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JAPANESE INDUSTRIAL STANDARD

**Design Rules for Safety and
Sanitation of Baking Machinery**

JIS B 9651—1988

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Design Rules for Safety and
Sanitation of Baking Machinery

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1. Scope

This Japanese Industrial Standard specifies the general matters other than those specified in JIS B 9650 concerning the safety and sanitation countermeasures on design, manufacture, installation and operation of baking machinery and attachments, hereinafter referred to as the "machinery".

Remark: The baking machinery specified in this Standard means the vertical type mixer, horizontal type mixer, divider, rounder, moulder, proof box, oven, frier, slicer, bean-jam wrapping machine, depositor, and make-up table out of many machines to be used in general manufacturing process of making bread by refining wheat flour and other raw materials, mixing, kneaders, dividing, rolling, forming, fermentation, calcining, oil frying, drying, cutting and cooling.

2. Definitions

For the purposes of this Standard main definitions shall be in accordance with JIS B 9650, and in addition the following apply:

- (1) vertical type mixer A machine to make bread dough by mixing liquid, mucilage or solid raw materials and their mixtures, agitating, and kneading, having vertical shaft agitator to be moved in a bowl by power.
- (2) horizontal type mixer A machine to make bread dough by mixing liquid, mucilage or solid raw materials and their mixtures, agitating and kneading, having horizontal shaft agitator to be moved in a bowl by power.

Applicable Standards:

JIS B 8404-Gun Type Oil Burners

JIS B 8405-Low Pressure Air Atomizing Oil Burners

JIS B 8406-Rotary Oil Burners

JIS B 8415-General Safety Code for Industrial Combustion Furnaces

JIS B 9650-General Design Rules for Safety and Sanitation of
Food Processing Machinery

- (3) divider A machine to divide the dough lump to definite size.
- (4) rounder A machine to form the divided dough pieces to surface skin and to spherical shape.
- (5) moulder A machine to draw out gas from dough pieces or form them.
- (6) proof box A machine to promote fermentation of dough. There are intermediate fermentation apparatus and final fermentation apparatus.
- (7) oven A machine to calcine the dough pieces formed or passed through fermentation process. There are mainly the following.
 - (a) direct fire type oven An oven of system to combust fuel directly in the calcining chamber.
 - (b) direct fire circulation type oven An oven of system to use by mixing the used gas and new combustion gas, which has one or more sets of heating apparatus at inside or outside of combustion chamber and each heating apparatus has one burner.

The combustion gas is circulated through calcining chamber and heating apparatus by a fan, a part of used gas is removed by overflow or vent apparatus and new fresh combustion gas is supplied auxiliarily from the burner.
 - (c) indirect heating multiple burner type oven An oven of system to heat by enclosing the burner part (generally, the gas burner) so that the non-combusted gas, combusted matters, etc. do not enter in the calcining chamber.
 - (d) indirect heating circulation type oven An oven provided with combustion duct, combustion chamber and circulation blower. The combustion gas circulates in this closed system with mixing with new-fresh combustion gas in combustion chamber, releases a part of gas at exhaust gas opening or over flow part and new-fresh combustion gas is supplemented from the burner, and the non combustible gas or combustion refuse are made not to enter in the calcining chamber.
 - (e) electric type oven An oven of system to heat with generating heat by flowing electricity through resistor.
- (8) frier A machine having mechanism for oil frying and the oil retaining tank.
- (9) slicer A machine to cut to a definite size or an optional size. There are three types of reciprocating type slicer, band slicer and circular shape slicer.
- (10) bean jam wrapping machine A machine to work for forming foods in which bean jam, cream, jam, etc. are made the wrapped-in materials and the cake dough or raw material resembled thereto in shape are made outer skin.
- (11) depositor A machine to extrude bean jam, cream, jam, cake dough, etc. continuously or into spot state.

- (12) make-up table A machine for forming work such as dividing, folding, twisting, cutting, etc. to the dough to be fed continuously or the dough of sheet state by each type apparatus arranged on the conveyor.

