Farm Structures
FACTSHEET

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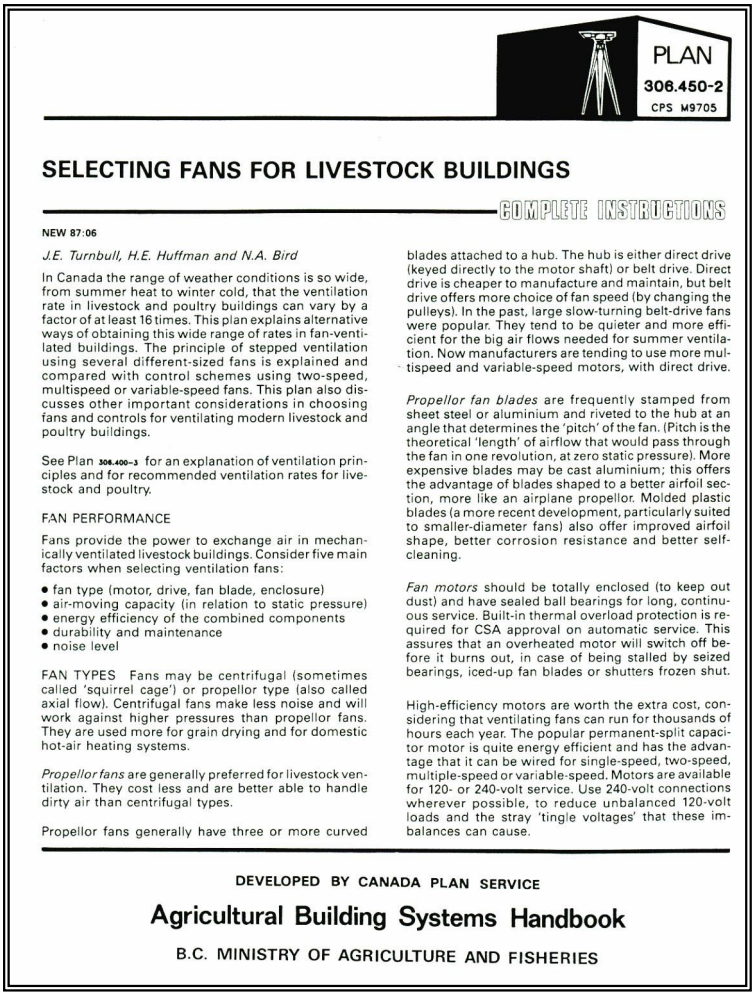
Selecting Fans For Livestock Buildings



PLAN
306.450-2
CPS M9705

SELECTING FANS FOR LIVESTOCK BUILDINGS

COMPLETE INSTRUCTIONS

NEW 87:06

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In Canada the range of weather conditions is so wide, from summer heat to winter cold, that the ventilation rate in livestock and poultry buildings can vary by a factor of at least 16 times. This plan explains alternative ways of obtaining this wide range of rates in fan-ventilated buildings. The principle of stepped ventilation using several different-sized fans is explained and compared with control schemes using two-speed, multispeed or variable-speed fans. This plan also discusses other important considerations in choosing fans and controls for ventilating modern livestock and poultry buildings.

See Plan 306.400-3 for an explanation of ventilation principles and for recommended ventilation rates for livestock and poultry.

FAN PERFORMANCE

Fans provide the power to exchange air in mechanically ventilated livestock buildings. Consider five main factors when selecting ventilation fans:

- fan type (motor, drive, fan blade, enclosure)
- air-moving capacity (in relation to static pressure)
- energy efficiency of the combined components
- durability and maintenance
- noise level

FAN TYPES Fans may be centrifugal (sometimes called 'squirrel cage') or propellor type (also called axial flow). Centrifugal fans make less noise and will work against higher pressures than propellor fans. They are used more for grain drying and for domestic hot-air heating systems.

Propellor fans are generally preferred for livestock ventilation. They cost less and are better able to handle dirty air than centrifugal types.

Propellor fans generally have three or more curved blades attached to a hub. The hub is either direct drive (keyed directly to the motor shaft) or belt drive. Direct drive is cheaper to manufacture and maintain, but belt drive offers more choice of fan speed (by changing the pulleys). In the past, large slow-turning belt-drive fans were popular. They tend to be quieter and more efficient for the big air flows needed for summer ventilation. Now manufacturers are tending to use more multispeed and variable-speed motors, with direct drive.

Propellor fan blades are frequently stamped from sheet steel or aluminium and riveted to the hub at an angle that determines the 'pitch' of the fan. (Pitch is the theoretical 'length' of airflow that would pass through the fan in one revolution, at zero static pressure). More expensive blades may be cast aluminium; this offers the advantage of blades shaped to a better airfoil section, more like an airplane propellor. Molded plastic blades (a more recent development, particularly suited to smaller-diameter fans) also offer improved airfoil shape, better corrosion resistance and better self-cleaning.

Fan motors should be totally enclosed (to keep out dust) and have sealed ball bearings for long, continuous service. Built-in thermal overload protection is required for CSA approval on automatic service. This assures that an overheated motor will switch off before it burns out, in case of being stalled by seized bearings, iced-up fan blades or shutters frozen shut.

High-efficiency motors are worth the extra cost, considering that ventilating fans can run for thousands of hours each year. The popular permanent-split capacitor motor is quite energy efficient and has the advantage that it can be wired for single-speed, two-speed, multiple-speed or variable-speed. Motors are available for 120- or 240-volt service. Use 240-volt connections wherever possible, to reduce unbalanced 120-volt loads and the stray 'tingle voltages' that these imbalances can cause.

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Agricultural Building Systems Handbook

B.C. MINISTRY OF AGRICULTURE AND FISHERIES

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