



Integrated Poultry Health Management

Drinking Water Management

Drinking Water Management is essential to ensure optimum health and the best performance of a poultry flock. Successful water sanitation begins with a thorough water line cleaning program. Water system and water source variability can create cleaning challenges; the following information is a guideline to ensure optimal drinking water supply.

The elements of Drinking Water Management Practices as they apply to a poultry house include:

1. Annual water analysis.
2. Water line sanitation, biofilm purge prior to bird placement. Consult equipment suppliers before using products to prevent damage.

Water Line Sanitation – Biofilm Purge Prior to Placement

Product or Method	Instructions or Directions for Use
High Pressure Flush	1 Minute per 60 feet of line. Do not offer cold water to brood chicks.
Chlorine 5%	350 ml/gallon stock solution.
Citric Acid	800-1000 grams/gallon stock solution.
Vinegar	No dilution. Add at 1 gallon/1 gallon stock solution.
Ammonia	350-500 ml/gallon stock solution.
Proxy-Clean™	0.8 - 3% Solution. Allow the system to stand for a minimum of 12 hours.
PWT ^a Jones Hamilton	1 pack (16 oz.) / 2.5 gallons stock solution. Allow 8 hours for cleansing. Flush
Sterilex	12 oz per gallon of water. Allow the system to stand for 12-24 hours.

Drinking Water Sanitation (Birds in Barn)

Product or Method	Instructions or Directions for Use
Ammonia (clear household)	100 -150 ml/gallon stock solution.
Chlorine 5% (Closed System)	60 ml/gallon stock solution
Chlorine 5% (Open System)	150 ml/gallon stock solution
Citric Acid	200 grams/gallon stock solution.
High Pressure Flush	1 Minute per 60 feet of line. Do not offer cold water to brood chicks.
Hydrogen Peroxide 35%	15 - 30 ml/gallon stock solution
Premise Aqua	1 part Premise Aqua/40 parts water
Proxy-Clean™	8 oz. / 5 gallons stock solution. Treat for 24 hours.
Ultraviolet Technology	Follow manufacturers guidelines.
Vinegar (white household)	4L Vinegar = 1 US gallon stock solution.

Note – stock solutions to be metered at a rate of 1 oz. stock/128 oz. drinking water.



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Water Acidification

Product	Directions for Use
Acidomix	0.25 – 3 grams/ liter drinking water. Dose will vary according to water hardness.
Acid-Pak 4-Way 2X	Add to drinking water at 0.5g/liter.
Acidistat	100 – 400 ml’s per 19L stock solution. Dispense through a proportioner at 1% (1:100)
Agri-Acid	300 – 1000 ml’s per 20L stock solution. Dose will vary according to water hardness.
Citric Acid	200 grams/gallon stock solution.
Combiacid	
Jefacid™	Create stock solution so ph is <5, leave in water line for at least 24 hours. Flush

Note—A calibrated pH meter must be used to accurately measure the final pH of the drinking water. The use of antibiotics may lower the pH of drinking water.

Water Quality - Equipment Management

Product or Method	Instructions or Directions for Use
Control Method	Action to be Taken
All Drinker Types	Use a water meter and record water consumption daily. Refer to Table 6 for daily water consumption guide. Flush lines weekly at high pressure. Check water filters weekly, replace regularly. Flush water lines 12 hours after the administration of vaccine, vitamins or antibiotics.
Nipple Drinkers	Recommended 8-12 birds/nipple. It is recommended that nipple flow be set at 25 ml/minute. Maintain water pressure per manufacturers recommendations. Lines must be level with no air blocks. Monitor and adjust height daily – at chicks’ eye level for the first two days; at a 45 degree angle starting at day 3; then, gradually raise lines so that the birds drink straight up by day 10.
Bell Drinkers	Recommended 10-12 bell drinkers/1000 birds with a water depth of 1.9 cm (0.75 inches). Monitor and adjust drinker height daily – up to seven days of age, the top lid of the automatic drinker should be set at the height of the average birds back; then, the drinkers should be raised to a level where the bottom of the drinker is even with the average birds back.



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Disinfection of Wells

It is important that all wells are periodically disinfected with chlorine to ensure they are free from bacterial contamination. Test for bacteria frequently (at least twice per year), and treat again as necessary.

The method outlined below describes a general procedure to disinfect a well. If you have any questions about this procedure, contact your local environmental health officer for advice.

