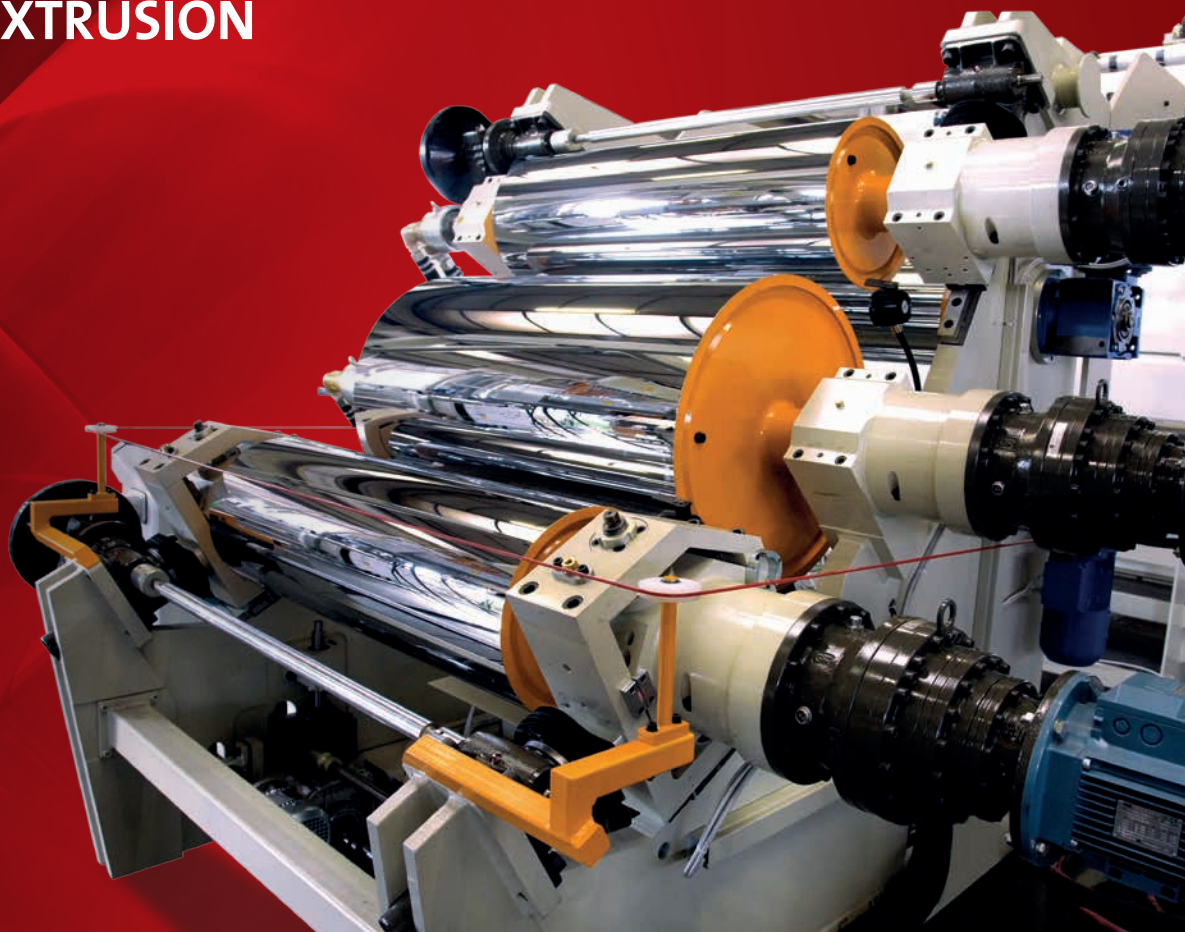


INNOVATIVE APPLICATIONS  
OF EXTRUSION



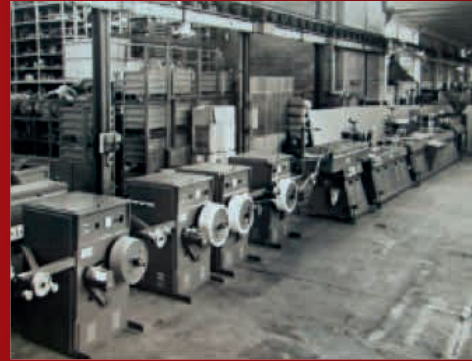
PROFESSIONAL IN EXTRUSION

Since 1950  
**Union**  
OFFICINE MECCANICHE



## SINCE 1950

Photos from UNION's historical archive, referred to extrusion lines production, since 1950<sup>o</sup>.





# UNION OFFICINE MECCANICHE S.P.A.

Since 1950, UNION, situated in S. Vittore Olona, has planned and manufactured complete extrusion lines and its components.

The quality reached in many years of continuous activity and research allows the company to be among the most important manufacturers over the world. UNION is nowadays synonymous of reliability and productivity, providing technical service assistance to its worldwide customers, with solutions and applications of high technology.

UNION produces extruders and complete lines for the extrusion for sheets, foils, profiles, hollow sheets at 2 and more walls. Special lines for composite panels of plastics and metal, complete lines for undulated and greca sheets of PMMA, PC, PET. Advance equipment for XPS, XPET, XPE foam boards, sheets and profiles.

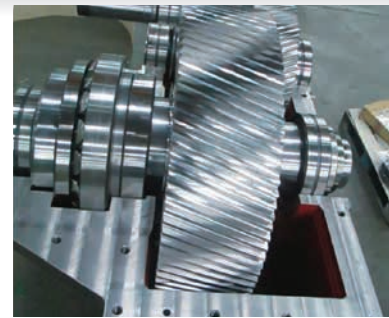
Headquarter in San Vittore Olona (Mi)



Assembly stage and testing of the extrusion lines.



Extruders Screw designed and manufactured in UNION's factory.



