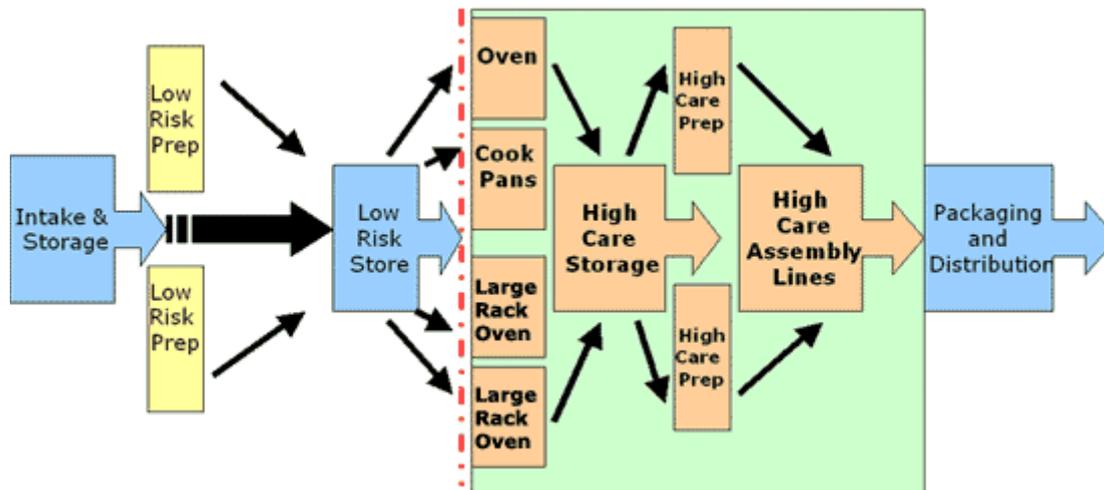


<http://www.bized.co.uk/compfact/kettleby/ket12.htm>

## How does the production process work?

There are four main areas to the factory:

- **Intake and Storage** - receives the raw materials - meat, vegetables and so on.
- **Low Risk Preparation and Storage** - the raw materials are processed and then stored. For example, potatoes may be peeled - some will be used for making into mash, others sliced for use in other meals; meat may be minced or stored in chunks. Access from the low risk area to the next, high-risk area is impossible without going through the hygiene routine. This is to prevent staff in one area from moving through to another and risking possible contamination or compromising hygiene.
- **High Care and Assembly** - the cooking and manufacturing process proper - in this section the meals are all prepared and packaged.
- **Packaging and Distribution** - the outer sleeves are placed on the products. They are boxed, palletised and placed into lorries for delivery.



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### Intake and Storage:

Large quantities of raw materials arrive at the factory every day, for example, potato deliveries can come in 2-3 times a day and amount to 140 tons a week. On arrival they are checked and tagged. The purpose of the tagging is to ensure that every ingredient can be traced - where it came from, what happened to it in the factory and which product it went into. This enables the business to be able to maintain its quality control and identify problems and to withdraw products if problems do occur at a later stage. For example, if a customer complains about a particular product, its origin and the ingredients that went to make it are all fully traceable at every stage in the process.

If raw materials do not meet the correct standards they are withdrawn or 'quarantined'. Around 2% of the intake may be unsuitable for one reason or another - marks on the potatoes, for example - and is classed as wastage. Kettleby Foods have 3 main suppliers of potatoes ranging from Lincolnshire to Ireland and the main supplier of meat comes from Yorkshire.



## Low Risk Preparation and Storage

The production-planning department decide on the quantity of ingredients needed for the range of products it has to produce to satisfy the orders being placed by Tesco. A batch of ingredients will then be prepared, for example, 3 batches of meat will be earmarked for cooking for Cottage Pies. Potatoes may be cooked in 250kg, 500kg or 1 ton batches. It takes around 20 minutes to cook  $\frac{1}{2}$  ton of potatoes. This process allows the raw materials to be consolidated into pre-defined amounts.

Image: Potatoes, washed and cleaned, being loaded into the cooker.

Having been prepared, the raw materials are then batched up and stored in the high care storage area before being used in the preparation of the meals themselves.



Image: Ingredients stored in batches ready to move to the cooking process area.

