BROILER · WATER QUALITY

The biggest input on the farm, the least tested.

Two handbooks — Ross 2025 and Cobb 2021 — read straight from the water tables.

A broiler drinks more water than it eats feed

At 21 °C a healthy flock drinks 1.6–1.8 litres of water for every kilo of feed. That ratio rises about 6.5% for every 1 °C above 21 °C, and prolonged tropical heat doubles it. Water is the most-consumed input on the farm — and usually the least measured.

The one number both breeders agree on

ORP ≥ 650 mV

Ross: ideal 650–800 mV

Cobb: ≥ 650 mV = good quality water

Oxidation-reduction potential measures the sanitizer's activity, not its ppm dose.

Two independent breeder handbooks land on the same threshold to the millivolt. Below 650 mV, a heavy organic load is overwhelming the chlorine: check pH, chlorine concentration, water purity and waterline cleanliness before anything else.

The pH trap: fine for the bird, fatal for the chlorine

Ross calls water pH 6.5–8.5 “satisfactory” for the bird. But active chlorine (HOCl) collapses right across that same band:

pH 5.0	pH 6.0	pH 6.5	pH 7.0	pH 7.5	pH 8.0	pH 8.5
100%	96%	90%	72%	48%	21%	10%

% of chlorine present as hypochlorous acid (HOCl), the strong sanitizer — Cobb pH/HOCl table.

Free chlorine 3–5 ppm at the drinker (Ross) means nothing if pH has pushed the chlorine into its weak form. Cobb runs chlorine at pH 5.0–6.5, where it is 90–100% active. A pH that is comfortable for the bird can be a pH where your sanitizer has quietly died.

The limits, side by side

	ROSS Table 7.2	COBB spec table
TDS, ppm	< 1,000 good	< 1,000 suitable
pH (bird)	6.5–8.5 satisfactory	6.8–7.5 avg, 7.6 max
Hardness, ppm	< 100 soft = good	60–180; > 110 soften
Nitrate, ppm	10 maximum	10 avg, 25 max
Sulphate, ppm	< 200 satisfactory	125 avg, 250 max
Iron, ppm	< 0.3 satisfactory	0.2 avg, 0.3 max
Sodium, ppm	50–300 satisfactory	32 avg, 50 max
Coliforms	0 CFU/mL ideal	0 CFU/mL

They agree on the hard limits — nitrate ~10, iron 0.3, chloride 250, coliforms 0. They part company on the salts: Cobb caps sodium at 50 ppm, where Ross still calls 300 “satisfactory.” Where the guides disagree, treat it as a judgment call, not a fact.

Keep it clean all the way to the drinker

Filter to 40–50 microns and clean weekly. Biofilm forms in every line and shields bacteria from disinfectant — flush lines in hot weather and between flocks. Test the water on any change in colour, odour, taste, flow or an unexplained drop in performance.

Based on Aviagen Ross Broiler Management Handbook 2025 (Section 7, Table 7.2; Section 5) and Cobb Broiler Management Guide 2021 (Chapter 7, Water Management, and the mineral table by Dr. S. Watkins).

THE SCALE

Water is the number one input — measure it daily

Ross — drinking systems, water:feed ratio, flow rates (Tables 5.4-5.5)

The water:feed ratio is a free health monitor

At 21 °C, birds are drinking enough when the ratio of water (litres) to feed (kg) sits close to 1.6–1.8. A daily water meter gives you this for nothing. A change in water intake is one of the earliest warnings of a health or performance problem — often before feed intake or weight move. Not all water drunk is consumed: usage = drunk + spillage.

WATER RISES WITH HEAT

+6.5% water requirement for every 1 °C above 21 °C.
Prolonged tropical heat can double daily water consumption.
In hot weather, flush the lines regularly so water does not warm and grow biofilm.

NIPPLE DRINKER FLOW RATE, BY AGE (Ross Table 5.5)

	ml/min
Day 0–7	20–29
Day 8–14	30–39
Day 15–21	40–49

Enough drinkers, at the right height

Ross minimum: 12 birds per nipple under 3 kg, 9 birds per nipple over 3 kg.
Check and adjust drinker height daily — too high restricts intake, too low wets litter.
Cobb note: birds take most of their daily water 2–3 hours after eating, so a drop in consumption points at a restriction or a supply problem before it points at the birds.

What page 1 compressed into one line

“The biggest input, the least tested.” A daily water reading and a water:feed ratio turn the most-consumed input on the farm into your earliest warning signal.

THE AGREED NUMBER

ORP ≥ 650 mV — measure the result, not the dose

Ross Section 7 and Cobb Chapter 7 — independent handbooks, identical threshold

Why ORP beats a ppm reading

Oxidation-reduction potential (mV) measures how strongly the water can still oxidise — that is, the sanitizer's actual activity, not how much you dosed. A pool test kit can read 4–6 ppm chlorine while a heavy organic load has already bound most of it: Cobb notes free chlorine is not a useful sanitizer unless at least 85% is present as hypochlorous acid.

