IN LINE COMPOUNDING
DIRECT EXTRUSION SYSTEM



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ICMA® is your Partner of Choice for Superior Performance.

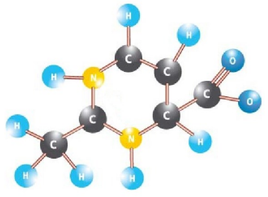
ICMA® SAN GIORGIO

IN LINE COMPOUNDING

THERE ARE 3 REASONS FOR WHICH IT'S IMPORTANT TO THINK AND RECONVERT TO THE DIRECT EXTRUSION TECHNOLOGY:

TECHNOLOGICAL:

At each extrusion cycle the polymers lose their characteristics by degrading themselves. At each extrusion cycle the most heat-sensitive fillers are degraded. At each extrusion cycle the fibres lose their characteristics by shortening themselves. A product made by direct extrusion has always high performances characteristics.



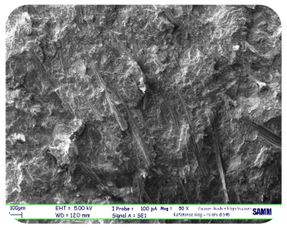
ECONOMIC:

We are increasingly globalised and we must become more and more competitive and the most direct way is the cost reduction. Great efforts are being taken to run after the best price for the raw materials and we don't realize that the solution is already in our hand: every single cent saved and multiplied to the units bring at the end of the year to unexpected gain.



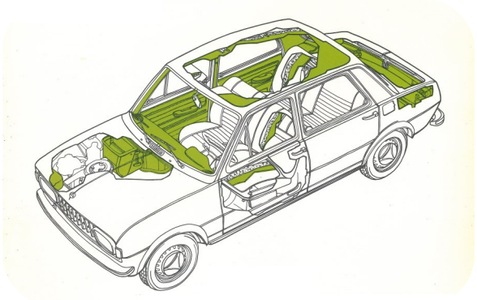
STRATEGIC:

Differentiate to become more competitive: you know the final properties you want to get for your finished product. Only you can run a fine-tuning process to achieve them. Formulations will no longer be shared with the compound supplier (and consequent sharing with other customers of theirs)



DIRECT EXTRUSION IS IN OUR DNA:

It was the year **1974** when ICMA has developed and patented the first Extrusion Direct System for composite materials, and since then, many other projects, increasingly sophisticated, have been completed.





ICMA: THE UNIQUE PLAYER/TURN KEY PROJECT

ICMA is a unique player for the direct extrusion lines: with the deep knowledge of the compounding technology and down stream equipment **under the same roof**.

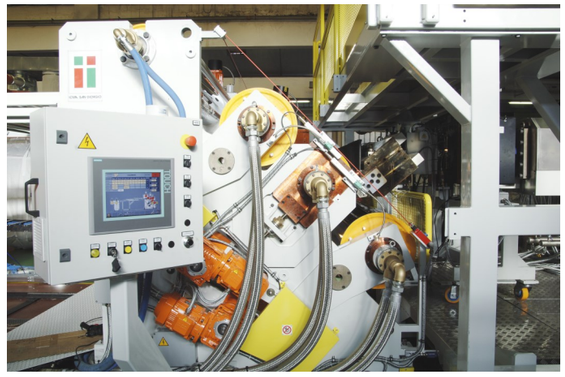
Beside the manufacturing of twin screw co-rotating extruder, ICMA have in **house capability** of designing, engineering and manufacturing of the most of the extrusion downstream equipment and technology.

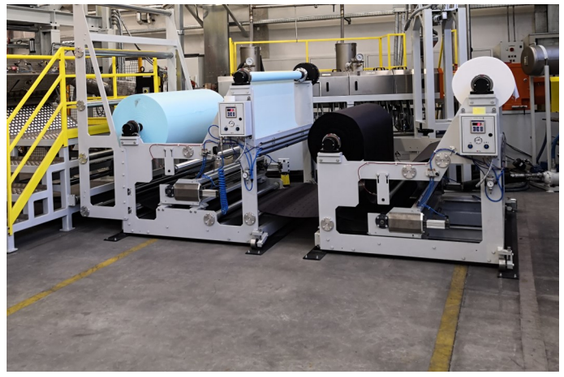
Over the years ICMA has specialized in the supply of **turn key projects for the direct extrusion**, from the handling & feeding of the raw materials to the down-streams and cooling devices.

