INNOVATION IN INSULATION

Continuous production lines for sandwich panels
Sandwich elements have become essential in the construction industry. They are used alongside traditional building materials such as wood, steel and concrete and have become the first choice material for the realization of various buildings such as production halls, airports, exhibition halls, cold rooms, plants, agricultural buildings and many others. The reasons for this trend are to be found in their excellent properties as insulating elements. Architects select these multilayer panels for many reasons, including their design potential and aesthetics, and their static and acoustic properties. The choice of materials for the core and outer layers is determined by the specifications for the sandwich elements.

**Design and cost considerations**

Sandwich panels are easy and fast to install, they can be produced rapidly and on demand in the required quantity and length, and they can be easily transported to wherever they are needed. All in all, sandwich panels are a lower cost solution compared to traditional building materials. The current trend is to use sandwich panels to construct the complete outer shell of buildings. Architects specializing in the design of private housing have presented successful solutions ranging from luxury homes to affordable housing for underprivileged people.

**Continuous and discontinuous**

KraussMaffei provides the expertise to engineer optimized systems for manufacturing sandwich elements. Our products cover all the options – from presses where the elements are produced one by one to complete production plants, including double belt presses, designed for mass production of sandwich elements.
Continuous production lines are engineered to perfection for outstanding quality in sandwich elements.

KraussMaffei design continuous production lines for high-volume production of insulating panels. A continuous production line is a turnkey solution for continuous production of insulating panels.

Continuous production lines integrate:
1. Feeding and forming the facings
2. Roll-forming the facings
3. Feeding equipment for the mineral wool or other core materials
4. Metering and mixing the PUR/PIR components
5. Application of foam or glue
6. The lamination unit or double belt press for calibrating and curing the panels
7. Cutting the elements to length
8. Cooling, stacking, and wrapping the elements

> Production speed: up to 60 m/min
> Panel width: 600 to 3000 mm
KraussMaffei’s RimStar family of mixing and metering machines are available in versions to process from 2 to 16 components. PUR glue systems typically use 2 components with an output of 10 – 30 g/sec. PUR/PIR systems for sandwich elements use at least 5 components, including a blowing agent such as pentane; their output is several kg/min.

The application of the PUR glue system or the lay-down of the PUR/PIR foam application is the key technology for a sandwich element production plant.

KraussMaffei supplies a full range of different mixing heads each engineered to meet specific requirements. For the application of PUR glue, KraussMaffei developed a Jet mixing head which applies glue with or without fillers in a uniform layer on the facings. A rate of, for example, 120 g/m² without overspray has been achieved. The PUR/PIR foam is laid down using mixing heads designed specifically for sandwich element production. For sandwich panels with rigid facings, foam application can be optimized by adding a special tube (“poker”) equipped with small foam outlets which ensure perfect distribution of the foam on the lower facing. For insulation boards with flexible facings produced at high speed, 3 L-design mixing heads positioned one beside the other supply foam in the required quantity and quality.

**Turnkey production lines**
KraussMaffei supplies complete lines, including the uncoiling units, for producing sandwich elements with flexible and rigid facing layers, or the feed units for panels or mineral wool. For metal facings KraussMaffei supplies state-of-the-art roll forming equipment. After calibration and curing, a complete line will include saws, cooling conveyors, stacking and wrapping units. These downstream units are chosen and integrated to match each customer’s special production requirements.
VERSATILE AND OPTIMIZED FOR EACH APPLICATION

Depending on the required properties and the applications, a wide range of composite structures has been developed to create sandwich elements for different needs. The characteristics of the core and outer materials determine the properties of the elements. The core material of sandwich elements can be, for example, PUR foam, PIR foam, mineral wool, paper honeycomb, glassfiber reinforced PUR, PUR mixed with particles of other materials, XPS, EPS, or combinations of different materials as composite structures. The material used for the outer layers can be divided into two categories:

Rigid layers
- Metal sheet such as steel, stainless steel, copper, aluminum
- Boards such as OSB, MDF, gypsum and boards made of various fiber-reinforced materials

Flexible layers
- Paper, aluminum, PVC and other plastics, glassfiber reinforced films.

**Examples of sandwich elements:**

**Sandwich panel**
Layers: Painted steel sheet for strength and a high-quality surface
Core: PUR/PIR foam or mineral wool to provide insulation and reduce weight

**Insulation board**
Layers: Aluminum foil to provide a vapor barrier
Core: PUR/PIR foam to provide insulation and reduce weight

**Construction panel**
Layers: High Pressure Laminates (HPL) to provide a high-quality surface
Core: PUR foam or XPS to reduce weight

**Light-weight panel**
Layers: Plywood to provide strength
Core: Paper honeycomb to reduce weight

**Multi-layer wood panel**
Several layers: Thin OSB or plywood boards to provide strength
Bonding material: Glassfiber-reinforced PUR glue to provide strength

**Walls for pre-fabricated house**
Layers: OSB to provide strength
Core: PUR foam to provide insulation and light weight

**Façade panel**
Layers: Painted aluminum sheets to provide a high-quality surface and environmental durability
Core: Extruded HDPE or PVC to provide strength
KraussMaffei has designed and manufactured equipment for the polyurethane industry for more than 40 years now. KraussMaffei is the technology leader in several market segments, where we are considered to be the reference supplier. We have the experience and know-how to support you, our customers, every step of the way – from the initial idea, through development of the optimal solution, to commissioning, operating and servicing your system. At all times, you can rely on our outstanding competence in planning and engineering and on our fast-response service and support.

Production systems engineered by KraussMaffei meet all the criteria for high-tech production systems for insulating panels. Whatever the target use for the sandwich panels – industrial buildings, cold rooms, prefabricated houses, or wall and roof insulation – our production systems ensure high-performance process technology. The result is excellent product quality.

Benefits for your business

- The systems are modular and perfectly tailored to the application and to customer requirements
- KraussMaffei stands for state-of-the-art machinery, proven and reliable concepts and highest product quality
- Energy consumption is low due to the efficient, proprietary routing of the heating air through the double belt unit
- Turnkey project management by KraussMaffei specialists
- Competitive advantage from sandwich elements with a high-value surface due to high-precision calibration
- Change of thicknesses and widths is fast, easy and errorproof
- Highly automated, cost-effective production

Service, support and spare parts – when you need them, where you need them

Rely on us for a fast and competent response to all your service needs anywhere in the world. From troubleshooting and training to spares or repairs – we're on the job.