Beef deboning and trimming
From carcass intake to product dispatch

- Online monitoring and control
- Full traceability from A to Z
- Proven yield increase
- Seamless integration of key equipment
- Focus on ergonomics and hygiene
Take the guessing out of processing

Beef processing companies looking for greater efficiency are increasingly focusing on key performance indicators (KPIs) that are crucial pointers for how effectively their plant is running.

Yield = competitiveness
Yield has a significant and direct impact on the bottom line, making it one of the most important KPIs in fresh meat processing. The cost structure of the industry means 65–75% of final product costs stem from raw materials. Beef processing companies therefore have to maintain complete control of yields at every stage.

Inaccurate check weighing and/or inexact packing can mean the loss of considerable sums every day. Depending on production volumes, even very small fluctuations in giveaway can result in substantial losses – or substantial profits.

Effective control
Management information is normally based on historical data from previous production runs. By contrast, Marel equipment and systems provide full access to real-time data about the production process, as it is happening.

It is then possible to make immediate adjustments to orders, throughput, manning, etc. to optimise production flows – no need to wait until the next day to make adjustments.

Throughput reflects efficiency
Beef processing companies want to make sure they reap the expected advantages and financial benefits from the investments they make in advanced equipment designed to increase capacity and efficiency.

Stringent monitoring of throughput is therefore essential to follow whether or not set goals are reached, and to constantly improve efficiency.

Food quality and food safety
Food quality and food safety are two hot issues in beef processing – reflecting consumer focus.

Retailers therefore demand quality, traceability and no underweight. Suppliers must be able to deliver products that comply in full with agreed specifications. This requires systems that monitor and link KPIs in the production flow such as PH value, temperature, etc with traceability systems.

Monitoring stock movements
In a fresh meat processing company, the stocks of raw materials, semi-processed and finished products represent considerable value. Such stocks have only limited shelf lives, which mean stringent stock management is essential.

Health and safety
In many countries, it can be difficult to find skilled labour to work in beef production. Staff may be discouraged by heavy lifting, awkward working positions, the lack of information about their performance, etc.

Automatic, ergonomically correct work stations help reduce repetitive strain injuries. Online monitoring gives operators a tool for tracking their own performance, which may improve work satisfaction.

Basis for calculation:
- Example registered over eight production hours
- 80 pistols per hour
- €6,176 per day – 220 days a year
- Value added per year €1,358,720

<table>
<thead>
<tr>
<th>Product</th>
<th>Standard Yield (%)</th>
<th>Actual Yield (%)</th>
<th>Difference Yield (%)</th>
<th>Product weight (%)</th>
<th>Price/kg (%)</th>
<th>Value (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenderloin</td>
<td>69.03</td>
<td>72.20</td>
<td>+3.17</td>
<td>1755.6</td>
<td>26.0</td>
<td>1444</td>
</tr>
<tr>
<td>Silverside</td>
<td>84.65</td>
<td>87.18</td>
<td>+2.53</td>
<td>8060.8</td>
<td>6.0</td>
<td>1328</td>
</tr>
<tr>
<td>Topside</td>
<td>83.64</td>
<td>86.39</td>
<td>+2.75</td>
<td>13317.2</td>
<td>6.0</td>
<td>2228</td>
</tr>
<tr>
<td>Eye round</td>
<td>62.54</td>
<td>64.41</td>
<td>+1.87</td>
<td>10492.4</td>
<td>6.0</td>
<td>1176</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6176</td>
</tr>
</tbody>
</table>
One stop for all your processing needs

Marel’s state-of-the-art processing equipment spans the entire production process, right from carcass chill to dispatch of the final product.

In today’s globalised market, beef processing companies are often confronted with low profit margins as a result of pressure from powerful retailers. Additionally, the industry in general has to deal with increased costs as well as labour shortages. This has made it ever more vital for food processors to be able to efficiently control, monitor and measure virtually every aspect of their shop-floor operations.

Marel provides a comprehensive portfolio of beef processing equipment and solutions, ergonomically designed to minimize wear and tear and reduce work related strain injuries, capable of meeting the entire spectrum of requirements for portioning and traceability.

- Production control software
- Graders and batchers
- Portioning equipment
- Industrial scales
- Labelling systems
- Injection monitoring systems
- Check weighers
- Packing systems
- Quality inspection systems
- Deboning and trimming lines
- Sawing systems
- Meat harvesters
- Skinners
- Robot lines
- Freezers

The StreamLine deboning and trimming system is the first system we have seen, that fulfills all our needs for online monitoring of our production.

Tim Aitken, CEO, Greenlea Premier Meats
From carcass intake to product dispatch
- deboning, trimming, portioning, packing and labelling

1. **Intake and registration**
   Carcasses from stock are weighed-in on an overhead track scale near the entrance to the deboning hall. Information about each animal such as animal ID, age, slaughter date, farmer, pH value, etc, is captured by the Innova production control system.

2. **Breakdown**
   Carcasses are cut down according to individual specifications and weighed before entering the StreamLine for deboning/trimming. Yield, throughput and other key performance indicators (KPIs) for each operator can be registered and monitored.

