FARM BUILDING AND EQUIPMENT PLANS

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INTRODUCTION

The object of this book is to provide extension workers, building supply dealers and other interested agencies with a ready reference to the plans available for distribution. For a number of years the Agricultural Engineering Department has been preparing and sending out plans for all types of farm structures. These plans represent the best designs available, and have been prepared with the help of specialists in every line concerned. A large number of these plans have been designed in the department especially to meet conditions as they exist in Virginia. Plans from other states adaptable to Virginia conditions have also been included, as well as a considerable number of designs prepared by the Bureau of Agricultural Engineering, U. S. Department of Agriculture. All of the plans listed have been very carefully prepared or selected to meet conditions as they exist in this state, and may be safely used.

Descriptions of farm structures and equipment for which plans are available are given, and where such structure or equipment is illustrated in this booklet, the description is marked thus *. Bills of materials are available in most cases.

These plans are free to the farmers of Virginia. However, the cost of preparing these plans is considerable and it is requested that only such plans as are actually needed be ordered. Should a plan be needed for a type of structure not listed, write for information as new plans are constantly being prepared and a number of special plans not listed are also on file and available.

In ordering plans, whenever possible, please order by number. When in doubt be sure to give enough information to enable us to choose the most suitable plan for your conditions. For instance in the case of dairy barns give: (1) Type of barn desired, that is, one-story or two-story; (2) Size herd to be accommodated; (3) Market to be supplied, etc. In the case of other plans follow the same general procedure. Plans furnished will be large size working blue prints, not the miniature duplicates illustrated in this booklet.

Under no circumstances should the illustrations in this booklet be removed. To do so will destroy the value of the booklet as a reference, since duplicates are not available.

Address all correspondence and requests for plans to: Agricultural Engineering Department, Extension Division, V. P. I., Blacksburg, Virginia.
The passage of a new dairy law by the last legislature, effective in June 1930, has caused greatly increased interest in dairy barns. This interest is not only in new construction, but in remodeling as well, to meet the requirements of the law. Smaller dairymen particularly are affected by this law, and the need for information by so large a number makes a mimeographed sheet of this kind advisable.

This law enforced by the State Dairy and Food Division applies to all markets not having an ordinance with requirements more rigid than those laid down by the law. This means practically all markets except the larger cities. The law applies only to whole sweet milk and sweet cream, and not to sour cream or milk by-products. Nor does it apply to the dairyman with two cows or less, except in so far as is necessary to produce clean market milk.

There are two principal city markets whose requirements are more rigid than those of the state law. These markets attract a great many shippers of the state. Below are given the State Dairy and Food Division requirements; also the requirements of these two city markets, Washington, D. C. and Richmond.

The State law provides for three grades:

Grade A scoring at least 80 points on the official score card, 40 of which must be for methods. The maximum bacterial count shall not exceed 100,000 per cubic centimeter for this grade.

Grade B scoring at least 70 points, 35 of which shall be for methods. Maximum bacterial count not exceeding 200,000 per cubic centimeter.

Grade C scoring 50 points, 30 of which shall be for methods. Bacterial count not to exceed 1,000,000 per cubic centimeter. For the purposes of this discussion Grade A only need be discussed.

STATE BARN REQUIREMENTS:

A separate stall shall be provided for dairy cows. If hay is stored above, a tight floor must be provided in hay loft.
Light: There shall be not less than 4 square feet of glass per cow uniformly distributed.

Air and ventilation: There shall be not less than 500 cubic feet of air space per stall. Tilting, adjustable windows or other adequate ventilation approved by inspector required.

Floor: Floor and gutters to be of concrete, graded to drain properly and kept in good repair. Covered terra cotta drains for distance of 50' from barn required.

Stanchions: All barns in which cows are to be housed permanently must have swinging stanchions.

Manure: Barn to be cleaned thoroughly at least once daily and manure carried to fields, or stored not less than 50 feet from barn.

Location of barn: Dairy barn should be located at least 50 feet from other buildings housing animals and 100 feet from privies and hog pens.

Toilet: Sanitary toilet according to State Board of Health specifications required.

Milk House: Milk house must be a separate building not directly connected to barn or dwelling. Must be of adequate size to take care of handling and storage of milk with room for proper washing and sterilization of all utensils. Floor shall be of concrete properly drained. Milk room must be ceiled and painted. Building must be well lighted, ventilated and properly screened. Building shall be kept clean and used for no other purpose except care of milk and utensils.

Boiling water or steam must be provided for proper sterilization. Water supply must be pure, easily accessible, adequate, safe and sanitary.

