**IS 11800 : 2024**

***भारतीय मानक***

***Indian Standard***

**गोवंश के लिए कृत्रिम योनि —**

**विशिष्टि**

 *(पहला पुनरीक्षण)*

**Artificial Vagina for Bovines — Specification**

(*First Revision)*

ICS 65.020.30

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 भारतीय मानक ब्यूरो

 BUREAU OF INDIAN STANDARDS

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**October 2024 Price Group**

Animal Husbandry and Equipment Sectional Committee, FAD 32

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Animal Husbandry and Equipment Sectional Committee had been approved by the Food and Agriculture Division Council.

With increasing application of artificial insemination technique in the national livestock development plans, a sizeable number of artificial vagina are being used and required regularly for the collection of semen from the stud bulls. This standard was, therefore, evolved to guide the manufacturers for production of quality artificial vagina.

This standard was originally published in 1986 to maintain the quality and establish dimensional uniformity across the country. This revision has been brought out to bring the standard in line with the current industrial practices and requirements. In this revision following major modifications have been done:

1. Flexible type vagina has been removed;
2. The length of casing and cone has been updated and individually specified for both buffalo bovine and cattle bovine; and
3. The requirement for material of semen collection tube is updated.

The composition of the Committee responsible for revision of the standard is given in Annex D.

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.

*Indian Standard*

ARTIFICIAL VAGINA FOR BOVINES — SPECIFICATION

*( First Revision )*

**1 SCOPE**

This standard prescribes the material, dimensions, and other requirements for artificial vagina.

NOTE — This standard does not cover flexible type vagina.

**2 REFERENCES**

The standards listed in Annex A 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 edition of these standards.

**3 MATERIALS**

The material for various parts of artificial vagina (*see* Fig. 1) shall be as given in **3.1** to **3.4**.



Fig. 1 A Typical Shape of Artificial Vagina

**3.1 Outer Case**

Natural or synthetic, hard or flexible rubber or thick canvas reinforced rubber free from longitudinal joints shall be used. It shall not contain any reclaimed rubber or vulcanized waste.

**3.2 Liner and Cone**

Fully elastic latex rubber or neoprene rubber shall be used. No free colour shall be added in the rubber.

**3.3 Semen Collection Tube**

It should be made of chemically pure neutral glass and should not consume HCl more than 0.20 ml/gm when measured during boiling water test as given in IS 2303 (Part 1/Sec 1).

**3.4 Insulation Bag**

Rexin with inside foam padding of minimum 2 mm thickness shall be used.

**4 DIMENSIONS**

**4.1 Outer Case**

The internal diameter of the case shall be 62.5 mm ± 2.5 mm. The length of the case shall be 290 mm ± 10 mm for cattle bull and 230 mm ± 10 mm for buffalo bull.

**4.2 Liner**

The length of liner shall be in between 440 mm to 520 mm and its diameter shall be of 54 mm ± 1 mm.

**4.3 Cone**

The length of the cone shall be 220 mm ± 30 mm for buffalo bull and 325 mm ± 30 mm for cattle bull. The proximal and distal diameter shall be 75.0 mm ± 2.5 mm and 15.0 mm ± 2.5 mm, respectively.

**4.4 Semen Collection Tube**

The tube shall be graduated up to 15 ml. Graduation up to 10 ml shall be at intervals of 0.1 ml each and that up to 15 ml at intervals of one ml each. The length and diameter of tube shall be 120 mm ± 5 mm and 18 mm ± 1 mm, respectively.

**4.5 Insulation Bag**

The length of the bag shall be in between 300 mm to 400 mm. The width at base shall be in between 155 mm to 185 mm and the width at point of attachment shall be 110 mm ± 5 mm.

**5 PHYSICAL PROPERTIES OF RUBBER**

**5.1** The tensile strength and elongation at break of rubber when tested on dumb-bell test piece in accordance with the method given in IS 3400 (Part 1) shall be minimum of 1 MPa and 400 percent, respectively.