3. Safety and Sanitation Countermeasures for Division of Machine

3.1 Vertical Type Mixer

3.1.1 Safety Countermeasures The safety countermeasures shall be as follows:

- (1) The mixer having a vertical type agitating shaft shall be provided with the following safety devices:
 - (a) The safety guard set with enclosing the agitating shaft above the bowl shall, as required, be a structure capable of opening and closing in large degree, in which when the opening part is opened, the power is shut-off automatically
 - (b) In the case of (a), it shall be of such structure that the power stopped once does not actuate again if the switch is not "closed" again, even the opening part is closed.
 - (c) In the case of setting a timer, the one having humidity resistance shall be used.
- (2) The vertical type mixer shall be provided with respective single independent motor and its controller. Provided that the humidity resistance shall be taken into consideration.
- (3) The electric control board to be installed at the outer part of vertical type mixer shall be of drip-proof structure.
- (4) In the case where a mixer is set, it shall be so made that the position does not deviate and excessive vibrations are not generated.

3.1.2 Sanitation Countermeasures The sanitation countermeasures shall be as follows:

- (1) The collar of bowl shall be of such structure having no clearance, and the one to be attached to the outer surface of bowl, be sealed.
- (2) All surface materials shall not absorb the food raw materials.
- (3) It shall be of such structure that the oil oozed out from the bearing part of agitating shaft does not drip down to the food-contacting part.
- (4) Sufficient spaces for cleaning the all surfaces shall be provided and their height, at not higher than the height of eyes capable of confirming stains on the upper surface, as far as possible.

- (5) Excepting where it is set tightly on the floor, the mixer shall be provided with a clearance of 150 mm or more from the floor surface or a space sufficient for easy cleaning.

3.2 Horizontal Type Mixer

3.2.1 Safety Countermeasures The safety countermeasures shall be as follows:

- (1) The horizontal type mixer having automatic or hand operating bowl overturning device shall be so made that when the bowl is opened not less than $1/5$, the agitator can not be started in motion if the worker does not use his both hands.
- (2) The horizontal type mixer attached with an automatic overturning device shall be of such structure that for hermetically sealing the bowl without closing $4/5$ or more of complete opening in the opening state of bowl, the worker further operates the electric motor for overturning by using both hands.
- (3) In the case where the operation of speed conversion of horizontal type mixer is carried out, the risk preventive method for the worker shall be taken.
- (4) In the case where the risk preventive device for worker is provided for the agitator in operation, various countermeasures shall be taken so that the normal operation of mixer is not damaged.
- (5) The horizontal type mixer shall be provided with respective single independent electric motor and its controller.

Further, a operation switch with a key shall be so provided that during the check and cleaning of the machinery, it is impossible to be actuated by other worker.

- (6) The attaching position of control-operation board shall be the position where the worker can see sufficiently even when the bowl is opened. For other than the stopping switch operating devices shall not be set in double.
- (7) The machine to return the medium dough to the horizontal type mixer shall be provided with interlock device for danger prevention for the worker.
- (8) The timer having humidity resistance shall be used.
- (9) The electric control board to be installed at the outer part of horizontal type mixer shall be water-proof.
- (10) The cooling jacket of horizontal type mixer shall be attached with such device that the pressures of all cooling mediums do not become the maximum or more set pressure.
- (11) The valve and controller to actuate the cooling medium in jacket of horizontal type mixer shall be attached at the position having no hindrance to safety of worker.

3.2.2 Sanitation Countermeasures The sanitation countermeasures shall be as follows:

- (1) The agitator and parts such as agitator shaft and the like shall be of such structure that their all surfaces become effectively clean according to the ordinary washing method.
- (2) The end part of agitator shaft shall be such structure that it contacts the surface of bowl for the contacting area to become minimum, and the all raw materials can be mixed suitably and not to be separated not less than the required amount.
- (3) The agitator sealring, including agitator hub shall be capable of being detached easily or exposed immediately, and be easy in washing of parts.
- (4) The surface of shaft attached with the sealring shall be in accordance with 4.1 of JIS B 9650.
- (5) All packing seals shall be of structure to prevent the water leakage and, provided with a complete drain device in order to prevent spreading until outer part when water leakage is caused.
- (6) The inlet of raw materials shall be of a suitable size for preventing leakage of raw materials and, attached with a collar.

Further, the door and cover shall be attached at the raw material inlet without clearance.

Further, in the case where the door and cover are made hinge type, these shall be of easily detachable structure, and be attached by such method that cracking and clearance are not caused.

