

JIS

JAPANESE INDUSTRIAL STANDARD

**Design Rules for Safety
and Sanitation of
Cake Making Machinery**

JIS B 9652—1988

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Design Rules for Safety and Sanitation
of Cake Making Machinery

B 9652-1988

1. Scope

This Japanese Industrial Standard specifies general matters concerning safety and sanitation countermeasures for design, manufacture, installation and operation of cake making machinery and its attachments, hereinafter referred to as the "machinery", in addition to JIS B 9650.

Remark: The cake making machinery specified in this Standard means the cake mixer, horizontal kneader, biscuit kneader, divider, bean jam kneader, rice cake making machine, pie roller, make-up machine, candy making machine, oven, frier, slicer, bean jam wrapper, depositer, make-up table, decorative injector and rice cracker dough cutter out of many machines to be used for general manufacturing process of Japanese cakes, Western cakes, "Senbei" (except rice cracker), "Arare" cracker, snack, wheat-gluten, and chocolates.

2. Definitions

For the purposes of this Standard, in addition to JIS B 9650, the following definitions apply:

- (1) cake mixer A machine having agitator to be moved by power in inside to make cake dough by mixing, agitating and kneading of liquid, viscous body, or solid body raw materials and their mixtures.
- (2) horizontal kneader A machine to make dough for cake of comparatively high viscosity by mixing, agitating and kneading the raw materials of wheat flour, fats and oils, sugar, etc. with water, salt, etc.
- (3) biscuit kneader A machine to be used mainly for kneading of biscuit dough.

Applicable Standards:

JIS B 8243-Construction of Pressure Vessels

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**Documents**

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- (4) divider A machine to divide mainly the cake dough, bean jam, etc. to a definite amount.
- (5) bean jam kneading machine A machine to make bean jam, jam, marmalade, custard cream, etc. by agitating and sliding down (scrape) of raw materials in bean jam baking vessel to promote concentration of water content, permeation of sugar, gelatinization of starches, etc. There are mainly the following:
 - (a) vertical type bean jam kneading machine A bean jam kneading machine attached with an agitator from the above or the inclined above of bean jam baking vessel set horizontally.
 - (b) horizontal type bean jam kneading machine A bean jam kneading machine attached with an agitator to the shaft penetrating horizontally the U-type bean jam baking vessel.
- (6) rice-cake making machine A machine to make rice-cakes or doughboys by working the steamed glutinous rice or nonglutinous rice.
- (7) pie roller A machine to process the pie dough by means of plural rolling rollers and the conveyor capable of reciprocal moving.
- (8) make-up machine A machine to conduct making-up of dough by varying amount of dough and pressure.
- (9) candy making machine A machine to make candies, and caramels by dissolving, concentrating and cooling the raw materials such as sugar, "Mizuame" (millet jelly), etc. This contains the following:
 - (a) dissolving double ovens A machine to dissolve the raw material by heating up to a definite temperature.
 - (b) automatic vacuum concentration apparatus A machine to concentrate the raw material dissolved by heating by further heating and making vacuum.
 - (c) rotary cooling board A machine to knead and to cool by adding additives to the concentrated candy lump.
 - (d) wheat-gluten automatic feeding-out machine A machine to elongate the candy lump cooled to a suitable temperature to a rope state of a suitable thickness.
 - (e) forming machine A machine to cut and to form the wheat-gluten of rope state elongated to a suitable thickness.
 - (f) cooling machine A machine to cool the formed wheat gluten grains until a suitable temperature.
- (10) oven A machine to calcine the dough pieces passed through forming or fermentation process. There are mainly the following:
 - (a) direct-fire type oven An oven of the system to combust directly the fuel in a calcining chamber.