**5.2** When test pieces are subjected to ageing for 168 h at 70 °C ± 1 °C in accordance with the method given in IS 3400 (Part 4), change from original value of tensile strength and elongation, tested in accordance with IS 3400 (Part 1) shall be $\begin{matrix}+10\\-25\end{matrix}$ and $\begin{matrix}+0\\-25\end{matrix}$ percent, respectively.

**5.3** The rubber used for outer case shall withstand boiling for 2 h and latex rubber for liner and cone shall withstand autoclaving for 30 min at 100 kPa pressure.

**6 CHEMICAL PROPERTIES OF RUBBER**

**6.1** *p*H of water extract when tested in accordance with **6.1** shall be 7 ± 0.5.

Rubber parts shall be cut into 2 mm pieces. Autoclave the pieces for 5 min at a pressure of 40 kPa to 50 kPa with 200 ml of water. Discard the first extract and repeat the process with another 500 ml of water for 40 min. Decant the extract, cool and determine the *p*H with a *p*H meter.

**6.2** The concentration of each of the harmful contaminations of arsenic, copper, manganese, and heavy metal shall not exceed 5 mg/kg. The contaminants shall be tested in accordance with the method given in Annex B.

**7 OTHER REQUIREMENTS**

**7.1** Both ends of the outer case shall be raised up to 4 mm and rounded outwards to secure the liner. The outer surface of the case shall be ribbed for better grip except for 20 mm length from both the edges.

**7.2** Both sides of the liner shall be either smooth or one side smooth and other side rough. The edges of the liners shall be rounded outwards at both ends.

**7.3** The surface of the cone shall be smooth, and both ends rounded outwards.

**7.4** Semen collection tube shall have the shape of a centrifuge tube with rounded edges, the other end having conical shape.

**7.5** The insulation bag shall have inside foam padding for the whole bag for protecting the collection tube. One end shall be circular to receive the vagina and the other end shall be provided with a good quality zip chain of 150 mm length for viewing the collection tube.

**7.6** The artificial vagina should have a metallic vent of non-ferrous material with a screw able air valve for adjustment of air pressure. The valve through which water is poured should be 60 mm ± 10 mm away from one end with a diameter of 110 mm ± 5 mm. The joint shall be leak-proof.

**8 WORKMANSHIP AND FINISH**

The artificial vagina shall be homogenous in composition, evenly and smoothly finished, and free from pinholes, pits, cracks, grooves, and other defects.

**9 MARKING AND PACKING**

**9.1 Marking**

Each artificial vagina shall be marked with the following particulars:

1. Manufacturer’s name or recognized trademark;
2. Type; and
3. Batch or code number.

**9.2 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.

**9.3 Packing**

The artificial vagina shall be packed in thick polythene bag for safe transit.

**10 SAMPLING FOR LOT ACCEPTANCE**

Unless otherwise agreed to between the purchaser and the supplier, the sampling of artificial vagina for lot acceptance shall be done in accordance with Annex C.

**ANNEX A**

(*Clause* **2**)

**LIST OF REFERED STANDARDS**

|  |  |
| --- | --- |
| *IS No.* | *Tittle* |
| IS 2088 : 2023 | Methods for determination of arsenic (*third revision*) |
| IS 2303 (Part 1/Sec 1) : 2021/ISO 719 : 2020 | Grading glass for alkalinity: Part 1 Hydrolytic resistance of glass grains, Section 1 Determination and classification of hydrolytic resistance at 98°C (*third revision*) |
| IS 3400  | Methods of test for vulcanized rubber:  |
| (Part 1) : 2021/ISO 37 : 2017 | Tensile stress-strain properties (*fourth revision*) |
| (Part 4) : 2012/ISO 188 : 2011 | Accelerated ageing and heat resistance (*third revision*) |
| IS 4905 : 2015/ISO 24153 : 2009 | Random sampling and randomization procedures (*first revision*) |
| IS 7523 : 1974 | Specification for rubber catheter (urinary)  |
| IS 9316  | Methods of test for rubber latex:  |
| (Part 7) : 1987 | Determination of total copper [RL:7] |
| (Part 9) : 1987 | Determination of total manganese [RL:9] |

**ANNEX B**

(*Clause* 6.2)

**METHOD OF TEST FOR CONTAMINANTS**

**B-1 GENERAL**

**B-1.1 Preparation of Test Solution**

Pass 100 ml portion of sterile pyrogen free saline solution containing 9 g of sodium chloride per litre at room temperature through artificial vagina at a flow rate of approximately 10 ml/min and collect the effluent. Make up the solution to 250 ml.

