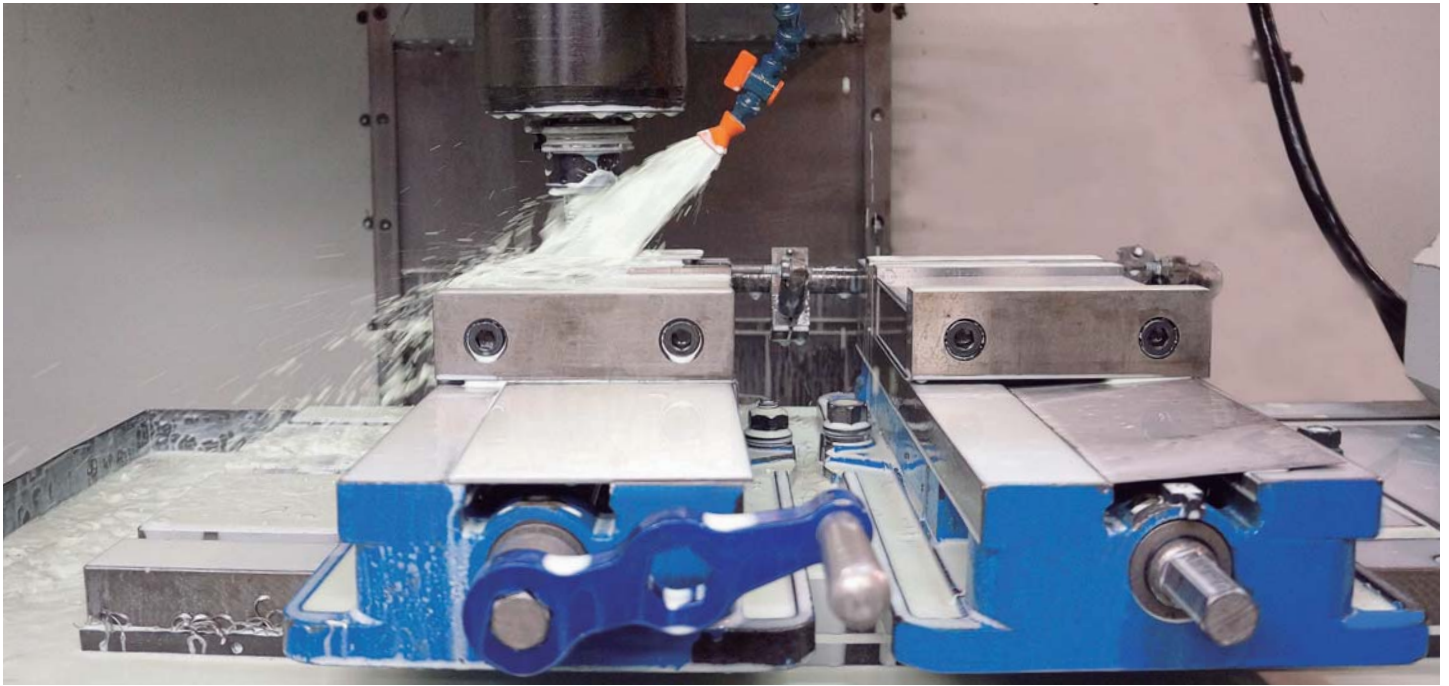
treatment, zone annealing, plating, assembly and ink marking as well as design support.



Precision screw machine components



Solder cup contact



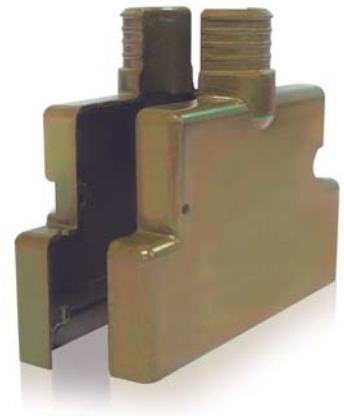
Milling is typically used to produce parts that are not axially symmetric and have many features, such as holes, slots, pockets, and even three dimensional surface contours.



Rectangular to circular transition



Rectangular backshell



Two piece machined part

Due to the high tolerances and surface finishes that milling can offer, it is ideal for adding precision features to a part whose basic shape has already been formed.

Thanks to the versatility of CNC Milling, Esterline Connection Technologies is capable of machining different types of shapes such as:

- Rectangular
- Triangular



These enclosures are used to environmentally and electrically protect delicate circuits such as small gauge wires, resistors, capacitors and other components from outside environments.



