

Co-extrusion technology

Endless perfection



- Completely automated high capacity production
- Perfect climate control
- Unequaled high level of food safety
- Very consistent product quality



Perfect solution

Marel offers the most complete range of machines ever for the production of cooked-smoked sausage, covering all production stages from meat preparation to packaging of the final products. Whatever sausage you want to make, regardless of the casing type, length or caliber, in very large or smaller quantities, we can put together the perfect solution for you.



Traditionally, sausage are made by stuffing natural or preformed casings with meat dough. Another option is to create sausages using innovative co-extrusion technology. Here the casing is formed at the same time as the sausage is produced.

Co-extrusion is a completely automated process for producing sausage with a casing formed with a casing gel. A uniform thin layer of gel is applied in an ingenious way to the outside of the sausage just as it is being formed. As it passes through a salt bath this layer acquires the necessary firmness for further processing. When compared to conventional production methods, cost savings are significant and food safety aspects unequalled. The edible casings can be made from alginate, collagen or a combination of alginate and collagen, depending on the production process chosen by you or the end product characteristics you need.

Marel offers a number of options for this production method, solutions that cover the whole process. Our specialists will work with you to see which system best suits your requirements.

The art of co-extrusion technology

With our co-extrusion technology you do not use preformed casings for the production of sausages. The casing is created at the same time as the sausage is produced.

Product characteristics

Co-extruded sausages are very uniform and consistent, each sausage being identical in shape, length, caliber and weight. Their presentation is good and the edible casing gives the product the desired bite. Co-extruded sausages will keep their shape during drying and smoking as well as during grilling, frying or in the microwave. The sausages meet the very highest food safety requirements due to full automation of the system.

All cooked-smoked sausages currently on the market can be produced using our co-extrusion technology. With the various existing systems you can produce sausage of a caliber from 17 - 32 mm and a length from 100 - 200 mm. The system is very easy to operate, so changing to a different caliber or sausage length is easy.

The co-extrusion technology can be set up in different ways, to always meet your specific needs. You can contact our specialists to discuss the possibilities.



Our co-extrusion technology is modular in set up and eminently suitable for high volume production.

Cost saving - labor

By opting for a co-extrusion system you are choosing the most efficient sausage production system in the world today. Production is fully automatic, making the process less labor-intensive.

Cost savings - casings

With the co-extrusion technology, you save a lot on casing costs. Casing gel is much cheaper than preformed or natural casings. Co-extrusion is a continuous system without the limitation of a natural or preformed casing, with just one start-stop, no casing breaks and no need for twisting or hanging.

Food safety

Besides savings, there is another important reason for choosing co-extrusion: the unequalled high level of food safety of the end products made on the system. During production, product remains untouched by human hand. The entire production process is automatic and in-line from the moment of co-extrusion right up to the last process step, cooking of the product in its final packing, the so called 'cook in the pack' principle.

The chance of any contamination is minimal. Product quality is very consistent and product shelf life is longer than for items produced using a more traditional method.

Process stability

Thanks to the system's perfect climate control, you can set the temperature, humidity and air speed in the drying phases of the production process. This guarantees a stable process and consistent end products.

Key features

- **Completely automated high capacity production**
- **Cost savings (mainly labor and casing costs)**
- **Attractive product characteristics**
- **Unequalled high level of food safety.**

Co-extrusion, how it works ...

Firstly, a dosing pump extrudes a continuous flow of meat mix. When the sausage is formed, a thin layer of casing gel is extruded (co-extrusion) and spun onto the sausage meat by a rotating nozzle. An 'endless rope of sausage' is produced.

Contact with a brine solution causes the gel to start turning into a casing. After brining, sausages are cut into specified lengths by the crimper wheel, pre-dried (and heated) and liquid smoke applied. This adds color and taste and helps the sausage acquire its strength. The products are dried once more. Sausages are then ready for packing. They can be loaded manually or automatically by robots into their final packaging (such as a thermo former that seals the pack), thus maximizing food safety.