All the engineering phases, from design to manufacturing, the assembly, the internal testing and final commissioning, can be customized according to the project specifications.

The ICMA turn-key solutions can also offer a series of services from **the personnel training before the delivery** and also at the end of the start-up in order to minimize the operative risks.

Each line is tested scrupulously in our company before the delivery in order to assure to the clients a quick commissioning after the assembling at the final production site.

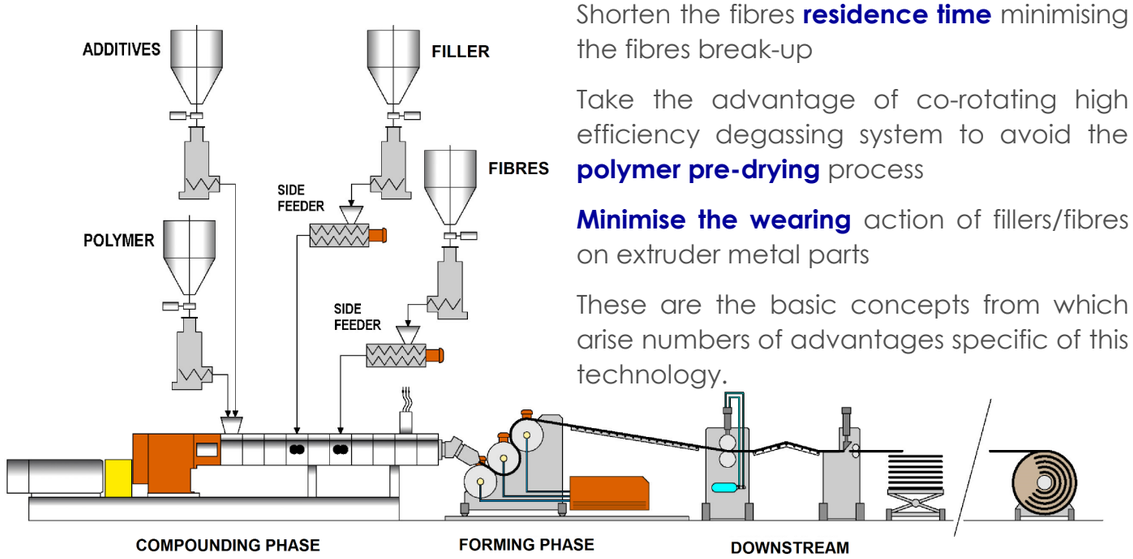




THE SPLIT FEED TECHNOLOGY

ICMA CO-ROTATING TWIN SCREW EXTRUDER GIVES THE UNIQUE SOLUTION OF SPLIT FEED TECHNOLOGY OF FILLERS/FIBRES

The separation of the plasticization phase of polymer matrix from the introduction and mixing of fillers/fibres is the basic concept of the co-rotating technology.



Transfer energy at the exact point without misspending it to heat the filler

Shorten the fibres **residence time** minimising the fibres break-up

Take the advantage of co-rotating high efficiency degassing system to avoid the **polymer pre-drying** process

Minimise the wearing action of fillers/fibres on extruder metal parts

These are the basic concepts from which arise numbers of advantages specific of this technology.

Modular construction of screw and barrel Allow a drastic reduction in maintenance cost.







SHEETS AND BOARDS

NOWADAYS, ON THE MARKET YOU CAN ALREADY FIND DIFFERENT EXTRUDED SHEETS PRODUCED BY USING THE DIRECT EXTRUSION TECHNOLOGY



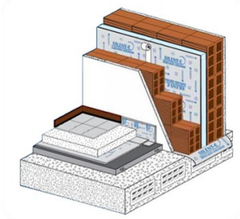
For automotive:

HEAVY LAYER sheet based on PO + $CaCO_3$ + $BaSO_4$ for noise reduction

WOOD-STOCK ™ sheet based on PO + Natural filler for interiors parts

LIGHT WEIGHT: sheet based on PO reinforced with glass fibres

For constructions: **PO + $BaSO_4$** for sound dampening



Technical Sheets: **PO + metallic fillers** for Electro - magnetic shield, Magnetisable sheet