Both breeders, one threshold

ROSS	Ideal ORP 650–800 mV; over 650 mV controls most waterborne challenges.
COBB	An ORP value of 650 mV or greater indicates good quality water.

When the meter reads below 650 mV

A reading under 650 mV means contaminants are consuming the oxidiser faster than it can work. Ross's checklist, in order: pH, chlorine concentration, water purity, and waterline cleanliness. ORP meters are inexpensive; follow the maker's calibration and cleaning steps. The value drops as the organic load rises — so it doubles as a biofilm and contamination alarm.

Why the agreement matters

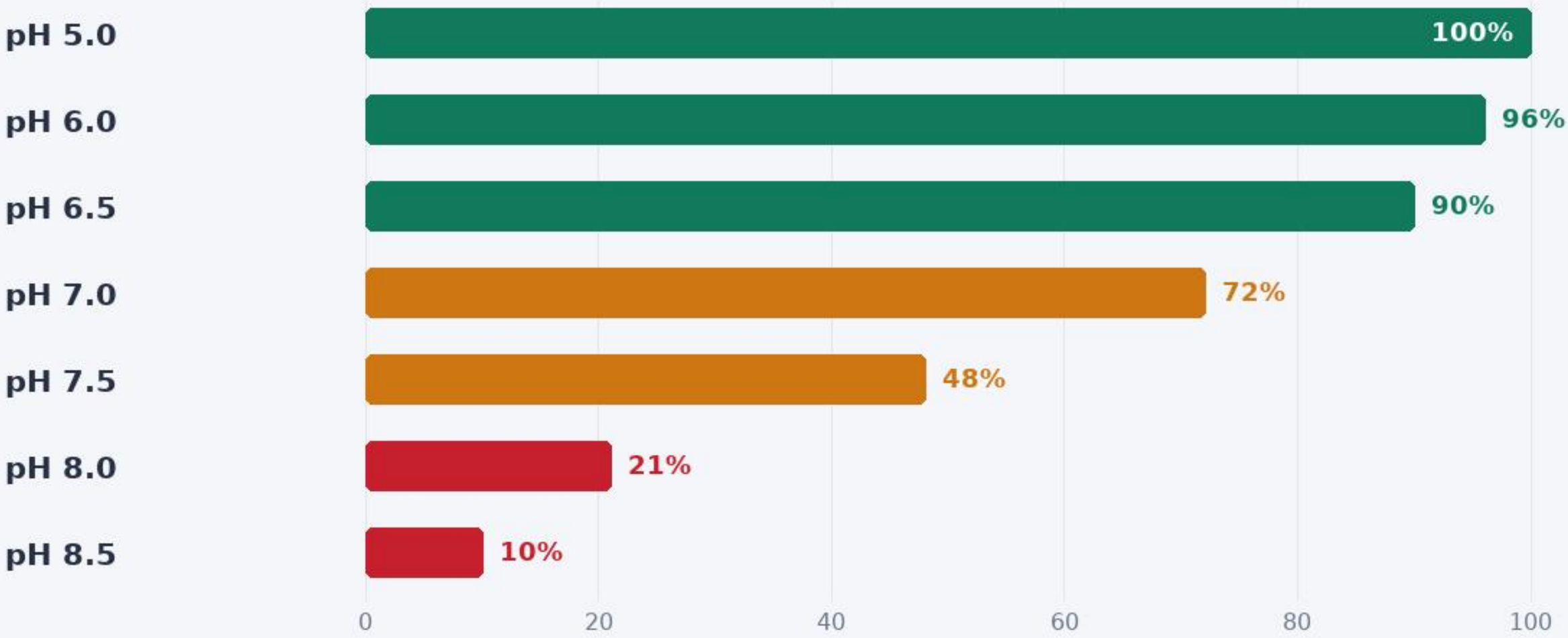
Ross and Cobb differ on several mineral limits (next pages). They do not differ on this. When two independently written handbooks put the sanitation pass-mark at the same 650 mV, that is the number to instrument and trend — not the ppm on the dosing pump.

THE pH TRAP

The same pH band that suits the bird starves the chlorine

Cobb pH/HOCl ratio table — % active hypochlorous acid vs water pH

Active chlorine (HOCl) as a share of free chlorine, by pH



At pH 8, four-fifths of your “free chlorine” is the weak hypochlorite ion. The dose is there; the sanitizer is not.

Two ranges, two purposes — do not merge them

Ross's 6.5–8.5 is a general bird-tolerance band from Table 7.2 (its footnote even drops to pH 5–6 for gut health). Cobb's 5.0–6.5 is the disinfection-optimised band, where chlorine is 90–100% active. Neither is wrong: one describes what the bird tolerates, the other what the chlorine needs. The mistake is quoting a single “right pH” for both jobs at once.