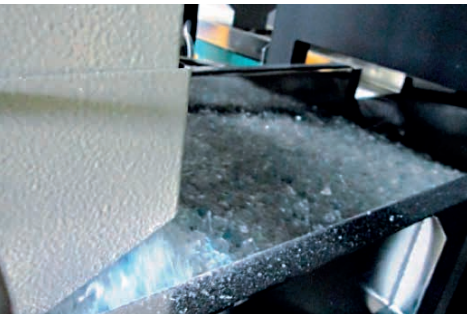
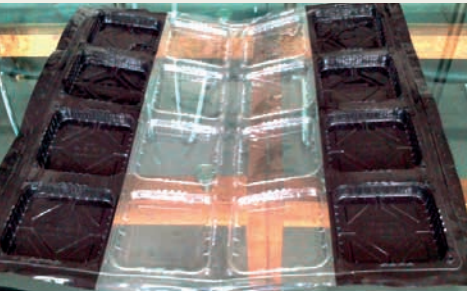
Gear box designed and manufactured in UNION's factory.

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## FLAT PET FOILS APPLICATIONS

In 1989, UNION manufactured the first complete extrusion line for PET foil production. Nowadays, UNION's extrusion lines, features for reliability, low energy consumption, high production and optimal quality of final product. They can be realized with single or co-rotating twin screw extruders, depending on customer requirements. The high efficiency degassing system, allowed to feed the extruder with **100% bottle flakes post-consumer**, maintains an high viscosity level, without using any dryer systems.



Some example of PET foils applications, generally thermoformed and used as food packaging.

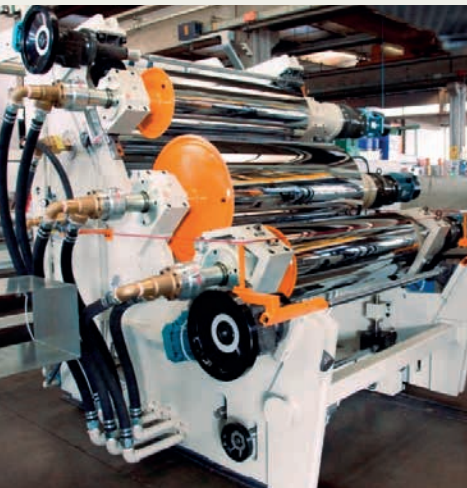






The new calibration and polishing calender type FIS, inclined at 45°, is designed for low thickness PET foil. It has a mechanic closing and opening system that ensures a maximum pressure of 150 kg/cm. It is also equipped with a cross-axis system that ensures an uniform and lower sheet thickness. The automatic opening/closing of the cylinders is obtained by independent brushless motors controlled by inverter.

A flat extrusion die made by special steel, ensures an accurate material flow out of the lips. It's equipped with internal deckels for fast regulation of sheet width and an advanced system for fine adjustment of sheet thickness.



Various PET food packaging.



## FLAT PP/PS FOILS APPLICATIONS

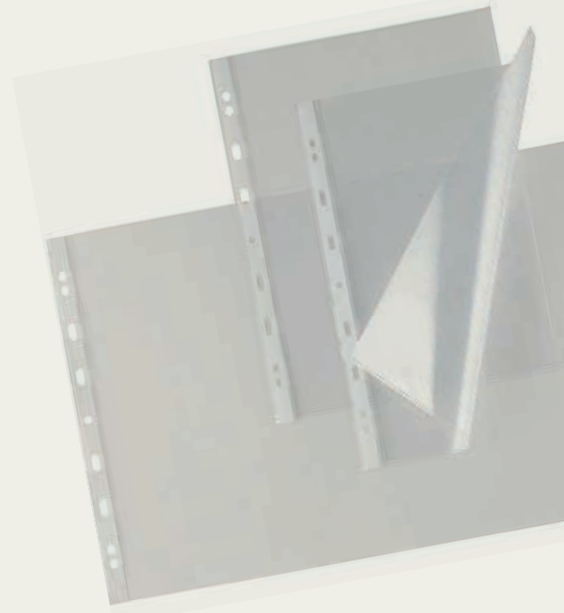
UNION extrusion lines for PP/PS foil are manufactured to meet all customer's requirements for food and non-food packaging applications. They can be realized with compact dimensions and work in-line with the thermoforming machine, to ensure energy saving up to 30%.



An example of PS/PP foils application, is thermoformed in cups, dishes or various food grade trays.



## LOW THICKNESS FLAT PP FOILS APPLICATIONS



The air knife system creates a laminar air flow on the material coming from the extrusion flat die, which pushes the material in contact with the calender roller, in order to guarantee uniform and low thickness PP foils. The foil achieved can be afterward laminated for special applications.



File folders and clear folders are an example of low thickness flat PP foils applications.



## MULTILAYERS BARRIERA FOILS APPLICATIONS

The multilayers barrier packaging, in a modified atmosphere, allows to pack a large number of products, increasing their shelf life and maintaining the organoleptic and nutritional properties. The know how achieved by UNION over the years, has allowed the company to optimize all the steps of this process, ensuring high quality results.

In extrusion technology, by using from 3 to 5 extruders, is possible to achieve barrier foils starting from base polymers (such as PP, HIPS, PET), tie resins (acrylic or maleic anhydride) or polyamide and EVOH as a barrier layer to oxygen or natural gas.



In hot melt lamination, contrasting thermo-regulated cylinders are used or the foil is directly laminated in calender, by the contact of hot melt materials. Both systems ensure a perfect and a uniform adhesion of the layers over the entire width of the foil. The coating system «barrier or hot melt lamination» is applicable on existing lines and is also used for other materials such as PP and PS.