Example of an enclosure before and after plating

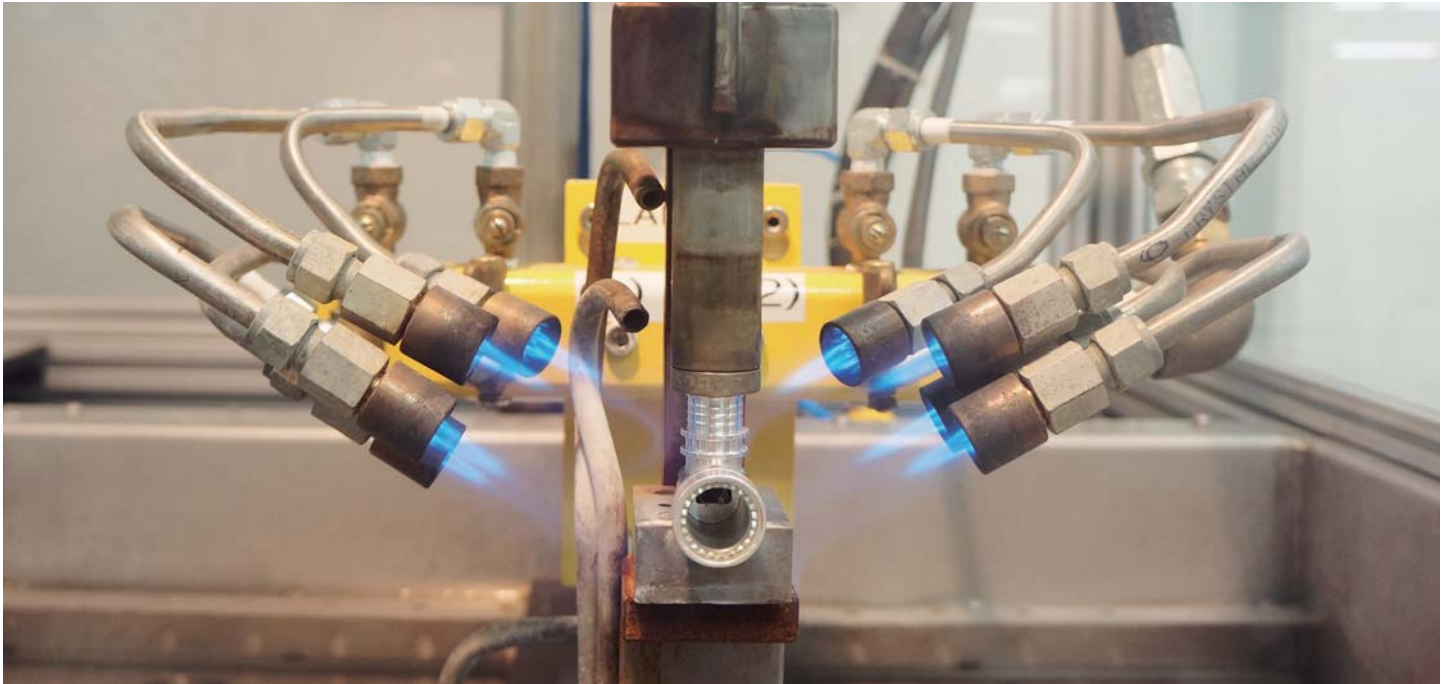


Housing

In some instances, where repairability is required; a two part approach can be taken, with a separate cover which can be screwed on to the base frame.

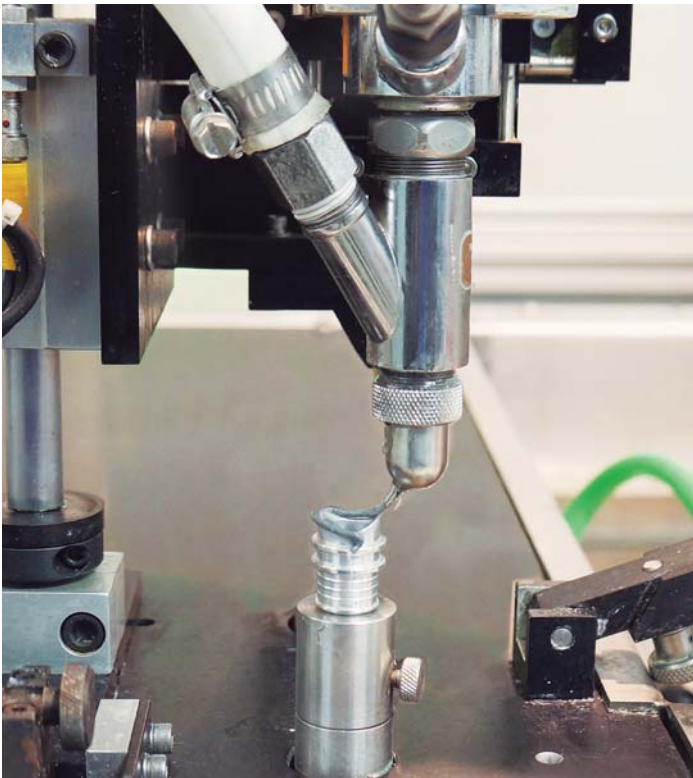


Enclosures can also be specially treated to provide better protection to key sensitive components. Refer to our coating section for details



A specialized welding process used to join two or more metal parts by melting a filler material that creates a strong bond between them. The filler is exposed to high temperatures caused by direct flame application.

Torch Brazing provides a cost effective process to fabricate complex assemblies while reproducibility and reliability are maintained.



An automated feeder of filler material is used to consistently provide the correct amount required.



