FAD 20 (15457)
IS…: 2022

भारतीय मानक

Indian Standard

सब्जी काटने की मशीन — विशिष्टि

Vegetable Cutting Machine — Specification

ICS 67.260

भा र ती य मा न क ब्यू रो

B U R E A U O F I N D I A N S T A N D A R D S

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June 2022

Agriculture and Food Processing Equipment Sectional Committee, FAD 20

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards after the draft finalized by the Agriculture and Food Processing Equipment Sectional Committee had been approved by the Food and Agriculture Division Council.

The vegetable cutter machines are intended for cutting, shredding, dicing, chipping and grating of various types of vegetables.

The use of vegetable cutting machines may involve introduction of various mechanical and other hazards. Their extensive use justifies the need of a standard covering both safety and the hygiene requirements important to machine design and operation.

In the formulation of this standard considerable assistance was provided by Tamil Nadu Agricultural University, Coimbatore and Indian Institute of Horticultural Research, Bangalore.

The composition of the Committee, responsible for the formulation of this standard is given at Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

IS…..: 2022

Indian Standard

VEGETABLE CUTTING MACHINE — SPECIFICATION

1 SCOPE

This standard prescribes safety and hygiene requirements for the power operated vegetable cutting machine.

2 REFERENCES

The standards listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

IS No.	*Title*
IS 2491 : 2013	Food hygiene - General principles - Code of practice (*third revision*)
IS 10500 : 2012	Drinking Water — Specification (*second revision*)

3 TERMINOLOGY

The following are the major basic parts of the Vegetable cutting machine:

3.1 Feeding chute/pipe/hopper/conveyor — The part is useful to hold and feed vegetables and which is large enough to accommodate all size and shape of the vegetables.

3.2 Closing lid/plunger/pressing handle — This part is useful to convey and guide the vegetables inside the cutting chamber.

3.3 Cutting chamber — It is a closed part in which rotating blades/discs are fitted to cut/slice vegetables.

3.4 Circular/rectangular perforated blades — These attachments are useful to cut vegetables in the cubes of different shape and sizes.

3.5 Collecting chute/delivery chute — This part is attached to the slicing chamber to collect the cut pieces.

3.6 Motor for operation — This part is the prime mover to operate the slicing mechanism.

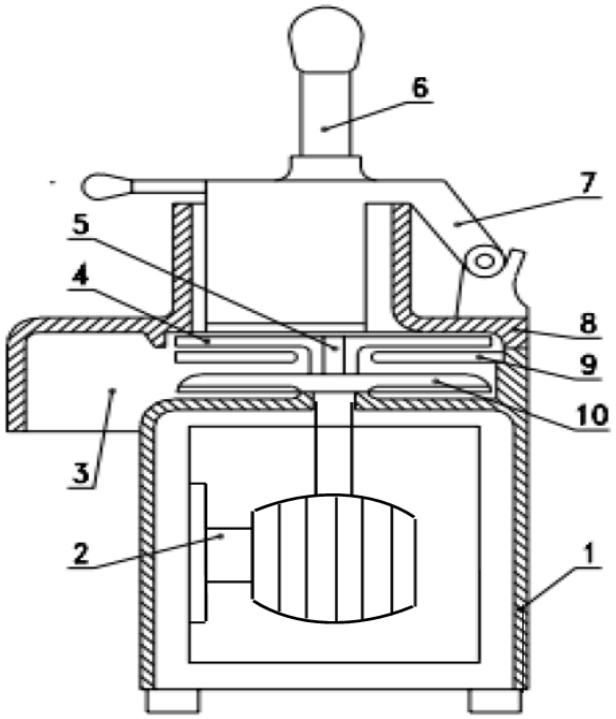
3.7 Rubber bush/wheels for the legs — The rubber bushes are useful to firmly support the machine without slipping. Whereas, the wheels are useful to move the machine conveniently.

4 TYPES OF VEGETABLE CUTTING MACHINES

4.1 This standard covers the following three types of machines including combinations of them.

4.1.1 *Machines with Rotating Cutting Devices*

Such machines contain the rotating cutting devices in a fixed chamber. Product is fed into the top of the chamber, typically through a feed hopper and assisted by a pusher or plunger device (*see* Fig 1).