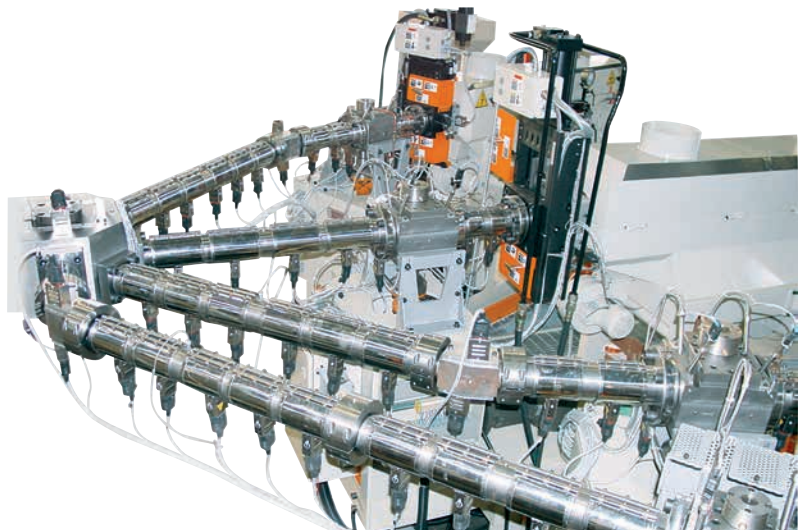
PET - PE - PS - PP

TIE RESIN

EVOH

TIE RESIN

PET - PE - PS - PP



## HIGH PRODUCTION FLAT PP/PS FOILS LINE

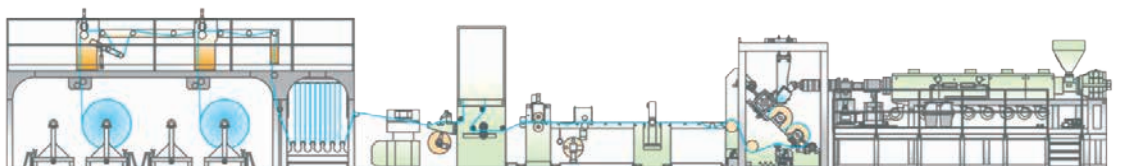
The complete extrusion line for PP/PS foil, with inclined calender type FI, is the most technologically advanced on the market, designed for customers that require high productions. The configuration of the line allows the production of every type of thermoforming foils, with a thickness range from 150 to 2000 micron, an useful width from 600 to 1500 mm and an high production up to 2000 Kg/h.

The calender is driven by means of 3 independent synchronized motors. The rollers closing is mechanical and can reach 120 kg/cm of linear pressure. Furthermore a device permits the misalignment of the pressure (cross-axis) for calendaring sheet, having a thickness lower than 200 micron.



The configuration of entry material into the calendar enables to use the flat die with a specific inclination, making the thickness adjustment by the operator, far simpler.

Layout referred to a complete extrusion line for PP/PS foils, with inclined calender FI at high productions.





## FLAT SHEET APPLICATIONS

With more than 500 lines manufactured and installed all over the world, UNION offers the widest and most complete range of machines for the production of flat sheets. Our lines, represented by the initials LV, LB, LVIG and LFI, allow to produce a thickness included between 0.8 and 60 mm, a width from 600 to 7000mm and an output from 100 to 3000 Kg/h. For the producers of extruded materials from flat die, UNION is a valuable point of reference. For every request, UNION offers the best solution. The attention to details, as well as to the accessories, is our special quality service.



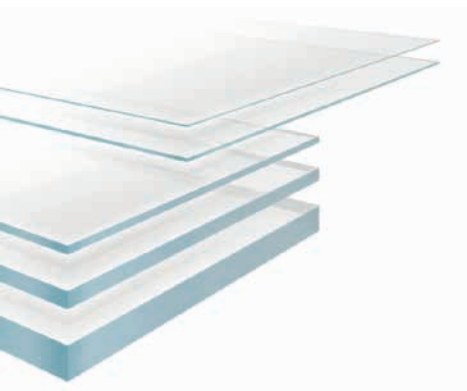
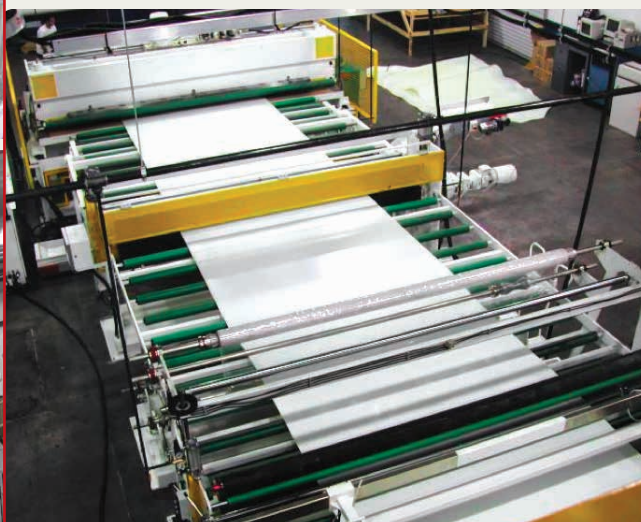
Complete extrusion line UNION  
for flat sheet production.

- . Residential doors
- . Refrigerator liners
- . Refrigerator doors





UNION produces high technology extrusion's lines suitable to process PC or PMMA flat sheets features a high optical clarity besides multilayer sheets in ABS+ PMMA with scratch resistance and bright surface, which make them perfect for sanitary products applications.



High optical clarity PC or PMMA flat sheets



An example of multilayer sheets in ABS + PMMA thermoformed in sanitary products such as Jacuzzi, bathtubs or small swimming pool



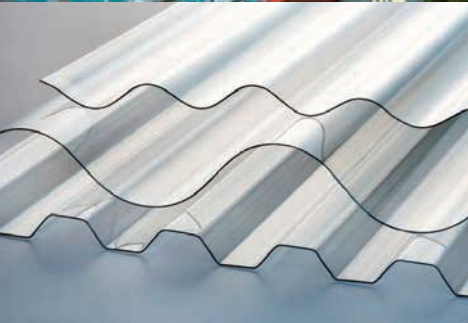
Applications of PC or PMMA flat sheets in the construction sector such as skylights, roofs, and greenhouses.



## CORRUGATED & GRECA SHEET APPLICATIONS

The innovative line manufactured by UNION for sheets and corrugated or greca profile in PC and PET, can reach an output speed of 8 m/min, recording for the complete line an energy consumption less than 0.30 kW/kg.

