

Foreword

The formulation of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled “Enhancing the Implementation of the AFMA Through Improved Agricultural Engineering Standards” which was funded by the Bureau of Agricultural Research (BAR) of the Department of Agriculture (DA).

This standard has been technically prepared in accordance with PNS 01-4:1998 (ISO/IEC Directives Part 3:1997 – Rules for the Structure and Drafting of International Standards. It specifies the general requirements for the construction of milking parlor.

The word “shall” is used to indicate requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted.

The word “should” is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required.

In the preparation of this standard, the following references were considered:

Agricultural Engineers’ Handbook, McGraw-Hill Book Company, New York, 1961.

Bath, D. L., F. N. Dickenson, H. A. Tucker and R. D. Appleman. Dairy Cattle: Principles, Practices, Problems, Profits, 2ed. Philadelphia, 1978.

Barre, H. J. and L. L. Sammet. Farm Structures. John Wiley & Sons, Inc. New York.

Bethard, G. and Dennis Armstrong. Facility Design for Large Jersey Dairies, Research Foundation.

Chastain, J and R. Nicolai. Dairy Lighting System for Free Stall Barns and Milking Centers, University of Minnesota, August 1996.

Dairy Cattle Housing and Equipment, Agricultural Building Systems Handbook. Canada Plan Service, 1985.

Farm Structures in Tropical Climates, FAO, Rome, 1988.

Gooch, Curt A., Consideratoin in Flooring. College of Agriculture and Life Sciences, Cornell University, 2001.

Homemade Milking Stall Design, North Dakota State University.

Milking Parlour Design and Hygiene Standards. Rural NI Portal, 2001.

Production and Processing Regulation, Canadian Food Inspection System, October 1997.

Reinemann, D. J., H. K. Bolton and B. J. Holmes. Flat-Barn Milking System, University of Wisconsin, October 1993.

Smith, J.F, D. V. Armstrong and M. I. Gamroth. Planning a Milking Center, Kansas State University, February 1996.

Agricultural Structures – Milking Parlor

1 Scope

This standard specifies the general requirements of a milking parlor for dairy cattle and carabao. It includes general, structural and functional requirements.

2 Reference

The following normative document contains provisions which through reference in this text constitute provisions of this National Standard:

National Structural Code of Building**Philippine Electrical Code 2000****National Plumbing Code of the Philippines**

PAES 414-1:2002 Agricultural Structures – Waste Management Structures: Part 1 –
Agricultural Liquid Waste

PAES 414-2:2002 Agricultural Structures – Waste Management Structures: Part 2 –
Agricultural Solid Waste - Composting

3 Definitions

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

3.1**milking parlor**

building or a portion of building where milking occurs but where no animals are housed

3.2**holding area**

area provided to accommodate animals before milking

3.3**back-out stall**

type of stall where animals must back up to exit the stall

3.4**walk-through**

type of stalls that allows the animals to proceed directly forward after milking is completed

4 Location

4.1 The milking parlor shall be located close to the confinement to optimize animal flow. The minimum distance of the milking parlor shall be 30 m away from lactating barn and the maximum distance shall not exceed to 180 m if the milking frequency is three times a day and 275 m if it is two times a day.

4.2 For sanitation, it shall be at least 100 m away from manure piles or wastewater pond.

4.3 The site shall be well drained.

4.4 Electricity should be available at the site.

5 Structural Requirements

5.1 Floor

5.1.1 Floor shall be concrete and properly reinforced to prevent cracks.

5.1.2 The floor used by the animal as access or passage shall be rough-finished while the other floor area shall be smooth-finished.

5.1.3 The floor slope shall be 2% - 4 % towards the drain.

5.1.4 Intersection with the walls shall be rounded with 50 mm - 60 mm radius.

5.2 Roof

5.2.1 The roof structure shall be made of timber or steel with anti-rust paint.

5.2.2 Roofing materials shall be made of G.I. sheet and other durable roofing materials.

5.2.3 Skylights (i.e. plastic roofing sheets) at strategic locations for natural lighting are recommended.

5.2.4 Roof vents, when provided, shall be properly screened.

5.3 Walls, ceilings, windows and doors are not mandatory, but if present, the following provisions shall be followed:

5.3.1 Wall

5.3.1.1 The wall shall be concreted, smooth finished and properly painted. Internal surface of the walls should be painted with white emulsion or latex paint.

