

25.4.3.4 Use of suitable containers

Storage containers for ingredients, rework and part processed materials are commonly made of plastic and can become damaged by regular use. Such containers should be on a system of regular inspection, for example after washing, and damaged tubs should be disposed of.

25.4.3.5 Minimising product exposure

The production process should be enclosed where possible, for example tanks, hoppers, ingredient containers and other vessels should have lids. Where the production line is exposed, the risk of foreign body contamination must be carefully assessed and if necessary, the line should be modified to cover the product. This particularly applies where walkways cross the production line or where there is further processing equipment above the line that could present a physical hazard. Rework must be carefully handled, containers should be lidded and any wrapping materials removed from rework before reprocessing.

25.4.3.6 Care during maintenance and building work

Maintenance procedures should include the protection of exposed food contact surfaces during work, careful cleaning of the area afterwards, and the control of screws, nuts, bolts and so on. Operations that involve the generation of potential foreign materials, such as drilling, should be carried out away from the production line. Buildings should be maintained in a state of good repair, to avoid the risk of flaking paint and other debris. Temporary repairs and “cardboard and tape engineering” should be avoided, or where present, swiftly replaced with a permanent, food-safe solution.

25.4.3.7 Prevention of pests

Chocolate processing equipment is generally dry cleaned, making it difficult to remove all traces of residue. Insects such as cocoa moth and saw-toothed grain beetle are attracted to such residues and can cause infestations. Other ingredients used in confectionery manufacture, for example sugar syrups, are very attractive to insects such as wasps and it is therefore very important to effectively pest-proof the production building and to ensure that external doors are kept closed. In addition it is necessary to minimise residues, quickly clear leaks and spills and to keep waste covered.

25.4.3.8 Staff awareness

A high level of awareness of the factory staff can play an important role in prevention of foreign material contamination. Different means of encouraging such awareness can be used, for example having loose parts boxes in the production room for the collection of stray items (such as nuts and bolts), displaying foreign materials picked up by metal detectors or sieves and setting up feedback notices about the foreign materials returned as consumer complaints.

25.4.4 Equipment to prevent and detect physical hazards

In addition to the methods of control, described in the above sections, it is important to apply foreign body prevention and detection equipment to the production line. A combination of techniques provides the best armoury against the ingress of foreign materials.

These techniques can include sieves and filters, typically at ingredient intake points and other key points in the process, such as at the end of the chocolate making process and importantly, during rework processing. The size of the mesh should be sufficiently small (e.g. 2 mm; 0.1 in) to ensure that significantly sized foreign material fragments cannot pass through it. The sieve mesh should be constructed as sturdily as possible to minimise the likelihood of it breaking; punch-plate styles are particularly robust. Sieves and filters should be subject to regular inspection, to ensure they are still intact and to monitor levels of foreign material present.

Magnets can also afford a defence against ferrous metal contamination. They should be situated in parts of the process downstream from equipment that may be prone to failure; for example in the troughs of enrobbers that are subject to grid-wire breakages. As with sieves, magnets should be regularly checked to remove build-up of the fine metal dust that is commonly present from the chocolate making process and to check for any unusual levels of metal pieces. These serve as an early warning system for equipment failures or other sources of metal hazards.

Metal detection is an important step of the production process, and is best situated as near to the end of the production process as possible for the optimum detection of metal hazards that may be generated during manufacturing and packing operations. Metal detectors should be carefully specified to suit the production process, in close consultation with the metal detector supplier, to ensure that the most appropriate detector and position in the production line are selected. However it is important to note that metal detectors will not remove all the metal fragments that may be generated by the production process (see also Chapter 24). They have limitations in sensitivity with regard to the metal size and type. Some types of metal such as stainless steel are particularly difficult to detect and long, thin metal fragments of metal may not be detected, depending on the orientation in which they pass through the detector. (George, 2004).

X-ray equipment may be used, particularly when the main hazard to be detected is non-metallic, or for finished products wrapped in metallised packaging.

End of line metal detectors and X-ray equipment are the last line of defence in the process and it is essential that effective upstream foreign body prevention measures are in place.

25.5 Chemical hazards

There are two main sources of chemical contamination during chocolate manufacturing and processing – the intrinsic contamination of incoming raw materials, and contamination that may occur during the production process.