3. **Deboning and trimming**
   The primals are distributed to work stations on the StreamLine, based on operator availability and are de-boned/trimmed/skinned, according to individual specifications. All cuts are fully traceable. Yield, throughput, quality and other KPIs for each operator are registered and monitored online. The StreamLine can be equipped with membrane skinners, band saws, etc.

4. **Meat harvesting**
   Residual meat on the bones is harvested as high quality 3 mm manufacturing meat. Under low pressure this residual meat is removed from the bones, keeping the bones intact. The resultant 3 mm meat can be compared with manually obtained trimmings.

5. **Packing products**
   Products are automatically distributed for individual or bulk packing.

   5.1. **Thermopacking**
       A label containing data about the product such as product ID, type etc is printed and applied before the product is vacuum-packed using a thermoformer.

   5.2. **Vacuum bag packing**
       Vacuum bag packing can be fully automatic, manual or a combination of both. A label containing data about the product such as product ID, type, etc. can be printed and applied before the product is sent to sealing.

   5.3. **Manual packing**
       Products such as oversize or multipack products are sorted into bins. This procedure can be combined with a batching operation based on weight and/or count. A label containing exact data about the type and lot can be printed and added. The packed products are subsequently sent to the bagging line for sealing.

   5.4. **Trolley/bulk**
       Products from the StreamLine can also be sorted into trolleys or bins.

6. **Manual box packing**
   The bagged products are sent to box packing and subsequently to box registration and labelling (11)

7. **Freezing**
   Crust freezing of beef products prior to cutting improves yield, accuracy and overall product quality. Marel offers more freezer options depending on need.
High-speed portion cutting of virtually any boneless beef product with maximum weight accuracy. Several portion cutting options and equipment are available depending on need.

Using vision camera technology, the robot batcher automatically sorts, styles and loads beef products of varying weight into trays with predefined fixed weights. More systems are available, depending on need.

The trays are top sealed, check weighed, price labelled (up to 160 packs/min.) and packed into boxes or crates.

On-line management information about goods flow, as well as material yields, is an essential tool for effective management.

Frans Stortelder, Managing Director,
Jutland Meat A/S
Box registration and labelling
All boxes pass the box registration and labelling station. Each box is allocated to a unique position in the stock hotel, based on the weight and the box and product ID, or sent directly to palletising and dispatch.

Stock
Crates/cartons can be stored on the basis of the fully flexible principle or the “First In – First Out” (FIFO) principle. The stock can be used as a buffer between processes – for example, for maturing or temperature alignment, or as a dispatch buffer.

Palletising
Crates/cartons can be automatically sorted and assigned to multiple pallets at a high capacity and with a high degree of flexibility. This helps operators avoid heavy lifts.
Fat Analysing and trim grading
Trim from the StreamLine is run through a SensorX fat analyser that measures the fat content of the trim using X-rays. Subsequently the meat is automatically sorted on the trim grader according to specifications for mixing and grinding.

Grinding and mixing
After grinding the meat is mixed with ingredients such as spices, water, flour, etc. to follow the specified recipe. The mixed products are then sent for further processing, such as sausage or burger production.

Compatible with Innova
– Intelligent production control system

Innova deboning and trimming
Innova Deboning and Trimming is part of the Innova software suite featuring a total plant control system enabling beef processors to gain full control over production processes, inventories and material flows. The module is supporting Marel StreamLines and all processes in front of and subsequent to the line including weighing, grading, portioning, quality assurance, inventory and dispatch. The deboning and trimming module has been designed with the following main features:

Individual traceability on every part
Innova keeps track of an animal through all processes such as deboning, trimming and packing. All parts leaving this area can be identified with labels tracing back to the original animal and lot.

Real-Time instructions
At the deboning and trimming station a compact ergonomic terminal is mounted in front of the operator. This terminal is used by the system to automatically instruct the operators about tasks and specifications.

Monitoring of yield, throughput and defects
Standard yield and throughput results are stored in the system for all tasks. Operators are monitored in real time on their performance, which they can check themselves at all times.

Integrated quality control
Inspection procedures can be configured in the system for all products. The system randomly guides products to operator stations identified as quality control stations. Defects are identified, optionally valued, and a notification given online to the operator that caused the defect.
Innova ties it all together

Innova production management software is the complete IT solution for modern beef processing companies. It covers the entire production cycle value chain, from intake of supplies to product dispatch, providing all key performance indicators (KPIs) for each stage. This key information includes yields, throughput and efficiency, giveaway and loss of sales, quality, stock levels and movements, and profitability. Critical KPIs are closely monitored and controlled in real time.

Innova integrates seamlessly with Marel processing lines and equipment to ensure the best possible performance. Remote control and automated data collection from both individual equipment and entire processing lines provide management with important new opportunities for greater efficiency.

Innova can generate a wide range of easy-to-use reports in practical formats.

For more information: www.marel.com/innova

Yield

Throughput

Marel

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

Marel, Stork Poultry Processing and Townsend Further Processing – Our brands are among the most respected in the fish, meat and poultry processing industries. Together, we offer the convenience of a single source to meet our customers’ every need.

For further information please visit www.marel.com