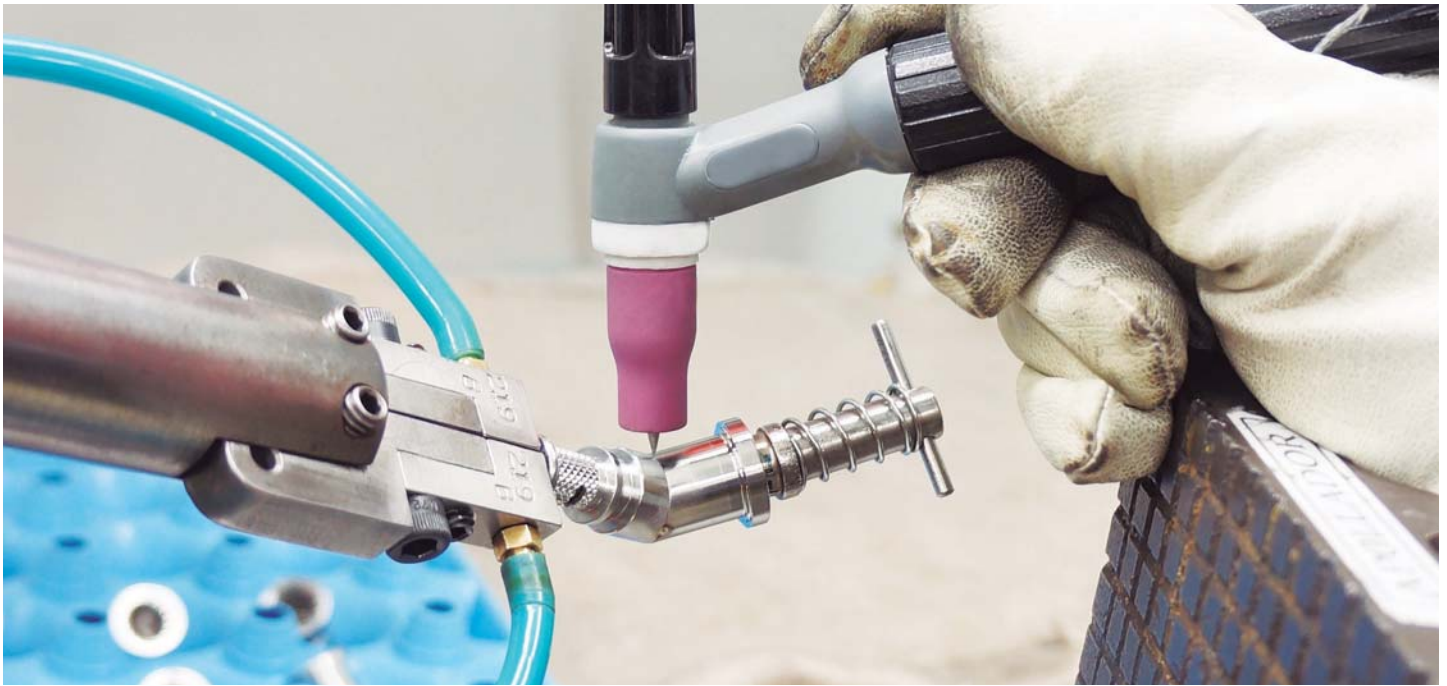
Finished 90° saddle joint



90° angle joint  
Prior to coupling ring installation



Fixturing and alignment is a key factor to maintain good quality on finished parts.



Esterline Connection Technologies uses a gas tungsten arc welding process with a non-consumable electrode and an inert gas for arc shielding.

It is most commonly used with aluminum and stainless steel.



Welding fixtures prevent the physical movement of the assembly during the process and also helps prevent the part from being stressed, therefore eliminating possible weld failures in the future.

Each fixture is individually designed to achieve the quality needed for the different configurations, including 45° and 90°.



45° stainless angle joint



90° stainless angle joint after all finishings

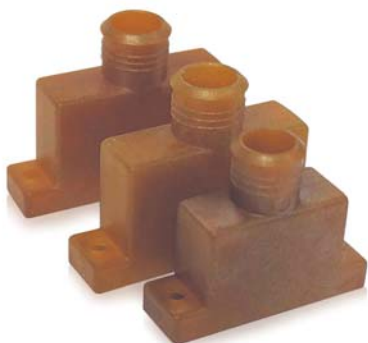


As part of our expertise we can weld at various angles



These various operations are performed to improve surface finish after die cast, machining and welding.

To ensure the highest performance, Esterline Connection Technologies performs surface finish operations to all our manufactured parts before the final operation.



Machined plastic



Machined parts after finishing process



Beads used for tumbling



# Finishing

Our finishing operations include:

- WHT (Weld Heat Treatment)
- Abrasive blasting
- Tumbling

Abrasive Blasting is achieved by propelling a high pressurized stream of grit material against rough areas to remove any imperfections and contaminants and leave a smooth surface.



Machined parts after tumbling

Conventional deburring processes are performed to eliminate sharp edges and burrs by using vibratory finishing machines.

This equipment offers others advantages such as brightening, smoothing, removing welding discoloration and surface cleaning.

Parts are placed inside a tank filled with media while a simultaneous vibrating and rotating motion scrubs the parts to deburr, polish and finish.



Cleaning process to remove residues

Post weld heat treatment reduces and redistributes the residual stress in a material that has been welded.

It is achieved by exposing the part at high temperatures for a certain amount of time.



Welded part after abrasive blasting



High volume plating line

Plating can optimize material performance properties such as better corrosion resistance, conductive or non-conductive attributes and even improved solderability.