## High Care and Assembly

The raw materials are stored in the high care storage after cooking and are subject to regular checks to ensure that quality is maintained. Batches of cooked minced meat, for example, have a shelf life of 48 hours in the cold store, whereas other raw materials such as sauces may have a shelf life of up to 7 days depending on their type and method of packaging. Meat based products are stored in large metal vats, whereas some sauces are packed in sealed pasteurised plastic bags - the bags, however, are specially designed to ensure that they cannot split or burst. Around 450 raw ingredients make up the inputs to get to the pre-packaging stage before they get blended into the final product. Platform chefs are involved in the cooking of the food and many are experienced in the catering trade. Most have an HND.



Image: The cook pans where the various foods are cooked. Computer systems monitor the time, temperature and status of the products. The chefs working here are all experienced in the catering trade.

An important feature of the planning and production process is the lead-time; this is the time taken from order to final manufacture and the product being ready to deliver. For Cottage Pies, the lead-time is around 5 hours. Three hours of that time is taken up by the cooked meat having to be cooled. Such processes have to be carefully monitored to ensure that proper hygiene procedures are adhered to - this again helps to ensure that the final product is safe to eat.

Tesco will generally place an order at 6am. They expect the order to be fulfilled and in their depots by the next day. There are 10 depots around the country and deliveries are being made to them 2-3 times a day.

The ingredients must then be put together to make the actual final product. This process is done partly through automation and partly through manual labour. The machinery needed to do this is expensive. One piece cost £600,000 alone! Some machines have programmable systems to be able to vary what it does. For example, the way mashed potato is laid onto cottage pie or a chicken and broccoli pie may be different in terms of the 'patterning' it makes. Tesco, who in turn may be interpreting the results of its own market research, may demand the patterning. To re-programme the software to change the patterning costs Kettleby Foods several thousand pounds each time!

The manual work can be quite tedious. Tasks include selecting portions of meat such as chicken from a bin and loading it into the individual trays. The portions are each weighed and an indicator console tells the worker whether the weight is correct for the product concerned. Too low and the company could risk breaking the law, too high and again they might be not meeting legislation but also the cost would rise!



Image: Staff weigh out the required amount of meat to put into the Lancashire Hot Pot. The meat is put into the trays along with the other ingredients before being passed down the production line for the next stage.

The trays with the meat then have the relevant sauce, vegetables and potato, etc added to them - mostly by machine. They are then wrapped in the film. It is important, however, at this stage that checks are made to ensure that the whole process has been done properly. Substandard products are removed from the production line and checks are made to ensure that no foreign bodies have got into the product. The trays pass through a metal detector, for example! All products are checked for their weight and if they are within the allowed tolerances they pass through to the packaging and distribution area - if not they are rejected. Kettleby Foods use statistical process control (SPC) to check for rejects. SPC is a statistical device to monitor the variations in product quality and process in relation to its targets.

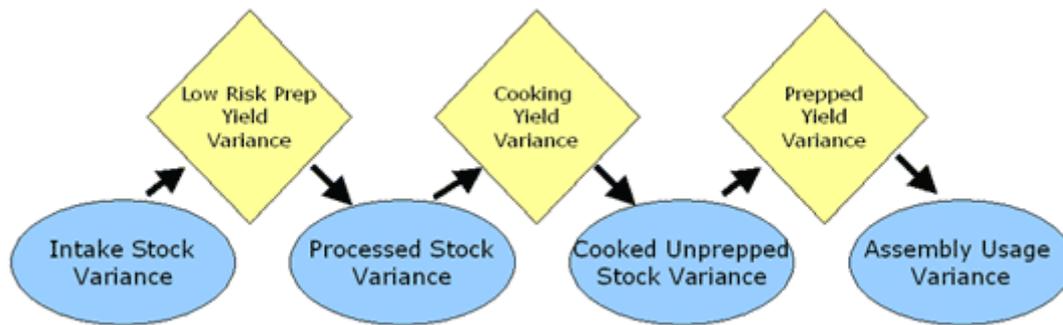


Image: Chicken and Broccoli Pies pass through the watchful eyes of a quality checker before having the potato topping added by machine. The staff member can add additional pieces of broccoli by hand if they spot that more is needed.

