

BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY

(Not to be reproduced without the permission of BIS or used as an Indian Standard)

भारतीय मानक मसौदा

**एपिस सेराना फैब के लिए सामूहिक रानी मधुमक्खी
पालन उपकरण — विशिष्टि**

Draft Indian Standard

**MASS QUEEN REARING APPARATUS FOR
APIS CERANA FAB. — SPECIFICATION**

ICS 67.260

Apiary Industry
Sectional Committee, FAD 03

Last Date of Comments:
18 December 2023

FOREWORD

(Formal clause will be added later)

Performance of the honey bee colonies depends on quality attributes inherited by the offspring of the queen. Thus, for successful and profitable beekeeping, production of young, freshly mated and good quality queen bees, with known pedigree are required. A strong and actively laying queen is one of the essential components of a successful honey bee colony. Queen transmits to the colony all the important characters like longevity, disease resistance, temperament, swarming tendency etc. As much as, the knowledge of queen rearing techniques is important, using the right apparatus for mass rearing of queen honey bees is equally important. Artificial Mass Queen Bee Rearing is being practiced widely all over the country, which is raising of queen bees cells by grafting larvae/eggs in large number of queen cell cups. For this, different types of equipment are used for preparing queen cell cups and transferring of eggs/ larvae to the cell cups affixed on wooden blocks on bars of grafting frame. This standard has been brought out to help the apiary industry in ensuring better quality control of mass queen rearing apparatus for *Apis cerana* Fab.

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.

1 SCOPE

This standard describes the material, design and dimensions for mass queen rearing apparatus for *Apis cerana cerana* Fab. and *Apis cerana indica* Fab.

2 REFERENCES

The following standard(s) contain provisions, which through reference in this text, constitute provision 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 this standards.

<i>IS No.</i>	<i>Title</i>
IS 1515 : 2013	Beehives – Specification (<i>fourth revision</i>)
IS 6911 : 2017	Stainless steel plate, sheet and strip - Specification (<i>second revision</i>)

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply:

3.1 Type B Hive

A hive comprising of 8 or 10 frames conforming to dimensions as given below (also *see* IS 1515):

	<i>A. cerana cerana</i>	<i>A. cerana indica</i>
Brood chamber	Outside: 300 mm × 195 mm	Outside: 266 mm × 220 mm
	Inside: 280 mm × 175 mm	Inside: 242 mm × 196 mm
Bee space	8.0 mm	6.0 mm

3.2 Frame

Structure consisting of a top bar, two side bars and one bottom bar.

3.3 Grafting Frame

A normal brood frame, whose side bars have two grooves on each inner side to fix two cell bars.

3.4 Cell Bars

Wooden planks made up of soft wood or same wood as that of frames. These have number of round holes to carry wooden blocks.

3.5 Queen Cell Cups Making Apparatus/Equipment

A single or a set of cells forming dip sticks, mounted on a circular metal disc with multiple metal tips welded underneath.

3.6 Queen Cell Cups

A grafting equipment made from beeswax, rendered from old combs. These are uniform cups selected and attached to the cell bars of the queen rearing frame. The cups are attached either on the wax-blocks, corks pieces or wooden-blocks, so as to facilitate easy removal of the sealed queen cells for transplanting, before emergence of the queens.

3.7 Grafting Needle

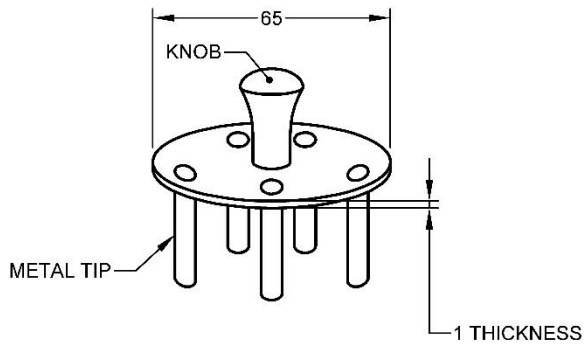
Needle used to lift young larvae or eggs from worker brood cells and place them in queen cell cups. It is an ordinary bent metal tool or spring loaded push in spoon.