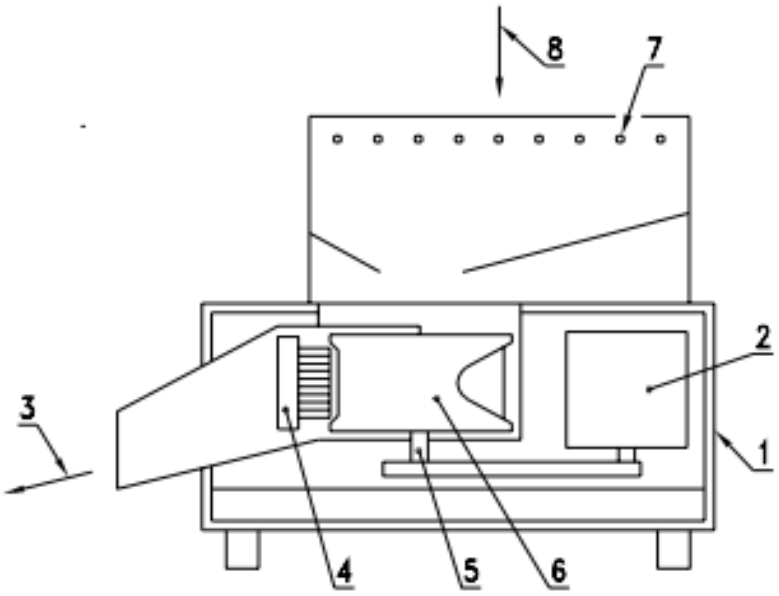
1) Main frame
2) Electric motor
3) Delivery chute
4) Cutting device
5) Shaft
6) Plunger (removable)
7) Pusher device
8) Feed chute

9) Fixed plate
10) Ejector

FIG 1 MACHINES WITH ROTATING CUTTING DEVICES

4.1.2 *Machines with Rotary Drum*

These machines generally have a hopper for feeding the vegetables to a rotating drum. As the vegetable is held against the outside wall by the spinning drum, thus it comes into contact with a fixed cutting device (*see* Fig 2).

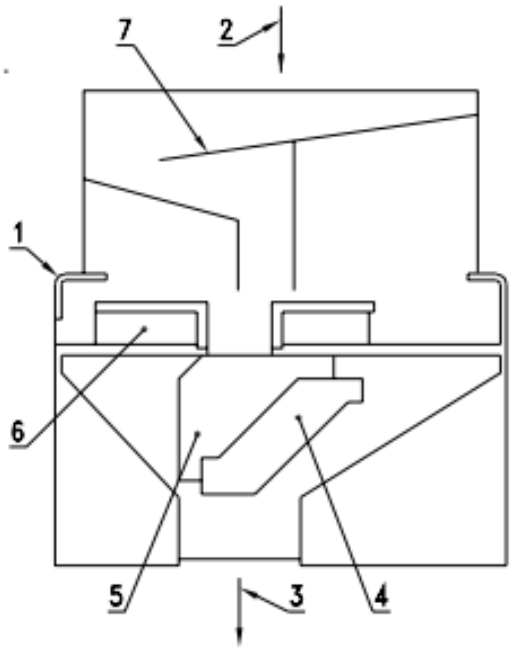


1) Body
2) Motor
3) Delivery chute
4) Cutting device
5) Shaft
6) Rotating drum
7) Fixed grid
8) Feed hopper

FIG 2 MACHINE WITH ROTARY DRUM

4.1.3 *Machines with Horizontal Reciprocating Cutters*

These machines are used extensively for chipping potatoes. Raw potatoes are fed from a hopper into the cutting chamber containing fixed plates and reciprocating plates and cutting devices (*see* Fig 3).