5.3.1.2 Intersection with wall to wall and floor to wall shall be shall be rounded with 50 mm - 60 mm radius.

5.3.1.3 All wall tops and ledges shall slope at 45°.

5.3.2 Ceilings

5.3.2.1 Ceilings shall be at least 2.4 m from the finished floor line.

5.3.2.2 Ceilings shall be constructed to prevent the collection of dirt or dust that might sift through from the areas above or fall from overhead collecting surfaces onto equipment or exposed products.

5.3.2.3 Ceilings and overhead structures shall be maintained free of scaling paint or plaster, dust, condensate, leaks, and other materials or defects.

5.3.3 Windows

5.3.3.1 All windows shall be properly installed with 16-mesh screen.

5.3.3.2 Window ledges shall be sloped about 45° to prevent the accumulation of dirt, water, or debris (Refer to Figure 1).

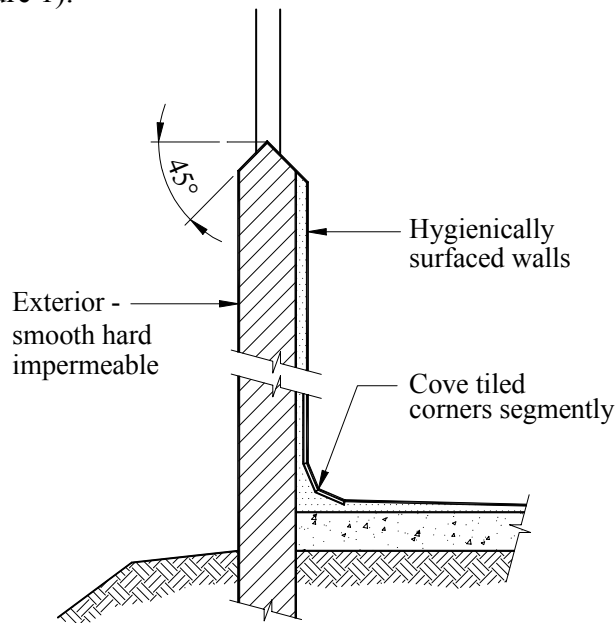


Figure 1 – Finishing of a milking parlor wall

5.3.3.3 Windowsill shall be at least 1 m from the finish floor line.

5.3.4 Doors

5.3.4.1 Doors shall have a minimum width of 1.5 m.

5.3.4.2 Doors and doorjambs shall be constructed of moisture and rust-resistant material.

5.3.4.3 Doors shall be fitted with screens, air flaps or provided with air curtain.

5.3.4.4 The juncture between the wall and the doorjambs shall be effectively sealed with a flexible sealing compound.

5.4 All other matters concerning structural design of the building not provided in this Standard shall conform with the provisions of the National Structural Code of Building.

6 Functional Requirements

6.1 Holding area or wash pen

6.1.1 Holding area and wash pen shall be provided. It shall have a minimum space requirement of 2.23 m² per animal.

6.1.2 Holding area shall be provided with roof to avoid wet animals entering the parlor in the rainy season.

6.1.3 Holding area shall be paved and rough finished and it shall slope 2% - 4% away from the parlor.

6.2 Entrance and exit alley

6.2.1 Milking parlor shall be provided with straight entrance to ensure a smooth and convenient operation.

6.2.2 The width of the alley shall be 0.7 m - 0.9 m to keep the animals from turning around.

6.2.3 The slope of the alley shall not exceed 5%. If specific circumstances require alleys shall be greater than 5%, install steps with 150 mm rise and 460 mm run. The treads may be sloped no more than 1.5% to help achieve the required elevation change.

6.3 Milking area

6.3.1 The type of the milking stall shall be back-out or walk-through stall (Refer to Annex A and B).

6.3.2 For a back-out stall, 0.9 m headroom shall be provided in front of the stall. For a walk-through, a space of 1.8 m ahead of the stall shall be provided to enable the animals to exit the stalls and turn into next alley.