**B-2 TEST FOR ARSENIC**

Carry out the test for arsenic as prescribed in IS 2088 with 10 ml of the solution, using for comparison 0.005 mg of arsenic trioxide.

**B-3 TEST FOR COPPER AND MANGANESE**

Carry out test from suitable test solution (*see* **A-1.1** ) for copper and manganese as prescribed in NRL : 7 [*see* IS 9316 (Part 7)] and NRL : 9 [*see* IS 9316 (Part 9)] respectively.

**B-4 TEST FOR HEAVY METAL**

From suitable test solution (*see* **A-1.1**), heavy metal contamination shall be tested in accordance with the method given in IS 7523.

**ANNEX C**

(*Clause* 10)

**SAMPLING OF ARTIFICIAL VAGINA FOR BOVINES**

**C-1 SCALE OF SAMPLING**

**C-1.1 Lot**

All the artificial vagina of same size and type and belonging to the same batch of manufacture shall be grouped together to constitute a lot.

**C-1.2** For ascertaining the conformity of the material to the requirements of the specification, samples shall be tested from each lot separately.

**C-1.3** The number of artificial vagina to be selected from the lot shall depend on the size of the lot and shall be according to Table 1.

These artificial vagina shall be selected at random from the lot. In order to ensure randomness of selection, procedures given in IS 4905 may be used.

**C-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY**

**C-2.1** Each artificial vagina selected according to col (2) and (3) of Table 1 shall be first examined for visual and dimensional requirements given in **5**, **8** and **9** of the specification. A vagina failing to satisfy one or more of these requirements shall be considered as defective. The lot shall be considered to have satisfied these requirements if the number of vagina found defective in the sample is less than or equal to the corresponding acceptance number given in col (4) of Table 1

**C-2.2** The lot having satisfied visual and dimensional requirements according to **C-2.1** shall be further tested for physical and chemical properties as given in **6** and **7** of the specification respectively. For this purpose, the number of vagina given in col (4) and (5) of Table 1 shall be tested. These may be taken from those already examined according to **C-2.1** and found satisfactory.

**C-2.2.1** The lot shall be declared as conforming to the requirements of this specification if none of the vagina tested according to **C-2.2** is found defective.

**Table 1 Scale of Sampling and Permissible No. of Defectives**

(*Clauses* 1.3, 2.1 *and* 2.2)

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl No.** | **Number of Artificial Vaqina in the Lot** | **For Visual and Dimensional** | **Sample Size** |
|  |  | Sample Size  | Acceptance Number | For Physical Properties | For Chemical Properties |
| (1) | (2) | (3) | (4) | (5) | (6) |
|  | Up to 8 | 2 | 0 | \* | \* |
|  | 9 to 25 | 3 | 0 | \* | \* |
|  | 26 to 50 | 5 | 0 | \* | \* |
|  | 51 to 100 | 8 | 0 | 1 | 1 |
|  | 101 and above | 13 | 1 | 2 | 2 |

 \*As agreed to between the buyer and seller.

**ANNEX D**

(*Foreword*)

