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TECNO PLAST INTERNATIONAL

The Monthly Magazine for the Plastics Industry

ECO-SUSTAINABLE ELECTRIC MACHINES: INNOVATION, EFFICIENCY AND AUTOMATION FOR MODERN INDUSTRY

Continuous research, technological development and sustainability are driving the evolution of the solutions designed by IPM Srl, with a new range of high-precision electric machines certified Eco-Technology.

Since its foundation around 40 years ago, IPM Srl has continuously invested in research and development - a key element in anticipating the needs of a constantly evolving market.
In line with this vision, alongside the traditional range of hydraulically operated machines – still preferred to produce large diameters and thick-walled pipes – the company has recently developed a new series of fully electric, eco-sustainable machines. These solutions have been designed to meet the growing demands of the industry for energy efficiency, high precision, process stability and environmental responsibility.
The new range includes socketing machines, cutting units and automatic pipe packaging systems, all engineered to ensure high productivity and efficiency. In particular, the end-of-line solutions integrate robotic systems and Artificial Intelligence technologies that enable to automate product handling, packaging and management, improving operational continuity and overall process quality.
As part of its ongoing commitment to sustainability, the company has registered the Eco-Technology trademark, which identifies all Green machines and certifies the adoption of low-environmental-impact technologies, energy efficiency and industrial innovation.

The advantages of the new generation of electric machines

The transition from hydraulic to fully electric technology represents a concrete evolutionary step for industrial machinery. It is not simply a matter of replacing one drive system with another, but rather of adopting an architecture that is more efficient, more precise, cleaner and more consistent with modern requirements for productivity and sustainability.
By eliminating the hydraulic unit - and thus the use of oil to drive actuators and mechanical move-

Eco-Technology
The trademark certifies:
- *Adoption of low-environmental-impact technologies*
- *Demonstrated energy efficiency*
- *Industrial innovation focused on automation and precision*

Benefits of Robotics and AI in Extrusion End-of-Line Management
- *End-of-line process automation: pipe handling and packaging without manual intervention*
- *Continuous optimization: AI algorithms adjust production parameters in real time*
- *Reduced downtime and waste: improved product quality and operational continuity*

"During the symposium "Stronger Together" – attended by more than 130 Italian and international customers seeking quality, technology, innovation and customization – key factors for standing out in the market and remaining competitive IPM Srl presented its latest technological developments: haul-offs, cutting units, socketing machines, pipe bending machines, threading machines, and above all, machinery and systems for the automation of the end-of-line operations. The latter can operate 24 hours a day and, in terms of precision, speed and durability, they are able to replicate and support human work. They help address issues related to workforce shortages and reliability while relieving operators from repetitive, heavy and potentially dangerous tasks. For these reasons – IPM Srl explains – such systems are increasingly requested by customers worldwide".
These plants consist of integrated systems of machines and robots which, thanks to Artificial Intelligence, cameras and increasingly precise sensors combined with more powerful software, are able to recognize and classify objects through image recognition. This enables them to produce, sort, assemble and package products while checking each individual component, even across increasingly large operational areas.
Moreover, through self-learning capabilities, their functions can continuously improve over time. The systems can be also remotely monitored and controlled, enabling higher production efficiency and optimized planned maintenance.
"However, this does not mean that machines can fully replace everything human beings can do. The ideal solution – IPM Srl emphasizes – is to combine the strengths of robots and humans, creating environments where they can work together".

