

## SECTION IX

### CAN COOLING

***GMP 9.1*** *After finishing a full retort cycle, the canned tuna products shall be water-cooled. The temperature of the cans after cooling shall be between 45° - 50°C.*

#### ***REASON***

If canned fish is not substantially cooled after heat processing, it will continue to cook, and its texture and flavour may be impaired. This condition is known as stackburn. Furthermore, problems with struvite will often be avoided if canned fish is cooled rapidly. Struvite, which is magnesium ammonium phosphate, forms from the natural constituents of some fish products during the heat process; it crystallizes out of solution and lodges in the flesh as the product cools. If cooling is slow, the crystals of struvite are large and consumers may mistake them for glass. If cooling is rapid the crystals formed will be very small and the problem of adverse consumer reaction may be avoided. In addition, if cans are kept at elevated temperatures for too long a period, thermophilic microorganisms not destroyed by the retorting process may grow and cause spoilage.

Water cooling should not reduce the temperature of the container below the point at which its surfaces will be dried quickly by the residual heat in each container. Each can must retain sufficient heat to quickly evaporate any water droplets left on the can after retorting. Failure to do this may cause external corrosion of the can.



45° - 50° C

Can temperature measurement



Restricted area



Don't touch can in basket; only authorized personnel are allowed into restricted areas

***GMP 9.2 The cooled cans shall be dried in a clean area free from sources which could dirty the cans with water spots, oil, stains, dirt, dust, etc. Cans must not be touched by hands until they are dry and cooled. Cans shall not be rewashed after retorting.***

***REASON***

Entry to the cooling area must be restricted to those working in the area. This will ensure that people, clothing, aprons, gloves or any other foreign objects do not come into contact with the cans as they are cooling. The cooling area must be clean and free of sources of dust and dirt and there must be no possibility of condensed water, dust and dirt or other debris falling onto the cooling cans.

People must not touch the cooling cans until they are dry and cool. Hand contact, particularly without proper gloves/glove dips, increases the possibility of contamination, particularly since the cans have a vacuum and may draw in minute amounts of air or moisture which could result in post-process contamination.

Protection of the canned food must extend to the post-cooling container handling systems. Studies have indicated that excessive bacterial contamination may develop on wet and soiled post-cooling can handling equipment, even though the cooling water is chlorinated or is naturally of good sanitary quality. Bacterial contamination may be transferred, in varying degrees, to the seam areas of the cans, and may lead to contamination of the product.

Cans should be handled gently. If the cans are roughly handled after processing, the seams may be damaged and the can bodies dented. Dents may fracture the lacquer coating in the can. Leaks caused by dents or by damaged seams can result in the contamination of the product. Cans are also very susceptible to vacuum loss due to rough handling and this may also lead to contamination of the product.

***GMP 9.3 All water used for cooling shall be safe and sanitary. Water shall be chlorinated, and a residual chlorine level of at least two parts per million in the cooling water discharged at completion of cooling shall be maintained at all times. Residual chlorine shall be measured at least twice per packing shift and the results recorded on the retort records. Chlorine shall be added to the water at least twenty minutes prior to use of the water for cooling purposes.***

***REASON***

Cooling water may be sucked into the can when the seam is hot, and there is a correlation between the microbial population levels in water used to cool cans after processing and the rates of spoilage which occur in these cans. Increased contamination of cooling water invariably causes a proportional increase in product spoilage in the cans, and may cause a health hazard.

Water of good sanitary quality must be used and chlorination employed to keep the chance of contamination at a minimum. A measurable free chlorine residual of at least 2 ppm is required at the discharge end of the cooler.

In order to ensure adequate contact time, sufficient chlorine to produce a 2 ppm residual must be added at least 20 minutes prior to use of the cooling water. Care must be taken to ensure the levels of chlorine are not so high as to damage the exterior finish of the cans.

***GMP 9.4 Retorted and unretorted cans shall not be mixed together.******REASON***

It is essential that a system for product traffic control in the retort room be established to prevent unretorted product bypassing the retort process and being mixed with retorted product. In addition, each retort basket, truck, car, or crate used to hold containers in a retort, or one or more containers therein, should, prior to each use, be plainly and conspicuously marked with a heat-sensitive indicator, or by other effective means to indicate visually those units that have been retorted. A visual check can then be performed to determine whether or not, as a result of retorting, the appropriate change has occurred in the heat sensitive indicator for all retort baskets, trucks, cars, or crates. Records that these checks have been made should be kept.