

Hybrid design - natural ventilation with mechanical winter positive pressure tempered air ducts, central in-floor exhaust; ad lib acidified milk/MR mix, high pipe line



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## Facility

New barn 11-2011, 49'x144', 10 ft eaves, insulated ceiling. Two rows of 8 pens 15'x16'. 8 calves per pen. All in all out. One to two pens usually empty. Central 8 ft alley, with air exhaust plenum and a fan at each end. 4' outside alley. Tempered air supply duct runs length of each side of barn, in outside alley, below insulated sidewall curtains. Horizontal duct holes regulate amount of fresh air exiting duct into pen at calf level. Fresh air supply via duct from attic. Heat exchanger inserted to temper air @ 50F when ambient <10F. Design by Curt Gooch, PE, Pro-Dairy. 14x23 bulk tank mixing room. Weaned calves move in same group to weaned barn 1-2 weeks post weaning.

## Colostrum Management

4 qts @ birth, esoph. feeder. Pen checked hourly. 2<sup>nd</sup> 2 qt feeding by bottle or esoph. feeder. IgG level not tested. Collected, bottled, chilled in freezer 2-3 hrs, transfer to refrig. end of milking. 10 TP levels good 2 yrs ago same routine: 8/10 @ >=5.2 to 6.2; 2 @ 5.0

## Age at Introduction

Newborns housed in clean bedded calf pen in maternity barn for 1<sup>st</sup> and 2<sup>nd</sup> colostrum feeding, then move to group pen in calf barn within 10-24 hrs. Fill approx. one pen per wk.

## Feeding System Components- calves per pen

800 gallon bulk tank supplies round barn high 1" PVC pipeline. 3 Peach teat nipples per pen each fed by drop hose, with check valve to prevent leaking, quick attach connector to high line. Held at 78-82F in BT, circulates by low speed diaphragm pump ([www.advanceddairy.ca](http://www.advanceddairy.ca) Kevin Kraemer), through filter. Tank lasts 3-4 days. Milk/MR mix (see below) acidified at main barn in 800 gal mobile bunk tank, transported, pumped into 2<sup>nd</sup> 800 gal BT at calf barn.

## Liquid Feed/ Additives

Initially fed 24-20 all milk MR acidified to 4.2-4.3 pH. In last year fed a mix of approx. 20% 22-20 MR + 20% transition/discard milk + 60% saleable milk. Acidify to pH 4.5, lower limit 4.3; Hannah waterproof PHep5 HI98128 pH meter (meas. to 0.01 pH) Order is MR, acidified; chilled waste milk plus chilled saleable milk added, acidified. Adjust milk: MR proportions according to milk: MR economics. Will use 23:22 MR + milk this winter. No additives.

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Fairmont Farm Inc Calf Barn (Nov. 2011)



800 gal transport bulk tank – MR, waste, saleable milk mix is acidified.



Left: exit line from bulk tank, to pvc pipe, through filter to calf barn. Low speed diaphragm pump on wall.



Right: 800 gal. transport BT on the right, 800 gal calf barn BT on the left.



Right: Mixer  
Below: Transfer pump used to move milk replacer and clean.





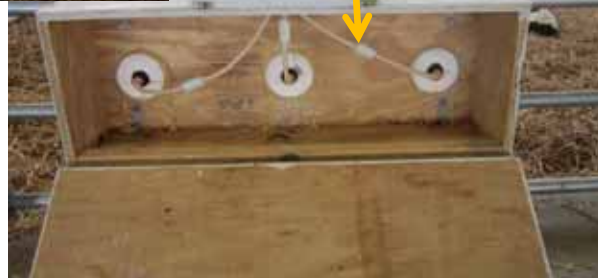


Left: 8 pens, 15' x16', per side; plywood boxes contain 3 drop hoses attached to nipples mounted in 4" pvc caps. (6" would be better for larger calves, more expensive) .  
1 inch PVC pipeline, not insulated.

Left & below:  
3 nipples per pen. Nipples are covered with caps to limit intake @weaning.



Check valves in drop hoses to prevent leakage. These clog periodically.