The sheet produced, based on customer's requirements, can be set with a max useful width of 1600 mm and a thickness from 0,7 to 3 mm. The line is designed to be fed by virgin or recycled material, allowing more flexibility in operations.



Corrugated sheets for greenhouse or roofing applications.



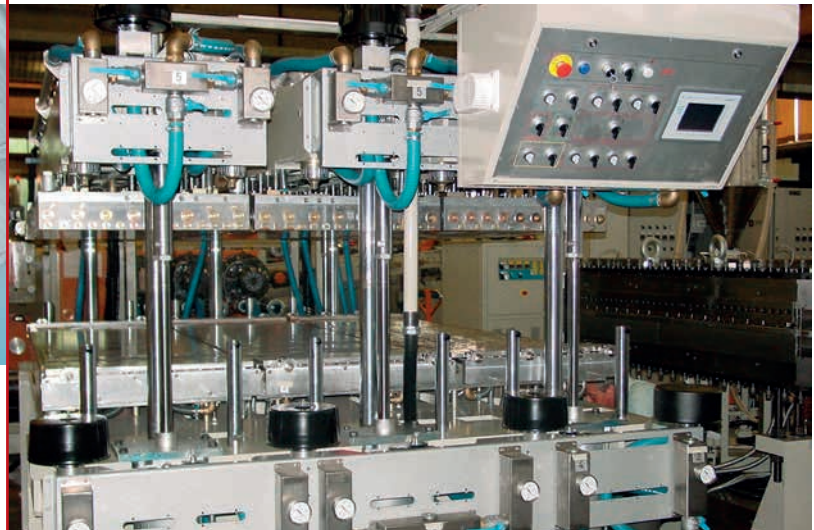
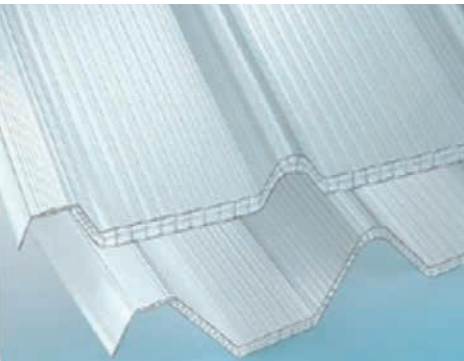


## FLAT & CORRUGATED HOLLOW SHEETS APPLICATIONS IN PC

UNION has been the first manufacturer to introduce the most advanced solutions for polycarbonate hollow sheet production. For example the calibrators at three couples of plates allow to cool the extruded material eliminating gradually all types of stress on the product. Every detail and component, are designed for being used in the most critical conditions though keeping the maximum quality as regards the productivity.



Example of flat and corrugated hollow sheet in polycarbonate.



## PP HOLLOW SHEETS APPLICATIONS

An example of UNION's line consist of a single screw extruder TR 160 with an hourly capacity of 1000 kg/h, UNION gear pump, a screen changer without flux interruption, a hollow flat die of 2900 mm, a calibration unit with 3 pairs of self-cleaning calibrator plates, a take-off at multiple rolls, a corona treatment, a transversal cutting unit and a conveying table. UNION has always been the world market leader in the flat extrusion technology and specifically in the multiwall sheet production, focusing to cutting edge technology market, offering high quality extrusion lines with high production.



Advertisement signboard  
on PP hollow sheets.



PP sheets divider  
for can/bottle transportation.

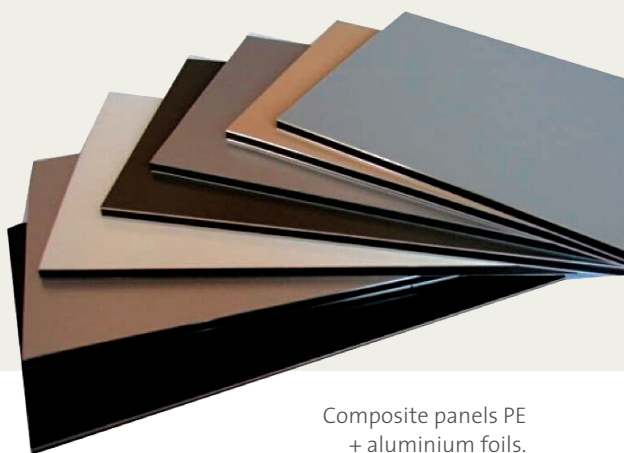


Food boxes in corrugated PP.



## COMPOSITE PANELS APPLICATIONS

UNION is the first company of extrusion lines that produces a complete system in line for polyethylene panels laminated with aluminum foil, copper and steel. Standard sheets are realized with a useful width from 900 mm to 2000 mm and a thickness range between 2 to 15 mm. The composite material has an excellent flat surface, light in weight and an high rigidity. It is suitable for many applications such as commercial or residential interior's and exterior's structures, trade booths or advertising signs.



Composite panels PE  
+ aluminium foils.



UNION extrusion line for  
composite panel.  
PE sheet coupling, type B-A-B,  
with aluminum foils.



