

Adding value to meat products by portioning to fixed weights

by Tom Dewaele, Marelec Food Technologies, Redanweg 15, 8620 Nieuwport, Belgium.

Supermarkets and retail are the first to respond quickly to market trends. Meat processing industries gladly adapt their products and processes to those requirements and volumes.

Starting initially in the UK, but spreading very rapidly over Europe and other continents, one can see complete shelves with a large variety of meat products offered at fixed prices per tray (for example all trays identical: 'family pack of x steaks for €y'). Consumers buy according to the available budget rather than to the required volume or weight.

Fixed weight requirements

Other meat processing industries are following fast. The supply of meat products to large hotel chains is one example. The chef grills the steaks according to well predetermined temperatures and timings to suit the preference of the consumer. This requires fixed weight products.

Meat for ready meals, where the microwave time is indicated, must be within small tolerances of weight variations. Another example is identical portions for airline catering. Large kitchens for schools, hospitals,



More and more, consumers buy according to the available budget rather than to a required volume or weight.

the army, etc. benefit from using fixed weight portions. High-end restaurants want consistency in weight and dimensions of the offered delicacies.

So, it is up to the supplier of the meat to fulfill these demands and, today, this is quite often done manually by qualified butchers.

Companies struggle as it becomes more and more difficult to find skilled people. But there is a solution. Today, there are machines on the market that cut all kind of

meat products into portions of fixed thickness or fixed weight or a combination of both.

Intelligent portion cutter

The intelligent portion cutter Portio from the Belgian company Marelec Food Technologies is one of those. The economical return is very fast due to the high capacities, accuracy and significant yield increase. One portion cutter easily replaces the

work of six manual labours, hence also reducing the footprint.

The principle of the portion cutter is based upon scanning technology. The products are placed on the infed belt and move through a laser line, which follows the contour exactly.

A high speed camera takes 150 images per second of the changing laser line which the software will transform into a 3D object with its volume. With this information, in combination with the density, the machine knows exactly where to cut to have the required weight.

Obviously the product has to move after being scanned towards the cutting station over a well defined distance at a very accurate speed.

Depending on the shape of the product, there will be one or three cameras. One top camera is sufficient for flat products. To have an accurate image on more rounded and irregular products, it is necessary to look from the sides as well. In this case, a left and right camera are added.

For the machine to know the density of the products, it is enough to scan and weigh three different pieces. The machine will calculate the density and keep this in the memory.

Every time, this particular product needs to be portioned, the density

Loading high volumes of the primals into the portion cutter.



A grader groups the portioned meat into batches.





The cutting angle can be changed over 30° or 45° from its vertical position in a few seconds.

will be taken from the memory program and large production series can start.

In case the density varies a lot in between products, an infeed weighing unit can be connected. This can be the case for smoked products such as bacon, where the fat content differs between every product.

With this infeed weighing unit in line, the weight of every individual piece is taken and the density will be adjusted, to keep optimum accuracy.

The technology ensures very precise weight portions. Depending on the product, the manufacturer confirms precision of up to 2g (STD or standard deviation) on weight portions below 150g.

The intelligence of the software helps to increase the yields. The software allows conditional programs to cut different portions in function of the size and/or weight of the primal product.

Interestingly, the intelligence of the machine will always aim for minimising the byproducts. Allowing a certain margin on the target weight will ensure that there is as little as possible left over. The intelligence will divide the product in such a way that it will cut it into pieces all with a

weight within the allowed tolerances. Field trials have proven yield increase from 1 up to 10%.

The ease of operation of the portion cutter is essential to allow the operator to fine-tune the programs in a swift way to find the optimum yields.

Consistency guaranteed

Another advantage of using technology, where the human will struggle to have consistently the same accuracy and yields is that the machine can cut different sizes or weights out of primal products.

One can program for example to cut steaks out of one primal of 100g, 140g and 160g. The machine will instantly calculate how to divide the primal into multiples of the requested weights.

This seriously increases the yields and the profits, as only saleable steaks are cut, with minimum trim or give away. To bring the steaks of equal weights back together, a grader in line with the portion cutter will group the portions into batches.

The technology of the Portio machines allows very high volumes to be processed where the limiting



The open structure of the equipment allows complete sanitising of the portion cutter.

factor becomes the off-loading of the portions rather than the speed to cut the products.

With the knife rotating at speeds up to 17.5 cuts per second for certain applications, capacities of 1,600kg/hour can easily be reached. This can even be doubled when the machine with a dual lane is used. In this case, two independent infeed belts, each with their own controller run in the same body, resulting in the highest capacities on the smallest footprint.

To portion different kinds of products, there is the possibility to use different knives. For the softer types of meat, thin knives of 1.5mm are used, where 2mm knives and heavy duty knives are used for harder or thicker products. Changing between products, programs or knives is a matter of seconds. To maintain the optimum biosecurity, there is a CIP that can be switched on during the process of changing between products. The fact that the knife is rotating in a closed protected cabinet increases the safety as the operators can never be in contact with the fast rotating knife. All doors are equipped with safety switches

that will disconnect the main power from the knife until all doors are properly closed.

For specific applications, mainly in poultry processing, there is a machine available that allows the cutting angle to be changed over 30° or 45° from its vertical position. This results in a fixed weight portion, but still keeps the natural shape of the product.

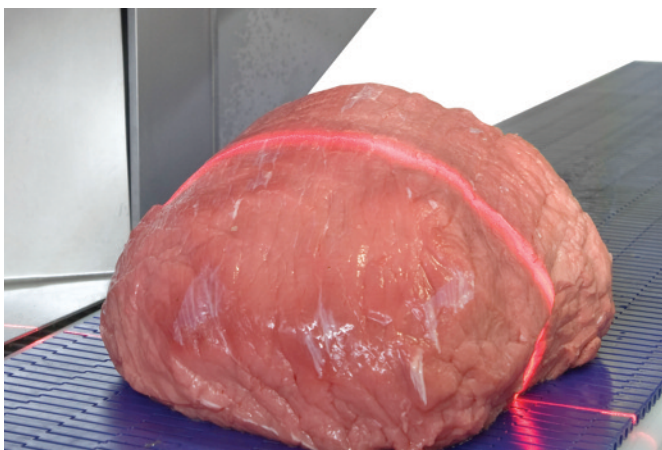
At the end of the processing day, the portion cutter can be completely sanitised due to its fully open structure. All electrical components are in closed separated sealed cabinets with heaters.

Trend for automation

It is clear that the fast increasing number of installed intelligent portioning machines proves the trend to move away from manual portioning to an automated process.

The reasons are a safer, more consistent and definitely a more profitable way of adding value to meat products – all this as a reply to the rapidly changing demands from the market. ■

The laser line follows the exact contour of the meat.



High precision and high capacities on pork loins all with equal weights of 85g.



Cutting chicken fillets at an angle results in fixed weight portions with a hand cut look.