4 REQUIREMENTS

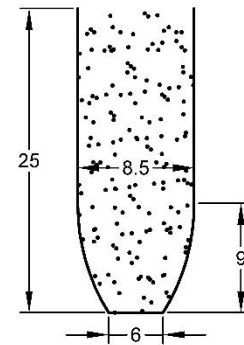
4.1 Material and Constructional Requirements

4.1.1 Bees Wax – Pure beeswax, preferably capping wax or beeswax recovered from broken or damaged combs shall be used for preparing queen cell cups. Size of queen cell cups shall be 6.0 × 8.5 × 9.0 mm (base × diameter × height) for *A. cerana cerana* and 5.0 x 7.5 x 9.0 mm (base × diameter × height) for *A. cerana indica*.

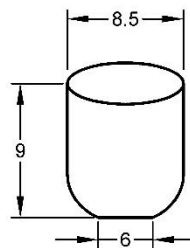
4.1.2 Queen Cell Cups Making Apparatus/Equipment – The metal tips shall be specifically and accurately designed for a particular geographical *A. cerana cerana* and *A. cerana indica* race / strain so as to have maximum acceptance of graftings. One end of the metal tip shall be tapered and rounded off. The diameter and taper of the rounded tip shall be confirmed by placing it in a natural queen cell of a particular race and a perfect fit shall be ensured. For *A. cerana cerana* of Himachal region, metal tip shall be 25 mm long (Fig. 1A). The part of the metal tip which is to be dipped in molten beeswax while preparing queen cell cups for this species shall be 6.0 mm in size at the base, 8.5 mm diameter and 9.0 mm long (Fig. 1C). While for the *A. cerana indica* of Kerala, the tip shall be 5.0 mm in size at the base, 7.5 mm diameter and 9.0 mm long. The diameter of the metal disc is 65 mm with 1.0 mm in thickness which has 5 metal tips 30 mm apart from each other in a circular manner welded underneath 2-3 mm inside to the outer margin. The metal disc has a knob at top to hold (Fig. 1B). The metal tip and metal disc shall be of stainless steel of designation SS 304 (Austenitic X04 Cr19 Ni9) or SS 316 (Austenitic X04 Cr17 Ni12 Mo2) conforming to IS 6911.



All dimensions in millimetres.
FIG. 1B METAL DISC



All dimensions in millimetres.
FIG. 1A METAL TIP



All dimensions in millimetres.

FIG. 1C

FIG. 1C WAX QUEEN CELL CUP

4.1.3 Grafting Needle – The rod shall be 150 mm long and 3 mm in diameter. One end of the needle is flattened and slightly bent so as to become a spatula of 1.0 mm width and 2.0 mm length (Fig. 2). The tip of spatula is smooth so as to prevent any damage to the larvae while grafting. For this purpose, spring loaded push in spoon type needles can be used (Fig. 3). Grafting needle shall be made of stainless steel of designation SS 304 (Austenitic X04 Cr19 Ni9) or SS 316 (Austenitic X04 Cr17 Ni12 Mo2) conforming to IS 6911.

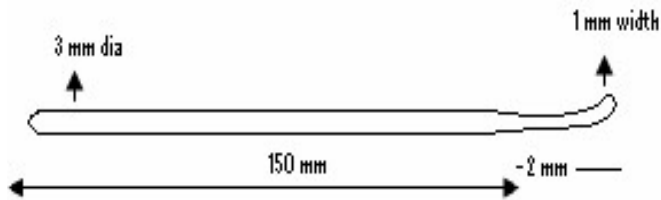


FIG 2. GRAFTING NEEDLE

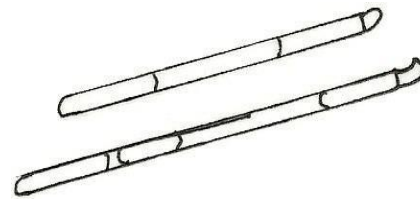
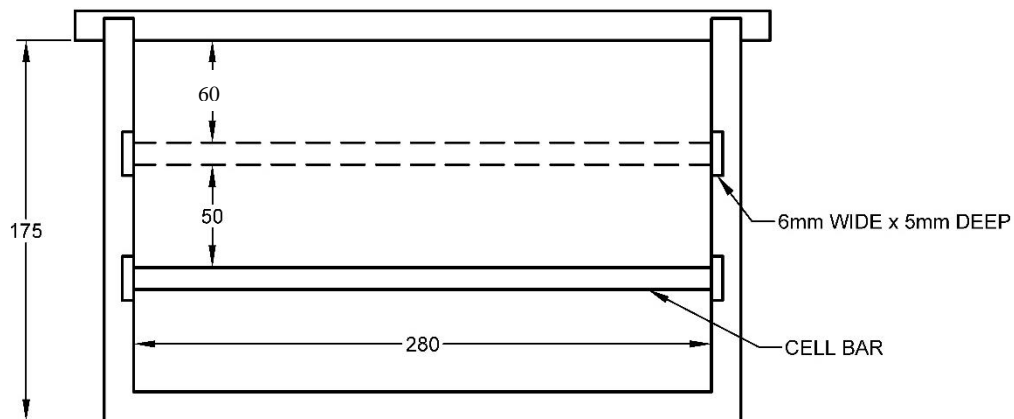


