

# Automation and packaging for pipe extrusion lines

**IPM continues to invest in plastic pipe extrusion lines by implementing process automation and digitization technologies, studying and implementing customized solutions according to specific customer needs. The goal is to improve production capacity and product quality, without forgetting the safety of the personnel involved.**

IPM (Italian Plastic Machinery) represents a consolidated reality worldwide in the production of machines for the extrusion and packaging of plastic pipes. Founded in 1987, it carries out its entire production process, from the design to the manufacturing of the machinery, directly at its premises, as guarantee of quality and total made in Italy. The modern company headquarter is located in Lugo di Romagna (Ravenna, Italy), in an area of approximately 17.500 m<sup>2</sup> covered for 7.300 m<sup>2</sup>.

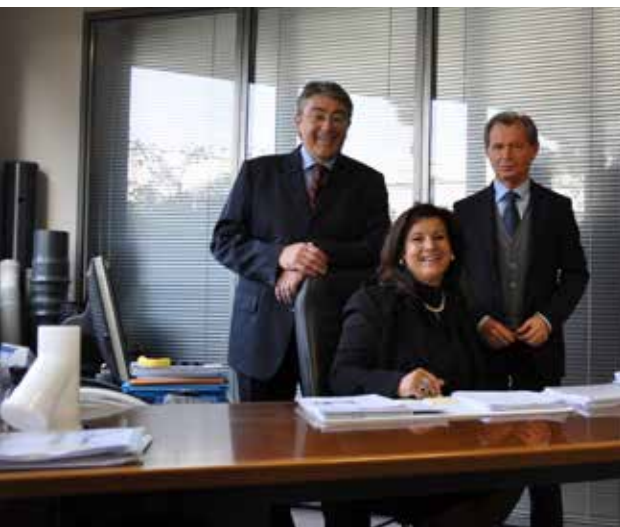
The company owners Silvia Geminiani, Claudio Argnani and Bruno

Barabani specify: “in an increasingly complicated global context, the goal of IPM is to foster the improvement, competitiveness and growth of its client companies through innovation and technological development, ensuring them the best performances and supporting customers until their desired results are fully achieved, contributing to economic development and improving the living conditions of people and of the planet”.

Backed by a long experience and constant innovation, IPM is one of the most representative companies in the extrusion field, offering very often “tai-

**IPM will be exhibiting at K 2022 in HALL 16 - BOOTH D58**





**Bruno Barabani, Silvia Geminiani e Claudio Argnani, IPM owners**

lor-made” systems to complete the extrusion lines for plastic pipes. In Europe, where the use of polypropylene pipes, but also those in PVC and polyethylene keeps growing rapidly, the demand for ever faster and more performing lines is spreading increasingly to the detriment of manpower. In particular, the implementation of automation technologies and digitalization of processes, control, and management, in a 4.0 perspective, has become essential to increase the competitiveness of pipes manufacturing companies, improving product quality and reliability.

### Automatic Packaging plants for pipes

IPM has invested and is still heavily investing in this area, studying, and creating customized solutions based on the specific needs of customers, paying particular attention to the optimization of the production area, and to energy saving.

Thanks to its new automatic packaging systems, it is now possible to complete the extrusion lines by collecting and packing pipes in wooden frames, in cardboard boxes, iron boxes, in polyethylene bags, plastic saddles, etc. conciliating production and marketing needs in the best way without ne-

glecting logistics and available spaces in the company.

The real challenge is precisely to increase the level of automation of the plants and their production capacity, improving product quality and reliability constantly, ensuring space-saving solutions and enhancing safety systems to protect machine operators.

All this required a remarkable commitment and study by IPM, leading IPM engineers to consider all the latest generation of technological devices such as: Cartesian systems, anthropomorphic arms and vacuum lifting systems that are able to move loads quickly and ergonomically in any position.

In fact, the reduction of logistic times is forcing companies to automate processes to achieve maximum productivity. An example of this is the spread of industrial robotic arms, because they accelerate all those repetitive activities that in the past were carried out by operators. Actually, this technology does not just improve efficiency in production and logistics, but it also allows heavy objects to be loaded, and high-precision operating cycles to be carried out automatically, without any human intervention.

One of the latest packaging plant that we have created and that was warmly welcomed is our new packaging system type RMC that is characterized by a series of Cartesian arms that are able to pick up cardboard sheets, prepare the packaging, select, collect, and deposit each single pipe according to its length and with opposite socketed ends, close and tape the boxes, weighing them and, if compliant, label and palletize them. Obviously, pipes with bigger lengths are collected, selected and inserted in special plastic saddles, and the resulting pallet is put by means of vacuum lifting systems inside wooden frames, all automatically and quickly, with precision and with maximum safety.