6.3.3 Milking stall shall be 1 m – 1.1 m wide when a bucket milking machine is used or when hand milking is practiced. If pipeline-milking system is practiced, 0.7 m – 0.8 m shall be provided.

6.3.4 Milking stall should be provided with head restrainer (Figure 2).

6.3.5 The stall length shall be at least 1.5 m and the height shall be at least 1.2 m.

6.3.6 Railings of the stall shall be made of at least 50 mm G.I. pipe and shall be spaced at 0.4 m.

6.3.7 The space for the milker/operator and milking equipment shall be 0.6 m – 0.8 m wide.

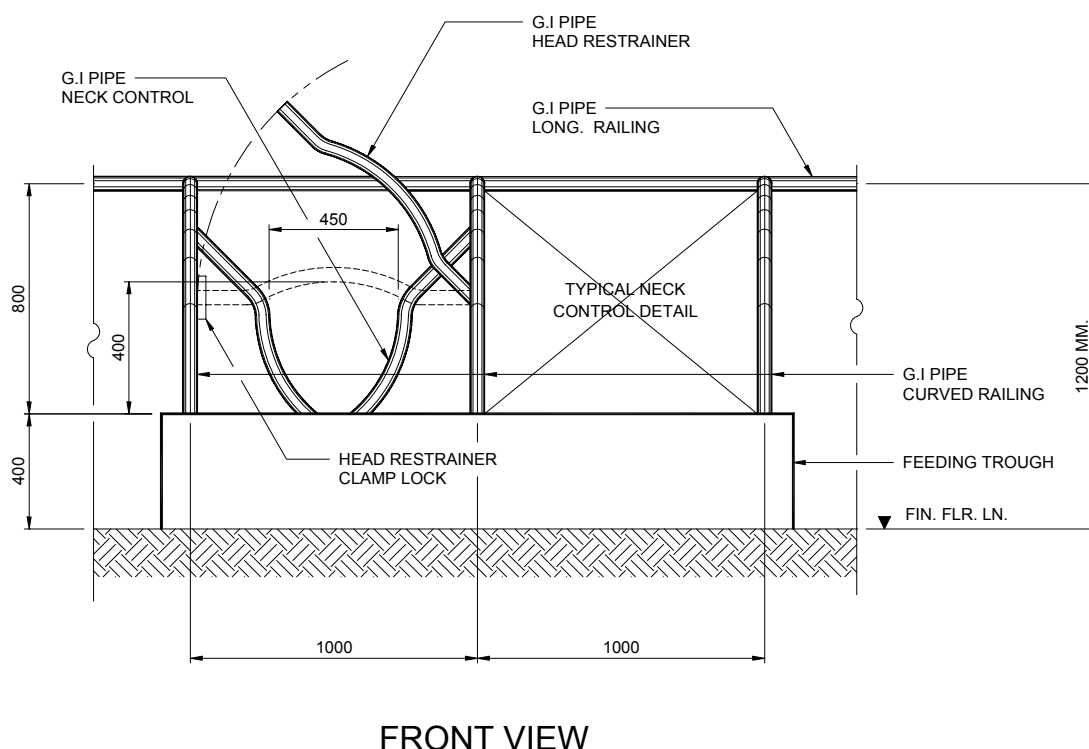


Figure 2 – Typical design of a head restrainer

6.3.8 Table 1 shows the number of stall required for different size of milking herd.

Table 1 – Recommended number of milking stalls, machines and operators

Animals	No. of milking stalls	No. of operator		No. of milking machines* (if used)
		Without milking machine	With milking machine	
1-10	1	1	1	1
11-20	2	2	2	1
21-30	3	3	2	1

* Two buckets

6.3.9 Milk and milking machine storage (optional)

6.3.9.1 A cupboard, stands or shelves of non-corrodible material should be located off the floor to hold the materials, and equipment used in the production and handling of milk.

6.3.9.2 A milk tank should be installed with a capacity that is equivalent to a minimum of 2.5 days of milk production by the dairy animal herd during its peak production period.