## **Wastage**

During the production process, the company has to be aware that there will be wastage throughout. This is not wastage through negligence of the staff but natural wastage that occurs as raw materials are processed. For example, if a ton of potatoes are cooked and mashed, you will not get a ton of mashed potato at the other end. When planning the production numbers therefore the planning team must try to calculate the variance between what they start with and what they end up with. The diagram below serves to illustrate this point.

### **Kettleby Foods: Material Variance Flow**



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- When stock arrives at the factory, it has to be checked. The quantity received may be different from that ordered - this is the 'intake stock variance'.
- Once arrived, the stock is processed. This may involve sorting meat, packing sauces, sorting potatoes and so on. The preparation of raw materials in the low risk area will involve some form of wastage along the way - this is the 'processed stock variance'.
- The products then go off for cooking. In this process there will again be some loss - a ton of minced meat put into the ovens will not result in a ton of cooked meat coming out the other end, fat will be drained off the meat, for example. This gives the 'cooked unprepped stock variance'.
- Finally, the products will be put into the relevant meals and packaged - the wastage from this process is referred to as the 'assembly usage variance'.

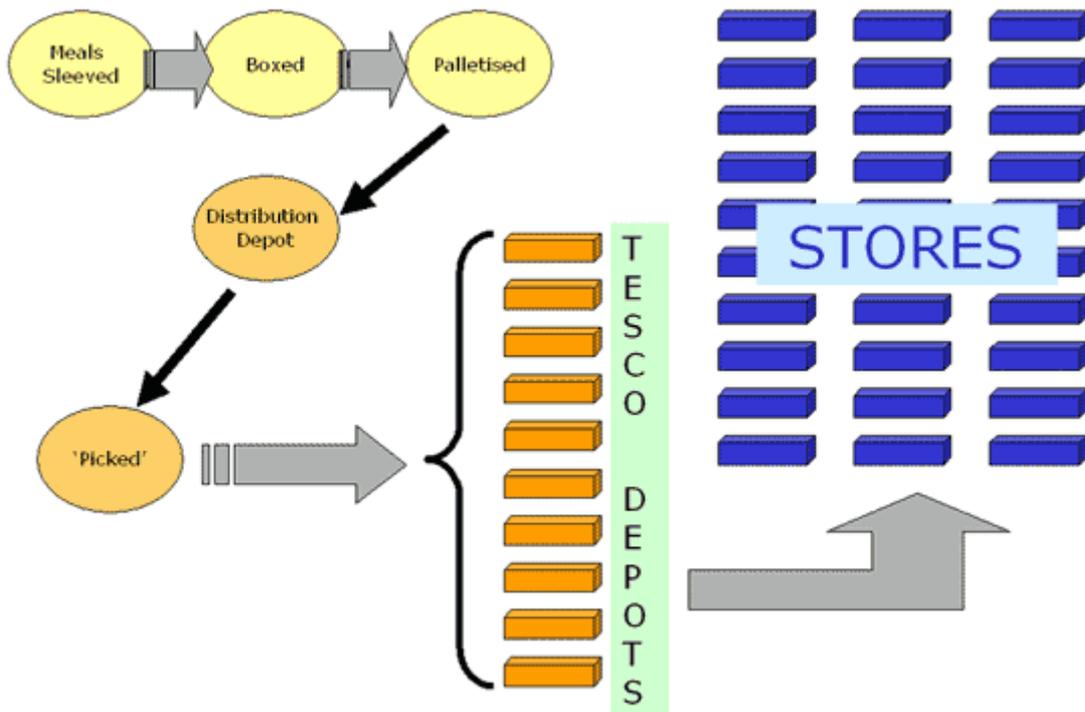
### **Packaging and Distribution**

In the packaging and distribution area, the product has the sleeve put over it. It is then boxed up and placed onto pallets. The pallets are then moved to the lorries to go to the distribution depot. Once there, the products will be 'picked' for distribution to the 10 Tesco depots and from there to the stores themselves.

At the distribution stage, the central depot will have the information about which stores will require what quantities and therefore which depots will need what. The palletised meals are sent to the main depot, which selects or 'picks' what each regional Tesco depot requires and then distributes those items. Once at the regional depots, the meals are transported to the stores themselves.



Image: The final product goes through a metal detector and weighing machine before passing through to the distribution area. Here they have the sleeves put onto them, are boxed up and placed onto pallets to be distributed to the main depot for 'picking'.



View [larger version](#).