What to actually do

If you sanitize with chlorine, drive water pH down toward 6.0–6.5 with an inorganic acid before you chase the ppm up. Below pH 7 the same dose does far more work; above pH 8 you are mostly dosing dead chlorine. Then confirm with ORP — the reading that ties dose and pH together.

The tie to Wednesday

Wednesday's paper dosed hypochlorous-acid water at pH ~6.0 — exactly the band where HOCl is 96–100% active — and measured what it did to real broilers. This page is the chemistry; Wednesday is the animal test of it.

THE FULL TABLE

Every limit, Ross beside Cobb

Ross Table 7.2 (criteria) and Cobb mineral table by Dr. S. Watkins (avg / max)

TOTAL DISSOLVED SOLIDS (TDS), ppm — Ross ladder

< 1,000	Good
1,000–3,000	Satisfactory — wet droppings at the top
3,000–5,000	Poor — reduced intake, poor growth, ↑ mortality
> 5,000	Unsatisfactory

Cobb agrees below 1,000 and above 5,000, and extends the ladder: 7,000–10,000 unfit for poultry (may suit other stock); above 10,000 for no livestock at all.

MINERALS & MICROBES	ROSS (Table 7.2)	COBB (avg / max)
pH	6.5–8.5 satisfactory	6.8–7.5 / 7.6
Hardness, ppm	< 100 soft; > 100 hard	60–180 / soften > 110
Nitrate, ppm	10 max (3 may affect)	10 / 25
Sulphate, ppm	< 200; 200–250 max	125 / 250
Chloride, ppm	< 250 satisfactory	14 / 250
Iron, ppm	< 0.3 satisfactory	0.2 / 0.3
Sodium, ppm	50–300 satisfactory	32 / 50
Magnesium, ppm	50–125; > 125 laxative	14 / 125
Calcium, ppm	60 average	60 / no upper limit
Coliforms	0 CFU/mL ideal	0 / 0
Total bacteria	TVC per flock	0 / 100 CFU/mL

Reading the two columns

Ross gives graded bands (good / satisfactory / poor); Cobb gives an average target and a hard maximum. Where a Ross “satisfactory” sits above a Cobb “max,” Cobb is the tighter spec — most visibly on sodium and the pH ceiling. Full provenance in 01-monday/SOURCES.md.

AGREE / DISAGREE

Trust the agreements; judge the differences

Ross Table 7.2 vs Cobb mineral table — where two handbooks line up, and where they don't

THEY AGREE — treat these as hard limits

ORP	≥ 650 mV = good, sanitation working
Nitrate	~10 ppm is the performance ceiling for both
Iron	0.3 ppm max — above it, iron bacteria and clogging
Chloride	250 ppm the shared maximum
Coliforms	0 CFU/mL — any presence means faecal contamination
Filtration	40–50 micron filter, cleaned weekly

THEY DIFFER — treat these as judgment calls

Sodium	Ross: 50–300 “satisfactory”	Cobb: 50 ppm max
pH ceiling	Ross: up to 8.5	Cobb: 7.6 max
Sulphate	Ross: < 200 satisfactory	Cobb: 125 avg target

How to use a disagreement

An agreement between two independent handbooks is about as close to a hard fact as this field gives you — hold that line. A disagreement is telling you the safe level depends on context (Cobb runs tighter on salts because saline water compounds with heat and sulphate). Default to the stricter number when your flock is already under heat or gut-health pressure.

KEEP IT CLEAN

The water is only as clean as the last metre of line

Ross Section 7 and Cobb Chapter 7 — biofilm, flushing, between-flock cleanout

Contamination is made in the line, not just the source

Bacterial counts at the drinker are routinely far higher than at the water source — the distribution system grows its own load. Biofilm forms in every pipe, forms faster on plastic, and shields bacteria and viruses from the disinfectant you are dosing. Vitamin and mineral products in the water feed it. It is the reason a clean source can still fail a test.

FLUSHING & CLEANOUT

Ross: flush nipple lines 1–2 h before placement and twice daily for the first 4 days; flush again in hot weather to keep water cool and slow biofilm.
Between flocks — Ross: circulate an approved sanitizer, hold ≥ 4 h, drain and rinse.
Cobb: let cleaning solution stand ≥ 12 h, then flush; hydrogen peroxide or potassium peroxymonosulfate (non-chlorine oxidisers) strip established biofilm that chlorine cannot.

TEST THE WATER WHEN (Cobb)

- Colour, odour or taste changes
- Flooding occurs near the well
- A person or animal falls sick from waterborne disease on site
- Maintenance is done on the supply
- A major loss of flow or pressure
- Performance is persistently poor with no other explanation

Save this and check one thing tomorrow

Pull yesterday's water meter and divide litres by kilos of feed. If the ratio is off 1.6–1.8, or the ORP is under 650 mV, the water is telling you something before the birds do.

Based on Aviagen Ross Broiler Management Handbook 2025 and Cobb Broiler Management Guide 2021.
Full provenance, every figure traced to a table and page: 01-monday/SOURCES.md