

You hold the power of calf nutrition quality control

Ann Hoskins, Vita Plus



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Why focus on quality control?

Average Daily Gain, lb	Milk Production, lb	Grade
2.2	110	A+
2.0	100	A
1.8	90	B
1.6	80	C
1.4	70	D
1.2	60	F
1.0	50	DNF



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What can dialing in quality do for you?

- Health benefits
- Performance
- Employee Morale
- Shrink
- Communication
- Grow A+ Calves



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Communication & Identification



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DATE	COW NUMBER	MOVE	HYPHEN CALF (ALIVE)	HYPHEN CALF (DEAD)	MULE CALF (ALIVE)	MULE CALF (DEAD)	CALVING DATE	TIME OF BIRTH	PLASTIC TAG #	ELECTRONIC ID #	WRENCH CALVING HAND	WIT TAG #	INITIALS	WEIGHT 28 DAYS	TIME OF COLOSTRUM	FIRST DEFENSE	INITIALS	CALF WEIGHT	BOVINEALY	NOTES
3-24-18	1222							11:15 AM	5423	250-232				12:00 PM				117		
3-24-18	12263							1:00 PM	114199	250-237	X			2:30 PM				94		
3-24-18	1451							4:55 PM	5424	250-218				5:00 PM				115		
3-26-18	12288							6:00 PM	5435	250-239				6:30 PM				107		
3-26-18	12282							8:00 PM	5436	250-240				8:30 PM				104		
3-27-18	11263							8:30 PM	2433	250-241				9:00 PM				90		
3-27-18	9459							4:00 PM	14200	250-242	X			4:30 PM				105		
3-27-18	474							2:00 PM	1509	250-243				2:30 PM				117		
3-27-18	10679							1:00 PM	14201	250-244	X									



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Calf Chores									
<p>Other calf chores</p> <ul style="list-style-type: none"> Fresh calves 1st Colostrum feeding Treat calves Decorate water troughs Decorate weaned calves 									
<p>60 Bottles AM</p> <p>55 Full</p> <p>5 2 Quarts ONLY</p>									
<p>60 Bottles PM</p> <p>55 Full</p> <p>5 2 Quarts ONLY</p>									
<p>Row 8: 240 241 2385 2386 242 243 2387 244 245 2388 2389 246 247 2468 249</p> <p>FULL</p> <p>Row 7: 2378 2382 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397</p> <p>FULL</p> <p>Row 6: 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384</p> <p>FULL</p> <p>Row 5: 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389</p> <p>FULL</p> <p>Row 4: 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384</p> <p>FULL</p> <p>Row 3: 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384</p> <p>FULL</p> <p>Row 2: 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384</p> <p>FULL</p> <p>Row 1: 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384</p> <p>FULL</p>									
<p>Treat List</p> <p>1370 1380 = 100 calves each</p> <p>1380 = 100 calves</p> <p>1380 = 100 calves</p> <p>1380 = 100 calves</p>									
<p>NO MILK!</p> <p>Row 1: 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384</p> <p>NO MILK!</p>									



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Consistency

• Doing the same day after day

- What does that take?
 - Mixing
 - Mixing Charts
 - Feeding programs
 - Easily identifying animals
 - Communication



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Mixing Milk Replacers

- What does it weigh?
- Water = 8.34 lbs. / gallon
- Milk = 8.6 lbs. / gallon
- 4 quarts per gallon
- 8 pints per gallon
- 3.8 L per gallon



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Mixing Milk Replacers

- **Know what's in your mix**

- Total Solids:

$$\text{Powder} / \text{total solution} * 100 = \% \text{ solids}$$



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Total solids

- **Example: conventional**

- 12 ounces of powder with 2.5 quarts of water
 - 12 ounces / 16 = .75 lbs. of powder
 - 2.5 quarts * 2.085 lbs. per quart = 5.21 lbs. of water
 - .75 lbs. + 5.21 lbs. = 5.96 lbs. (total solution weight)
 - (.75 / 5.96) * 100 = 12.6 % solids



