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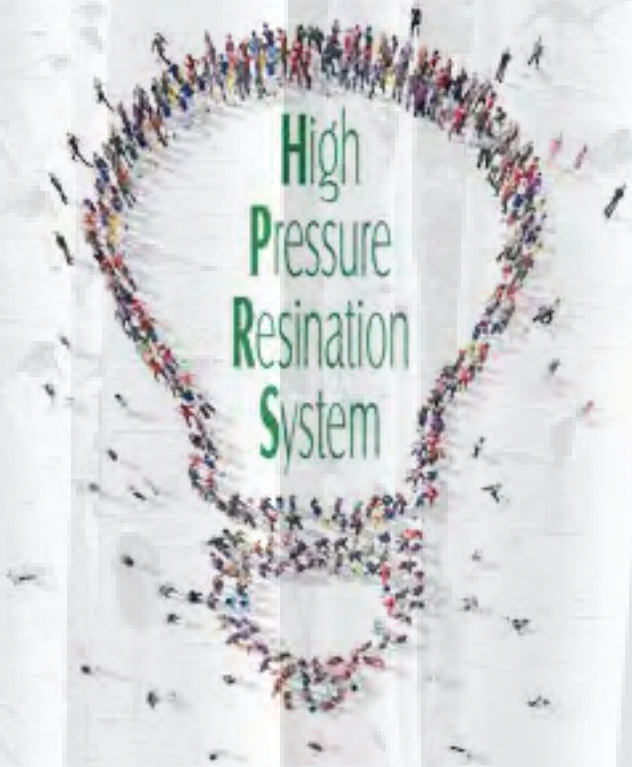


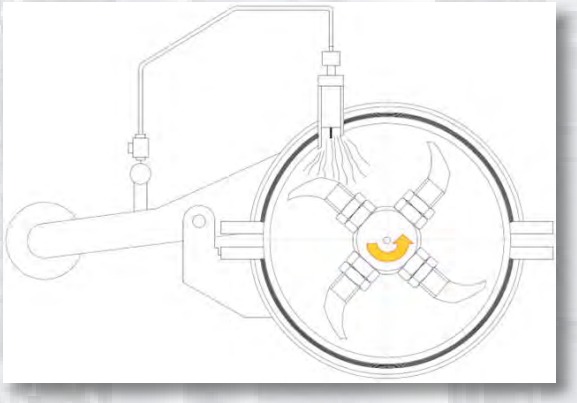
HPRS PROJECT
High Pressure Resination System

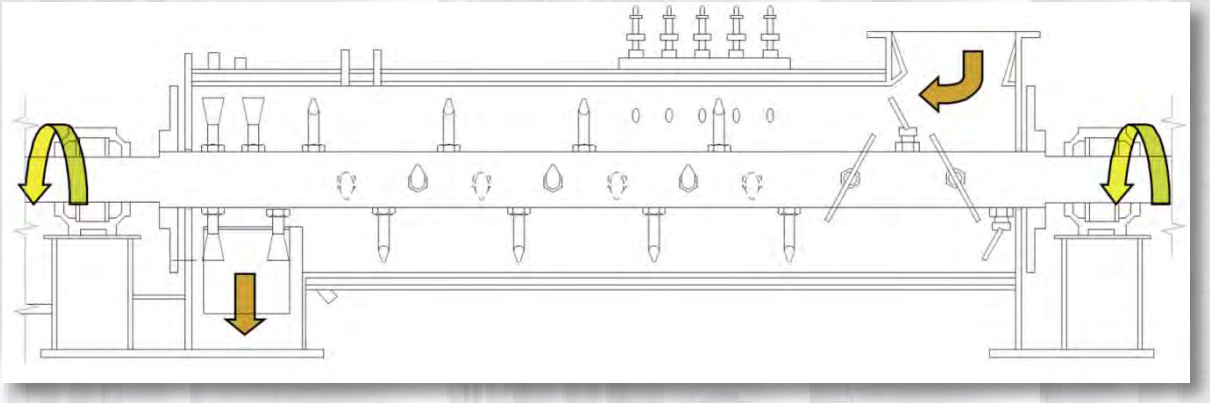
IMAL IMAL PAL GROUP ACIMALL JMC xilopan montanari