1) Body
2) Feed hopper
3) Delivery chute
4) Reciprocating cutters
5) Fixed plate
6) Reciprocating plate
7) Baffles

FIG 3 MACHINE WITH HORIZONTAL RECIPROCATING CUTTERS

4.2 Elements of a machine (*see* Fig 1, 2 and 3) — All machines generally contain the following elements of design:

a) a device for feeding product into the machine;
b) cutting plates or blades, hereafter called "cutting devices".
c) one or more cutting edges fixed to a frame. Fixed cutting blades may be installed in conjunction with moving plates;
d) an ejector;
e) a delivery chute; and
f) control devices.

4.2.1 *Devices for feeding*

Three types of devices for feeding product are used.

4.2.1.1 *Hopper feed*

The product is fed to the cutter from the hopper generally by gravity and/or by feeding devices.

4.2.1.2 *Pusher feed*

A small amount of product is fed into a feed chute and assisted to the cutters by pressure on the pusher device.

4.2.1.3 *Plunger feed*

Product is manually fed to the cutting device. It is assisted with a plunger. Typically, the feeding is done through a narrow feed chute.

NOTE — Often machines have both pusher and plunger feed so that the operator can select the most suitable operation according to the food product being cut.

5 GENERAL REQUIREMENTS

5.1 Each vegetable cutting machine shall be provided with a packing slip and instruction/operator's manual containing full information on installation, safe operation, safety during operation, maintenance and information regarding ordering for replacement of parts.

5.2 All the major components shall be easily removable for inspection and cleaning.

5.3 The vegetable cutting machine should be able to run without load to identify loosely fitted parts and excess noise to ascertain smooth running.

5.4 The vegetable cutting machine shall be provided with necessary toolkit for taking up any maintenance.

5.5 A minimum cautionary notice on dangerous operation should be written in vernacular language legibly and prominently on a label fixed on the vegetable cutting machine.

5.6 The machine parts which can pose a mechanical hazard shall be covered for safety of the operator.

5.7 The machine stability shall be ensured through a proper balanced design of the components.

5.8 The standard spare parts and precision in manufacturing should be maintained to achieve proper assembly and fitting of the machine.

5.9 The direction of rotation of cutting blade shall be suitably indicated.

5.10 The machine shall be provided with different types of knives for cutting/slicing vegetables in different patterns.

5.11 The machine shall be provided with self-cleaning arrangement as required for any specific operation and vegetables.

5.12 There shall be a provision to adjust the slice thickness of the cut vegetables.

5.13 The cutting chamber in the vegetable cutting machine shall be provided with a cleaning arrangement, may be in the form of a brush to keep the cutting blade clean.

5.14 The machine shall be provided with suitable doors/covers preventing entry of water into vital components, motor and electric controls.

6 ADDITIONAL ACCESSORIES AND SURROUNDING CONDITION

6.1 Floor/surface on which the machine is placed shall be smooth and free from pits and crevices and easily cleanable.

6.2 Installation of the cutting machine should be done on a raised position, i.e. either on a table or cement slab at convenient height or on floor at least 10 cm above the ground level, depending on the size of the machine.

6.3 The place of installation shall be provided with good drainage facility.

6.4 The place of installation shall be well aerated with good lighting.

6.5 Appropriate water supply shall be provided to the vegetable cutting machine for use during cutting/slicing, as required.

6.6 All utensils/ containers/ crates used in handling of vegetables shall be made of material (*see* IS 2491) which does not transmit toxic substances, odour or taste, is non-absorbent, resistant to corrosion and is capable of withstanding repeated cleaning and disinfection.

7 WATER QUALITY

7.1 Adequate safe and potable water shall be made available for washing of vegetables and vegetable cutting machine (*see* IS 10500).

7.2 Storage tanks for water shall be kept covered with tight fitting lids, examined regularly and cleaned thoroughly at regular interval as required.

7.3 Vegetables shall be washed/cleaned to remove soil and other contamination. The water so used shall not be re-used unless it has been suitably treated to be maintained in a condition which will not cause health hazard.

7.4 Water shall be periodically analysed chemically and microbiologically and record of such examinations shall be maintained. If water quality is not found suitable for use in processing activities, appropriate treatment may be given.

