

Special Design Considerations

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Traditional housing systems for dairy cows and low profile cross ventilated buildings have many similarities. Stall width and length, concrete groove spacing, parlor type, milk storage tanks, and manure storage systems are the same with either housing system.

However, because LPCV buildings are uniquely designed, specific considerations are necessary to ensure optimum efficiency and cow comfort. The following is an easy-to-use reference list of a majority of decisions unique to LPCV buildings. This list is intended to provide quick facts and simple considerations to help in the LPCV design process.

Building Width & Number of Rows (assumes 2 rows of stalls per pen)

- 8 row – nominal width of 200 ft
- 10 row – nominal width of 250 ft
- 12 row – nominal width of 300 ft
- 16 row – nominal width of 400 ft

Interior Service Lanes

- Use to provide access for fan and cooling system maintenance
- Lane located along the inside of the building sidewalls
- 3 to 10 feet – minimum recommended with is 3 ft.
- Increases building width 6 to 20 feet

End Wall Doors & Extra Building Length (doors required per 200 ft wide building)

- 20 doors - one per alley on both ends of the building
 - 5 to 10 ft at each end or 10 to 20 ft extra building length
- 12 doors - 10 doors at one end and 2 doors on the feed lanes on the opposite end
 - 5 ft at end with 10 doors and 30 ft at the end with 2 doors, 35 ft extra in building length
- 4 doors - one per feed lane on both ends of the building
 - 30 ft lanes on both ends of the building 60 ft extra building length
- 3 doors – one per feed lane on one end and 1 door on the opposite end.
 - 30 ft at one end and 50 ft at other end or 80 ft extra building length
- 1 door – one at the end of one feed lane
 - 50 ft at each end or 100 ft extra building length

Building Overhang

- Needs to extend far enough to protect fans from snow and ice damage sliding off the roof
- Manufacturer's fan specifications include information on length of fan shroud or hood.

Building Orientation (Preferred)

- Evaporative Pad Cooling System: north to south with pads on west and fans on east
- High-Pressure Mist System: east to west with fans on north and inlet on south
- Low-Pressure System: east to west with fans on north and inlet on south
- No evaporative cooling system (feed line soakers) - east to west with fans on north and inlet on south

Stall Configuration

Head to head or tail to tail has to be determined before the building can be ordered. The manufacturer will determine post spacing and location after decision is made. This is non-changeable after the building has been ordered.

Baffles

- Static pressure will determine number and height of baffles!!
- Desired air speed and building width have to match up
- Baffle Type: hard (metal), soft (curtain), or none
- Baffle Opening Size: based on the number of baffles
- Location of baffles

Winter Ventilation

- Type of Inlet
- Minimum air speed or minimum number of fans running
- Minimum inlet opening
- Management of snow events

Evaporative Cooling System

- Evaporative pads
- High-pressure mist
- Low-pressure nozzles
- None –feed line soakers only

Feed Alley Width

- 16 to 20 ft – some use a narrow width to reduce overall building width
- 18 ft is the minimum recommendation

Parlor ventilation and Cooling System

- Type: natural, tunnel, or cross ventilated
- Holding pen cooling, evaporative or soakers

Parlor Transfer Lanes and Locations

- Two or one way traffic
- Parlor exit lanes have to be sized to hold 50 % of a pen
- Usually only one 20 to 30 ft wide travel lane

Insulation

- Type: spray-on, fiberglass batt, rigid board, or none
- Close-cell spray-on is recommended
- R-value of insulation: minimum R-6 recommended

Lighting

- Light level: 25 foot candles is the minimum recommendation
- Light type: fluorescent or low bay metal halide
- Light strategy for lactating cows: 16 hours of light with 8 hours of dark, or 24 hours of light

- Light strategy for dry cows: 8 hours of light with 16 hours of dark
- Night light level, recommend 5 foot candles or less
- Automated or manual light control

Water System

- Water treatment system
- Emergency back-up water supply
- Pumping of water hydrants along interior service lanes

Exhaust Fans

- Automatic or manual control
- Diameter, horsepower
- Operating static pressure

Back-up Generator

- Parlor and milk cooling equipment
- 50 % of fans –
 - Fans must be wired to allow 3 to 5 fans to turn on and come up to operating speed before more fans are turned on -- must work with suppliers of generator and electrical control panel to work out the emergency power fan start up procedures prior to installation of fans.

Dry Cows/ Special Needs / Treatment Area

- Extra pens and treatment space in the same housing area as lactating cows or a separate area designated for dry cows and treatment
- Offset area adjacently attached to the parlor or separate building

Number of Milking Groups

- 8 to 12 groups, interrelated with manure management

Manure Handling Procedure

- Method: scrape, flush, or vacuum
- Time required for manure removal if scraping or using the vacuum system versus milking cows

Upper Management Issues

- Understanding of fan static pressure and the relationship between operating fans and the inlet area – seasonal differences in ventilation
- Organization of task to prevent doors from being open constantly
- Understanding of water treatment system
- Management of employees in an artificial light environment
- Maintenance issues of doors and lights