**COMMITTEE COMPOSITION**

Animal Husbandry and Equipment Sectional Committee, FAD 32

| *Organization* |  | *Representative(s)* |
| --- | --- | --- |
| Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu, Jammu |  | Dr Bhupendra Nath Tripathi **(*Chairperson*)** |
| All India Poultry Breeders Association, New Delhi |  | Dr A. K. Rajput Dr R. K. Jaiswal (*Alternate*) |
| Animal Welfare Board of India, Faridabad |  | Ms Prachi Jain  Dr Debalina Mitra (*Alternate*) |
| Bihar Animal Sciences University, Patna |  | Dr Deep Narayan Singh Dr Ranjana Sinha (*Alternate*) |
| Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya, Anjora |  | Dr Dhirendra Bhosle Dr O. P. Dinani (*Alternate*) |
| Department of Animal Husbandry and Dairying, Panchkula |  | Dr Birender Singh Laura Dr Dharmvir (*Alternate*) |
| Federation of Indian Animal Protection Organizations, New Delhi |  | Dr Sirjana Nijjar Dr Dinesh Mohite (*Alternate*) |
| Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana |  | Dr Navdeep Singh Dr Sikh Tejinder Singh (*Alternate*) |
| ICAR - Central Avian Research Centre, Bareilly |  | Dr Jagbir Singh Tyagi Dr Jaideep Rokade (*Alternate*) |
| ICAR- Central Institute for Research on Buffaloes, Hisar |  | Dr R. K. Sharma Dr Sushil Kumar Phulia (*Alternate*) |
| ICAR - Central Sheep and Wool Research Centre, Avikanagar |  | Dr Randhir Singh Bhatt Dr Srobana Sarkar (*Alternate*) |
| ICAR - Directorate of Poultry Research, Hyderabad |  | Dr Santosh Haunshi Dr M. Niranjan (*Alternate*) |
| ICAR - Indian Veterinary Research Institute, Bareily |  | Dr Subrata Kumar Ghosh Dr Amit Kumar (*Alternate*) |
| ICAR - National Research Centre on Equines, Hisar |  | Dr S. C. Mehta Dr Thirumala Rao Talluri (*Alternate*) |
| ICAR - National Research Centre on Pig, Guwahati |  | Dr R. Thomas Dr Sunil Kumar (*Alternate*) |
| Indian Poultry Equipment Manufacturers Association, Hyderabad |  | Shri Harish Rajaram Garware Shri Anil Somnath Dhumal (*Alternate*) |
| National Dairy Development Board, Anand |  | Dr R. O. Gupta Dr A. V. Harikumar (*Alternate*) |
| National Dairy Research Institute, Karnal |  | Dr Arun Kumar Misra  Dr Surender Singh Lathwal (*Alternate*) |
| National Egg Coordination Committee, New Delhi |  | Shri Ajit Singhd  Shri Bhagwati Singh (*Alternate*) |
| National Institute of Animal Nutrition and Physiology, Bengaluru |  | Dr Ravi Kiran G. Dr Ramachandran (*Alternate*) |
| PETA India, Mumbai |  | Dr Kiran Ahuja Ms Farhat U. I. Ain (*Alternate*) |
| People for Animals, New Delhi |  | Ms Gauri Maulekhi Ms Shreya Paropkari (*Alternate*) |
| Poultry Federation of India, Sonipat |  | Shri Ranpal Dhanda Shri Rahul Khatri (*Alternate*) |
| Tamil Nadu Veterinary and Animal Sciences University, Chennai |  | Dr S. Meenakshi Sundaram Dr M. R. Srinivasan (*Alternate*) |
| Uttar Pradesh Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan University (DUVASU), Mathura |  | Dr Yajuvendra Singh Dr Muneendra Kumar (*Alternate*) |
| BIS Directorate General  |  | Shri Suneeti Toteja, Scientist ‘F’/Senior Director and Head (Food and Agriculture) [Representing Director General (*Ex-officio*)] |

*Member Secretary*

Shri Pradeep Sharma

Scientist ‘B’/Assistant Director

(Food and Agriculture), BIS

Panel on Expert Panel for Review of Standards on Animal Husbandry Equipment Panel, FAD 32 : P2

|  |  |
| --- | --- |
| *Organization* | *Representative(s)* |
| ICAR - Indian Veterinary Research Institute, Bareily | Dr Subrata Kumar Ghosh **(*Convener*)** |
| Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana | Dr Navdeep Singh |
| National Dairy Development Board, Anand | Dr R. O. Gupta |
| Tamil Nadu Veterinary and Animal Sciences University, Chennai | Dr S. Meenakshi Sundaram |