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Indian Standard

RECOMMENDATION FOR
CATTLE HOUSING FOR AN AVERAGE FARMER

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Indian Standard

RECOMMENDATION FOR CATTLE HOUSING FOR AN AVERAGE FARMER

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Indian Standard

RECOMMENDATION FOR CATTLE HOUSING FOR AN AVERAGE FARMER

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 29 August 1986, after the draft finalized by the Animal Structures and Equipment Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Proper housing is an important feature in raising the production capabilities of animals, in addition to good breeding, feeding, selection and disease control. It is conducive to good health, comfort and protection from inclement weather and the animals are capable of utilizing their genetic abilities and feed for optimum production.

0.3 Cattle raising and dairying is practised in the country by various interests. Generally these interests are: (a) An average farmer who has not more than a pair of bullocks and two or three milch animals with their calves; (b) Rural milk producers normally having a total of about 20 animals including about 12 milch animals, their followers and a pair of bullocks; (c) *Gaushalas* and other organized milk producers; and (d) Large dairy farms.

0.3.1 This standard covers recommendations for shed for an average farmer. This would supersede IS: 4466 (Part 1)-1968*, IS: 5605 (Part 1)-1970† and IS: 8845 (Part 1)-1978‡. Since India's climatic condition, unlike most of the principal dairy countries of the world, are very varied, hence shed of cattle would also vary according to the climatic conditions prevailing in a particular region. In order to meet these varied requirements wherever necessary specific recommendation has been made for: (a) Plain areas with medium rainfall, (b) Arid areas, (c) High altitude areas, and (d) Heavy rainfall and high humidity areas.

*Recommendations for farm cattle housing for plain areas with medium rainfall: Part 1 Cattle shed for an average farmer.

†Recommendations for farm cattle housing for heavy rainfall and high humidity areas: Part 1 Cattle sheds for an average farmer.

‡Recommendations for farm cattle housing for arid areas: Part 1 Cattle shed for an average farmer.

IS : 11786 - 1986

1. SCOPE

1.1 This standard recommends a layout and constructional detail of a cattle shed meant for an average farmer normally having three milch animals with their calves and a pair of bullocks.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definition shall apply.

2.1 Standing (Stall) — The floor space provided within a shed for an individual animal to stand or lie.

3. SELECTION OF SITE

3.1 The shed shall be located on dry, elevated and well-drained area with consideration for future expansion.

3.2 The shed shall preferably be located at a place where there are enough suitably placed trees to serve as wind-breaks and to provide shade. In order to break the wind it is recommended that a row of trees be also planted across the direction of wind at the boundary of the farm.

NOTE — In case there are no shaded trees on the site, these should be planted immediately keeping a minimum distance of 4 m from the shed.

3.3 The site shall be away from public road but easily accessible throughout the year.

3.4 The site shall be such that arrangement could be made for adequate and good water supply.

3.5 The site shall be such that the long axis of the shed could be oriented east to west in all areas except temperate Himalayan and hilly regions. In desert areas, the shed shall be oriented across the prevailing direction of the wind in order to protect the roof from being blown off by high wind.

3.5.1 In coastal areas the shed shall be oriented along the prevailing wind direction in order to protect the roof from being blown off by high wind and at the same time to provide sufficient air movement in the shed. In sub-mountainous region, the buildings should be so sited as to avail of the natural aeration and drying.

4. LAYOUT OF THE SHED

4.1 An average farmer having not more than three milch animals with calves and a pair of bullocks generally makes use of an existing wall for constructing the cattle shed. The construction of shed under this

interest, therefore, has been suggested assuming that a lean-to type roof could be built against an existing wall. Arrangement of adequate water supply and light shall be made in the shed. The typical layout of such a shed to accommodate five animals is shown in Fig. 1. The two side walls would be a height of not more than 1.2 m. The height of main wall (see A in Fig. 1) shall be minimum of 2.5 m.