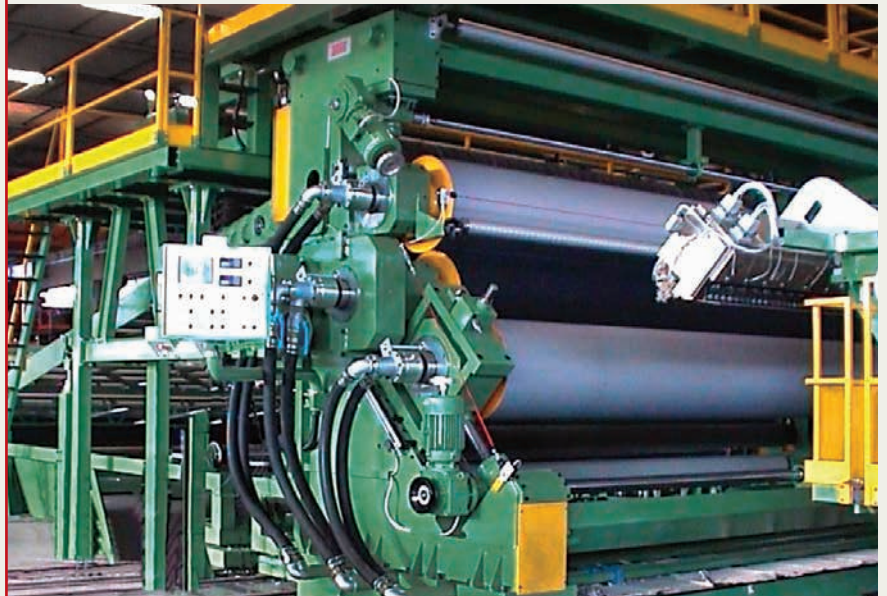


# GEOMEMBRANE APPLICATIONS

In construction industry, geomembrane rolls are used for concrete protection and drainage products deliver sound control of on-site water storage, treatment reservoirs and secondary containments.

UNION's extrusion line can achieve useful widths from 2 to 8 mt and an hourly production up to 3000 Kg/h.

Complete extrusion line for geomembrane sheet of 8 mt useful width.



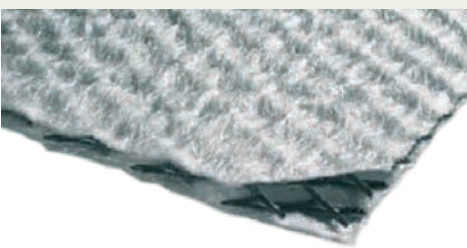
Example of geomembrane rolls application.

## GEOCOMPOSITE & GEONETS APPLICATIONS

The complete extrusion line for Geonets, consists of a regular net, realized by the connection of overlapping ribs, in high density polypropylene (HDPE). Geocomposite lines, for drainage system, consist of the coupling of one Geonet layer and two external layers of Geotextile, in non-woven material, made in polypropylene (PP).



Coupling system with non woven material in polypropylene.



Applications such as drainage layers in earthworks, hydraulic engineering tunnels and underground works.



## CAST FILM APPLICATIONS

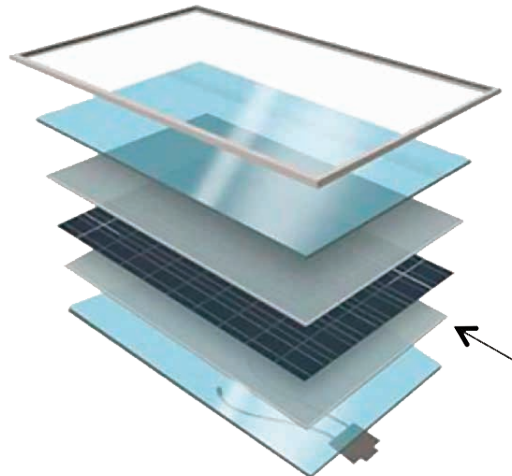
UNION produces complete extrusion lines for PP, PET, PMMA cast film, with a thickness range from 20 to 200 microns. The cast film is used in applications that require superior optical properties such as gloss, transparency, surface smoothness, planarity and good tear resistance.

Its applications are mainly in:

- . Non-food packaging (dry goods, shirts, decorative, solar panel sublayer)
- . Embossed/matted products (diapers, aprons)
- . Laminating / converter grade film
- . Battery insulation film



UNION's complete extrusion line for cast film with hourly production up to 800 kg and useful width of 1400 mm, for solar panels application.



Cast film layer on solar panels.

Battery insulation film.

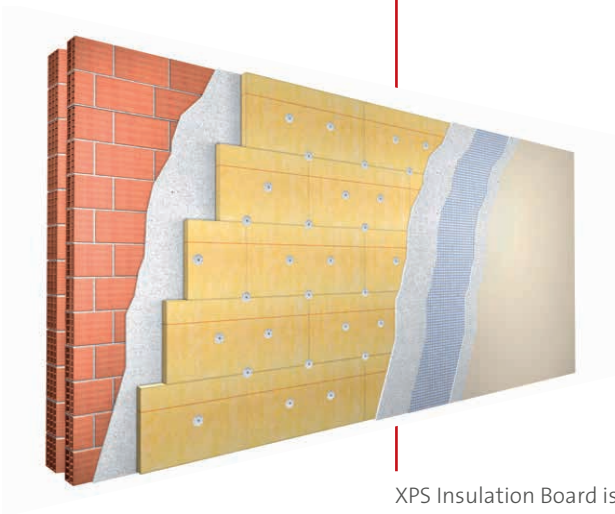


## FOAM XPS PANELS APPLICATIONS

Accumulator «Paternoster»



Production of XPS boards.



XPS Insulation Board is ideal for a variety of applications such as exterior insulation building.



UNION is the only company that produces the most complete range of extruders and extrusion lines for foam boards, ensuring high quality standards with the ability to build at its premises in San Vittore Olona - MI, all the extrusion lines.

UNION lines depend on the required outputs provided by the customers. Latest technologies using two separate extruders inline called Tandem, where the primary can be single or twin screw extruder while the secondary is a slow single screw extruder. This configuration it's necessary to separate the first part of the process (melt, mixing and expanding gas injection) into the primary extruder with a high revolutions number, from the second part (cooling of the melted material) into the secondary extruder with low screw revolutions.

## FOAM XPE PANELS APPLICATIONS

XPE boards are closed cell of non-cross linked polyethylene foam at low density, widely used for all types of packaging applications, due to the high shock absorbing capability. UNION's lines offered for this technology must have a minimum capacity of 900 Kg/h. The density obtained is between 20 to 90 Kg/m<sup>3</sup> with a board thickness up to 100 mm and a standard useful width of 1200 mm.

Color and boards length, are made upon customer request.

Production line for PE foam boards.

Tandem extruder for high outputs production.



Packaging applications for microelectronic components and fragile items.