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Total solids

• Example: autofeeder

- 150 g of powder with 1 Liter of water
 - 1 L of water = 1000 grams of water
- 150 g powder
- $1 \text{ L} * 1000 \text{ g} = 1000 \text{ g of water}$
- $150 \text{ g} + 1000 \text{ g} = 1150 \text{ g (total solution weight)}$
- $(150 / 1150) * 100 = 13.04 \% \text{ solids}$



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Consequences of solids variation

- **When solids are too high (> 15%)**
 - Slow rate of abomasal emptying rate
 - Water movement into GI tract
- **When solids are too low (< 11%)**
 - Digestive enzymes are diluted below optimal levels



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Checking milk solids with Brix

Milk/Milk replacer	Brix + correction factor
Whole Milk	Brix + 2
Calf Glo	Brix + 1
First Choice	Brix + 1
Vision	Brix + 1.5
Calf Precision	Brix + 0.5
Talon	Brix + 1
Momenta	Brix + 0.5



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Mixing Charts

Towns Milk Replacer Chart

Gallons of milk replacer solution	Water (lbs)	Water (gallons)	powder (lbs.)	Number of calves	
				(2 quarts / Calf)	(3 quarts / calf)
0.25	1.9	0.2	0.3		
0.50	3.7	0.4	0.6	1.0	
0.75	5.6	0.7	0.8	1.5	1.0
1.0	7.5	0.9	1.1	2.0	1.3
2.0	15.0	1.8	2.2	4.0	2.7
3.0	22.4	2.7	3.4	6.0	4.0
4.0	29.9	3.6	4.5	8.0	5.3
5.0	37.4	4.5	5.6	10.0	6.7



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# Gallons	Milk Replacer, lb.	Water, gallons	Milk, lb.
1	1.1	0.92	8.46
2	2.2	1.8	16.9
3	3.3	2.8	25.4
4	4.4	3.7	33.8
5	5.5	4.6	42.3
6	6.6	5.5	50.8
7	7.7	6.4	59.2
8	8.8	7.4	67.7
9	9.9	8.3	76.1
10	11.0	9.2	84.6
11	12.1	10.1	93.1
12	13.2	11.0	101.5
13	14.3	12.0	110.0
14	15.4	12.9	118.4
15	16.5	13.8	126.9
16	17.6	14.7	135.4
17	18.7	15.6	143.8
18	19.8	16.6	152.3
19	20.9	17.5	160.7
20	22.0	18.4	169.2
21	23.1	19.3	177.7
22	24.2	20.2	186.1
23	25.3	21.2	194.6
24	26.4	22.1	203.0
25	27.5	23.0	211.5
26	28.6	23.9	220.0
27	29.7	24.8	228.4
28	30.8	25.8	236.9
29	31.9	26.7	245.3
30	33.0	27.6	253.8
31	34.1	28.5	262.3
32	35.2	29.4	270.7
33	36.3	30.4	279.2
34	37.4	31.3	287.6
35	38.5	32.2	296.1
36	39.6	33.1	304.6
37	40.7	34.0	313.0
38	41.8	35.0	321.5
39	42.9	35.9	329.9
40	44.0	36.8	338.4
41	45.1	37.7	346.9
42	46.2	38.6	355.3
43	47.3	39.6	363.8
44	48.4	40.5	372.3
45	49.5	41.4	380.7
46	50.6	42.3	389.2
47	51.7	43.2	397.6
48	52.8	44.2	406.1

Date	4/24/2018	# Calves	AM Gallons	PM Gallons
Group	Quarts/Feeding			
0 to 14 Days	2	10	5	5
15 to 42	3	25	19	19
43 to 49	3	10	8	0
50 to 90	0	5	0	0
Bull calf < 14 Days	2	0	0	0
Total Gallons			31	24



Directions

1. Enter the number of calves for each age group in the yellow cells.
2. Use the calculated total gallons in the red box to add to Vita Plus feeding to determine how much to mix.
3. Use the chart on the right to measure amount of milk replacer to add to water to make milk.
4. Dispense 2 quarts twice daily to calves 0 to 14 days of age.
5. Dispense 3 quarts twice daily to calves 15 to 42 days of age.
6. Dispense 3 quarts once daily (AM only) to calves 43 to 49 days of age.
7. Dispense water only to calves older than 50 days of age.