- (b) direct-fire circulation type oven An oven of system to use by mixing the used gas and the new combustion gas, having heating apparatus not less than one set at inside or outside part of combustion chamber of which each heating apparatus has a burner.
The combustion gas is circulated through calcining chamber and heating apparatus by a blower, a part of used gas is removed by oven flow or vent device and the new combustion gas is supplemented.
- (c) indirect-heating multi burner type oven An oven of system to heat with surrounding completely the burner part (generally, gas burner) so as the non-combusted gas and combusting matters do not enter the calcining chamber.
- (d) indirect-heating circulation type oven An oven provided with the combustion duct, combustion chamber and circulation blower.
The combustion gas circulates in this closed system while mixing with new, fresh combustion gas in the combustion chamber, its a part is relieved at exhaust gas opening or overflow part, the new, fresh combustion gas is supplemented, and the non-combusted gas or combustion refuse is so made not to enter the calcining chamber.
- (e) electric type oven An oven of system to heat by generating heat by passing electricity through the resistance.
- (11) frier A machine having mechanism for oil frying and oil reservoir.
- (12) slicer A machine to cut to a definite size or to an arbitrary size.
There are three types of reciprocating type slicer, hand slicer and circular type slicer.
- (13) bean jam wrapping machine A machine to process for forming foods with taking bean jam, cream, jam, etc. as the inner materials and the cake dough or substrate similar thereto in shape as the outer skin materials.
- (14) depositor A machine to extrude bean jam, cream, jam, cake dough, etc. continuously or to spot state.
- (15) make-up table A machine to process for forming such as dividing, folding, twisting, cutting, etc. for doughs to be fed continuously or of sheet state by each kind device arranged on the conveyor.
- (16) injector for decorative arrangement A machine to inject bean jam, cream, jam, etc. (including solid mixed matters).
- (17) dough cutting machine for rice crackers A machine to cut dough for rice crackers.

3. Safety and Sanitation Countermeasures for Machine Division

3.1 Mixer

3.1.1 Cake Mixer

3.1.1.1 Safety Countermeasures The safety countermeasures shall be as follows:

- (1) The mixer having a vertical agitating shaft shall be provided with the following safety devices:
 - (a) The safety guard to be set with surrounding the agitating shaft above the bowl shall be of such structure that as required, it can be opened and closed in large amount and when its 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, even the opening part is closed, if the switch is not "closed" again, does not actuate again.
 - (c) In the case where a timer is set, it shall be moisture-proof.
- (2) The vertical type mixer shall be provided individually with respective independent electric motor and its control device. Further, the moisture 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 drop preventive structure.
- (4) The cooling or heating jacket of horizontal type mixer shall be provided with a such device that all pressures of cooling or heating medium do not exceed the set pressure.
- (5) In the case where the mixer is set, it shall be so made that the position is not deviated and excessive vibrations are not generated.

3.1.1.2 Sanitation Countermeasures The sanitation countermeasures shall be as follows:

- (1) The collar of bowl shall be of structure having no clearance and that attached to the outer surface of bowl shall be sealed.
- (2) All surface members shall be those absorbing no raw materials of foods.
- (3) It shall be of such structure that the oil does not drop down to food contacting part by oozing out from the bearing part of agitating shaft.
- (4) The space sufficient so as all surfaces to be able to be cleaned shall be provided and it, not higher than the height of eyes where stains of upper surface can be confirmed.
- (5) Excepting where it is set with contacting tightly, the mixer shall be provided with a clearance not less than 150 mm from the floor surface or such sufficient space that the cleaning is capable of being carried out easily, be provided.