PC-ABS alloy sheets

PET-PC-ABS lines where the efficiency of the degassing can be of great advantage

The co-rotating twin-screw extruders can be used also for generic polymers when is required a very high capacity (not achievable with the single-screw extruders of reasonable size)

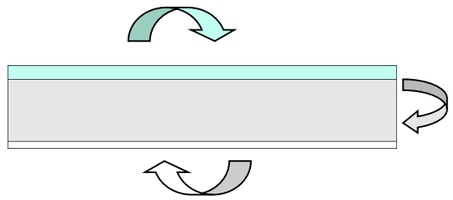
Lines for **BOPP - BOPET - BOPA**

Lines for **Cast Stretch film** and **Cast PP**



RIGID PACKAGING

Inner layer: virgin/food contact polymer



Core layer

Mix of virgin and recycled polymers + Mineral/Natural filler

Outer layer: virgin polymer + colour & mineral filler



Even in the world of the rigid packaging the push towards the extreme competitiveness has led to the introduction of higher performance and more economical materials. The PP or PS compounds with the addition of the mineral fillers are now a daily reality. Bring the direct extrusion in this area is still a mission to accomplish, but who will have the advantage of using this new technology, will have made the successful choice.





ICMA LAB EXPERIENCE

ICMA give you **the UNIQUE opportunity** to test your product's potential in the most modern lab facility.

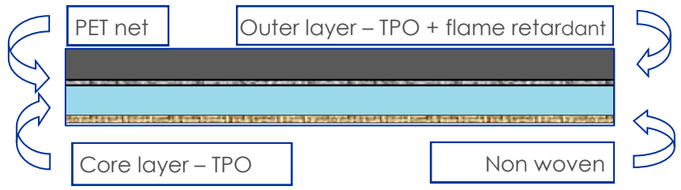
The direct extrusion set up is **extremely flexible** with the use of a twin-screw co-rotating extruders (MCM/60HT), which allow a wide combination of materials and different fillers and/or fibres reinforcements.

A **full set of downstream equipment** for the direct extrusion of foil and flat sheets and a specific dedicated equipment for the direct extrusion of profiles



MEMBRANES







The market is demanding more and more high-performance products and even with eco-friendly appeal.

Membranes based on polyolefin and thermoplastic rubbers have been developed.

ICMA provides complete extrusion lines that can realize membranes having really complex structures, with multiple co-extruded layers and lamination of various kinds on the surfaces as well as central reinforcements.

For special applications that require specific characteristics of resistance to flame, the direct extrusion becomes a must to get unique formulation costs and features .



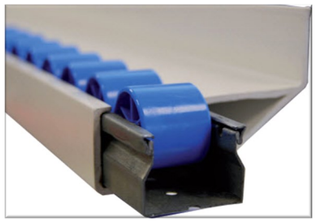
IN LINE CARPET BACKING EXTRUSION

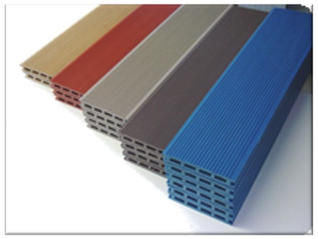


PROFILES/PIPES

COMPOSITE PROFILES

As demonstrated with the WPC profiles, the advantages of the direct extrusion are huge. The benefits of this innovative technology can also be realized for any profile made of a composite material: in particular on those profiles reinforced with fibres, where the individual process of extrusion allows to keep the fibres length giving a great advantage in terms of mechanical properties.



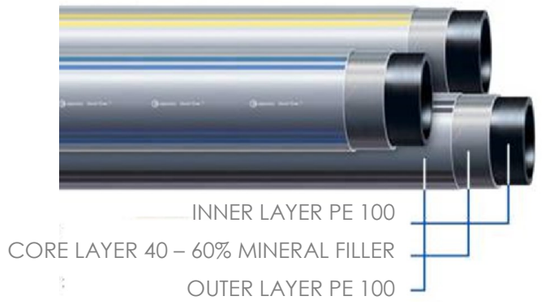


CO-ROTATING EXTRUDER FOR COMPOSITE PIPES

The composite pipes with minerals fillers are already widely used for special applications such as noise reduction in the use of internal piping as well as pipes with special resistance performance in the external sewage pipe. Particular advantages are obtained for heat resistant pipes where the composite used involves the use of fibres.



