



Feed Design Lab:
The research and education center
for innovation and sustainability in
the feed industry

**The functions of
the pilot plant**

The pilot plant

One of the unique aspects of Feed Design Lab is the pilot plant. It is a small-scale feed test factory in a spacious facility, equipped with the latest technology and machinery with multifunctional capabilities. The various process components can be used to conduct tests, experiments, or produce trial feed.

The capacity of the different machines depends on the type of raw materials and ranges from 500 to 5,000 kg/hour.

The minimum batch size is 50 kg.

This brochure offers an overview of the various machines and their functions.



1. Hammer Mill

Function: the hammer mill is the primary grinder for raw materials. The raw material is grinded into small particles by means of a rotor with freely moving knives or blades. Air is pulled through the hammer mill, causing the ground raw material to move through the hammer mill. The hammer mill contains internal screens through which the raw material passes once it has reached the desired particle size. The air which has been used in the hammer mill passes through filters to remove dust before being expelled from the machine.

The knives or blades and the rotor of the hammer mill can all be removed from the machine for cleaning and maintenance. In addition, the hammer mill is equipped with a dust explosion protection panel according to the ATEX Directive [European Directive on explosive atmospheres].



2. Mixing

After grinding, the product can be mixed or blended with other ingredients or liquids. This is why the mixer at the plant is located underneath the hammer mill.

Function: solids and liquids are added to the mixer to obtain the right proportions and desired product composition.

We use a double shafted mixing system. The double shaft mixer is fully detachable from the machine for cleaning and maintenance. This mixer must be filled for at least 25% and can hold up to 140%, depending on the density of the product. This mixer also has agglomeration, drying and cooling capabilities.





3. Sieving (1)

To ensure the safety and quality of the final product, we installed a sieve after the mixer. Depending on the customer's wishes we can install screens of different sizes.

Function: large particles are sifted out of the mixture here. This centrifugal sieve primarily has a control function.



4. Conditioning

After sieving, the mixture moves on to the next treatment. The conditioner is the first machine in this process.

Function: the product is prepared in the conditioner before entering the expander, extruder or press. Steam or water is added to the mixture. The mixture then goes into the expander or extruder or is routed directly to the press via a bypass.



5. Expanding/extruding

Function: in the expander the mixture is propelled by a screw with mixing blades; this creates pressure which breaks down starches. In this form the product is called an expandate. The product may then go through the press again to be shaped into pellets. An expander-press line also contains a cooler. In the extruder the mixture is propelled by a screw with mixing blades and is then pressed through a die. The die determines the shape of the product. The shape and size depend on the customer's wishes. An extruder line always contains a dryer-cooler.

The extrusion process also breaks down the starches so these can be absorbed faster and more effectively by the animal during the digestive process.



6



6. Pellet Press

Depending on the pretreatment, the mixture moves to the pellet press via the expander or via a bypass.

Function: the mixture is turned into pellets in the press. A few reasons for using pellets are to create a uniform product, reduce volume, reduce dust, improve transportation characteristics and improve digestibility. The press contains a rotating die where the rolls force the mixtures through the holes in the die. The diameter of the holes in the die determines the size of the pellets. This press is equipped with RSM (Roll Speed Measurement) to count the rotations of the rolls and a lineator (automatic roll adjustment) which is used to adjust the distance between the roll and the die during the production process. This combination improves the quality of the pellets, prolongs the life of the rolls and the die and ensures rolling without slipping.

8



8. Sieving (2)

After the drying process the pellets are transported to the next treatment, where they are sieved again.

Function: pellets that are either too big or too small are sieved out of the desired products in this rotating sieve. The pellets are separated into small, medium and large pellets. The screen is equipped with pressed, woven wire mesh which breaks the edges off the pellets or pieces.

9



9. Vacuum coating

Function: the vacuum coater deposits liquids onto the pellets. Because the pellets expand during the drying process, any added liquids can easily penetrate the pellets. This process takes place in a vacuum to facilitate increased absorption. Fat content is limited in the expander or extruder press because pellets cannot be formed if the fat content is too high. Additional fats, liquids and powders are added in the vacuum coater. In other words, the vacuum coater is a machine which deposits liquids and powders onto a carrier. The vacuum coater is double shafted.

The final product is delivered in big bags.

7



7. Drying

Function: after the expanding, extruding and pressing the pellets have a high moisture content. To prolong shelf life and safeguard quality, the moisture content needs to be reduced to an optimal percentage, which is done in the dryer. Extrusion products are dried warm because the moisture content of these products is relatively high. Expansion products and pressing products are cooled because these products have a lower moisture content.

Information

Would you like more information about the possibilities at Feed Design Lab? Please feel free to contact us

Stayerhofweg 25f
5861 EJ Wanssum
E: contact@feeddesignlab.nl
T: +31 6 - 538 26 611