WASHINGTON BARN REQUIREMENTS:

Location: Dairy barn must be located at least 50 feet from other buildings housing animals and 100 feet from poultry houses, hog pens and privies. Straw ricks are not allowed within 25 feet of barn and if in barn lot must be fenced off.

If other livestock is kept in dairy barn, a tight partition must be provided with no connecting doors or openings and this portion of the stable cleaned daily.

Light: Not less than 4 square feet of glass per cow, uniformly distributed.

Air and ventilation: Not less than 600 cubic feet of air space per stall. Tilting, adjustable windows dropping in at least 8" at the top required.
Floor: Entire floor, including gutters and mangers, must be of concrete, smooth and graded to drain properly. Gutters at least 6 inches deep and 15" wide. Covered terra cotta drains for a distance of 50 feet from barn are required.

Where cows face in the distance between cow platform and wall including gutter must be at least 4½ feet. Where cows face out the distance between cow platforms including gutters must be at least 9 feet.

Stalls and stanchions: Stalls shall allow at least 3'-6" for each cow and stanchions shall be metal.

Manure: Barn to be thoroughly cleaned at least once daily and manure pit located not less than 50' from barn.

The barn must be cailed tight beneath the joists and girders boxed. Where the barn is of frame construction the walls must be cailed inside also. Walls of non-absorbent material to window sills are required where cows face in, and for a distance of one foot above feed alley floor where cows face out.

Milk House:

Location: A separate 3-room building not less than 10 feet or more than 50 feet from dairy barn. Walls must be of non-absorbent material for 3½ feet, and cailed from that point and overhead. Floor must be of concrete and floor area in both milk and wash room must not be less than 7' x 9' or equivalent in each case. Light should amount to 10% of floor area. Ceiling ventilation must be provided in both milk and wash room. Doors and windows screened.

Provision must be made in milk room for cooling of milk to 50 degrees or below and insulated storage to hold at this temperature. Metal sterilizing cabinets of ample size, boiler of ample capacity and double wash tank required. Water and steam to both sections of wash tank required and steam line to cooler if cooler is not placed in cabinet for sterilization.

Boiler room should not connect with wash room. Toilet if in boiler room must have outside door and be connected to septic tank approved by State Health Department. Privy must be box and can type.

RICHMOND BARN REQUIREMENTS:

Location: Dairy barn must run north and south and be located at least 100 feet from other buildings housing animals. Only milk cows are allowed in barn.

Light: Six light 10/12 single sash window opposite each cow, and each end alley.

Air and ventilation: Not less than 600 cubic feet of air space per stall. For ventilation an opening 12" x 24" under each window covered by cheese cloth, or other adequate ventilation, such as King system, approved by inspector. Tilting windows not acceptable.
Floor: Concrete throughout, smooth, graded to drain properly. Gutters shall continue through wall of barn and connect outside in open concrete drain for distance of 75 feet.

Stalls and stanchions: Metal stalls, stanchions and posts required.

Loft floor shall be tongue and grooved. Ceiling of walls and underneath joists desirable but not compulsory.

Milk House

Location: Not less than 12' from barn and connected by open covered passageway. Milk room, wash room, and boiler room required. Steam for sterilization required.

The above gives briefly the requirements of the principal markets. However, it might be well to say that any one contemplating going into the dairy business or remodeling to get on a better market should by all means first consult the inspectors of the State Dairy and Food Division, Richmond, Virginia, or the inspector of the market he expects to supply. The inspector will be glad to come and help select and approve the location, and discuss in detail matters connected with the market with which the dairyman should be familiar. Such procedure often saves much trouble and expense, and guarantees that the finished job will be approved and accepted by the inspector.

METHODS: A few words about methods might also be worth while. Cows must be kept clean, udders and flanks brushed and washed before each milking.

Each milking must be removed to dairy immediately, filtered and cooled. Milk inspected by state must be cooled to 70 degrees. For Washington, to 50 degrees or lower and stored at or below 50 degrees. When transported it should be iced or cans jacketed and arrive at as nearly original temperature as possible. Markets vary on this from 50 to 60 degrees.

Utensils and strainers to meet approval of inspector. Herd to be tubercular tested at least once a year and reactors removed. Milk from diseased or injured udders not acceptable.

Milkers must be healthy and cleanly, and not be allowed to milk if exposed to contagious diseases.

Milk not to be used for two weeks prior to calving or until normal after calving.

This discussion should serve to acquaint the dairyman with the general requirements of his particular market and enable him to build and produce accordingly. Plans, further information and assistance may be obtained from the Agricultural Engineering Department, Extension Division, V. P. I., either through the County Agent or by mail direct.