FIG 3. SPRING LOADED PUSH IN SPOON

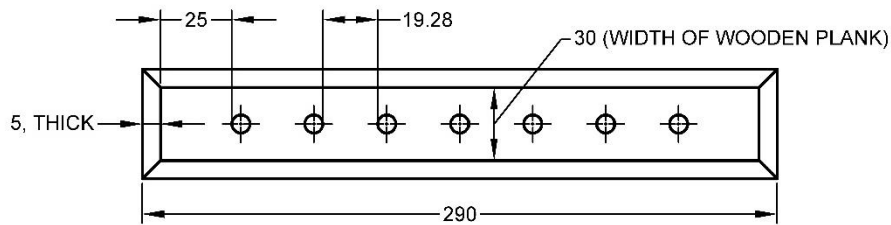
4.1.4 Grafting Frame or Cell Holding Frame – Grafting frame shall be a normal brood frame of Type B hive of 280 x 175 mm size. The side bar on its inner side shall have two grooves of 6.0 mm width and 5.0 mm depth. First groove shall be located 60 mm from below the top bar while second is 50 mm below the first one (Fig. 4). This allows placing of two cell bars in a single brood frame.



All dimensions in millimetres.

FIG. 4 GRAFTING FRAME

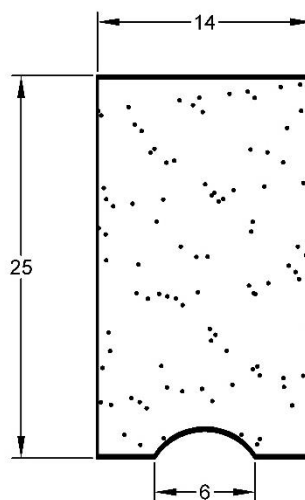
4.1.5 Cell Bar – Cell bar shall be a 290.0 mm long, 30 mm wide and 5.0 mm thick wooden plank. Longitudinally, each plank shall have 8 or 7 round holes in the center (Fig. 5). Each hole shall be 15.0 mm in diameter and 19.28 mm apart from each other. On each side of the bar, each hole lies at 25.0 mm from the end towards inner side.



All dimensions in millimetres.

FIG. 5 MODIFIED CELL BAR

4.1.6 Wooden Blocks – Queen cell cups shall be fixed on wooden cylindrical blocks and the wooden cylindrical blocks shall be well fitted in the holes of cell bars. The wooden cylindrical blocks shall be made up of soft and light wood. These wooden cylindrical blocks shall be 25 mm in length and 14 mm in diameter with 6.0 mm wide depression in the middle to fix the queen cell cup with beeswax (Fig. 6).



All dimensions in millimetres.

FIG. 6 WOODEN BLOCK

4.2 Prerequisite Conditions for Mass Queen Rearing

4.2.1 Favorable agro-climatic conditions along with abundant availability of bee flora should be ensured.

4.2.2 Best performing bee colonies should be selected and made available.

4.2.3 Strong starter and cell builder colonies should be selected and made available for having surplus royal jelly and caring of queen cells.

4.2.4 Matured drones of desired stock should be made available in large number.

4.2.5 Grafting room shall have $34 \pm 1^{\circ}\text{C}$ temperature and 65 ± 2 percent Relative Humidity.

4.2.6 It should be ensured that, mating nuclei is of standard size.

4.2.7 Isolated mating yards should be maintained by the bee keeper.

5 MARKING

5.1 The Queen rearing frame shall be marked with the following particulars:

- a) Name of the product;
- b) Trade-mark, if any;
- c) Batch or code number;
- d) Name of the manufacturer; and
- e) Date of manufacture.

5.2 BIS Certification Marking

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.