

Material Streams

We work exclusively with hot air in the pressing process.

The hot air flows through the tool and rapidly heats the material from approx. 90 °C to 190 °C.

The different melting points of thermoplastics are not relevant for our process.

Due to the rapid temperature increase, the various thermoplastics soften sufficiently and bond reliably with waste wood, plastics, paper composites, and paper fibers.

The hot air used neutralizes odors as well as viruses, bacteria, and mold.

Adhesions or contaminants therefore do not impair the process.

This results in a significant cost advantage:

All materials are shredded and processed **without sorting, without cleaning, and without water-based preparation.**

The result is a highly efficient process: • fewer process steps

- lower energy consumption
- reduced CO₂ emissions
- significantly lower costs

Material Diversity & Circular Economy:

- Processing of material mixtures with high tolerance to heterogeneous compositions
- Use of waste wood A1–A2 fractions in production
- Technology suitable for natural fibers and synthetic fibers
→ e.g. industrial hemp, wool, nutmeg, water hyacinth
- High process flexibility for a wide range of composite materials
- Materials remain in the material cycle – no thermal recovery
- Contribution to the circular economy through material use instead of disposal

- Materials are shredded and processed directly into pallets
- Further product developments possible due to flexible manufacturing
- Pressing process with hot air (100–220 °C) – melting points of plastics are not an obstacle
- Hygienic advantage: bacteria, viruses, mold, and odors are neutralized
- Machines require no conversion when changing materials – except for fundamental recipe changes (e.g. thermoplast to thermoset)
- High process stability and flexibility
- Different pallet dimensions allow customized material input
→ e.g. more paper composites at 600×400 mm than with larger formats
- Improved utilization of material streams – previously unusable material becomes recyclable
- Fewer processes = lower energy consumption, less CO₂, reduced costs
- Machine technology from the automotive industry – optimized and protected
- Protection through utility models, patents, and ongoing patent applications (EU)
- Establishment of a comprehensive patent family with manufacturers

- Pallet dimensions enable targeted material usage

→ Small-format pallets (e.g. 600×400 mm) offer higher input capacity for paper composites

→ Larger formats (800×600 mm or 1200×800 mm) require adjusted recipes with a lower paper content.

- Advantage: utilization of previously non-recyclable material streams through format-dependent optimization

→ Increased material recovery, less waste, more sustainable production

Tested Materials in the Technical Center:

- Cross-linked PEX plastic from old heating pipes
 - Thermoplastics in mixed form and thermosets processed separately
 - Fractions from float/sink separation (HDPE, PP)
 - PET mixed plastics with other polymer contents
 - Mixed thermoplastic plastics (not sorted by type)
 - Composite plastics (e.g. glass fiber reinforced)
 - Coated melamine paper – resin content reactivatable by hot steam
 - Tetra Pak ground material, not separated
 - HDPE/PP color-mixed fractions
 - HDPE from battery recycling
 - Thermoplastic filter dust with 13% PVC content from cable recycling
 - Material changeovers in injection molding machines = lumps / thermoplastic mixtures = shredded
 - Old clothing made of synthetic fibers – melting point must be considered!
 - Corona masks (new, PP fleece, metal nose clip) – metal removable via magnetic separation
 - Paper composites
 - Paint sludge based on plastics
 - Separated hospital waste (e.g. head/shoe covers, disposable clothing)
- For used fractions: hygiene concept required in cooperation with a university
- Data sheet “Green Dot”, fraction 323-2 (as of 03/2018)

Goal and Vision:

Saving raw materials from incineration – development of new recipes for sustainable material use.

Situation in Germany:

Waste is handed over to disposal companies by cities/counties/industrial companies, transported away, and sorted.

We offer savings potential in the **high multi-million range** for companies, cities, municipalities, and counties – and thus for residents and society.

Material streams arise that disposal companies incinerate due to a lack of technology or know-how. Many of these material streams can demonstrably be processed by the LAP GmbH project – scientifically proven, including implementation on an industrial scale.

The LAP project means:

less incineration = cost savings = less incineration = no CO₂ issue.

EU regulations – incineration prices will rise in the coming years – resulting in even higher costs.

Current and future situation:

High process costs (conventional technology) for sorting, preparation, and recycled granulate remain.
At the same time, imports of cheap recyclates continue, and prices for virgin granulate change very little.

Topic on the coasts of Germany or worldwide – therefore technology transfer and global scaling possible:

Beach debris – waste wood contains salt components.

In Germany, gasification/incineration of this waste wood has been discussed.

At high combustion temperatures, hydrochloric acid is released, which attacks the plants.

Our process operates in the low-temperature range – therefore no hydrochloric acid is generated.

This aspect would need to be examined again.

In addition, the technical condition of plastics that arise as beach debris – according to my information – these are currently landfilled.

Plastics and ocean pollution:

We assume that there are minor organic adhesions.

Therefore, plastics must be sorted and cleaned after removal from the ocean.

This represents a cost block that our process does not require – resulting in a cost advantage compared to other processes.

- The project is a central solution for the recycling industry – if the technology is recognized.
- We are in exchange with the VDI (Association of German Engineers) and other experts.
- Also with the Stuttgart Chamber of Industry and Commerce, BW International, and BW Environmental Technology.

Incineration of waste plastics abroad – globally – no recycling technology available, or is there?

High investment costs – barrier to the plastics agreement?

LAP process advantages: low pre-processing requirements and flexible material processing.