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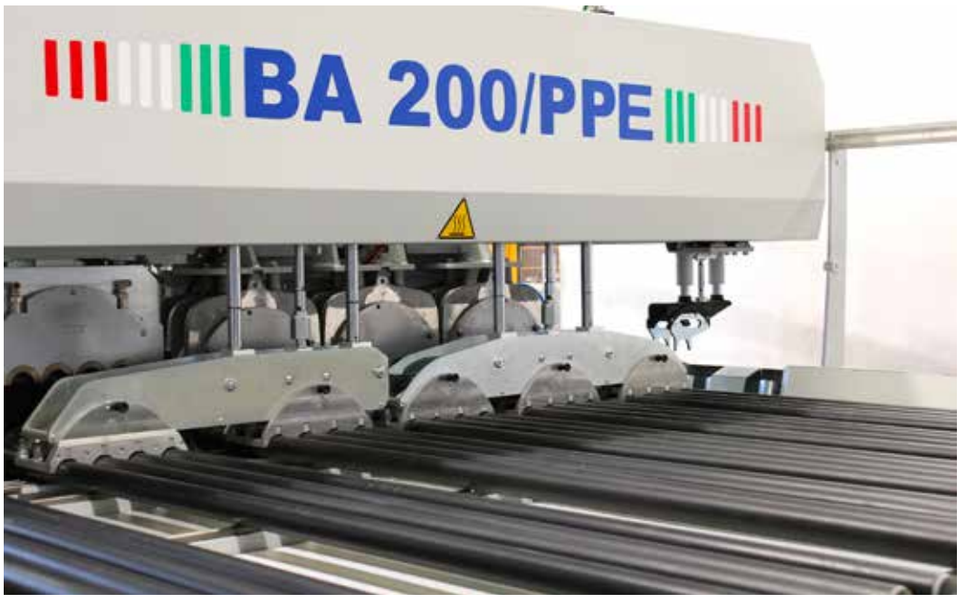


ments - the entire machine can be redesigned more rationally. In an electric solution, energy is consumed only when required by the process, whereas in hydraulic systems, a significant portion of energy is lost due to the continuous operation of the power unit and to the inherent inefficiencies of the circuit.

Energy savings

One of the main advantages is energy efficiency. This benefit has not only been evaluated in theoretical terms, but through a structured measurement and comparison project carried out with Turtle, a spin-off of the University of Bologna. The study involved specific instrumental measurements aimed at objectively determining both energy consumption and the CO_2 footprint associated with machine operation. The results revealed a measurable improvement, with a reduction in energy consumption and environmental impact of approximately 30%.

Precision and process stability

Electric technology enables superior precision and stability. Direct axis control allows position, speed, acceleration and force to be managed with greater accuracy and repeatability, reducing the influence of variables typical of hydraulic systems such as oil temperature, pressure losses, component wear and performance variations over time. This results in a more stable process, greater performance consistency and more uniform product quality.

Reduced maintenance

The absence of a hydraulic unit eliminates all activities related to oil management, filter replacement and the monitoring of hoses, fittings, valves and potential leaks. Reducing the number of components subject to wear and degradation means fewer routine and extraordinary maintenance interventions, improving machine availability and supporting production continuity.

Lower environmental impact

From an environmental perspective, the advantages are clear. In addition to reduced energy consumption, the elimination of hydraulic oil provides direct benefits in terms of cleanliness, safety, reduced spill risks and simplified management of operating materials. Furthermore, noise levels are significantly reduced, improving working conditions for operators. In an industrial context increasingly focused on sustainability, this represents both an operational and a strategic value.

Shorter and more consistent machine cycles

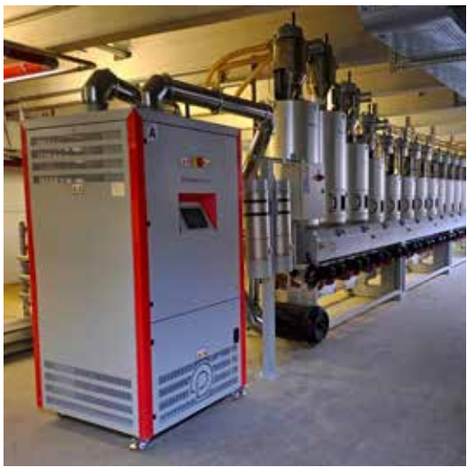
Electric technology enables shorter and more consistent cycles. The dynamic performance of electric motor, combined with precise control, allows movements to be optimized, reducing idle time while maintaining high cycle repeatability. In fact, what matters is not only the maximum achievable speed, but also the machine's ability to maintain the same performance level over time in a stable and reliable way.

"Thanks to this innovation and sustainability-driven approach, IPM Srl continues to develop technologies that actively contribute to the transformation and modernization of the industry, offering solutions that are increasingly efficient, reliable and environmentally responsible" explained the company.