Some examples of Esterline Connection Technologies's plating capabilities include:

- Cadmium
- Nickel
- Alodine
- Stainless steel
- Black zinc nickel



Machined parts with different plating



Same part with six different surface finishes

# Plating

Plating can be applied to a part by either depositing a metallic layer onto the surface, or by chemically converting/altering the surface. In both situations, electrical current may or may not be used depending upon the desired finish results.



Aluminum parts wired for plating

Esterline Connection Technologies has decades of experience in providing a variety of plating finishes to a diversity of metal or composite materials. Our automatic and manual lines can accommodate large to small volume scale production runs.



Black zinc nickel



Stainless steel after passivation

Our teams are constantly at work to improve our plating technologies with focus and dedication to reducing our environmental footprint.

In addition to our RoHS solutions, Esterline Connection Technologies is a major actor and contributor to the industry wide consortium dedicated to addressing the REACH challenge.



Contacts with different platings



Our plating preparation is adaptable to using either barrel processes or wire strands.



Waste water treatment



Esterline Connection Technologies excels in applying an array of coatings and specialized finishes that help prevent wear to components when utilized and exposed to the harshest environments.



## Dry Film / Solid Film Lubricants

Solid or dry film lubricants are a high performance coating used for reducing friction, galling, seizing and protection against corrosion. Dry or solid film lubricants greatly improve the wear life of parts and are less prone to collecting soil particulates and can often outperform traditionally used oils and greases.

These specialized lubricants are applied on a designated area and then cured and bonded through a heating process.



Esterline Connection Technologies plastic and machined parts are treated in order to promote adhesion with other components

From left to right: plated, masked

## Xylan®

Esterline Connection Technologies often utilizes this technology as a solution to prevent wire chafing and friction in various componentry.

Parts are masked to selectively coat desired areas for Xylan® (PTFE - like coating) application. To ensure proper coating adhesion, parts are placed inside an oven for curing.



## Polysulfide

This Elastomeric sealant is commonly used for its excellent resistance to liquids, solvents, oils/ lubricants and fuels. It is a great alternative solution to using conventional oil resistant and weather resistant gaskets and can also be used as an additional sealing layer.



Polysulfide stripes can be applied to very specific and small areas to create a barrier for dissimilar materials



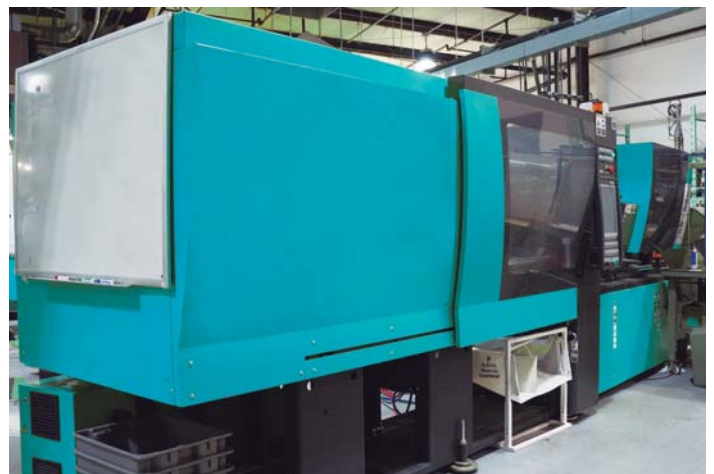
Anti-abrasion Xylan® inner coating



Injection molding is commonly used in the plastic industry for medium and high volume scale projects.

At Esterline Connection Technologies we can process a wide range of materials such as:

- Nylon
- PBT
- PEEK
- Ultem™



Molding tool

Using a modular approach we are enabled to design and manufacture a wide variety of products while minimizing tool expenses.



Custom connectors capability for different shapes and sizes

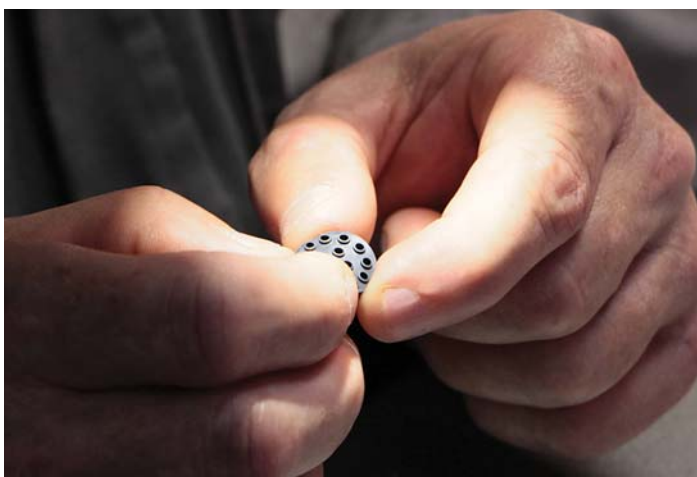
# Injection Molding

Our engineering team is available to assist you in the design and selection of the material that fits your application.

Esterline Connection Technologies has the expertise to support the most complex to simple molded components.



Packaging robot



Thermoplastic and thermoset are part of our expertise.



Balanced runner example



Modular tools allow for different configurations with easy changeover

An in-house tool shop allows us to be competitive in cost and lead time to align with our customer requirements.