## FOAM XPET PANELS APPLICATIONS

The foam PET panels are ideal for a wide range of applications as core material.

They are lightweight, stable and flexible, with excellent mechanical properties and a high processing temperature. UNION innovative extrusion lines can reach hourly productions up to 800 kg/h, with a density between 70 to 150 kg/m<sup>3</sup>, a thickness from 50 to 70 mm and an useful width from 600 to 1000 mm.



Applications in wind energy market, transport and marine field for interior structures.

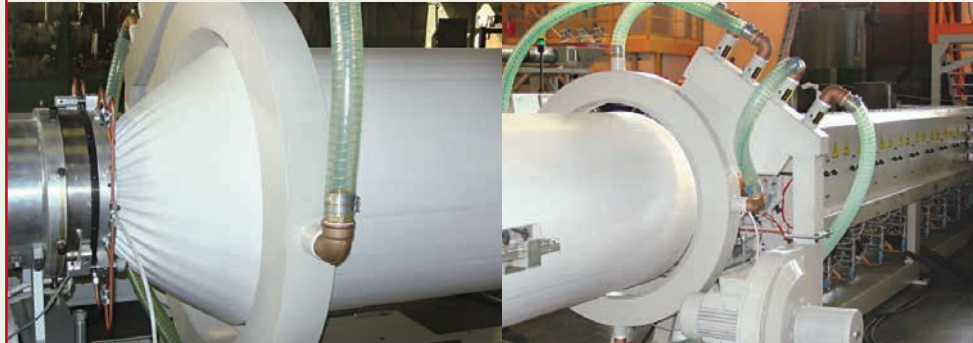


# FOAM XPS SHEET APPLICATIONS

UNION extrusion lines for XPS sheet are equipped with a low speed co rotating twin screw extruder for an hourly production up to 350 kg and with a Tandem system for an hourly production up to 700 kg. The circular extrusion die features with external regulation of opening lips.

The calibrator is composed by a cooling can for cooling the inside part of the sheet and a cooling ring for cooling the external part of the sheet. The XPS sheet obtained is wound on a pneumatic expansion shaft, directly controlled by a motor with inverter, type Servosystem, complete with gearbox. The lines can be integrated with lamination or coating systems able to produce high technological multilayer sheets.

Extrusion circular die and calibrator.



Example of food trays made by thermoforming foam PS sheets.



UNION's line for foam PS sheet production.



## FOAM XPE SHEET APPLICATIONS

The foam polyethylene sheets are light in weight, flexible, elastic, waterproof, mold resistant, non-toxic and can be used in various fields.

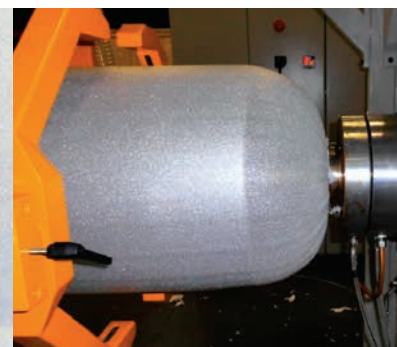
They are ideal in packaging to protect items against low shocks and scratches UNION lines for foam sheets are available in several versions: single screw, twin screw and Tandem system using physical foaming agents. UNION, with the ongoing technological development of his extrusion lines taken over the years, is able to offer to its customers a wide range of choice with an excellent cost/productivity rate and an high product quality. It is possible reach a production up to 800 Kg/h with individual widths of 1800 mm. The lines can be integrated with lamination or coating systems able to produce directly in line, high technological multilayer sheet.



XPE laminated with aluminium foil.



UNION's extrusion line for PE sheet foam.



Circular extrusion die.

## XPE PROFILES APPLICATIONS

The extruded PE foam profiles are used for the packaging industry and for technical applications. Foam PE material is very flexible for perfect adaption to different shapes. For the packaging industry profiles are mainly used to protect, due to the high shock absorbing capability, for fragile glasswork, TV's, audio sets, PC's and printers.

UNION offers a complete extrusion lines, with an hourly production from 30 to 600 kg/h.



XPE profiles ideal for a packaging applications.



UNION's line for XPE profiles.

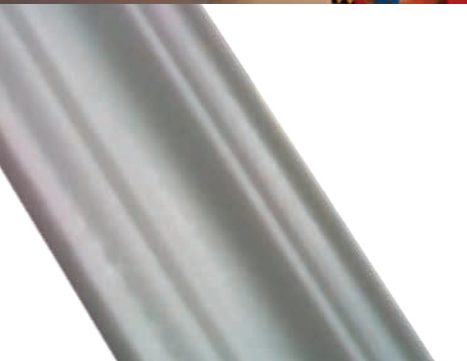




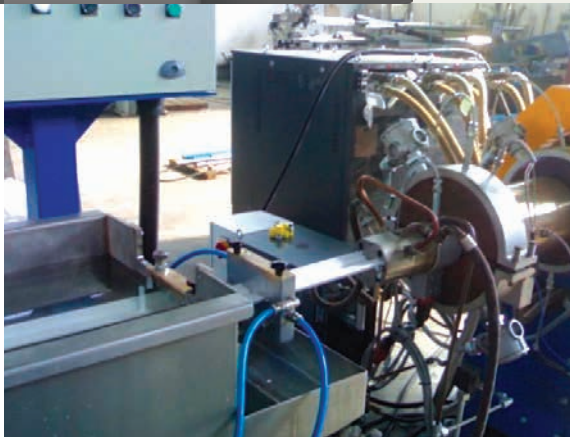
## XPS PROFILES APPLICATIONS

For the production of profiles, UNION can provide different solution to the customers: single screw extruders for small productions and co-rotating twin screw extruders or Tandem systems for medium-high production. The foam Polystyrene profiles are not as flexible as the Polyethylene and Polypropylene ones, but rigid. The extrusion lines for foam Polystyrene profiles need, after the die head, a calibrator with a sufficient length to calibrate the profile and cool it down gradually.

Examples of decorative profiles applied on internal house walls.