High Pressure Resination System

PB resination systems with standard blenders

- Resin is injected into the blender through nozzles mounted between material infeed and outfeed. One third of the length of the blender is wasted for mixing because of the position of the nozzles.
- Resin and wood particles are blended together solely by mechanical mixing friction, with the following drawbacks:
  - When the glue flows into the blender the material is compact and tightly packed together because of the centrifugal force
  - Wood particles tend to break because they are dry when they enter the blender
  - Elevated blender motor power required for blending
  - Extensive blender wear (inner linings and blending tools)
  - High thermal energy requirements for blender cooling
  - Fine particles tend to receive a higher concentration of resin
  - Excessive glue build-up on blender lining and blending tools in some cases as well





General description of the HPRS project
High Pressure Resination System

A constant and homogenous “curtain” of wood particles is created by the action of one or two accelerator rolls mounted at scale outfeed.

The dosing pump sprays glue at high pressure onto the particles as they descend, before they enter the blender. Thanks to a new system designed by IMAL, the size of the resin crystals is reduced by a special refiner, multiplying the gluing surface by approximately 100 times. The distribution of the resin over the particles is much better and hence it is possible to reduce resin consumption requirements.

The resin is then applied at high pressure to cover the entire surface of the fibre.

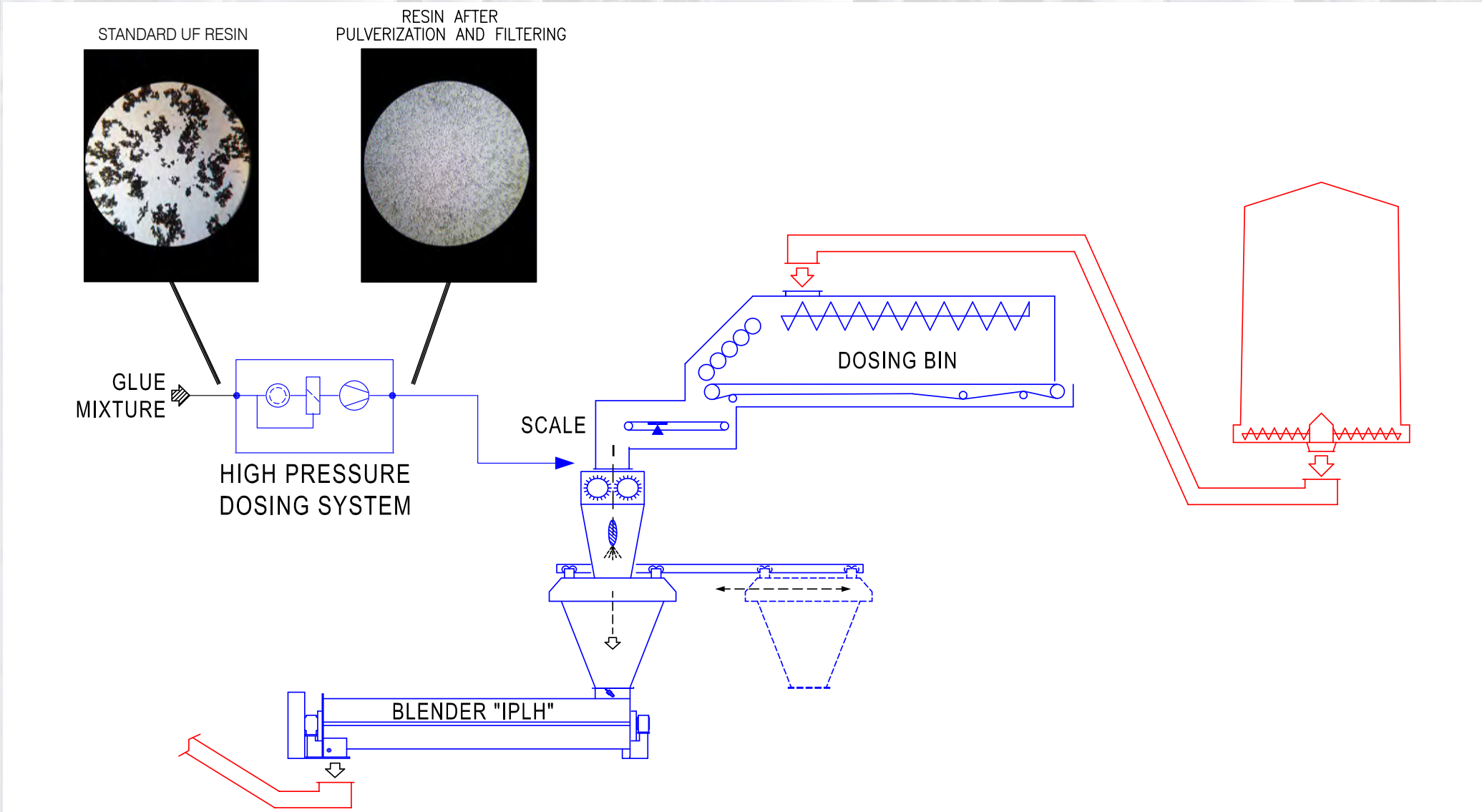
In this way, the resin is distributed over the surface of each and every particle, to ensure that each particle only receives the amount of glue it actually needs, with a consequent reduction in the amount of resin consumed.

