IS : 11799 - 1986
[Superseding IS : 4466 (Part 2)-1968,
IS : 5605 (Part 2)-1970 and
IS : 8845 (Part 2)-1978]

Indian Standard

RECOMMENDATIONS FOR CATTLE HOUSING FOR A RURAL MILK PRODUCER

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard

RECOMMENDATIONS FOR CATTLE HOUSING FOR A RURAL MILK PRODUCER

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 October 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) a rural milk producer 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.

0.4 This standard covers recommendations for shed for a rural milk producer. This would supersede IS : 4466 (Part 2)-1968*, IS : 5605 (Part 2)-1970† and IS : 8845 (Part 2)-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 2 Cattle shed for a rural milk producer.

†Recommendations for farm cattle housing for heavy rainfall and high humidity areas: Part 2 Cattle shed for a rural milk producer.

‡Recommendations for farm cattle housing for arid areas: Part 2 Cattle shed for a rural milk producer.

1. SCOPE

1.1 This standard recommends layout and constructional details of a cattle shed meant for a rural milk producer, normally having 20 animals which may include about 12 milch animals, their followers and a pair of bullocks.

2. TERMINOLOGY

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

2.1 Paddock or Yard — An open area surrounded by walls, fences or rails for accommodating cattle. This area is meant to provide open air exercise to the animals. It generally contains manger(s) or trough(s) with or without ties to control animals for different purposes.

2.2 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 directions of wind at the boundary of the farm.

NOTE — In case there are no sheded 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. HERD SIZE

4.1 A typical herd has been assumed to have about 20 animals comprising 12 milch animals of which about 8 may be in milk. The remaining eight animals may include the followers of adult animals and a pair of bullocks.

5. SHED

5.1 The shed shall consist of standings for accommodating adult animals and the young stock. At the far end of the shed, there shall be a room for accommodating calves and a separate calving box. The paddock or yard for adult and young stock and calves may be separate on either side of the standings. The calves and the down calver shall have separate paddocks or yards for themselves laid adjacent to the calf room and calving box.

6. LAYOUT

6.1 The layout and overall dimensions of each of the units (*see* **5.1**) may be as given in Fig. 1 and Fig. 2.

7. CONSTRUCTION

7.1 Standings — The standings shall be constructed in such a way that the animals are arranged in rows. The length and width of each standing shall be decided depending upon the size of the animals. The length and width of each standing may vary from 1·5 to 1·7 m and 1·0 to 1·2 m per animal respectively. In coastal region, sometimes buffaloes with spreading horns are found; in that case the width per animal may vary from 1·2 to 1·3 m.

7.1.1 *Floor of Standings* — The floor may be either of *MOORUM-KANKAR* and sand, cement concrete, stone slabs or bricks-on-edge. The details of laying these floorings may be as given in Appendix A of IS : 11786-1986*. A plinth of at least 15 cm shall be provided for the floor. The surface of the cement concrete or stone flooring shall be grooved to make it non-slippery for animals. For larger animals, the grooves shall be formed in a square of 15 × 15 cm and for calves 10 × 10 cm (*see A in Fig.* 3). The width of the groove shall be 12 mm and depth 10 mm. The groove shall be of 'U' shape. A slope of 1 in 60 towards the drain shall be provided in order to keep the floor properly drained after washing. Steel rings may be provided on the floor near the manger for tying the animals.

*Recommendation for cattle housing for an average farmer.