# Plastic Extrusion



As a complement capability to our conduit assembly product line, Esterline Connection Technologies's liner extrusion process offers flexibility with a variety of raw material options that include:

- ETFE (-65°F to +310°F)
- PFA (-95°F to +500°F)
- FEP (-95°F to +400°F)
- PTFE (-95°F to +500°F)



Available in a wide variety of different diameters, colors and hardness; we have an experienced engineering team available to help choose the right option for your end application.



After the extrusion, a light weight polymer braid layer can be added to enhance conduit tensile strength and protection.





# Braiding



From stainless steel, tin-copper, nickel, bronze to Dacron®, Esterline Connection Technologies has exceptional experience in braiding different materials, sizes and shapes which are then incorporated as a protective physical layer within our conduit product series.

Half of the bobbins move in a clockwise direction while the other half moves in the opposite direction. Both intersect through a “sinusoidal path” as a central ring guides the strands through the entire process resulting in a locked braiding architecture.



Metallic braids integrated into cables and conduit offer beneficial functions of EMI/RFI shielding, improved signal integrity, strength and easy crimping or solder termination to a connector or backshell.

Esterline Connection Technologies has a fully integrated process composed of bobbin winders and braiders.

This provides manufacturing flexibility and options to offer multiple braid layer configurations and custom solutions to accommodate your most demanding design applications.

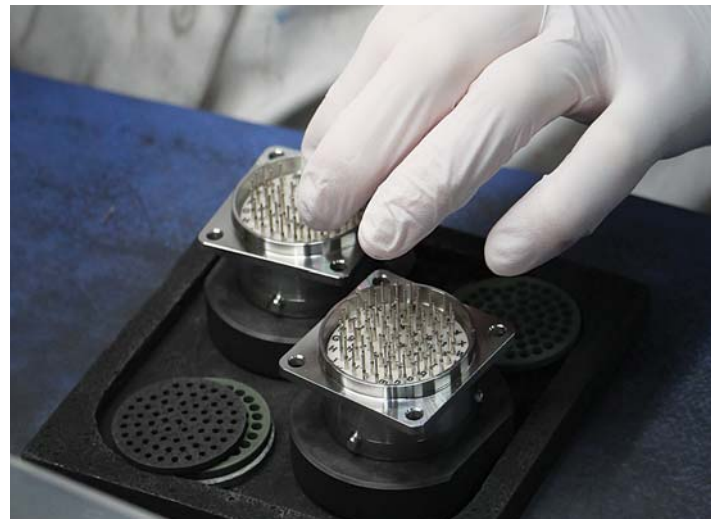
# Assembly



Esterline Connection Technologies has state-of-the-art and fully integrated assembly capabilities dedicated to providing quality and value-added solutions to our customers.

Mastering component assembly requires various competencies such as:

- Crimping
- Laser and ink marking
- Riveting
- Soldering
- Ovens





Built to the highest standards and including certification by AS9100, we have a vertically integrated operation that includes:

- Liner extrusion
- Braiding
- Assembly
- Testing

As part of the Sunflex brand, Esterline Connection Technologies has great expertise in providing high performance conduit systems which are ideal for harsh environment applications that include:

- Chemical exposure (oils, solvents, etc.)
- Vibration
- High moisture environments
- Sunlight exposure



Assembly combining flexible and rigid conduit



Individual components before terminating shield





From individual components to a complete subassembly, the overall process requires various steps to achieve a final part.

Our manufacturing cells have been designed with flexibility in mind and have the capability to process simple and complex parts with the same basic layout and flow.



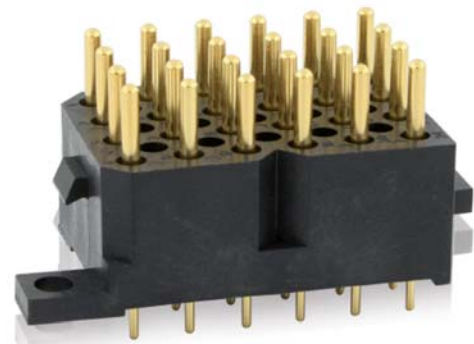
Insertion process



Backshell before and after final assembly

From circular Mil-Spec to custom designs, we have a long heritage of connector assembly capabilities, including:

- Automatic ink marking
- Plastic sonic welding
- Plasma treatment
- Soldering



Rectangular plastic connector

Our connectors are used in the most harsh environments and various markets including aerospace, commercial, heavy industry and military.