3.1.2 Horizontal Kneader

3.1.2.1 Safety Countermeasures The safety countermeasures shall be as follows:

- (1) The horizontal type kneader having an agitating-tank overturning device of automatic or manual operation, when the agitating tank is opened by $1/5$ or more, shall be so made that if the worker does not use his both hands the agitator can not be started in actuation.
- (2) The horizontal kneader attached with an automatic overturning device shall be of such structure that the opening state of agitating tank is not closed by not less than $4/5$ of full opening and for completely close tightly the agitating tank, further the worker operates the electric motor for overturning by using both hands.
- (3) In the case where the operation of speed conversion of horizontal kneader, the danger preventive method for worker shall be applied.
- (4) In the case where the danger preventive device for the worker is set for the agitator during actuation, various countermeasures shall be applied so as the normal actuation of kneader not to be damaged.
- (5) The horizontal type kneader shall be provided with respectively single independent electric motor and its controller.
Further, it shall be provided with operating switch with a key so that during the check and cleaning of machine, it can not be actuated by other worker.
- (6) The attaching position of electric control manipulation board shall be a place where even the agitating tank is opened, the worker can see sufficiently. Other than stopping switch, the device for operation shall not be provided in double.
- (7) A machine to return to the horizontal kneader the medium kind dough of dry bread, biscuit and other part cookie doughs shall be provided with an interlock device for danger prevention of worker.
- (8) The timer to be used shall be moisture-proof.
- (9) The electric control board to be installed on the outer-part of horizontal, kneader shall be water-proof.
- (10) The valve and control device to actuate the cooling or heating medium in the jacket of horizontal kneader shall be attached at a position where the safety of worker is not interfered.

3.1.2.2 Sanitation Countermeasures The sanitation countermeasures shall be as follows:

- (1) The parts such as agitator, its shaft, etc. shall be of such structure that their all surfaces can be made effectively clean according to the ordinary washing method.
- (2) The end of agitator shaft shall be such structure that it contacts with such surface that the contact surface area with the surface of agitating tank becomes minimum to be capable of mixing suitably the all raw materials and is not separated by not less than the required.
- (3) The agitator seal ring including the agitator hub shall be so made that it is detachable easily or can be exposed immediately so as the washing of parts to be easy.
- (4) The surface of shaft attached with the seal ring shall be in accordance with the specifications of 4.1 of JIS B 9650.
- (5) All packing seals shall be of water-leak preventive structure and further provided with a complete drain device to prevent the spreading of leaked water until the outer part when water leak is caused.
- (6) The intake of raw materials shall be of suitable size for preventing leakage of raw material and, attached with the collar.
Further, the door and cover shall be attached at the intake of raw material without clearance.
Further, in the case where the door and cover is made hinge type, these shall be of such structure as to be detached simply and to be free from fissuring and clearance.
- (7) The clearance between the top end of horizontal kneader agitating tank and the housing frame shall be not less than 100 mm.
- (8) The projection opening for powder and grain bodies shall be detachable and also the parts of projection opening, of detachable structure.
- (9) The projection opening of liquid raw materials shall be of sanitary structure to be detachable.
Further, the projection opening shall not protrude into the agitating tank, be attached to the agitating tank and cover, and suspending down type, not be used.
- (10) The responsive device to be attached to the agitating tank surface shall be of such structure that no stain retains to be sealed or to be made capable of being detached easily.
- (11) The agitating tank of horizontal kneader shall be complete in draining, and, attached with water exhaust pipe to be exposed simply or detached simply.
- (12) In the case where part number is required as in heater and the like, it shall be stamped on the upper end surface of shank and sleeve.

- (13) The liquid raw material injection tube, valve and attachments shall be of sanitary decomposition type or of such type as not to cause blocking of raw materials. The end of such piping shall be of automatic water exhaust type and no check valve, be used therefor.
- (14) The agitating tank and agitator of horizontal type kneader shall be capable of being washed by rotating the agitator in the agitating tank containing a small amount of water and, of such structure that it is able to exhaust water after washing simply.
- (15) The space in which all surfaces can be cleaned shall be provided and its height, not higher than the height of eyes where the stains on upper surface can be confirmed.

3.1.3 Biscuit Kneader

3.1.3.1 Safety Countermeasures The safety countermeasures shall be as follows:

- (1) It shall be of such structure that the grease supply can be conducted from the outer part without detaching the cover. The bearing part should, preferably, be of automatic oil supply device.
- (2) At the inner part of covering lid, the grid state safety guard shall be attached. When this safety guard is detached, the interlock mechanism shall be made to actuate so as the agitating blades not to rotate.
- (3) The operation of switch shall be of switching system of automatic and manual operations. It shall be of such structure that during actuation of interlock of (1) and (2) and during overturning of tank in automatic operation the agitating blades do not rotate.
- (4) In the case where it is desired to rotate the agitating blades in the midway even during overturning of tank, change the transfer switch to manual switch and push two switches by both hands at the same time so as the inching operation to be capable. In this case, the two switches shall be set separately individually so that it is impossible to push two switches by both fingers of one hand at the same time.
- (5) The emergency stop button shall be attached at the place where the worker is at the most near place to the working range.
- (6) Rotary parts of gear, chain, and pulley shall be tightly closed completely.
- (7) The foundation in which the overload at mixing time other than the machine weight is taken into consideration shall be applied.
- (8) It shall be so made that the pressure does not become the set pressure or more at the times of supplying the cooling water and the warm water of jacket.