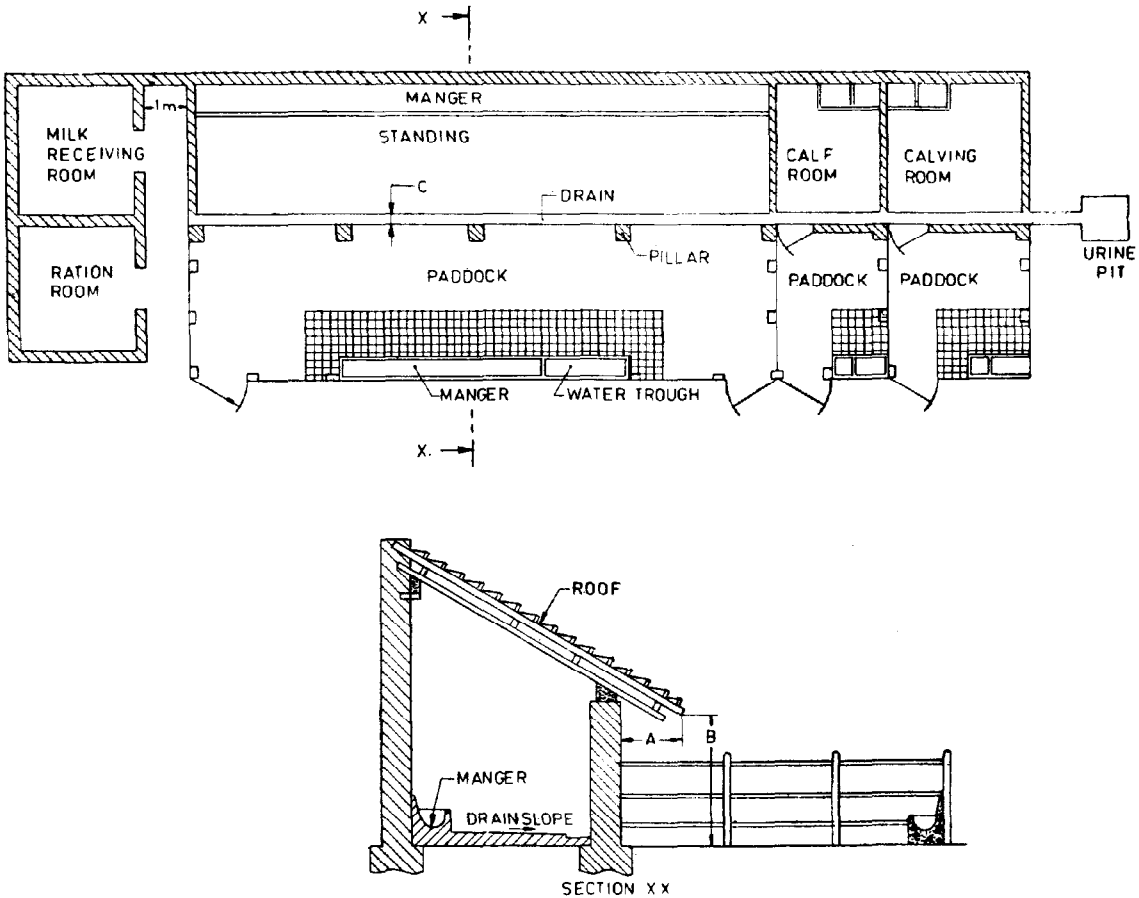


FIG. 1 A TYPICAL LAYOUT OF SHED, LEAN-TO TYPE ROOF

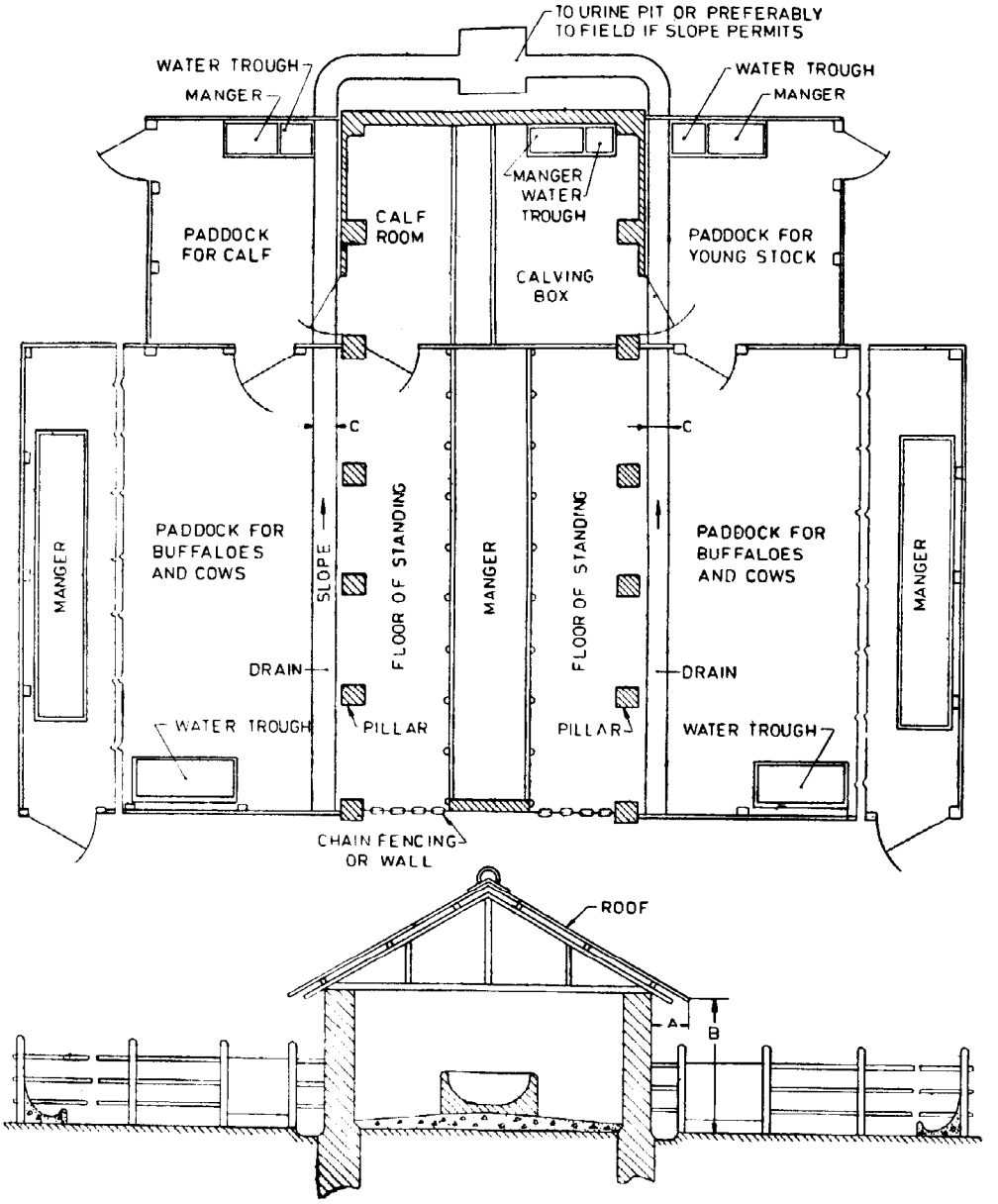
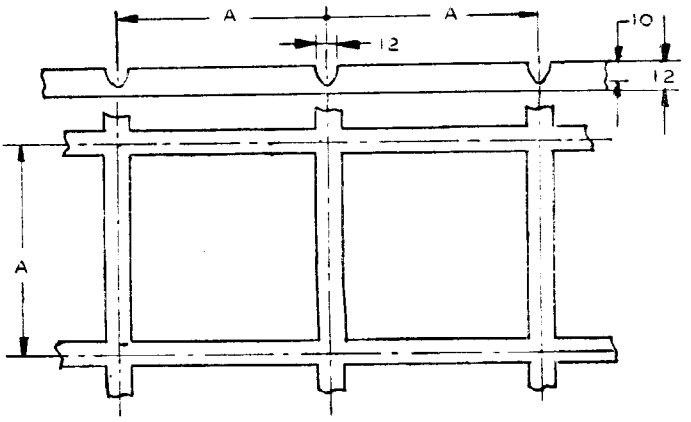


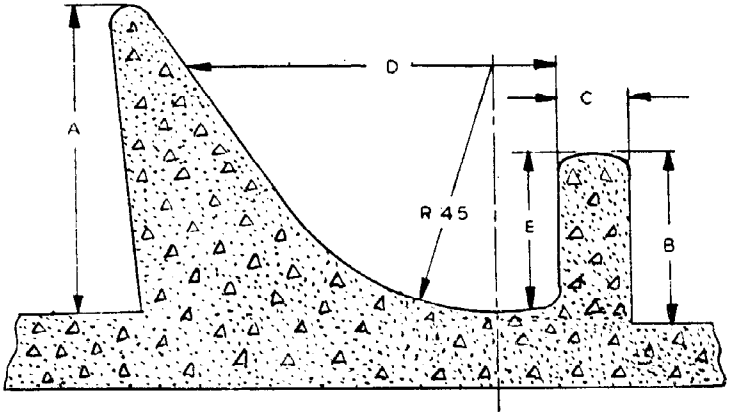
FIG. 2 A TYPICAL LAYOUT OF SHED, GABLED TYPE ROOF



All dimensions in millimetres.

FIG. 3 CROSS SECTION OF STANDING

7.1.2 *Manger* — The manger shall be of continuous type. The manger shall be made of stone slabs, wooden plank 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 (*see* Fig. 4) shall be as given in Table 1. In case the mangers are of brick, the fore curb should be topped with angle iron.



All dimensions in millimetres.

FIG. 4 CROSS SECTION OF MANGER

TABLE 1 DIMENSIONS OF MANGER

(*Clause* 7.1.2)

All dimensions in cm.