SOURIAU push-pull assembly kit



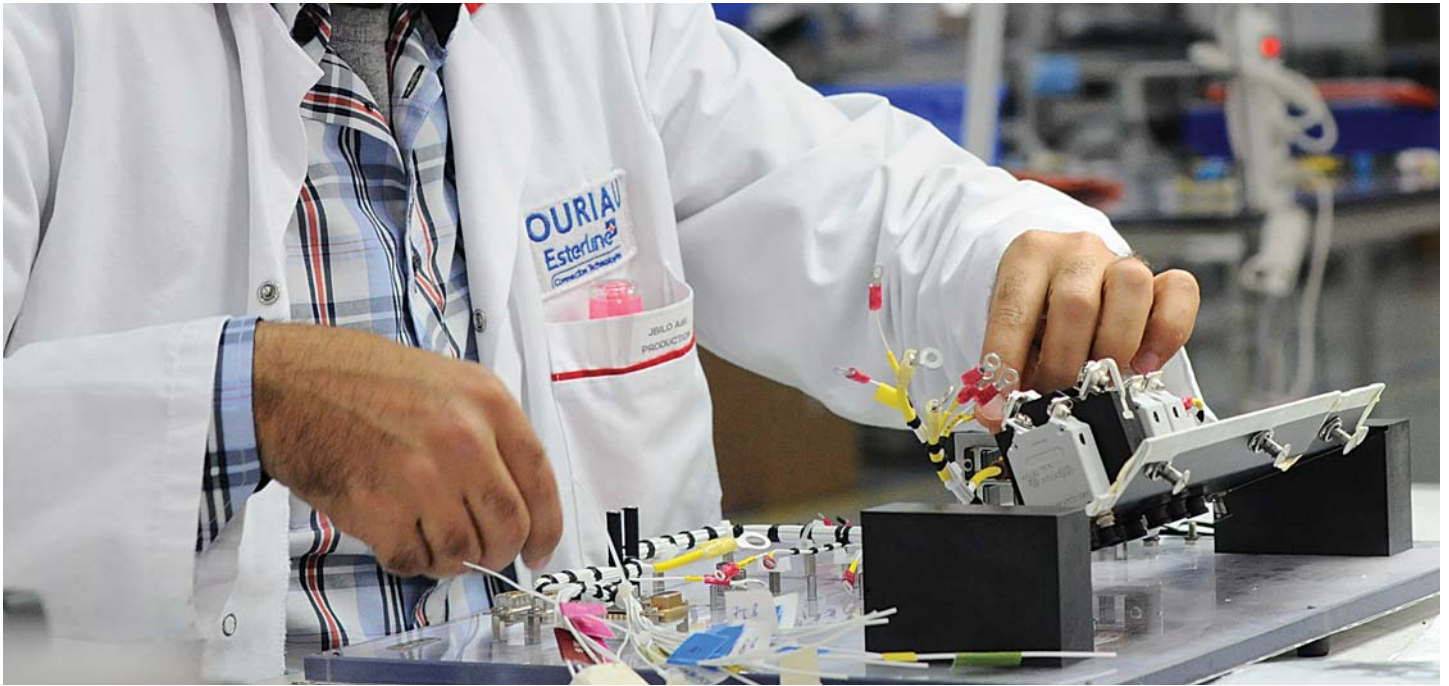
Plastic sonic welding is ideal for combining two molded parts to achieve a robust connector solution



Application specific panel mount connector



Hermetic connector



Cable assemblies are usually an overlooked part of the complete system, but they are in fact key in the overall performance of the end product.



From data signals such as USB and LAN to high power requirements, our value added proposition enables us to provide a complete solution to our customers.



We have developed complete solutions that allows us to complement the quality and reliability of our SOURIAU and SUNBANK brands.



State of the art cutting and stripping equipment enables our sites to obtain reliable cable assemblies that meet and exceed the tolerances established by IPC/WHMA-A-620.



Semi-automatic tools are used to crimp loose contacts and reeled terminals.



Semi-automatic stripping allows us to remove the outer insulation in order to expose the copper filaments that will be crimped to a terminal or contact without damaging the strands of the conductors.



We also have the option of soldering wire to the contacts with precise application by a highly qualified technician.



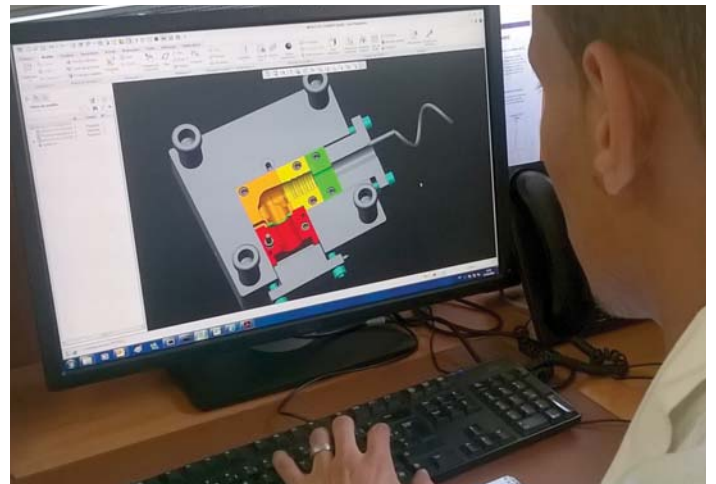


A process of adding a molded-on environmental protection and strain relief.

As part of our commitment to offer complete solutions to our customers, we have developed our standard overmolding tools that support our vast connector offering.

Overmolding can be used to add features such as ergonomic grip, strain relief, color identification and texture to a component which gives endless possibilities to our customers.

Esterline Connection Technologies has a design engineering office that researches and develops standard and specific cable assemblies.



Overmolding prototype tool



Overmolding examples



# Overmolding



Overmolding examples

Our manufacturing facility has different types of molding machines capable of processing different compounds and sizes.

This enables us to add flexibility into our product portfolio.



We can also create custom application solutions that enable us to meet diverse customer needs.