Procedure

- Pour unscented household bleach (5-6% chlorine) directly into the well. The chart below outlines the amount of chlorine to add based on the diameter of the well or pipe and the depth of the water in the well or pipe.
- Help the chlorine mix by running a hose back into the well for 30 minutes. Run each tap (including outside house bibs) until you can smell chlorine.
- Open the valve or plug at the top of the pressure tank to allow the solution to contact the entire inside surface of the tank, then close the valve or plug.
 - Leave the chlorinated water in the system for 24 hours. This is a very strong chlorine solution (50

Diameter of Well, or Pipe		Bleach (5-6% Chlorine) per Depth of water in Well or Pipe	
Inches	Cm	Per 10 Feet	Per 3 M
2	5	1 tsp	5 mL
4	10	4 tsp	20 mL
6	15	10 tsp	50 mL
8	20	7 Tbsp	100 mL
10	25	1/2 cup + 2 Tbsp	150 mL
12	30	3/4 cup + 1 Tbsp	200 mL
24	60	3 1/2 cups	800 mL
36	90	2 quarts	2.3L
48	120	3 quarts	3.4L
60	150	5 quarts	5.7L
72	180	7 quarts	8L
96	240	3 gallons	13.6L



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Chemical Analysis - Water Quality Standards for Poultry

Microbiological Analysis	Units	Result	Health Canada Guidelines ⁴	Level Considered Average (S.E.Watkins, Ph.D) ²	MAC (Maximum Acceptable Concentration)
Total coliforms	CFU/mL		0/100mL	0	50 cfu/ml
E.coli	CFU/mL		0/100mL	0	<1
Heterotrophic Count	MPN/mL		500 cfu/ml		500 cfu/ml
Physical Properties	Units	Result	Health Canada Guidelines	Level Considered Average (S.E.Watkins, Ph.D) ²	MAC (Maximum Acceptable Concentration) (S.E.Watkins, Ph.D) ²
Colour	Units				15
Turbidity	NTU		0.3/1.0/0.1		5
Temperature	°C		n/a	n/a	n/a
Routine Water Analysis	Units	Result	Health Canada Guidelines	Level Considered Average (S.E.Watkins, Ph.D) ²	MAC (Maximum Acceptable Concentration)
pH			6.5 – 8.5	6.8 - 7.5	6.0 - 8.0
Total hardness	ppm		n/a *	60 -180	110
T-Alkalinity	Mg/L		n/a		250-650
Total dissolved solids	Mg/L		≤ 500		500
Sodium (Na)	Mg/L		≤ 200	32	50
Iron (Fe)	Mg/L		≤ 0.3	0.2	0.3
Magnesium (Mg)	Mg/L		n/a *	14	125
Manganese			≤ 0.05		
Calcium (Ca)	Mg/L		n/a *	60	
Chloride (Cl)			≤ 250	14	250
Fluoride			1.5		
Nitrate	Mg/L		45	10	25
Nitrite	Mg/L		n/a		



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Chemical Analysis - Water Quality Standards for Poultry (continued)

Metals Extractable	Units	Result	Health Canada Guidelines	Level Considered Average (S.E.Watkins, PhD) ²	MAC (Maximum Acceptable Concentration)
Aluminum	Mg/L		0.1/0.2 ^c		0.1
Antimony	Mg/L		0.006		0.006
Arsenic	Mg/L		0.005		0.01
Barium	Mg/L		1		1
Boron	Mg/L		5		5
Cadmium	Mg/L		0.005		0.005
Chromium	Mg/L		0.05		0.05
Copper (Cu)	Mg/L		≤ 1.0	0.002	0.6
Lead (Pb)	Mg/L		0.01	0	0.02
Uranium	Mg/L		0.02		0.02
Zinc	Mg/L		≤ 5.0		1.5
Oxidiza- tion Test	Units	Result	Health Canada Guidelines	Level Considered Average (S.E.Watkins, PhD) ²	MAC (Maximum Acceptable Concentration)

Note - n/a * values = Public acceptance of hardness varies considerably. Generally, hardness levels between 80 and 100 mg/L (as CaCO₃) are considered acceptable; levels greater than 200 mg/L are considered poor but can be tolerated; those in excess of 500 mg/L are normally considered unacceptable.

References:

1. Leslie, Michael, Water Sanitation, Canadian Poultry Consultants Ltd.
2. Watkins, S.E., Water Quality: What Do We Really Know?, University of Arkansas
3. Norwest Labs, APHA and US EPA Testing Methods
4. Health Canada, Guidelines for Canadian Drinking Water Quality
5. Dallimore, Karen, Water: It's Not Just H₂O, Canadian Poultry February 2007