Sl No.	Particulars	Stone Slab	Wooden Plank	Brick Laid in Cement or Lime	Ref to Fig. 4
(1)	(2)	(3)	(4)	(5)	(6)
i)	Height of the manger wall, *Min*	75	75	75	A
ii)	Height of fore curb, *Max*:				
	a) For adults	50	50	50	B
	b) For calves	30	30	30	—
iii)	Thickness of fore curb, *Min*	4	3	10	C
iv)	Inner width of manger, *Min*:				
	a) For adults:				
	1) One way feeding	60	60	60	D
	2) two way feeding	120	120	120	D
	b) For calves: one way feeding	40	40	40	—
v)	Depth of manger, *Min*:				
	a) For adults	40	40	40	E
	b) For calves	15	15	15	—

7.1.3 *Water Supply* — There shall be an adequate supply of potable water in the shed. For this purpose, a trough of reinforced cement concrete or brick-in-cement should be provided. The size of the trough shall depend upon the daily requirement of water calculated at the rate of 50 litres per livestock unit per day. The water troughs should be provided with railing on its sides so that the animals may not try to step in the water trough and contaminate it.

7.2 Walls — The wall shall be of brick or stone slab laid in cement mortar. The wall may be cement-plastered from inside. The thickness of the wall shall be at least 20 cm. All walls shall be solid up to 1·25 m height from the floor level and shall be constructed in honey comb pattern above that height in order to provide sufficient air movement in the shed. The rest of the portion of the wall may be left open by a series of wire-netted windows. In desert areas, the solid portion may extend up to 1·8 m in height. In case of lean-to type system, the end walls above the solid portion may be left open or provided with a series of wire-netted windows.

7.3 Pillars — One pillar shall be placed at intervals of every two or three standings depending on the width of each standing. Pillars may be made from any 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, dia	10 cm
e) Timer	
i) Square	10 × 10 cm
ii) Round	15 cm dia

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.

7.3.1 All edges in rectangular pillars shall be rounded off and finished smooth.

7.4 Roof — The roof shall be of lean-to type or gabled type. The roof material may either be asbestos cement sheets, galvanized steel sheets, asphaltic roofing material or locally available material. 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 areas where locally available materials are used, gunny sacks treated with cement lime mixture (*see* **7.4.1**) may be used. The roof shall be supported by steel or wooden trusses or by a series of central pillars. The pitch of the roof may range from 22 to 30 degrees depending upon the material used. Wooden purlins may be spaced up to 1·3 m apart. The eaves of the roof shall project out (*see A* in Fig. 1 and 2) at least 50 cm away from the pillars and in the regions where extreme climatic conditions prevail, the eaves of the roof may project out to 75 cm from the pillars in order to afford protection to the animals from direct sun and rain. The eaves should be 2·2 m high from ground level (*see B* in Fig. 1 and 2).

7.4.1 *Preparation of Cement-Lime Mixture* — Stir thoroughly 12 parts by volume of cement and three parts by volume of lime (*see* IS : 712-1984*) in 20 parts by volume of water. Add one part by volume of common salt (*see* IS : 797-1982†) 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.

7.5 Drains — The drain shall be laid in the shed at the back of the standing. In case of gabled type roof, two drains shall be laid outside the shed, one on each side of the standing. The drain shall be made of brick in cement mortar or of stone and shall be of 'U' shape with a depth of 6 cm at the bottom. The slope of the drain shall be 1 in 100 to 1 in 120. The width of the drain (*see C* in Fig. 1 and 2) may vary between 30 and 40 cm. The drain may be led to a common urine pit having a depth not exceeding 40 cm or to the field if slope permits. The urine pit may be circular or rectangular.

7.6 Calf-Room — A part of the standing at the far end of the shed shall be partitioned suitably for housing calves. Generally, a floor space of 1·2 to 1·5 m^2 is recommended per calf. There shall be a manger adjacent to the wall of the room. A wall covering half the height of the room shall be provided in order to separate the calf-room from its adjoining yard.

7.7 Calving-Box — A separate unit shall be provided for housing one down-calver. The calving-box shall be adjacent to the calf-room and at the end of the standings. The box shall be separated from the calf-room as well as from the rest of the shed by a suitable partition. The dimensions of the calving-box shall be 2·8 × 4 m. There shall be cement concrete manger and water trough in one corner of the box. The width of the manger and the water trough shall be at least 60 cm.