XPS profiles made by UNION's line.



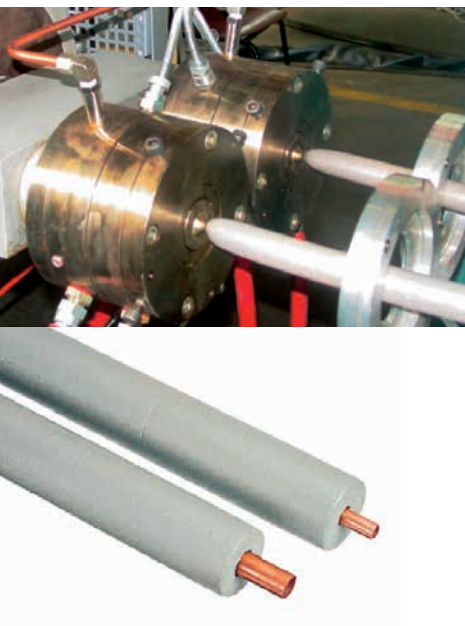
UNION's line running.

## XPE INSULATION PIPES APPLICATIONS

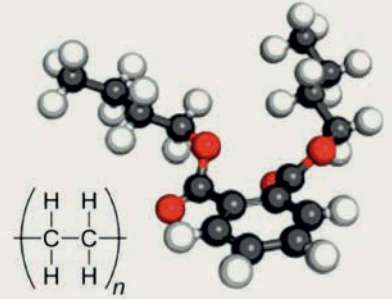
For the production of insulation pipes, UNION can provide different solution to the customers. Single screw extruders (generally for small pipes), co-rotating twin screw extruders with a 90-180 mm diameter or Tandem systems. The foam Polyethylene and Polypropylene tubes are mainly used for thermo-insulation of piping systems which transport refrigerated or hot liquid or gases.

The extrusion lines can be equipped with a second extruder which applies a rigid skin to close the pores of the tubes over the pipe to be insulated. There is also the possibility, when the diameter is small, to extrude the expanded tube directly around the copper pipe to be insulated. Multi die heads brings the advantage to increase considerably the extrusion line output.

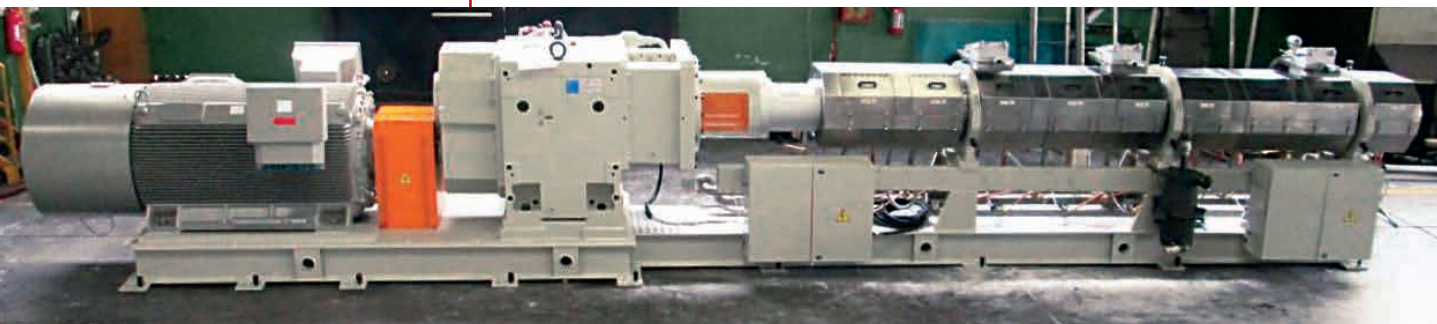
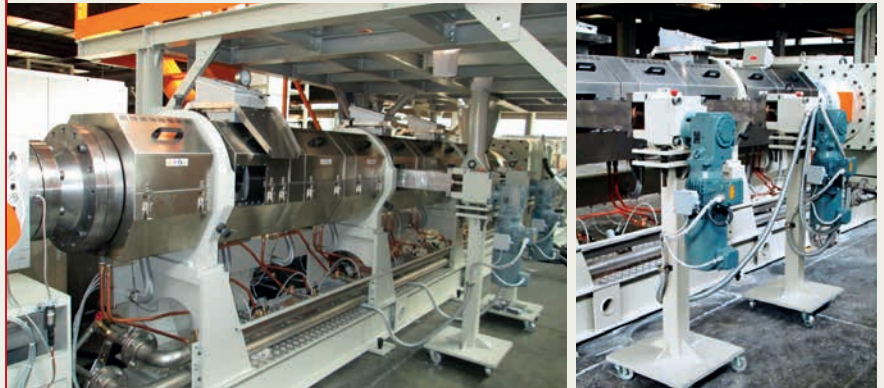
Parts of UNION extrusion lines  
for XPE tubes production.



## COMPOUND APPLICATIONS



UNION's lines offer different solution based on customer's requirements. They vary from tiny lab machines to big twin screw extruders producing up to 6000 Kg per hour. Twin screw extruders are preferred for high productions because they give better mixing performance at lower melt temperatures. Even single screw extruders can be used for compounding but only with an appropriate screw design. Screws and barrels are internally designed by UNION to meet the production and characteristics required by the customer.



Twin screw extruder ZP 144 L/D 48 for compound lines with high percentage of mineral charge (Supercharged).

Example of plastics compound in the market.





## STRAPPING TAPES APPLICATIONS

Some example of strapping tapes for packaging made in PP and PET.