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Mixing

- **Start with 110F - 120F water – depending on season**
 - Some milk replacers require different temperatures
 - Agglomerated vs. Dry Blends
- **Put water in mixing tank and agitate**
- **Add powder once weighed**
- **Don't over or undermix milk replacer**
 - Volume
 - Paddle
 - Temperature
- **Feeding temperature 100F – 105F**



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Mixing tools



Inline water thermometer



Inline flow meter



Digital thermometer



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Mixing Tools



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Mixing tools



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Portable Milk Mixers / Feeders



70-Gallon Portable
Milk Master TM-007



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Mixers



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Feeding Calendar

Pen	Youngest calf birthdate in pen	Calves on 1X feeding	Off Milk
1	6/12/2018	7/24/2018	7/31/2018
2	7/1/2018	8/12/2018	8/19/2018
3	7/2/2018	8/13/2018	8/20/2018
4	7/3/2018	8/14/2018	8/21/2018
5	7/4/2018	8/15/2018	8/22/2018
6	7/5/2018	8/16/2018	8/23/2018
7	7/6/2018	8/17/2018	8/24/2018
8	7/7/2018	8/18/2018	8/25/2018
9	7/8/2018	8/19/2018	8/26/2018
10	7/9/2018	8/20/2018	8/27/2018
11	7/10/2018	8/21/2018	8/28/2018
12	7/11/2018	8/22/2018	8/29/2018
13	7/12/2018	8/23/2018	8/30/2018
14	7/13/2018	8/24/2018	8/31/2018
15	7/14/2018	8/25/2018	9/1/2018
16	7/15/2018	8/26/2018	9/2/2018
17	7/16/2018	8/27/2018	9/3/2018
18	7/17/2018	8/28/2018	9/4/2018
19	7/18/2018	8/29/2018	9/5/2018
20	7/19/2018	8/30/2018	9/6/2018

Enter birthdate of youngest calf in pen in yellow column



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Calf Feeding Calendar

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Calf ID #	Birth Date	Day 1 to 14 2 quarts/feeding	Day 15 to 49 3 quarts/feeding	Day 42 Stop PM Milk	Day 49 Wean (No Milk)	Day 56 Move out
1	5/23	5/24	6/8	7/5	7/12	7/19
2	5/30	5/31	6/15	7/12	7/19	7/26
3	6/6	6/7	6/22	7/19	7/26	8/2
4	6/13	6/14	6/29	7/26	8/2	8/9
5	6/20	6/21	7/6	8/2	8/9	8/16
6	6/27	6/28	7/13	8/9	8/16	8/23
7	7/4	7/5	7/20	8/16	8/23	8/30
8	7/11	7/12	7/27	8/23	8/30	9/6
9	7/18	7/19	8/3	8/30	9/6	9/13
10	7/25	7/26	8/10	9/6	9/13	9/20
11	8/1	8/2	8/17	9/13	9/20	9/27
		1/1	1/16	2/12	2/19	2/26
		1/1	1/16	2/12	2/19	2/26
		1/1	1/16	2/12	2/19	2/26
		1/1	1/16	2/12	2/19	2/26

Directions

1. Enter the calf ID # and date of birth and press enter.
2. The calendar will be automatically adjusted based on the birth date and the column headings.
3. Use the highlight icon to highlight cells once the task has been completed.
4. This sheet can be customized to fit any feeding program by inserting columns and writing a formula. For example; (reference date + # of days) to calculate the date of a new item.