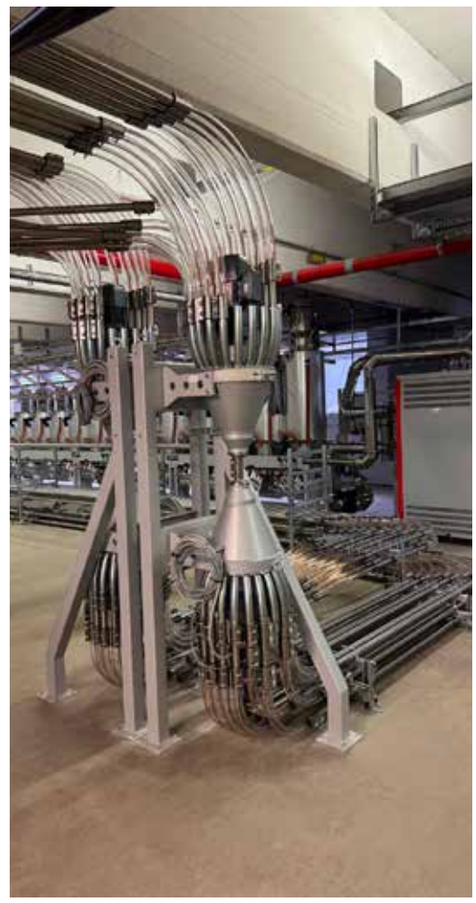
ADVANCED CENTRALIZED DRYING FOR ENGINEERING POLYMERS: PLASTIC SYSTEMS ENHANCES STABILITY AND EFFICIENCY

An advanced drying and conveying system installed at a major Northern Italian manufacturer ensures precise moisture control, stable thermal conditions, and reliable production for highly hygroscopic engineering polymers.

In the processing of high-performance engineering polymers for the electronics and electromechanical sectors, strict control of residual moisture and thermal stability is an essential prerequisite to ensure dimensional accuracy, mechanical properties, and production continuity. Within this context, Plastic Systems has recently completed the installation of an advanced drying and material conveying system at a leading manufacturer in Northern Italy.
The plant was designed with a 12-hopper configuration dedicated to the treatment of highly hygroscopic and thermally sensitive engineering polymers, including polyamides, polycarbonates, and glass fiber-reinforced compounds. The multi-material management system was developed to ensure stable thermal profiles, controlled residence times, and differentiated process conditions according to the specific moisture absorption and desorption curves of each polymer.
The core of the drying system consists of three rotor dryers from the DW series, enabling dynamic modulation of dehumidification capacity by optimizing the dew point according to the actual load and the hygroscopic behavior of the processed material. The rotor technology maintains a constant dew point between –25 °C and –40 °C, with air flow rates ranging from 40 to 1,000 m³/h and process temperatures up to 150 °C. This ensures suitable operating conditions even for high-performance polymers with stringent drying requirements.



The DW series represents a significant evolution in rotary wheel technology, both from a mechanical and thermo-fluid dynamic perspective. The desiccant rotor is driven by a chain transmission with a dedicated gear motor, ensuring constant torque, stable synchronization, and reduced mechanical stress over time, thereby minimizing maintenance requirements. The aluminum end plates contribute to effective thermal management and structural vibration reduction, enhancing the overall reliability of the unit.
Particular attention has been paid to the sealing system between the process and regeneration air flows. The use of silicone/PTFE gaskets ensures effective circuit separation, minimizing internal leakage and preserving dew point stability over time. This aspect is crucial for maintaining consistent dehumidification conditions, even during continuous production cycles with high load variability.
The modular design allows for flexible configurations, making the units suitable for both machine-side installations and large-scale centralized systems. In this specific case, the plant was engineered as a fully integrated centralized system, with coordinated management of the 12 hoppers and intelligent distribution of dehumidified air according to production priorities.
From a control standpoint, the dryers are equipped with an advanced microprocessor, PID temperature control, and inverter-driven air flow modulation. The self-adjusting dew point logic automatically adapts operating conditions based on detected humidity levels, reducing energy consumption and stabilizing material quality at the inlet of presses or processing lines. ModBus RTU/TCP connectivity enables seamless integration into Industry 4.0 architectures, ensuring centralized supervision, traceability of critical parameters, and remote diagnostics capabilities.
The material conveying system completes the plant architecture and is coordinated by six automatic control units distributed across three independent lines. This configuration ensures accurate flow management, stable feeding, and full traceability throughout the entire process, from storage to machine utilization. The segmentation into autonomous lines also provides greater operational flexibility, facilitating material changeovers and optimizing setup times.



