

## **PHT equipment's design and operation**

All machines should incorporate certain qualities:

1. It should perform the function for which it is designed.
2. Its work should be done cleanly, and the machine should be easily cleaned.
3. The machine should be as simply designed as possible and of such strong construction that few repairs are needed.
4. It should be economical in operation.

### **Food plant equipment design**

1. All machine parts must be designed for quick dismantling and reassembling – some merely by removing and replacing a nut or wing screw by hand. It is also best to construct these parts of lightweight material so that they can be easily handled for cleaning.
2. All food contact surfaces should be inert, smooth, nonporous, and non-absorbing; they must withstand the application of chemical cleaners, sanitizers, and pesticides; they must be easily cleaned and readily accessible for inspection
3. Open layers in cooking kettles, mixers, blenders, storage containers, and filling machines must be eliminated.
4. Surfaces of equipment in contact with food must be smooth and continuous; rough spots and gaps must be avoided.
5. All junctions, particularly pipelines and ducts, must be curved or rounded. Cooking kettles, storage tanks, holding containers, and similar units must have long curves at the juncture of the bottom and sidewalls instead of sharp corners.
6. All machine parts in contact with food must be accessible for hand-brush cleaning and/or inspection.
7. Dead-end areas in all machines must be eliminated.

8. Metals like lead, antimony, and cadmium must not be used in fabricating equipment. Copper or copper-containing alloys are not recommended.
9. Stuffing boxes or glands in which food might accumulate and decompose should not be used.
10. Pipe fittings must have a sanitary thread and threaded parts must be accessible for cleaning.
11. Sanitary-type valves, such as plug type, should be used.
12. Runoff valves should be installed as close as possible to mixers, kettles, containers, and tanks.
13. Coupling nuts on piping and valves must have sufficient clearance and must be easily taken apart.
14. Food products should be protected from lubricants and condensates as moisture condensing on ceilings may pick up dirt and peeled paint, later to drop into open cooking kettles or holding containers.
15. Mixing blades should be welded to the drive shaft or both should be in one piece. Shaft and blades should be removable from the mixer at a point above the surface of the product.
16. Machine parts in contact with food should be constructed of non-corrosive metal.
17. Equipment like kettles, certain mixers, and holding containers and storage bins should have sectional covers, which are free from layers, pivots, gaps, and heads in which dirt might collect.
18. Drive shafts must be sealed so that lubricating grease does not work its way into the food.
19. Any horizontal parts of machines or supports should be at a minimum of 15 cm (6 in) above the floor. Tubular supports are preferred, but if squared tubing is placed horizontally, it should be rotated 45° to eliminate flat surfaces. Equipment occupying large floor areas should have a clearance of 46 cm (18 in) or more to facilitate cleaning.