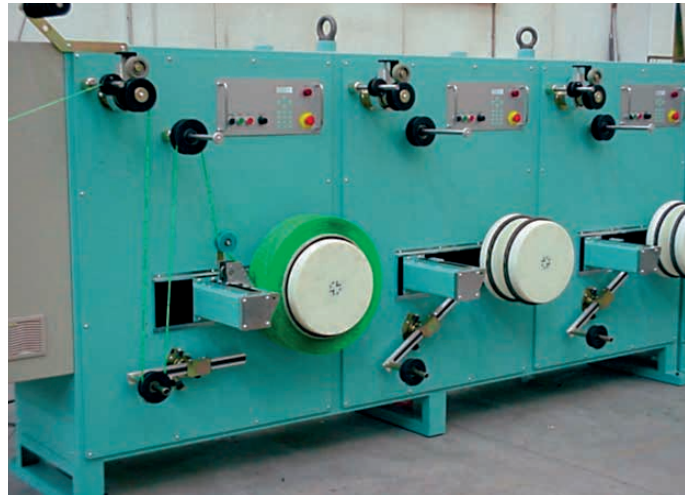
Thanks to the experience developed in the past and the high technology level in extrusion of recycled PET sheet and foil, UNION renew the production of strapping tapes line of PET-PP applying innovative technologies compared to its competitors.

Currently, PET strapping tapes provide the best quality/price ratio compared to other similar materials. They are elastic and suitable to be compressed over time, with a high toughness and resistance to weathering and corrosion.



It is possible to produce high quality PET strapping tapes, starting from ultrafine filtration washed flakes coming from post-consumer PET bottles flakes or mixtures of virgin resin or by strapping tapes trims.

Our broad experience allows us to support the customer, giving the best solution to all kinds of requirements.



UNION strapping tapes line.

## RECYCLING APPLICATIONS



Complete recycling line for heterogeneous plastics waste.

According to customer's needs, UNION produces extruders with a screw diameter between 60 to 300 mm and a length of 48 D.

The company designs and manufactures complete recycling lines, which include:

- shredders and granulators with feeding area large enough to insert panels up to 1200 mm width or trim coils up to 2000 mm diameter;
- an efficient degassing system in the extruder to extract from the material the residual gases and humidity;
- a very accurate filtration system by a manual or an automatic screen changer to filter all material impurities;



- an efficient pelletizing system with a perfect cut producing no fines, where the pellets are cut in air suspension but immediately dipped into the water chamber which cools the pellets and transports them to the centrifugal dryer;
- an efficient pellet drying system which allows the transport of pellets directly to the silos of the production lines.



## PRE AND POST ASSISTANCE

A high training in mechanical and technologic process of plastic material transformation marks the staff of sales department, supported by a skilled commercial back-office assistance. The pre and post-sale service managed by this division always assures a prompt intervention to the customers.



**SALES DEPT.**  
[info@unionextrusion.it](mailto:info@unionextrusion.it)

Besides the activity of the headquarters in San Vittore Olona - MI, UNION has an office in China and a wide network of agents with technical competence, to assist on site any customer's requests.







#### TECHNICAL DEPT.

[ufficiotecnicoimpianti@unionextrusion.it](mailto:ufficiotecnicoimpianti@unionextrusion.it)

UNION's technical department works with the most advanced technologies in the market, using software for simulating technical/physical resistances of the metals utilized in the construction of the extrusion lines.

Planning in the maximum safety by assuring the maximum reliability of the products are two UNION's targets.

#### ASSISTANCE AND TEST DEPT.

[assistance@unionextrusion.it](mailto:assistance@unionextrusion.it)

UNION has always given the right importance to this division. The professionalism and the experience of the staff during the years, ensure a prompt and accurate installation and start up of the lines, according to the European and International standards. UNION's commitment is to increase worldwide customer service, focusing in long term working relationship, with constant cooperation and support over time.

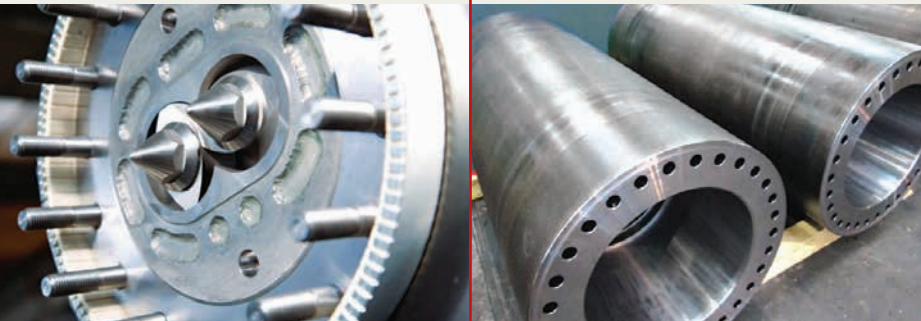


During the testing procedures, all the parameters of the line are controlled, including the quality of the final product achieved, in accordance to customer's requirements.

## FROM IDEAS TO PRODUCTION

UNION is able to meet specific customer needs, supporting with best technical and economical solutions and offering the latest innovations in specific industrial market. All line's components are manufactured by qualified workers, using high quality materials to ensure an efficient operation over time.

UNION is specializes in the construction of critical parts of the line, which are designed and manufactured with the latest generation machine tools, at its own headquarter factory in San Vittore Olona – MI.



## GUARANTEE SAFETY PROTECTION

All the lines are designed to ensure the maximum protection to the operators during the processing. They're certified ATEX where required, in fully compliance with European safety directives.

## THE FUTURE IS INNOVATION

## QUALITY POLICY

UNION's target is to remain at forefront in the evolution of plastic extrusion market, constantly updating its range of products and maintaining its cutting edge production technology.

We work in a structured and systematic way, throughout all the departments and guiding the client to the best solutions/applications in accordance with his expectations.

**Continuous learning, innovation and improvement are our daily efforts aimed to a quality service and an excellent performance of our lines.**

The customer's satisfaction and the loyalty to our company are the main indicators of our success.



## ENVIROMENT FRIENDLY

UNION has set itself an important environmental target, particularly focused to develop and constantly improve the energy efficiency of our extrusion lines and optimize the consumption of resources from our daily activities.







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 our offices or visit our website

[WWW.UNIONEXTRUSION.IT](http://WWW.UNIONEXTRUSION.IT)

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**union**  
 OFFICINE MECCANICHE