A very present application is the use of recycled materials that take advantages from the direct extrusion for both the single extrusion passage, maintaining unaltered the mechanical characteristics of the polymer as well as the possibility of engineering the product with fillers, fibres and / or impact modifiers



SILENT PIPE

3 layers HDPE/PP noise dampening pipes

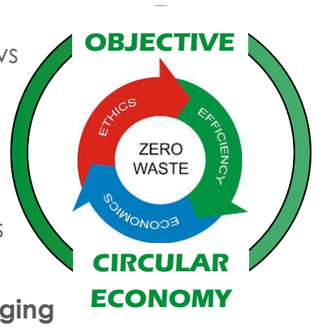
3 layers PP sewage pipes

DIRECT EXTRUSION / RECYCLING

ECO IMPATTO

new technology for plastic recycling

The **ECO IMPATTO** technology allows to significantly improve the **aesthetic and functional** qualities of products made with heterogeneous plastics, increasing their penetration on the markets for those products that already exist (construction, public works, etc.).



It opens up new and very interesting opportunities in **emerging applications** where the aesthetic aspect is fundamental and which are, for this reason, now precluded to heterogeneous plastics (ex. street furniture, walkways, piers, etc.);

It **extends the range of recyclable plastics**, even in those Non-selectable fractions that today cannot be used for mechanical recycling and therefore destined for energy recovery (incinerators) or landfill (in the worst case).



It is the perfect solution for recycling food packaging post-industrial **composite film waste** designed with complex structures that may include PET, PA, EVOH, PP, PE, aluminum foil or metallized films and also many other functional polymers such as adhesives, lacquers etc.

The RECOBOARD project

Born with the goal to find an ecofriendly alternative to the plywood used in the construction, the product has become a good recycling solution for many other applications.

The product consists of coextruded boards made with 100% recycled material with the skin layers engineered to give the necessary strength to the boards, while the core layer is totally from post consume feedstock.



- RECOBOARDReduce the environmental impact of plastic waste and reduce disposal costs for municipal authorities and waste management organizations.



- Avoid the dispersion of resins and adhesives present in plywood (such as formaldehyde 10) when landfilled or avoid CO_2 emissions when incinerated at the end of life.

CUSTOMER SERVICE



HELP DES/REMOTE ASSISTANCE

Our target is to help our customers to work at maximum operational efficiency.

In all our lines is installed a proper hardware dedicated to remote service to grant a quick assistance for machine operation.

Our staff is available at HELP DESK 16 hours a day.



TRAINING SERVICE

With our 40 years of experience in the compound industry and with our continuous research and development, we have accumulated a unique and unrepeatable technological and process knowledge.

We condensed such knowledge in training seminars on co-rotating technology.

Our seminars extend beyond basic operations as they scientifically deepen all the process issues that helps to optimize the quality and the efficiency of the production processes.



SPARE PARTS SERVICE

We have in stock a great availability of the most important parts of the extruders, for an immediate service.

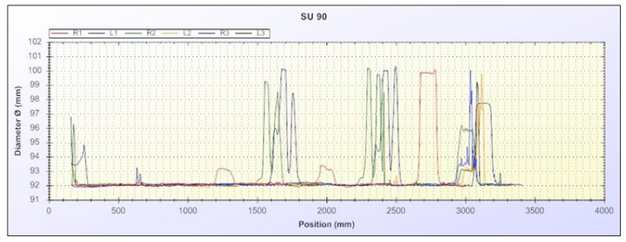
The internal production of the screw elements, of the barrel modules and of the other vital parts of the extruder guarantees us an absolute quality control.

The implemented traceability system of the parts allows us a precise control on the input/output product quality .

MAINTENANCE PROGRAMS

We offer specific packages for planned assistance and preventive maintenance, as well as updating programs for the electronic control systems to grant to our customers a safe and always efficient operation.

A re-training service for the operating and maintenance personnel is also available in order to ensure a safe and efficient line management.



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ICMA SAN GIORGIO
Advanced Compounding and Extrusion Systems

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