These systems are also available for big pipe diameters (even pipe diameter 400 mm, pipe length 3 m), and in addition to speed and precision, they offer the possibility to process pipes in total safety (even in case of emergency, the plant designed by IPM fastens the pipes). To be highlighted is also the small size of the machine (it takes up less space than a traditional palletizer) and the automatic handling of empty pallets and full trolleys. On re-



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**BA 680 INJ - Automatic socket for corrugated pipe**



**PE pipes line max diameter 1300 mm**

- No effect on the socket due to any pipe ovalization
  - Possibility to customize the socket shape
  - Possibility to thicken the socket wall on request
  - Possibility to socket pipes of different materials (PP and PE) on the same machine just by replacing the moulds
  - High output to exploit the speed of the modern corrugation lines at the most
- Moreover, with respect to the traditional fitting joining by friction system, with IPM belling machines INJECTION you can reach:

- No need for fitting storage, resulting in remarkable room and money saving
- Release from any sub-supplier for the purchase of the fittings
- Reduced gasket cost (instead of 2 as required by the fitting, only 1 gasket is needed with in-line socket)
- Eliminating time and money for defect detection in welding socket
- No production rejects due to any wrong welding of the fitting on the pipe

In addition, with respect to the socket carried out on the corrugator, online, our process is preferred for:

- Savings in raw material and speeding up the production cycle with consequent reduction in the cost of the product obtained, being the fitting doubly long
- More reliable joining following to removal of the trimming of the pipe internal wall
- No restraint concerning the pipe lengths to be produced (while inline socketing by the corrugator provides predetermined lengths)
- More stable socket since there is no shrinkage at all due to the "memory effect" of the raw material
- Few rejects
- Increase output capacity

Socketed large diameter PP pipe belling (IPM patent)

In these last few years characterized by the pandemic, IPM has certainly not been waiting

quest, these systems can also be integrated with automatic systems for reinforcing and / or closing the pallets.

### Socket of corrugated pipes in PE and PP-Injection System (IPM patent)

Other range of machines in high demand all over the world is the one of the belling machines for processing various types of materials: rigid PVC, polypropylene pipes, belling, in-line extrusion, corrugated (double- and single-wall) and ultrarib pipes, polyethylene and polypropylene ones, even of very large diameters up to 1200mm., with injection socket formation, directly on the pipe. (PATENTED).

This unique IPM process makes it possible to obtain a RIGID, RELIABLE, SHRINKAGE-FREE SOCKET.

Compared with other existing systems (fitting joining by friction) our machines offer a lot of advantages:

- Socket perfectly welded, mechanically stable, aesthetically appealing, with a uniform, regular and homogeneous shape
- Tolerances and characteristics to EN 13476
- Absolute dimension stability over time, even when subjected to the most varied environmental temperatures
- Repeatability of the process regardless of the characteristics of the raw materials used and their varied formulations.



**Corrugated pipes with socket**

and has researched and developed a new patented socket technology for joining PP pipes, exploiting the combination of “standard” and “mechanical” blowing system, ensuring socketed ends comparable to the sockets obtained by injection process.

In order to meet the requests received from Northern and Central Europe, where the use of polypropylene is becoming increasingly widespread, especially in large-diameter sewer conduits, IPM has designed a bellling system, characterized by the simultaneous use of shaped moulds, flanges, and expandable sector mandrel, which, by means of a “synchronized” movement, is able to shape and calibrate the plastic material, internally and externally to the pipe, realizing a perfectly squared socket of homogeneous thickness.

Reaching this goal was not easy and it has required a lot of time and considerable investment in research and development. A great deal of testing and continuous modification was done until an ideal configuration approved by the users, with whose cooperation was developed.

Also, to make the machine better performing, it has been designed so that it can socket two pipes per cycle (instead of one) up to diameter 160 mm.

From the point of view of sustainability, in addition to the machine’s contact ovens, which are insulated to reduce heat loss, a short-wave oven is used and it can guarantee high production and at the same time, it

can reduce energy consumption, since this oven is able to activate itself only when the pipes arrive, avoiding heat loss.

### **New video terminals**

- With 7-inch and 9-inch touchscreen panels, the latest generation from Siemens, featuring better performance in terms of speed;
- Renewed graphic interface, with visual indicators of efficiency and energy consumption that allows an immediate understanding of the performance of the machine;
- Analytical alarm troubleshooting directly integrated on the video terminal, able to provide more detailed information on the causes that originated the alarms;
- Historical archive of the alarms: the last 1000 alarm messages can be freely consulted by the operator;
- Manual and wiring diagram in PDF that can be visualized from the video terminal;
- Saving of format recipes (Memory card) on external microSD to avoid losing production data in the event of a malfunction of the panel;
- Job of Maintenance: scheduling of alarm messages, the text of which is specified by the end user, which are activated based on specific occurrences. It is therefore possible to plan scheduled maintenance interventions;
- Possibility of scheduling the sending of emails to addresses that can be specified by the user, upon reaching the conditions for activating maintenance jobs (this feature requires internet connection).

### **Teleservice**

IPM is able to reduce the distances, and assist its customers in real time, thanks to the Teleservice system, also made possible and facilitated by the advent of the broadband and by the increasing diffusion of corporate networks (wired or wireless).

Through this service, IPM offers the possibility to connect, through an industrial router, the machines of its own production to the user’s corporate network (that can be either by Ethernet or Wireless).

Alternatively, you can connect by means of a UMTS mobile connection. This allows you to have an internet connection, even where there is not any office network, either in the form wired or wireless.

In recent years, we have seen a significant increase in orders, despite the pandemic, mainly thanks to Industry 4.0 incentives, which have pushed European companies to invest in technology.

But there is no shortage of problems: war, rising energy prices, sanctions on Russia, difficulties in sourcing raw materials: these are the major problems that are affecting all sectors of industry, including Italian industry.

There is no shortage of work in our industry, but we find ourselves working in total uncertainty. First of all, it is difficult to determine whether we will be able to deliver on time, considering that for our machinery we have medium-long delivery times (even reaching over 12 months), correctly assessing the disproportionate costs of raw materials and components.

The pandemic and the war, additionally to the humanitarian drama, will keep bringing with it disastrous consequences at the level of production and markets and it is not easy to face. We only have one certainty: globalization will never again become what it was three years ago.