90° Overmolding

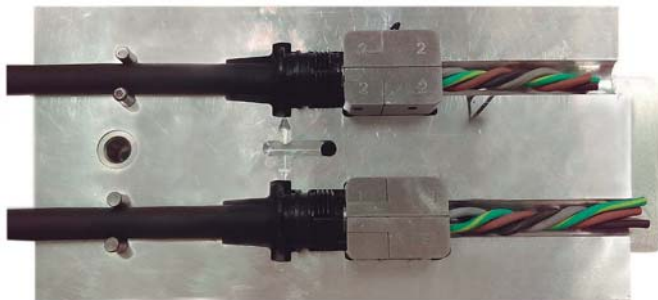


# Low Pressure Molding & Potting



This process uses blends of polyamides or polystyrenes to encapsulate and environmentally protect electrical or sensitive components.

The main purpose of low pressure molding is to protect electronics against moisture, dust, dirt and vibration.



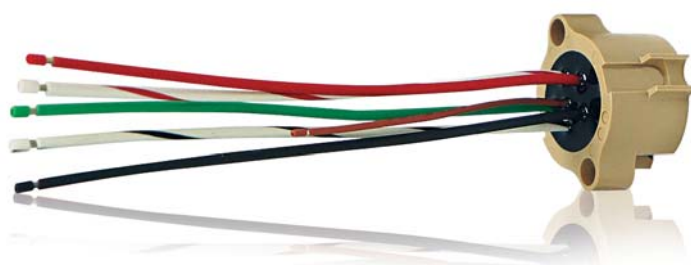
Low pressure molding tool built in aluminum

Molding pressure is around 50 to 200 PSI, which helps the material flow gently thru the electrical components without any damage or potential movement.

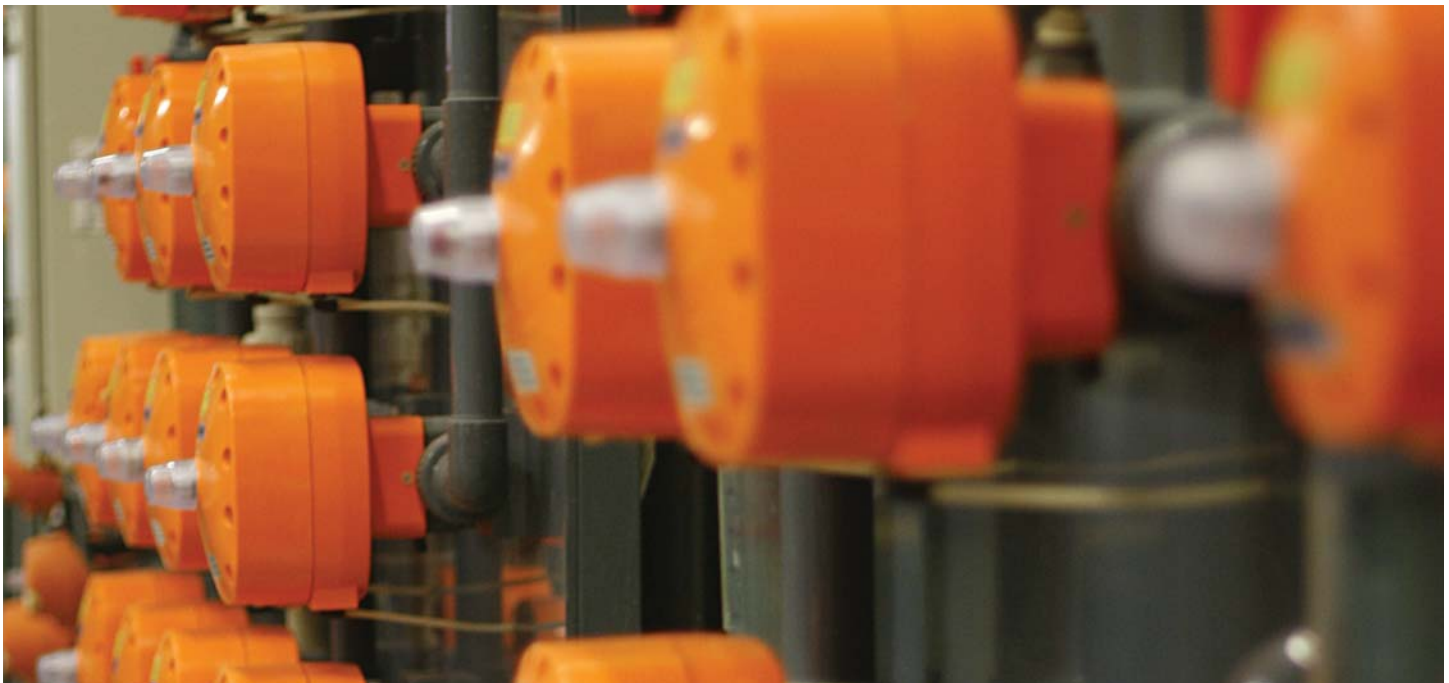
Aluminum mold tools are preferred and can help keep tooling costs low.



Potting is another low pressure process used to fill a cavity with solid or gelatinous compound which will give similar properties as the low pressure molding.



Raw material and equipment selections are key for this process, we have characterized different materials and can help you solve a specific need.



RoHS is European Directives that introduced new environmental responsibilities for electrical and electronics equipment manufacturers.