Overall, the plant represents a high energy-efficiency integrated solution designed to guarantee superior pellet quality, process reliability, and operational continuity in technologically complex production environments. The adopted engineering approach combines mechanical robustness, precision in thermo-hygrometric control, and full digital interoperability, meeting the increasingly stringent requirements of the engineering polymers sector for electronic and electromechanical applications.

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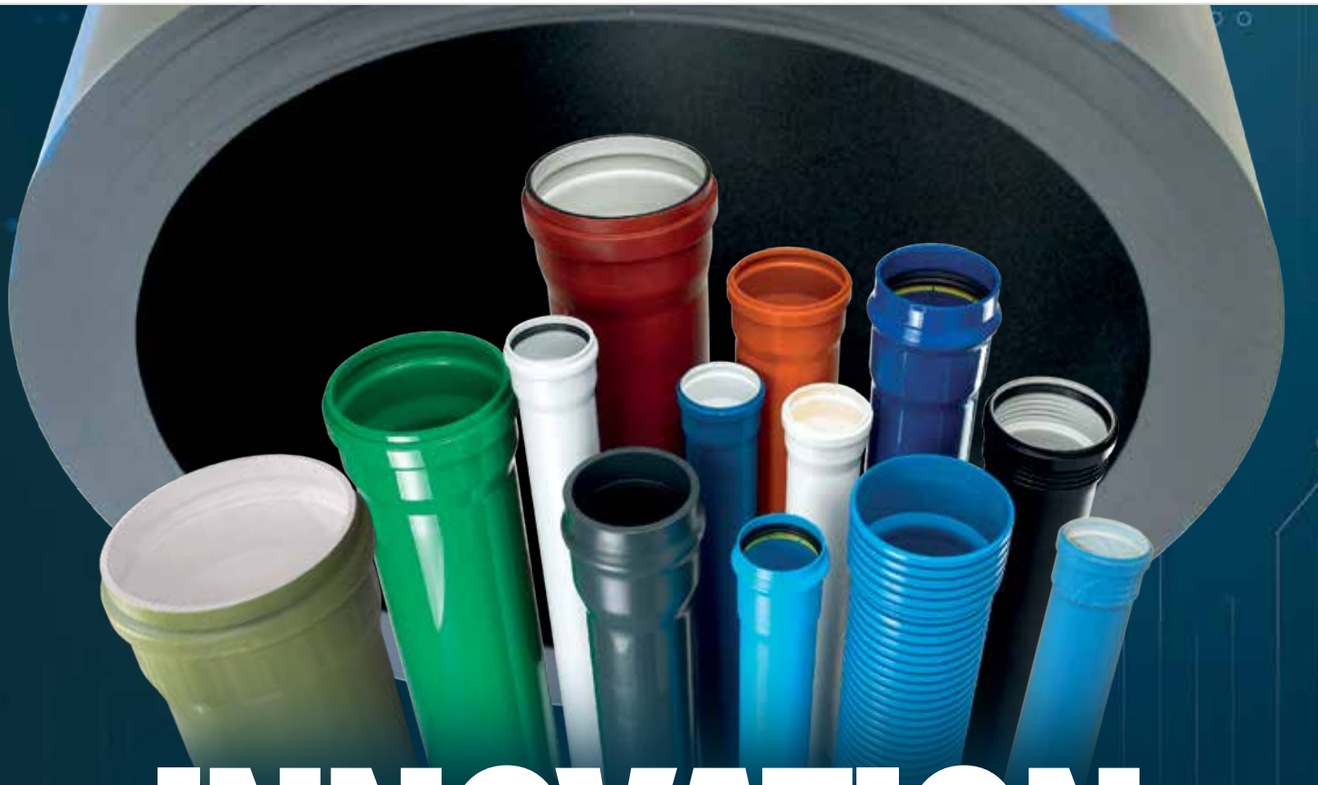

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