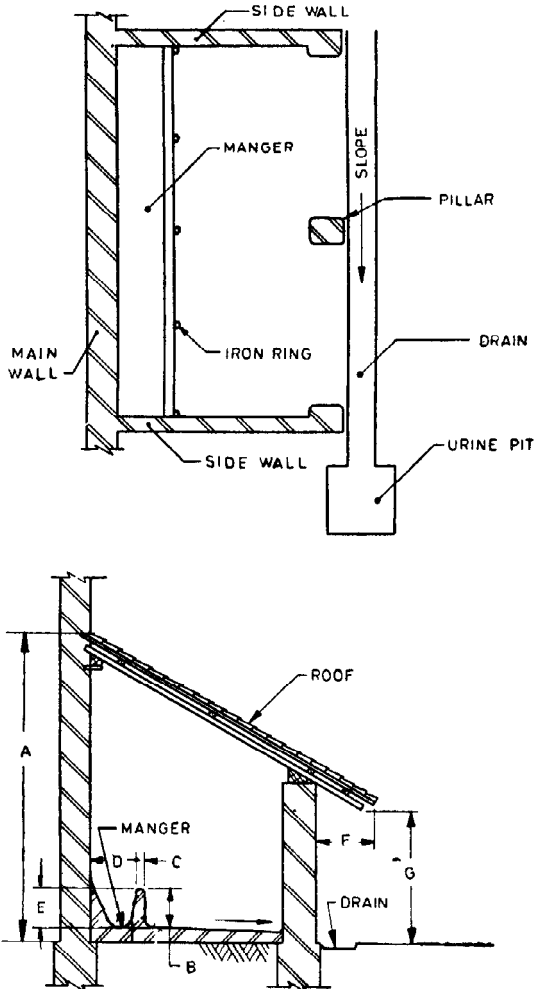


FIG. 1 TYPICAL LAYOUT OF FARM CATTLE SHED

5. CONSTRUCTION

5.1 Standings — The standings shall be constructed in such a way that the animals are kept facing towards the wall. The manger shall be adjacent to the wall. The length and width and area of cow shed and buffalo shed capable of accommodating one to four cattle is given in Table 1.

TABLE 1 SPACE NORMS FOR CATTLE SHED

All dimensions in metres.

NO. OF CATTLE	COW SHED		BUFFALO SHED		REMARKS
	Length	Width	Length	Width	
1	2.5	3.0	2.7	3.4	Along with calf
2	4.2	3.0	5.2	3.4	Along with calves
3	5.7	3.0	7.3	3.4	Along with calves
4	{ 5.6 2.0	{ 3.0 1.5	{ 6.8 2.4	{ 3.4 1.9	For cattle For calves

5.1.1 Flooring of Standings — The flooring of the standing may be of *moorum* or *kankar* or sand or stone slabs or brick-on-edge. The details of laying these types of floorings are given in Appendix A. A plinth of at least 150 mm in height shall be provided for the floor. The floor shall be sloped 1 in 40 for *moorum*, sand and *kankar* and 1 in 60 for brick-on-edge or stone-slab flooring.

5.1.2 Manger — The manger shall be of continuous type. The manger wall shall be made either of stone slabs, wooden planks or brick-in-lime or cement mortar. The flooring material of the manger shall be the same as for the floor but the surface shall be finished smooth. All the corners of the manger shall be rounded off and finished smooth. The dimensions of the manger shall be as given in Table 2. Iron rings may be provided for tying the rope of the animals.

TABLE 2 DIMENSIONS OF MANGER

All dimensions in centimetres.