- (7) The clearance between the top end of bowl of horizontal type mixer and the housing frame shall be not less than 100 mm.
- (8) The wheat flour throwing-in opening shall be of such structure that it is detachable and its parts are also detachable.
- (9) The throwing-in opening of liquid raw material shall be of sanitary structure and, be capable of being detached.

Further, the throwing-in opening shall be so attached to the bowl and cover as not to protrude into the bowl and hanging down type, not be used.

- (10) The sensitive device to be attached to the bowl surface shall be sealed in such structure that stains do not stay or be able to be detached easily.
- (11) The bowl of horizontal type mixer shall be complete in drainage and, exposed simply or attached with a drain tube to be detached simply.

- (12) In the case where part number is required such as in heater and the like, it shall be stamped on the upper end surface of shank and sleeve.
- (13) Pouring tube of liquid raw material, valve and attachments shall be of sanitary decomposition type or be such that no blocking of raw material is not caused. The end of such piping shall be of automatic drain type, and a check valve, not be used.
- (14) Bowl and agitator of horizontal type mixer shall be of such structure capable of being washed by rotating the agitator in a bowl containing a small amount of water, and, capable of exhausting water after washing simply.
- (15) The space where all surfaces can be cleaned shall be provided and, at the height not higher than the height of eyes capable of confirming the stains of upper surface as far as possible.

3.3 Divider

3.3.1 Safety Countermeasures The safety countermeasures shall be as follows:

- (1) The pinch parts or shear parts to be generated by reciprocating motion or rotary motion shall be provided with enclosure in all or protective device to be of such structure to protect the hand and fingers of worker from danger.
- (2) The guard for front face of divider shall be capable of regulating the dough weight in not detached state.
- (3) The rear part of divider shall be applied with protection by attaching the complete cover to enclose all driving parts or by providing individual enclosures to remove various dangers.

Further, on the cover of rear part an interlock guard shall be provided so that, when the cover is opened, the machinery does not actuate.

- (4) The oil hole for knife at the rear part of divider shall be of such dimensions that the finger of worker does not pass through.
- (5) The groove hole of arm for knife driving at the rear part of divider shall be attached with a preventive device of saddle type or other protecting device.
- (6) The divider shall be provided with a overload safety device of mechanical type such as shear pin or electric instantaneous actuation type.

3.3.2 Sanitation Countermeasures The sanitation countermeasures shall be as follows:

- (1) Parts to be attached to the piston shall not be at the food contact parts.

- (2) The system to feed oil to the contact surface of dough shall have an oil tank at a position easy to be approached for cleaning and the oil feed piping, be easy in travelling and cleaning.
- (3) The dust box shall be provided with attached cover, and the dust collecting part shall be easy for a worker to approach for cleaning to be able to be travelled partially.
- (4) The required dough hopper and dough lay down device shall be attached with each lid.
- (5) The attached conveyor shall be of such structure that the belt can be travelled or detached for cleaning.
- (6) In the case where the attached dough lay-down device, hopper, chute, etc. are erected, it shall be able to approach them.

3.4 Rounder

3.4.1 Safety Countermeasures The safety countermeasures shall be in accordance with the specifications of 3.1 of JIS B 9650.

3.4.2 Sanitation Countermeasures The sanitation countermeasures shall be as follows:

- (1) As to the rounder cone, grooves are required to cut in the surface of cone in some cases, these grooves shall be not less than 1.5 mm in bottom part radius, and in the case where the width of groove is not more than 3 mm, it shall be semi-circle. These surfaces shall be smooth similarly to the food contacting part and, of such structure that the cleaning is capable of being carried out easily.
- (2) All surfaces shall be able to be approached in the meaning of visual angle and reaching of hand. However, except where the track or the contact surface between the spiral and the rounder cone is not more than 0.13 mm and the spiral edge is not more than 3 mm in width.
- (3) In the case where plastics material is attached on the surface, it shall be attached so that fissurings or crazings are not generated.

Further, in the case where adhesives are used for attaching of plastics material, the adhesives shall be nontoxic, nonhygroscopic and semi-permanent.

- (4) In the case where a dust guard and canopy are used for rounder, these shall be taken into consideration that these are a part of region where the worker can approach and be movable for cleaning.
- (5) The attached conveyor shall be of such structure that the belt can be travelled for cleaning.
- (6) As to the dough chute placed at the height of floor, its edges shall be made higher than the floor surface by 100 mm, and attached with overlapped covers on it.