3.1.3.2 Sanitation Countermeasures The sanitation countermeasures shall be as follows:

- (1) For the part to contact dough, the corrosion resistant material shall be used.
- (2) The packing part shall have the structure to prevent completely the leakage of dough and water content from the inner part, and in case where those leak to outer part due to consumption of package, the bearing part, be so made not to be affected.
Further, it shall be of such structure that the exchange of packing can be conducted simply.
- (3) The inner parts of agitating tank shall not be made of dents for machine screw, bolt, etc. so as the dough not to adhere.
- (4) The agitating tank and agitator shall be so made that it is possible to clean simply.
- (5) The periphery of biscuit kneader shall be provided with the space capable of cleaning and maintenance.

3.2 Divider

3.2.1 Safety Countermeasures The safety countermeasures shall be as follows:

- (1) The pinch part or shear part to be generated by reciprocating motion or rotary motion shall be made such structure to protect the hand and fingers of worker from danger by enclosing all of them or providing protective devices.
- (2) The guard of front surface of divider shall be so made that the regulation of dough weight can be conducted in the state not detached.
- (3) The rear part of divider shall be so made that various dangers are excluded by applying protection by attaching complete cover to enclose all driving parts or by providing individual enclosures.
Further, the cover of rear part shall be so made that when the cover is opened the machine does not actuate by providing the interlock guard.
- (4) The oil hole for knife at the rear part of divider shall be of such size that fingers of worker can not pass through the hole.
- (5) The long groove hole of arm for knife driving at the rear part of divider shall be attached with saddle type preventive device or other protective device.
- (6) The divider shall be provided with an overload safety device of mechanical or electrical instantaneous actuating type such as shear pin.

3.2.2 Sanitation Countermeasures The sanitation countermeasures shall be as follows:

- (1) Parts belonging to the piston shall not be at the food contacting parts.
- (2) The system to feed the oil to the contact surface of dough, shall be so made that the oil tank is at a position where it is easy to approach for cleaning and the oil feed piping is movable easily and easy for cleaning.
- (3) In the case where a box to enter dusting flour or exfoliation agent is installed, it shall have the lid and the box part, be of such structure as to be easy for cleaning.
- (4) The belonging conveyor shall be of such structure that the belt is movable or detachable for cleaning.

3.3 Bean Jam Kneading Machine

3.3.1 Vertical Type Bean Jam Kneading Machine

3.3.1.1 Safety Countermeasures The safety countermeasures shall be as follows:

- (1) The stop switch shall be set in the range where the worker can reach with single hand from the position of projection of raw material.
- (2) For the rod to connect the agitating shaft and agitating blade, projections such as bolts for preventing winding-in the cloth of worker shall not be used.
- (3) The electric switch and timer to be used shall be moisture-proof.
- (4) The driving parts of machine of such structure that its head part travels in right and left or up and down such as pulley, belt, transmission gear, clutch, etc. shall be attached with a sufficient cover securely.
Further, the strength and mechanism shall be taken into consideration so that there is no danger to the worker due to detaching down, folding breakage, etc.
- (5) The double oven for steam shall comply with the specifications of JIS B 8243.
- (6) In the case where a direct fire oven is used, the air flowing-in opening and gas exhaust opening of so sufficient size that incomplete combustion gas is not generated shall be provided.

3.3.1.2 Sanitation Countermeasures The sanitation countermeasures shall be as follows:

- (1) The agitating blades shall be detachable easily for cleaning and, able to be assembled. The material of the blade shall be endurable against boiling sterilization.