This new resination technology has at last solved the issue of achieving the correct resin distribution over the wood particles; with traditional resin technology in fact, the fines were always over-glued because they tended to absorb 5 or even 7 times more than the amount of glue absorbed by the larger sized particles.

When inspected in the laboratory, it was sometimes noted that the larger sized particles were significantly under-glued, because the fines had virtually absorbed all the resin.

With this new system, the resin is distributed in relation to the surface area and not with respect to the particle size. In practise the resin on the finer particles per surface unit is very similar to that of the larger particles.

High Pressure Resination System

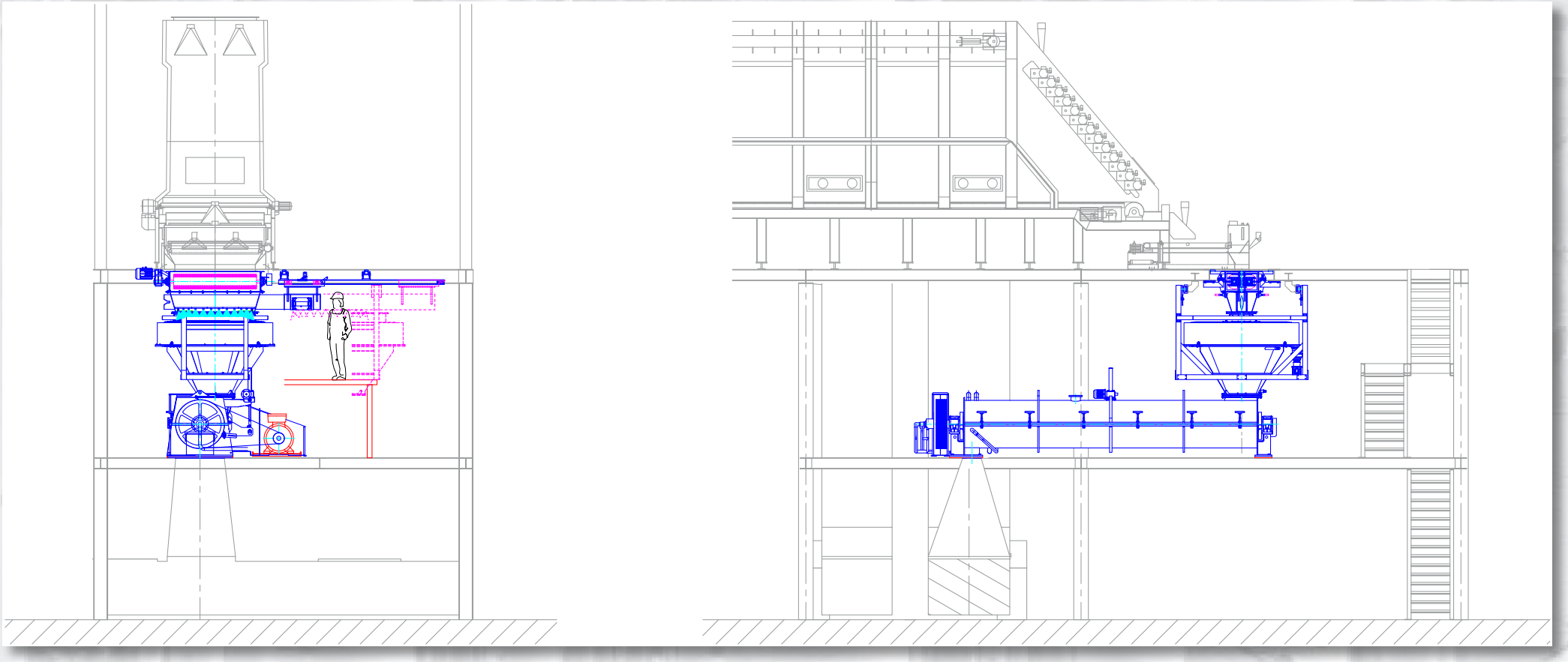


High Pressure Resination System

Advantages:

- Savings of up to 18% on resin consumption with respect to traditional systems, without impacting on board properties.
- The wood particles are resined as they fall, before they actually enter the blender. The resin is literally “painted” over the particles.
- Since the wood particles are already resined, and not dry, when they enter the blender, this renders them more flexible and less likely to break up during the mixing process. Furthermore, they are mixed for a longer period of time because the entire length of the blender is utilized.
- Blenders and blender tools last longer because less friction is required inside the blender.
- Reduced cooling energy requirements for the cooling system.
- Compressed air is no longer required for the injectors because the glue is atomized at high pressure.
- Reduction in formaldehyde emission because less resin is introduced into the board.
- Blenders and tools stay cleaner and glue/dust lumps do not form on the face layer.

High Pressure Resination System inside rotating hopper



Particleboard panels & Oriented-Strand Board panels

The special cooled chute is equipped with a motorized self-cleaning system, manifolds and mounts for the sprayer nozzles, and is used to convey the resined material to blender infeed.

The system consists of a chute, dosing rolls and high pressure glue distribution system.

Medium-Density Fibreboard panels

Thanks to a new system designed by IMAL, the resin crystals are reduced by a special refiner which can multiply the gluing surface by approximately 100 times. This is why it is possible to reduce resin consumption requirements.

The resin is then applied at high pressure to cover the entire surface of the fibre.

HPRS - High Pressure Resination System

The HPRS project is a 30 month project co-funded by LIFE+ which is the European Union's financial instrument supporting environmental and nature conservation projects.

HPRS stands for HIGH PRESSURE RESINATION SYSTEM, this project aims at developing, implementing and demonstrating the innovative high pressure resination system, before moving on to the commercialisation stage.
The target is to design a novel type of sustainable variable section orifice sprayer nozzles, through which resins are sprayed homogeneously at high pressure.

Such a system shall be capable of improving the energy efficiency of the electric motor utilized within the blending process itself by 15%, and at the same time, of reducing resin addition by 10%, and consequently the presence of toxic substances like formaldehyde. In traditional processes the wood fibres are crushed and driven at high speed inside drums, where the resin mix is injected through nozzles at a given pressure and mixed without a careful control of the resin/wood ratio. The HPRS solution on the other hand, consists in the application of sprayer nozzles with a variable orifice diameter, where resin pressure is monitored and kept at high speed to achieve a rapid and uniform distribution of the resin over the surface of the strands or chips, hence reducing unnecessary resin consumption and achieving an overall optimization of the blending process. Whilst UF resins have desirable thixotropic properties and provide the wood panel with good structural properties, it is paramount to optimize their use in relation to the desired properties and minimize the amount of formaldehyde, known for its effects on human health.The main activities will be performed at the XILOPANTEC premises in Cigognola (Pavia, Italy) , IMAL technicians and engineers will be present during the manufacturing activities in order to assist with the fine tuning of the pilot plant.
In order to reach this goal, a consortium of four partners, coming from two different EU countries (Italy and Spain) specialized in manufacturing wood-made panels, has been formed.

The LIFE-HPRS project aims at demonstrating a novel technology in the engineered wood sector, with the design of an innovative system for blending processes, which will permit a consistent reduction in the emission of formaldehyde-based toxic chemicals (10%) and a 15% reduction in energy consumption in the blending process, plus an additional 5% energy saving in the MDF drying process. Consequently the HPRS will lead to a significant reduction in the carbon foot-print related to the production of wood-based panels in the entire EU area and globally, where previous estimates are becoming more and more significant.

The aim of the LIFE-HPRS project is to:
- Design and construct a fully operational pilot line, where all energy consumption and safety tests compliant with European and national laws have been successfully performed.
- Manufacture 3 batches of 500m3 of wood panel prototypes, which will be tested according to the ISO 14040:2006 and 14044:2006 standards.

The LIFE-HPRS project aims at demonstrating a technology which will significantly reduce resin addition rates and enhance energy efficiency in relation to the manufacture of engineered wood panels.

www.hprsproject.eu