SL No.	DIMENSION	STONE SLAB	WOODEN PLANK	BRICKS	REF TO FIG. 1
(1)	(2)	(3)	(4)	(4)	(5)
i)	Height of fore curb, <i>Max</i>	30	30	30	B
ii)	Thickness of fore curb, <i>Min</i>	4	3	10	C
iii)	Inner width of manger, <i>Min</i>	75	75	75	D
iv)	Depth of manger, <i>Min</i>	30	30	30	E

5.2 Roof — The roof shall be lean-to type suitably sloped according to local conditions. The roof material may either be asbestos cement or

galvanized steel sheets, tiles or asphaltic roofing sheets or locally available materials. Where necessary, particularly in hot climate, asbestos cement or galvanized steel roofs may be overlaid with a 8 to 10 cm thick thatch to lessen the stress of extreme climate. In sheds where locally available materials are used, gunny sacks treated with cement lime mixture (see 5.2.1) may be used. Generally, the eaves of the roof (see F in Fig. 1) shall project out at least 50 cm away from the pillars and in the regions where extreme climatic conditions prevail, the eaves may project up to 75 cm from the pillars in order to afford protection to the animals from direct sun and rain.

5.2.1 Preparation of Cement-Lime Mixture — Stir thoroughly 12 parts by volume of cement and three parts by volume of lime (see IS : 712-1973*) in 20 parts by volume of water. Add one part by volume of common salt (see IS : 797-1976†) and one-half part by volume of alum (see IS : 258-1967‡) and stir until all ingredients are well mixed. Apply the mixture evenly with the help of a brush on the inner surface of the gunny sack. Give two coats of the mixture on the outer surface of the gunny sack. Stretch the gunny sack and dry in the sun until it becomes stiff.

5.3 Pillars — The pillars may be made from any one of the following materials and their minimum dimensions shall be as indicated against each:

- | | |
|-------------------------|---|
| a) Brick | 45 × 35 cm (see Note 1) or
40 × 30 cm (see Note 2) |
| b) Mild steel I section | 10 × 10 cm |
| c) Stone masonry | 30 × 30 cm |
| d) Iron pipes | 10 cm diameter |
| e) Timber | |
| 1) Rectangular pillar | 10 × 10 cm |
| 2) Round poles | 15 cm diameter |

NOTE 1 — In case of 22.5 × 11.25 cm brick, 2 lengths and 3 widths shall be used.

NOTE 2 — In case of 20 × 10 cm (modular) brick, 2 lengths and 3 widths shall be used.

NOTE 3 — All iron structures shall be suitably painted for protection against corrosion.

*Specification for building lime (second revision).

†Specification for common salt for chemical industries (second revision).

‡Specification for potash alum, technical (first revision).

5.3.1 All edges in rectangular pillars shall be rounded off and finished smooth, as far as possible. The height of pillar (see *G* in Fig. 1) shall be minimum of 2.1 m.

5.4 Drain — There shall be a drain laid just outside the shed. It shall be built out of brick and cement mortar and shall have rounded corners. Its lengthwise slope shall be 1 in 40. The width of drain may be of 23 cm but in any case not more than 30 cm. The drain shall be of 'U' section with a depth of 6 cm at the bottom of the section. The drain shall be let to a urine pit having a depth not exceeding 40 cm. It may be circular or rectangular.

APPENDIX A

(Clause 5.1.1)

DETAILS OF LAYING DIFFERENT TYPES OF FLOORING OF STANDINGS

A-1. MOORUM, KANKAR AND SAND FLOORING

A-1.1 The *moorum*, *kankar* and sand flooring shall be laid over a subgrade of rubble packing or broken bricks of 15 to 25cm thick wetted and well rammed. A 15-cm layer of hard *moorum*, *kankar* and sand (as the case may be) shall be laid over this subgrade with coarser pieces at the bottom and fine ones over at the top. A layer of powder *moorum*, *kankar* and sand about 3 to 5 cm shall be spread over the top of this layer. Water shall then be sprinkled and the surface shall be well rammed. Water shall again be sprinkled until the floor is fully saturated. The surface shall be rammed, levelled and well consolidated. When the floor is dry, a thick paste of cow dung plaster shall be uniformly spread and it shall be well rammed. A final thin coating of mixture of cow dung (four parts) and cement (one part) shall be applied after the floor has dried up and wiped clean to prevent cracking and panelling. The cow dung plaster shall be applied weekly or fortnightly to keep the floor in good condition.