6.3.9.3 Milk tanks should have free space at each side and in front, behind, above and below to allow access for inspection, transfer, cleaning and sanitizing.

6.4 Facilities

6.4.1 Milking machine (if present)

6.4.1.1 Milking machine shall remain stationary during milking and the milk line shall not run through the holding pen. If portable milking machine is used, it should be located at a safer distance so as not to disturb the animals during milking.

6.4.1.2 The minimum size of vacuum supply pipelines and vacuum pulsator line shall be 50 mm.

6.4.2 Electrical installation

6.4.2.1 Lighting

6.4.2.1.1 Adequate electrical lighting shall be provided in the building and all electrical fittings shall be waterproof and be designed for hygiene.

6.4.2.1.2 Light fixtures in area where exposed milk is handled shall ensure maximum safety to prevent contamination of products. Fixtures shall be easily cleaned to prevent the collection of dirt/debris on lamp surfaces.

6.4.2.1.3 The intensity of lighting in each station is shown in Table 2.

Table 2 – Minimum lighting intensity for milking center

Area	Lighting intensity* lux (Lumen/m ²)
Holding area/wash area	100
Parlor room General lighting Milker/Milking operator's area	200 500

* Refer to Annex C

6.4.2.2 Convenience outlet shall be waterproof type. It shall be installed 1 m - 1.5 m high depending on the position and height of milking machine.

6.4.2.3 All electrical installation shall meet the requirement of Philippine Electrical Code.

6.4.3 Water supply

There shall be provision for adequate supply of potable water, and wash basin/rack for cleaning the equipment and facilities and the building. Plumbing system shall be in accordance with the National Plumbing Code.

6.5 Ventilation

6.5.1 Screens shall be used where needed to prevent product contamination from dust, and insects.

6.5.2 Mechanical ventilation shall be used to provide fresh air to areas where natural ventilation is inadequate.

6.6 Drainage

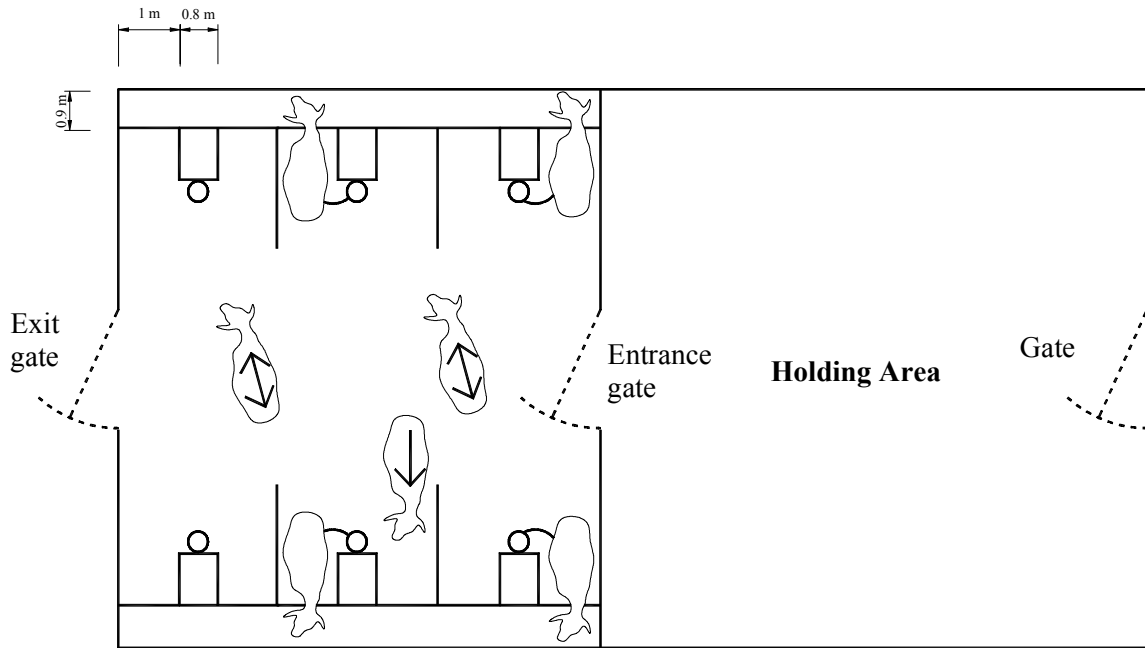
There shall be provision for adequate drainage and it shall be accessible for cleaning and maintenance.