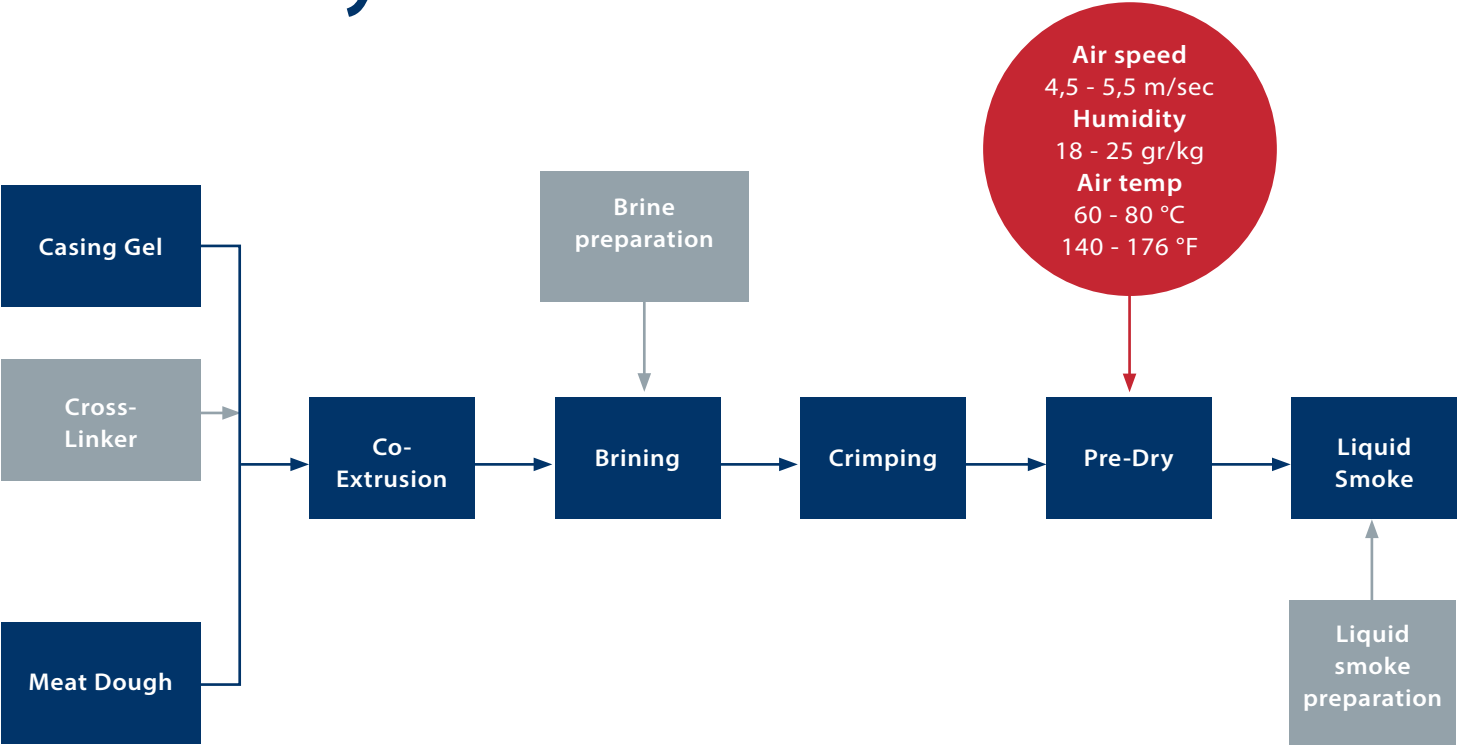
The last stages in co-extrusion sausage production are cooking and chilling the product in its packaging. Sausages can be sterilized or pasteurized (depending on the pack) and get their definite structure. The sausage is now ready to eat. The 'cook in the pack' principle is a key factor for product quality and food safety.

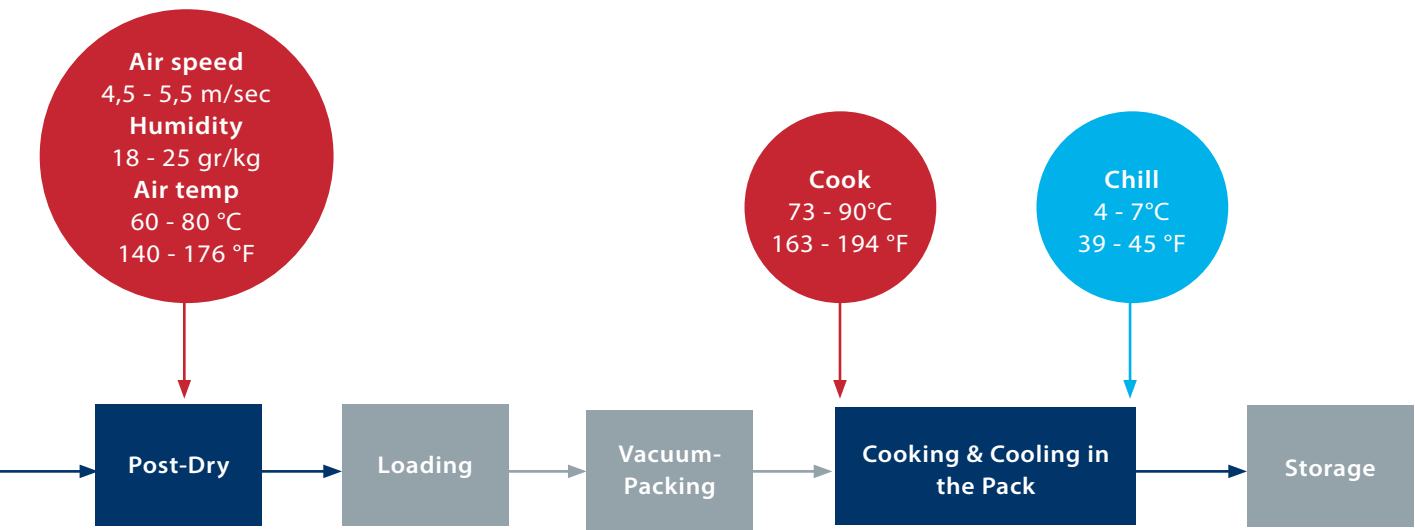




**Co-extrusion technology
sausage production is a fully
automatic system.**

Process lay-out







Co-extrusion technology at a glance:

- Completely automated high capacity sausage production
- Uniform products: highest possible consistency in weight, length and caliber
- Unequaled high level of food safety
- Virtually no waste, give away or rework
- Very constant process conditions
- High cost savings (mainly casing material and labor)
- Perfect climate control

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Marel is the leading global provider of advanced equipment and systems for the fish, meat and poultry industries.