8. PADDOCK OR YARD

8.1 There shall be a paddock with the following minimum space per animal for various categories of animals:

a) Buffalo	8 m^2
b) Cow	7 m^2
c) Young stock	4 m^2
d) Calf	2 m^2
e) Calving	12 m^2

*Specification for building limes (*third revision*).
†Specification for common salt for chemical industries (*third revision*).
‡Specification for potash alum (*first revision*).

8.1.1 There shall be feeding and water troughs within the paddock.

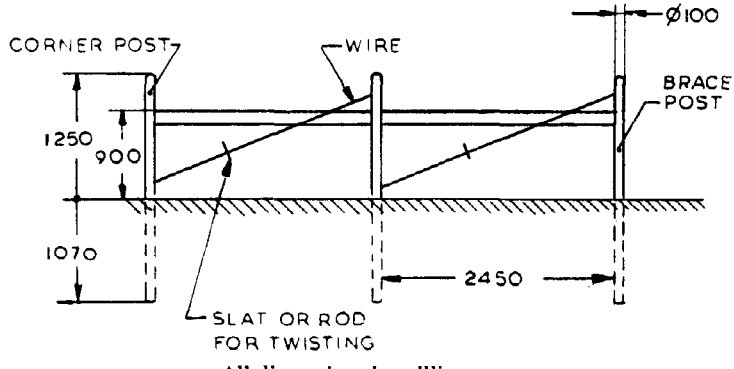
8.2 Fencing

8.2.1 The wall of bricks or stone slabs or a railing or wires may constitute fence. The railings may be of 35 mm galvanized iron pipe or 5 mm galvanized iron wire and posts to support railings. The posts may be of 5 cm steel pipe, 6 × 4 cm angle iron, 8 × 5 cm stone slabs or 10 × 10 cm timber placed 2 m apart. The posts shall be holed to pass the railings through or it may be riveted or 'U' bolted to the place.

8.2.1.1 The railings for different categories of the animals shall be fixed with the posts as given below:

Height from Ground to Centre of Each Rail	*Calves*, cm	*Cows, Young Stock and Buffaloes*, cm	*Bull*, cm
First rail	30	40	40
Second rail	60	80	80
Third rail	90	120	120
Fourth rail	120	—	150

8.2.2 The wooden horizontal braces or steel horizontal braces shall be placed as given in Fig. 5. Braced steel end or corner posts shall be embedded as given in Fig. 6.

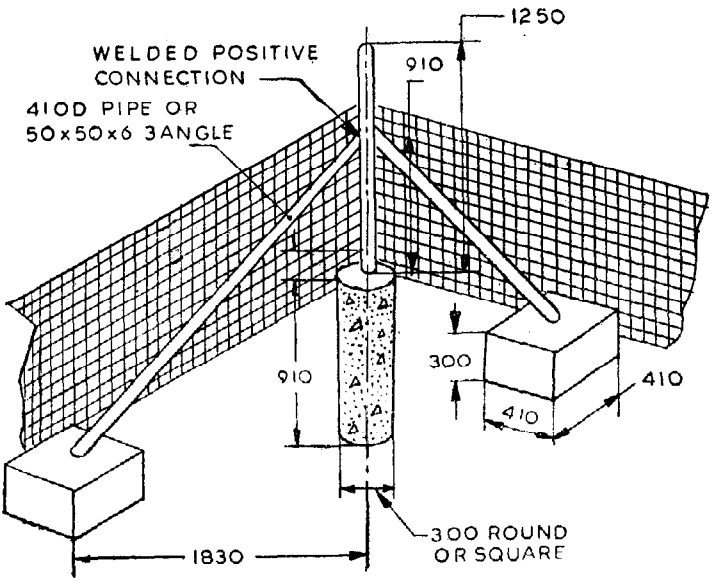


All dimensions in millimetres.

FIG. 5 WOOD OR STEEL HORIZONTAL BRACES

9. ANCILLARY STRUCTURE

9.1 Provision of milk recording room and ration room, each of approximately 9 m^2, preferably at fore end of the shed, may be made.



All dimensions in millimetres.

FIG. 6 BRACED STEEL END OR CORNER POST

10. LIGHTING

10.1 Provision of lighting shall be made. In case electricity is available, a 25 W bulb for each 10 m^2 floor space or 60 W bulb for each 25 m^2 space or equivalent fluorescent tube light may be provided.

11. WASTE HANDLING

11.1 It is suggested that bio-gas plant of suitable size should be installed. The animal waste should be removed from standing/dung alley either by scrapping or direct collection in hand push cart or animal cart and taken to feed the bio-gas plant.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
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

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

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