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<b>Free Access</b>	<p>3 Peach Teat nipples/pen of 8 calves. Must check drop hoses for plugged lines daily but manageable with 3 nipples per pen, always nipples available.</p> <p>Calves consume 2-2.5 gallons per day on average; affected by distribution of age in barn. Bulk tank at 78F in summer, 82F in winter. Cross suckling post weaning in 1 of 20 calves, use plastic nose rings in these.</p>
<b>Calves need to coax</b>	<p>Most calves catch on after being taken to nipple 1-2 times. 1 out of 5 calves require multiple times but figure out within 2 days. In last year, only 2 calves have been lost, both culled for non adapting and they were both odd.</p>
<b>Mixing/ Cleaning</b>	<p>Tank is washed once per wk, every other fill. Butterfat does accumulate. Bulk tank drained, rinsed, filled with water and CIP, scrubbed, CIP is circulated 1x through lines and into drain. Follow with acid rinse. New nipples for each new pen. Drop hoses changed annually, minimal evidence of build up in lines.</p>
<b>Resting Area Space</b>	<p>Entire pen is bedded, 30 sq. ft / calf.</p>
<b>Bedding</b>	<p>Cement floor. Shavings layer. Straw on top, bedded every other day. Extra shavings in between used in areas that become damp, especially older pens and at nipples. Has obvious effect on improving air quality.</p>
<b>Jackets</b>	<p>As soon as gets into 30sF. On about 4 weeks, many shed jacket themselves by then.</p>
<b>Ventilation / Drafts</b>	<p>Chief concern for new calf barn was how to provide good quality air at calf level. Moving from 100 calves in hutches w/ almost no respiratory disease. Curt Gooch, PE, Pro-Dairy designed desired hybrid barn (see facility above) to utilize natural sidewall ventilation w/ additional fresh air delivered @ calf level through forced air ducts in the sidewalls. More holes open in transition season. 'Minimal' (winter) ventilation system runs 365. Stale air exits via central floor exhaust plenum. Since Nov. 2011, drafts have not been a problem. Anticipate need for additional cooling in summer if hot. 2012 minimal hot days.</p>
<b>Treatments</b>	<p><u>Scours</u>: If any, first 10 days. 6 calves got electrolytes in last year. Sometimes give Revitalize - Ralco-soluble fiber + electrolyte capsule. <u>Respiratory</u>: Monitor aggressively, treat on signs and temp. W/ daily routine it is not difficult to detect animals not 100%. Naxcel 3 days, banamine initially. Respond well. Monitor daily. Approximately 25% of calves will receive treatment of some sort for 'suspected' respiratory problem. A small number of treated calves did not compete well in older heifer barn and were culled.</p>
<b>Pen Moves/ Weaning</b>	<p>8-16 calves are weaned at a time. Youngest calf in the pen = 38 days, oldest about 45. Monday, nipples are covered in the day, uncovered at night, for 3 days. Next 2 days nipples uncovered only in the morning. Calves remain in pen another 1-2 wks. Moved as a group to post wean barn around 56 days old.</p>
<b>Dry feed</b>	<p>21% protein calf pellet free choice, in buckets, from day one. Same grain next barn. Consumption low until 38 days (youngest wean age). Will search more palatable product. Eating at least 6 lbs by week after weaning. High quality 2<sup>nd</sup> cut hay, corner rack each, pen from day one.</p>
<b>Weights / Avg Daily Gain</b>	<p>Weigh at birth and post wean move ~ 56 days. Paul livestock scale. ADG typically 1.8 to 2.1 lbs/day to 56 days. Occasional scattered pens 1.7 to 1.77.</p>
<b>Vaccinations (Cow &amp; Calf)</b>	<p>Dry cows: MuSe, Scourguard, Jvac; Calves: Inforce 3 @ 2<sup>nd</sup> colostrum and 4 wks; Bovishield HB, rabies at 3 mos; lepto HB booster 3. 5 mos.</p>





4' outside alley. Tempered air supply duct runs length of barn, each side, in outside alley, below insulated sidewall curtains. Horizontal duct holes regulate amount of fresh air exiting duct into pen at calf level. Curtains on thermostat.



Fresh air supply via duct from attic. Heat exchanger inserted ahead of duct fan tempers air to 50F when ambient temp <10F.

Central 8 ft alley, with air exhaust plenum and a fan at each end.

## Air objective



Objective: deliver fresh air at calf level that wafts slowly (less than draft speed 50 ft/ min) across pen to exit via central exhaust plenum.

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Exhaust plenum fans

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## Biggest Challenges

Respiratory management factors and how they affect air quality:  
Bedding and moisture management of pack has huge impact. Use shavings over damp areas between every other day bedding.  
Is there enough space? Did we build the barn big enough?  
How much air is needed? When to temper the temperature? How much heat abatement is needed? Still working through these things. Fortunately we have an excellent calf manager that can manage! Happy with our investment.

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## Changes to Make?

Handling waste milk – need more efficient way to handle, chill, store.  
Improve calf starter intake pre- weaning. Better palatability? Textured?

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## Recommend

Gather ideas. Then seek 'expert' or professional engineering advice on Your facility.  
Don't go with the attitude to 'copy'. Pay for the engineering. Get the right application for what you want.

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*Life is Good !*