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Where are the hot spots in your autofeeder?

- **Cleaning**
 - Hoses
 - Rinse vs. Circuit
 - Regular sanitation audits
- **Calibration**
- **Knowing your solids**
- **Feeding tables**
- **Cleaning pens**
- **Waters**



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Solids content in whole milk vs. milk replacers mixed at 12.5% solids

	Whole milk	20:20	22:22	24:18	25:25	26:18	
	%						
	Wet	Dry	Dry	Dry	Dry	Dry	Dry
Water	87.5	0.0	0.0	0.0	0.0	0.0	0.0
Protein	3.1	24.8	20.0	22.0	24.0	25.0	26.0
Fat	3.7	29.6	20.0	22.0	18.0	25.0	18.0
Lactose	5.0	40.0	51.4	43.3	48.5	36.5	47.4
Ash	0.7	5.6	8.6	8.0	8.7	7.4	8.6
Total solids	12.5	100	100	100	100	100	100



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Figuring out milk on a Dry Matter Basis

- **Fat – 4.2%**
- **Protein – 3.3%**
- **Milk solids 12.5%**

• Example

- Protein: $(3.3 / 12.5) * 100 = 26.4\%$
- Fat: $(4.2 / 12.5) * 100 = 33.6\%$



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Taking Solids on Whole Milk

- **Brix + 2 = total solids**
- **Example:**
 - Take a sample of agitated milk prior to pasteurization
 - Place a drop of milk on the optical lens
 - Reading is 10, add 2 and your milk solids are 12%



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Milk Additives and fortifiers

- **When adding balancers, extenders & fortifiers be consistent**
- **Weigh powders and mix thoroughly**
- **Follow tag directions**
- **Monitor your current solids and know how much you are adding**
- **Quality samples should be taken before additives are added**



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Temperature Guidelines for Pasteurizing

Batch Method	145°F	30 minutes
Continuous Flow	161°F	15 seconds



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Types of Pasteurizers

- Batch
- Continuous flow-high temp - HTST



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What is Pasteurization?

Goals for Pasteurized Waste Milk Cleanliness

- **Total Plate Count (TPC)**
 $< 20,000 \text{ cfu} / \text{ml}$
- **Total Coliform Count**
 $< 1,000 \text{ cfu} / \text{ml}$
- **Total E. Coli Counts**
 $< 100 \text{ cfu} / \text{ml}$



WVDL Guidelines, 2009

Take Home: Routinely (Weekly) Collect Samples and Analyze Them



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Taking Samples

• Take samples:

- Before pasteurization
- Post Pasteurization
- Last Calf

- Other critical points
 - Out of storage containers
 - Out of feeding equipment



Colostrum

- **Heat Treating**
 - 140F for 60 min
- **Take Bacteria Samples**
 - Before storage
 - At feeding
- **Proper warming procedures**



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Starter



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On-farm Starter Evaluation

Evaluate starter grain across ages of calves

- Available by day 3
- Appropriate amount within reach
- Palatable and fresh
- Absence of: fines, mold, bird droppings
- Communication among feeders.
- Starter storage-bag vs. bulk
- Product turn-over (2-3 weeks in summer)

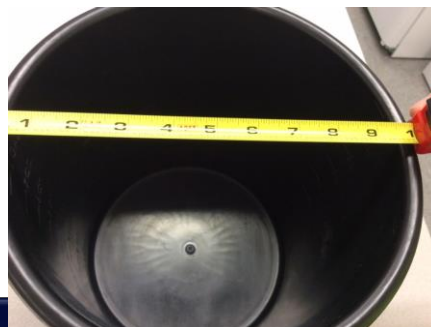
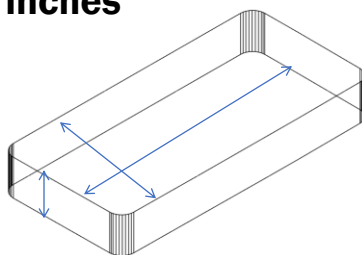