7.5 Proper care shall be taken to prevent contamination of ground water by effluent through seepage and maintain ground water quality.

8 HYGIENE CONDITIONS

8.1 Vegetables shall be processed and handled under strict hygienic conditions as prescribed in IS 2491.

8.2 Hygiene in operation

8.2.1 The use of wood and other materials which cannot be adequately cleaned and disinfected, shall be avoided except when their use would clearly not be a source of contamination.

8.2.2 Vegetable cutting machine shall be designed and constructed as to prevent hygienic hazards and permit easy and thorough cleaning and disinfection and, where practicable, be visible for inspection.

8.2.3 Sample of the cut slices shall be analysed for any microbial contamination time to time in every batch of processing

8.2.4 Inedible/waste material handling containers shall be leak-proof, constructed of metal or other suitable impervious material which should be easy to clean or easily disposable and be able to be closed securely.

8.2.5 Equipment and utensils used for inedible materials or waste shall be identified/ marked and should not be used for edible products.

8.3 Personnel hygiene

8.3.1 Food handlers shall practice high degree of personal hygienic as laid down in in IS 2491.

9 MARKING

9.1 The vegetable cutting machine shall be marked on a suitable non wearing part with the following particulars:

a) Manufacturers name and recognized trademark, if any;
b) Size of the machine with capacity;
c) Batch and code number; and
d) Power requirement.

9.2 BIS Certification Marking

The vegetable cutting machine may also be marked with the Standard Mark.

9.2.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Agriculture and Food Processing Equipments Sectional Committee, FAD 20

Organization(s)	*Representative(s)*
In Personal Capacity, Triuchirappali	Dr K. Alagusundaram (***Chairperson)***
Agriculture Machinery Manufacturers Association, Pune	Dr Surendra Singh
	Shri Kashinathsa V. Kabadi (*Alternate*)
CCS Haryana Agricultural University, Hisar	Dr Ravi Gupta
Essen Multipack Limited, Rajkot	Shri Shaildip Wagh
ICAR – Central Institute of Agricultural Engineering, Bhopal	Dr S. K. Giri
	Dr Ravindra Naik (*Alternate*)
ICAR – Indian Institute of Horticultural Research, Bengaluru	Dr A. Carolina Rathina Kumar
	Dr S. Bhuaneswari (*Alternate*)
ICAR – Central Institute for Research on Cotton Technology, Mumbai	Dr V. G. Arude
ICAR – Central Institute of Post-Harvest Engineering and Technology, Ludhiana	Dr Sandeep Mann
	Dr R. K. Vishwakarma (*Alternate*)
Indian Council of Agricultural Research, New Delhi	Dr Kanchan K. Singh
	Dr Panna Lal Singh (*Alternate*)
Indian Institute of Food Processing Technology, Thanjavur	Dr S. bhuvana
Indosaw Industrial Products Private Limited, Ambala Cantt.	Dr Vinod H. Kalbande
Ministry of Agriculture, Department of Agriculture, New Delhi	Shri C. R. Lohi
	Shri P. K. Chopra (*Alternate*)
National Committee on Plasticulture Applications in Horticulture, New Delhi	Shri Anand Zambre
National Institute of Food Technology Entrepreneurship and Management, Sonipat	Dr P. K. Nema
Northern Region Farm Machinery Training and Testing Institute, Hisar	Shri Mukesh Jain
Osaw Agro Industries Private Limited, Ambala	Shri Jagdish Singh
Tamil Nadu Agricultural University, Coimbatore	Dr R. Thirupathi
	Dr. P. Rajkumar (*Alternate I*)
	Dr. P. Sudha (*Alternate II*)
In Personal Capacity	Dr R. Visvanathan
In Personal Capacity	Shri Pitam chandra
In Personal Capacity	Shri S. D. Deshpande
In Personal Capacity	Shri Jix Antony
BIS Directorate General Head (FAD)	Shrimati Suneeti Toteja, Scientist 'E' and Head (FAD) [Representing Director General (*Ex-officio)*]

Member Secretary
Shri Debasish Mahalik
Scientist 'B' (FAD), BIS