A-2. BRICK-ON-EDGE FLOORING

A-2.1 The subgrade for this type of flooring shall be rubbles or brick aggregates which shall be hand-packed, watered and well rammed. A layer of 10 cm of lime concrete shall be spread over the sub-base, well rammed and shall be allowed to set for 7 days. The bricks shall be well burnt and of good quality (see IS : 3583-1975*) and shall be well

*Specification for burnt clay paving bricks (first revision).

soaked in water before laying. Bricks shall be laid on about 10 mm thick cement or lime mortar bed and each brick shall be properly bedded on edge and set home by gentle tapping with the handle of trowel or a wooden mallet. Its inside faces shall be buttered with mortar before the next brick is laid and pressed against it. On completion of a portion of flooring the vertical joints shall be fully filled from the top with the mortar.

A-2.2 The surface of the flooring during the laying shall be frequently checked with a straight edge at least 2 m long so as to obtain a true surface with the required slope. The surface of the flooring shall be kept constantly moist for a minimum period of 7 days. In the case of fat lime mortar, curing shall commence two days after the laying of the flooring and shall continue for 7 days. The bricks may be laid in rows having the joints parallel and at right angles to the walls or in 'herringbone' pattern.

A-3. STONE-SLAB FLOORING

A-3.1 The stone slabs shall be of good quality, hard, sound and dense (see IS : 3622-1977*). Apart from sandstone any other good quality stone slabs may be used according to the availability of the material. The subgrade shall be prepared as given in A-2.1 and the lime concrete bed shall be cleaned, wetted and mopped. The bedding for the slabs shall be made with cement mortar 1 : 4 (1 cement : 4 coarse sand) or with lime mortar (either 1 lime putty : 1 *surkhi* : 1 coarse sand or 1 lime putty : 2 coarse sand). The average thickness of the bedding mortar under the slab shall be 20 mm. The mortar shall be spread under the area of each slab to the specified thickness. The stone slab shall be washed clean before laying. It shall be laid on top, pressed, tapped with wooden mallet and brought to level with the adjoining slabs. It shall be lifted and laid aside. The top surface of the mortar shall then be corrected by adding fresh mortar at hollows. The edges of the slab already paved shall be buttered with cement slurry. The slab to be paved shall be lowered gently back in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slab with as fine a joints as possible. Subsequent slabs shall be laid in the same manner. After each slab has been laid, surplus cement on the surface of the slab shall be cleaned off. The flooring shall be cured for a minimum period of 7 days. The surface of the flooring as laid shall be true to a level and shall be of the desired slope. Slight unevenness at the meeting edges of slabs shall be removed by fine chiselling.

*Specification of sandstone (slabs and tiles) (*first revision*).

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Definition</i>
Force	newton	N	$1 \text{ N} = 1 \text{ kg.m/s}^2$
Energy	joule	J	$1 \text{ J} = 1 \text{ N.m}$
Power	watt	W	$1 \text{ W} = 1 \text{ J/s}$
Flux	weber	Wb	$1 \text{ Wb} = 1 \text{ V.s}$
Flux density	tesla	T	$1 \text{ T} = 1 \text{ Wb/m}^2$
Frequency	hertz	Hz	$1 \text{ Hz} = 1 \text{ c/s(s}^{-1}\text{)}$
Electric conductance	siemens	S	$1 \text{ S} = 1 \text{ A/V}$
Electromotive force	volt	V	$1 \text{ V} = 1 \text{ W/A}$
Pressure, stress	pascal	Pa	$1 \text{ Pa} = 1 \text{ N/m}^2$