Sanitary Design of Equipment for Food Processing

Sanitary design is a term used to describe the key parameters for designing and developing equipment and surfaces that can be easily cleaned and sanitized. An effective sanitary design of equipment reduces the risk of contamination during food processing and improves food safety. The key parameters for a sanitary design of equipment include:

Materials:

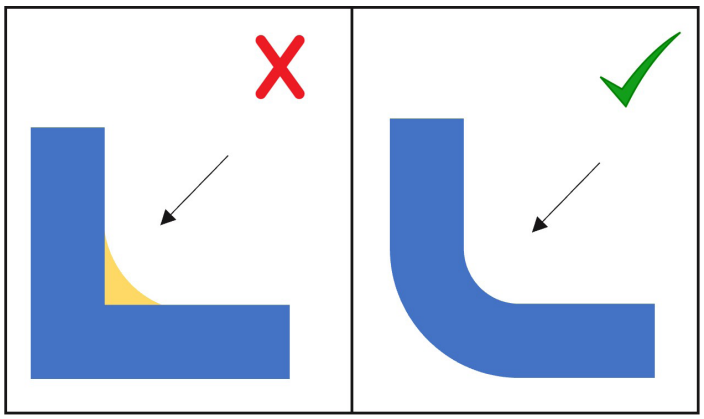
- The equipment's food contact surfaces should be made from materials that are smooth, durable, impervious, non-toxic, non-absorbent, non-reactive, non-contaminating and resistant to corrosion.
- Stainless steel is a commonly used metal for constructing food equipment, but not all stainless steels are the same. Stainless steel for food equipment is generally made from iron-carbon-chromium-nickel alloys, in which the structural strength varies with nickel level and the corrosion resistance varies with chromium level.
- Titanium, platinum and gold are durable and corrosion-resistant materials, but their use is limited by the high cost.
- Aluminum is used in the components where light weight and high strength is required. Aluminum has low corrosion resistance and requires care during cleaning and sanitation.
- Copper, due to its high conductivity, is used in cookware, and in non-food contact surfaces like electric wires and pipes. A key concern is the leaching of copper ion into foods, especially in acidic food products.
- There has been an increase in the usage of food-grade non-metal materials, such as plastic, rubber, ceramics and glass, in food equipment. These materials should meet the same sanitary design requirements as metals when used.

Installation and operation:

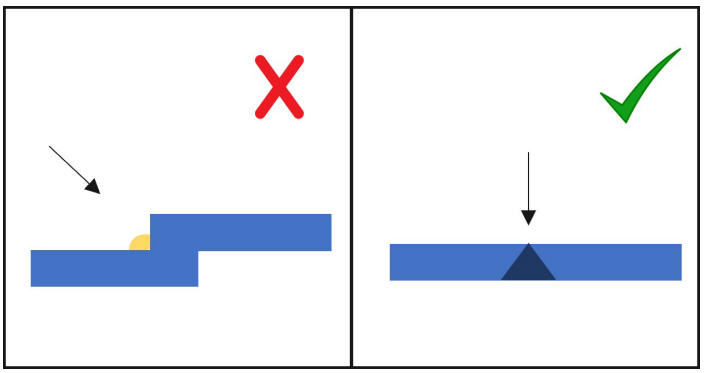
- Equipment should be installed in a manner that allows sufficient space between and around equipment for proper cleaning and drainage.
- Recommendations for space between and around the equipment varies based on the type and size of equipment.
- The equipment should be at least 4 inches away from the wall, unless attached to the walls, and 6 inches from the floor, unless attached to the floor or platform.
- Large equipment (4 to 8 feet in diameter) should be at least 12 inches from the wall.
- Equipment should be operated in a way that does not allow cross-contamination.
- Equipment valves, handles, switches and touch screens should be designed to prevent the accumulation of food materials.

Construction and fabrication:

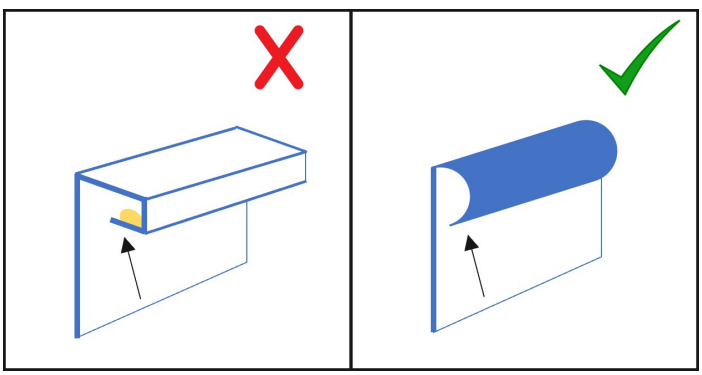
- Food equipment should be constructed and fabricated in such a way that it is free from cracks, crevices, rough joints and sharp angles, and is easily accessible for cleaning and sanitation, as shown in these figures.



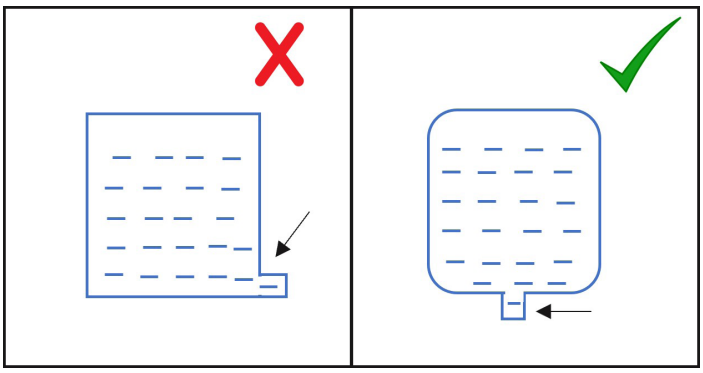
Internal angle and corners in equipment should be smooth and coved to avoid the accumulation of food material.



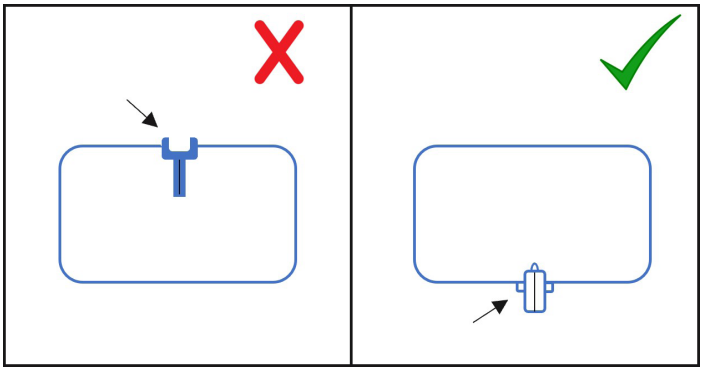
Welded joints in equipment should be continuous and smooth.



Rims of equipment should be designed to avoid accumulation of dirt and water.



Equipment should be self-drainable with no potential hold up of food material.



Fasteners and bolts should be avoided on food contact surfaces.

Maintenance:

- Regularly inspect and maintain equipment to avoid dirt, debris, leakage, standing water, condensation, rusting, cracks, crevices and broken parts.
- Establish cleaning and sanitation protocols and maintain a record of when and how you clean and sanitize the equipment.
- Equipment that cannot be cleaned or maintained should be discarded.
- Make sure that modification or changes in equipment will not increase the risk of contamination.
- Consult technical assistance or a sanitation expert when using equipment in a way it was not originally designed.

References

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Pub. 3864-B (Online Only) 11/22
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