
Cooling Tower Float Valve Adjustment And Makeup Water Audit

1.0 Maintenance Objective & Frequency

The objective of this procedure is to adjust the cooling tower float valve to maintain the correct basin water level and to perform a makeup water audit to identify excessive water consumption or leaks. Proper float valve adjustment prevents overflow, reduces water waste, and ensures adequate water supply for heat rejection. This PM also includes inspection of the valve seat, linkage, and float integrity.

Frequency: Quarterly (every 3 months) or as needed if water level irregularities are observed. Perform an audit immediately if makeup water usage spikes by more than 10% compared to baseline.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Lock out the cooling tower fan motor and any recirculation pump breakers at the motor control center (MCC). Verify zero energy with a voltage tester.
- **Pneumatic Isolation:** Not applicable for this procedure. However, if the float valve is pneumatically actuated, isolate and bleed the air supply.
- **Hydraulic Isolation:** Close the isolation valve on the makeup water supply line upstream of the float valve. Place a lock and tag on the valve handle.
- **Mandatory PPE:** Safety glasses, hard hat, steel-toed boots, chemical-resistant gloves (if handling water treatment chemicals), and hearing protection if the tower is in operation nearby.
- **Confined Space:** If entry into the basin is required, follow confined space entry procedures including atmospheric testing and a standby attendant.

3.0 Required Tools, Parts & Lubricants

- Adjustable wrench (10-inch or 12-inch)
- Flathead and Phillips screwdrivers
- Pliers (slip-joint or tongue-and-groove)
- 5-gallon bucket or graduated container for flow measurement
- Stopwatch or timer (smartphone acceptable)
- Water level gauge or ruler (metric/imperial)
- Float valve rebuild kit (if needed): seat washer, O-rings, linkage pins
- Thread seal tape (PTFE tape)
- Penetrating oil (e.g., WD-40 or equivalent)
- Flashlight or headlamp
- Notebook and pen for recording audit data

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO as per Section 2.0. Confirm that the makeup water isolation valve is closed and locked out.
2. Visually inspect the basin water level. Note any signs of overflow, algae buildup, or debris that may affect float operation.
3. Remove the access cover or panel to the float valve assembly. Use a flashlight to inspect the float, linkage, and valve body for corrosion, wear, or physical damage.
4. Check the float for buoyancy. If the float is plastic, ensure it is not cracked or waterlogged. If metal, check for pinhole leaks. Replace if compromised.
5. Inspect the valve linkage pins and pivot points. Apply penetrating oil if stiff. Ensure free movement without binding.
6. With the makeup water isolation valve still closed, remove the valve seat or disassemble the valve head. Inspect the seat washer and O-rings for wear, cracking, or deformation. Replace with rebuild kit parts as needed.
7. Reassemble the valve hand-tight, then use thread seal tape on any threaded connections. Do not overtighten plastic components.
8. Slowly open the makeup water isolation valve to restore water supply. Observe the float valve operation as the basin fills. The valve should close fully when the water level reaches the setpoint (typically 1-2 inches below the overflow pipe).
9. Adjust the float arm or linkage to achieve the correct shutoff level. Bend the float arm gently (if metal) or adjust the threaded rod/stop to raise or lower the float. For plastic linkages, adjust the clip position.
10. Perform a makeup water audit: With the tower in normal operation (fans and pumps running), measure the time it takes to fill a 5-gallon bucket from a sample port or the makeup line. Record the flow rate in gallons per minute (GPM). Compare to the baseline flow rate from the previous PM or OEM specification.
11. If the flow rate exceeds the baseline by more than 10%, investigate for leaks in the supply line, valve seat leakage, or excessive blowdown. Adjust the float valve to minimize makeup demand without starving the system.
12. Clean any debris from the basin screen or strainer. Replace the access cover and ensure it is sealed to prevent contamination.

5.0 Verification & Return to Service

1. Remove all LOTO devices. Restore power to the cooling tower fan and recirculation pump. Verify that the tower starts and operates normally.
2. Monitor the basin water level for at least 15 minutes of normal operation. Confirm that the float valve maintains the water level within 1/4 inch of the setpoint and does not cause overflow or low-level alarms.
3. Check for any water leaks at the valve body, threaded connections, or sample ports. Tighten or reseal as necessary.
4. Record the final makeup water flow rate, basin level setpoint, and any parts replaced in the maintenance log. Update the baseline flow rate if adjustments were made.
5. Sign off on the PM work order in ServiceGrid, including notes on float condition, valve rebuild status, and audit results.

Regulatory Disclaimer: This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.