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General Recommendations

- Feeder width: 10 to 14 inches
- Maximum throat height : 21 inches
- Maximum throat depth 9 inches
- Minimum linear feed bunk space/calf: 5 inches



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Calf Starter Shrink Calculator

Cost of Feed, \$/lb	Average Amount fed/calf/d								
0.26	2.2	1	2	3	4	5	6	8	10
	1	2	4	6	8	10	13	17	21
	10	21	42	63	84	104	125	167	209
	25	52	104	157	209	261	313	418	522
	50	104	209	313	418	522	626	835	1,044
	75	157	313	470	626	783	940	1,253	1,566
	100	209	418	626	835	1,044	1,253	1,670	2,088
	1000	2,088	4,176	6,263	8,351	10,439	12,527	16,702	20,878
		% shrink/day for 365 days							
		Number of calves fed/day (do not change cell B15)							
		Cost of Feed, \$/lb							
		\$/year lost in shrink per # of calves							
		Average amount fed/calf/d for the group							



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Drinking Water

Tips to increase water intake:

- Offer clean, fresh and warm drinking water within 10 minutes of feeding milk to maximize water intake.
- Do not over- or underfeed water.
- Aim for targeted feeding amounts of drinking water.



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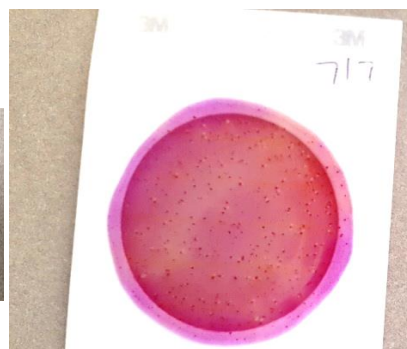
Which would you drink from?



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Water hygiene



	Calf Hutch	North Heifer	South Heifer	Pen 2
ATP Surface	1954	4614	7766	7790
ATP Water	3822	2892	500	2178



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Cleanliness

- **Rinse with 100 – 100F water**
- **Wash in hot soapy water 140 – 160 F**
 - Alkaline detergent is necessary to break up milk fat
 - Manually scrub with a hard bristled brush
 - pH of 11-13
- **Post Rinse with Acid**
 - Use lukewarm water to remove soap
 - Add acid sanitizer – follow directions
 - pH of 2-4



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Cleanliness

• Air Dry

- Do not stack equipment in places where it can not dry

• Sanitize

- Sanitize with in 2 hours of use



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Reference - Temperature & pH levels

	Temperature	pH level	Critical temperature
Pre-rinse	100-110F	-	Never <93F or >120F
Wash	140-170F	11 to 13	Never <120F
Post-rinse	100-110F	2 to 4	-
Air-dry	60-110F	-	-
Sanitize	100-110F	3 or less	-

Source - Progressive Dairyman (5 steps to Perfect Cleanliness)



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Cleanliness

- **How do we know it really works?**
 - Sanitation audits



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ATP Meters



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Check this out.....



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Safe Zones

% Milk solids	Milk, quarts/day	Milk quarts/feeding	Milk solids intake, lb./day	Milk solids intake, oz./feeding	Milk solids intake, % of body weight	Milk fat intake, lb./day
8	3	1	1.0	6	1.0	0.2
10	4	2	1.25	8	1.25	0.3
11	5	3	1.5	10	1.5	0.33
12	6	4	1.75	12	1.75	0.38
13	7	5	2.0	14	2.0	0.44
14	8	6	2.25	16	2.25	0.50
15	9	7	2.5	18	2.5	0.55
16	10	8	2.75	20	2.75	0.61
17	11	9	3.0	22	3.0	0.66



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