7 Waste disposal

For waste management, refer to **PAES 414-1:2002** and **PAES 414-2:2002**.

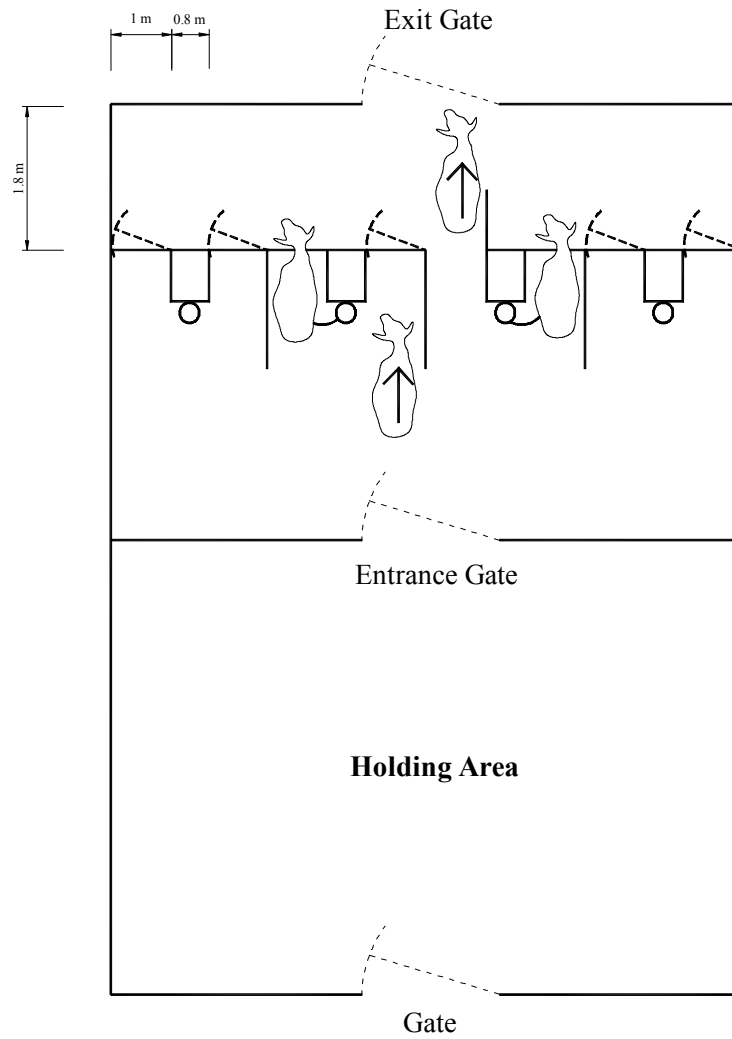
Annex A
(informative)

Typical Back-Out Parlor



Annex B
(informative)

Typical Walk-Through Parlor



Annex C
(informative)

Lighting Requirements

Lighting Intensity lux	No. of Bulbs Required per m ²							
	Incandescent lamp						Fluorescent lamp	
	25W	40W	60W	100W	150W	200W	20W	40W
500	3.935	1.989	1.052	0.520	0.314	0.226	0.682	0.266
400	3.148	1.591	0.842	0.416	0.251	0.181	0.546	0.213
300	2.361	1.193	0.631	0.312	0.189	0.136	0.409	0.160
200	1.574	0.796	0.421	0.208	0.126	0.090	0.273	0.107
150	1.180	0.597	0.316	0.156	0.094	0.068	0.205	0.080
100	0.787	0.398	0.210	0.104	0.063	0.045	0.136	0.053
50	0.393	0.199	0.105	0.052	0.031	0.023	0.068	0.027
10	0.079	0.040	0.021	0.010	0.006	0.005	0.014	0.005