The RoHS (Restriction of use of certain Hazardous Substances) directive, part of the WEEE (Waste Electrical and Electronic Equipment) directive,

is applicable since February 14, 2014.

The RoHS directive regulates the use of certain chemicals, such as : Lead, Cadmium, Hexavalent Chromium, Mercury, Polybrominated Biphenyl, Polybrominated Diphenyl Ether with derogation in some domains such as Aerospace and Defense.

**SOURIAU - SUNBANK has taken action to meet the requirement of this directive.**



REACH is a European Regulation (Regulation No 1907/2006) started in 2007 to secure the manufacture and use of chemicals in the European industry. This is to identify, assess and control the use of chemical substances in manufacturing process in European production sites.

Objectives are to protect human health and the environment from the potential risks of chemical substances. Also establish a comprehensive and transparent information on the nature and risks of the substances from supplier to end customer. Secure handling of chemicals by employees in the company by requiring compliance with safety standards. Strengthen the competitiveness of industry, in particular the European chemical industry, a key sector of the economy in Europe.

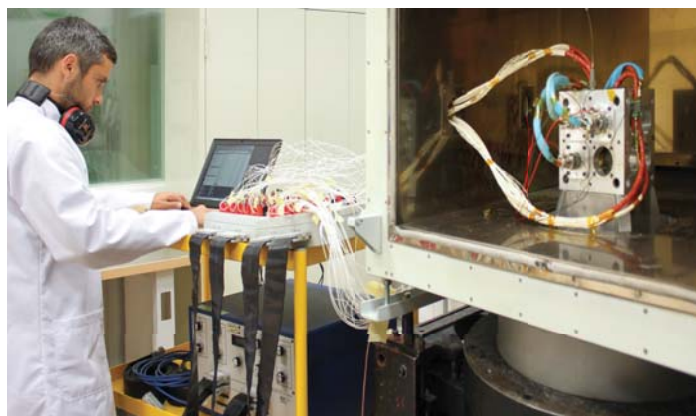
**SOURIAU has taken action to meet the requirement of this regulation and has released an "authorization dossier" to ECHA (European Chemical Agency) in order to obtain derogations on some critical substances listed.**



In order to make sure that our products are compliant with the most stringent quality standards, we have developed robust processes that allow us to simulate different critical conditions such as:

- Mechanical stress
- Environmental resistance
- Electrical performance
- Calibration & verification
- Climatical environment

Whether it is for prototype orders or regular production, quality is one of our key drivers.



Vibration test

Each of our manufacturing sites has a specialized group of resources both human and technological that understand the product that is being manufactured and the expected performance.



Contact retention pull test



Calibration test



Climatical test

## Independent Testing Laboratory

Attested as an Independent Testing Laboratory, the CTL in compliance with the IEC Quality Assessment System and ISO/IEC 17025 : 2005 as well as the ISO 9001 : 2008 requirements. A unique range of tools are used to reproduce the harshest environmental conditions.



## CTL is also Certified:

- By the British Standard Association (BSI) as a laboratory competent to conduct official qualifications and periodic inspections of products BS CECC 75201-002 (JVS Series).
- By the Bundesamt für Wehrtechnik und Beschaffung (BWB) as a laboratory competent to conduct official qualifications and periodic inspections of products VG95328 and VG96912.
- In compliance with standard MIL-STD-790 by the Defense Logistics Agency (DLA) of the Department of Defense of the United States of America as a laboratory competent to conduct official qualifications and periodic inspections (retention of qualification) of QPL products (Qualified Product List) according to product standards MIL-DTL-38999, MIL-DTL-26482 and MIL-DTL-24308.
- By the NAVAIR (Naval Air Systems Command) of the United States of America as a laboratory competent to conduct official qualifications and periodic inspections (retention of qualification) of products SAE AS39029 (contacts) and SAE AS85049 (backshells).

# Worldwide Manufacturing Capabilities

## North America (Paso Robles):

- Machining
- Plating
- Coatings
- Injection molding
- Plastic extrusion
- Braiding
- Assembly
- Testing
- Low pressure molding & potting
- Overmolding

## Mexico (Tijuana):

- Machining
- Die cast
- Welding
- Assembly
- Finishing
- Testing

## Dominican Republic (Santiago):

- Overmolding
- Low pressure molding & potting
- Assembly
- Testing



# Worldwide Manufacturing Capabilities

## France (Champagné, Cluses, La Ferté-Bernard, Marolles):

- Machining
- Plating
- Injection molding
- Assembly
- Testing
- Coating
- Screw machining

## Japan (Osaka, Tokyo):

- Testing



## Morocco (Tangier):

- Overmolding
- Assembly
- Testing

## India (Coimbatore):

- Machining
- Die cast
- Plating
- Assembly
- Testing

## Notes

A large grid of graph paper, consisting of 20 columns and 30 rows of small squares, intended for taking notes.



Notes

A large, empty grid area for taking notes, consisting of 20 columns and 30 rows of small squares.

## Notes

A large grid of graph paper, consisting of approximately 30 columns and 40 rows of small squares, intended for taking notes.



# Reliable People, Reliable Solutions



Your local contact



Our contribution to environmental protection:  
This catalog is printed on PEFC certified paper  
Advancement of sustainable wood cultivation. [www.pefc.org](http://www.pefc.org)

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## SUNBANK- SOURIAU