



The Ultimate

**COOLING TOWER
STARTUP CHECKLIST**

Revision - January 2020



IMPORTANT NOTE

The content shared in this document was provided by Marley, a SPX brand.

However, it can be used to perform a through inspection on virtually any cooling tower, because the instructions are completely general. However, this checklist is intended to be used as a guide only once it may not cover all potential issues.

Once you complete the checklist, use the results to work on developing a plan for repair and maintenance.

If you have any questions, send an email to info@midwestmachinery.net or call one of our offices and our team of sales engineers will be happy to assist you.

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SAFETY AND HEALTH HAZARDS

Before starting a cooling tower inspection it is important to identify potential safety and health hazards associated with the work and how to eliminate or control them.

Use the following general guidelines for basic worker protection, and always follow safety and health regulations published by local authorities.

SAFETY GUIDELINES

- Turn off cooling tower fans before working inside any cooling tower.
- Wear a full or half face respirator with HEPA filters.
- Wear a hard hat, safety glasses or goggles, work gloves, and high top leather boots with nonslip soles. Fall protection should be provided as required.
- When climbing the cooling tower structure is required, workers should be equipped with a full body harness and two shock absorbing lanyards of at least 6 ft. in length.

MECHANICAL EQUIPMENT

Speed Reducer Type: Belt Gear Direct Drive

Belt Drive Unit

Belt Designation _____ Good Keep an eye Needs immediate attention

Fan Sheave Designation _____ Good Keep an eye Needs immediate attention

Motor Sheave Designation _____ Good Keep an eye Needs immediate attention

Gear Drive Unit

Manufacturer _____ Model _____ Ratio _____

Oil Level Full Low Add Immediately

Oil Condition Good Contains Water Contains Metal Contains Sludge

Last Oil Change Date _____ Oil Type Used _____

Seals _____ Good Keep an eye Needs immediate attention

Backlash _____ Good Keep an eye Needs immediate attention

Fan Shaft Endplay _____ Good Keep an eye Needs immediate attention

Unusual Noises? No Yes Action Required _____

Drive Shaft

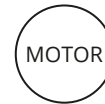
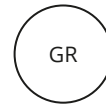
Manufacturer _____ Material _____ Good Keep an eye Needs immediate attention

Fan

Fan Type: Propeller Blower

Manufacturer _____ Fixed Pitch Adjustable Pitch

Diameter _____ Number of Blades _____



Blade Material _____ Good Keep an eye Needs immediate attention

Hub Material _____ Good Keep an eye Needs immediate attention

Hub Cover Material _____ Good Keep an eye Needs immediate attention

Blade Assembly Hardware _____ Good Keep an eye Needs immediate attention

Tip Clearance _____ " min _____ " max Good Keep an eye Needs immediate attention

Vibration Level _____ Good Keep an eye Needs immediate attention

Fan Cylinder Height _____ Good Keep an eye Needs immediate attention

Mechanical Equipment Support _____ Good Keep an eye Needs immediate attention

Oil Fill and Drain Line _____ Good Keep an eye Needs immediate attention

Oil Level Sight Glass _____ Good Keep an eye Needs immediate attention

Vibration Limit Switch _____ Good Keep an eye Needs immediate attention

Motor

Manufacturer _____

Name Plate Data: HP _____ RPM _____ Phase _____ Hz _____ Volts _____

F L Amps _____ Frame _____ S F _____ Special Info. _____

Last Lubrication - Date _____

Grease Used - Type _____

Unusual Noises? No Yes Action Required _____

Unusual Vibration? No Yes Action Required _____

Unusual Heat Build-up? No Yes Action Required _____

OTHERS

Make-up Valve _____ Good Keep an eye Needs immediate attention

Other Component _____ Good Keep an eye Needs immediate attention

Other Component _____ Good Keep an eye Needs immediate attention



COOLING TOWER SPRING STARTUP CHECKLIST

Tower Manufacturer _____
Model Number _____
Serial Number _____

DESIGN CONDITIONS

GPM _____
HW _____ CW _____ WB _____
Cell No. _____ Number of Fan Cells _____
Tower Type _____
Crossflow _____
Counterflow _____

STRUCTURE

Casing Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Structural Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Fan Deck Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Stairway Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Ladder Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Handrail Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Interior Walkway Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Cold Water Basin Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Silt, debris Buildup _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention

WATER DISTRIBUTION SYSTEM

Open Basin System

Distribution Basin Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Inlet Pipe Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Inlet Manifold Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Flow Control Valves _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Nozzles - Orifice Diameter _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Silt, Algae, Debris _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention

Spray Type System

Header Pipe Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Branch Pipe Material _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Nozzles - Orifice Diameter _____	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Up Spray <input type="checkbox"/> Down Spray <input type="checkbox"/>	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention

HEAT TRANSFER SYSTEM

Fill - Type and Material	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Eliminators - Type and Material	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Louvers - Type and Material	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention
Biological Fouling	<input type="checkbox"/> Good	<input type="checkbox"/> Keep an eye	<input type="checkbox"/> Needs immediate attention

COMMENTS

TOWER CASING

- Leaks, cracks, holes or general deterioration, including air leaks between adjoining panels
- Hardware attaching the casing to the structure is tight and in good condition
- Corrosion or scale buildup on steel casing
- Wood decay, including soft rot or plywood delamination, in wood casing
- Fiberglass casing brittleness or cracking
- Access doors are in good working order and shut tightly when tower is in operation
- If your budget allows, consider replacing ACB (asbestos cement board) casing immediately, regardless of its condition*

* Contact the Federal Agency, OSHA, EPA, as well as the local and state agencies for information concerning specific state regulations and requirements for handling and the disposal of asbestos wastes.

STRUCTURE

- Corrosion and loss of metal in the structure of a steel tower
- Tightness of bolted joints
- Corrosion near welded joints on galvanized steel towers
- Wood deterioration, including throughcracks, fractures, or decay in wood members. Special attention to the wood around steel or cast iron fasteners and connectors, as well as the bottom of columns
- Tightness of bolted structural joints. Inspect joint connectors for evidence of corrosion or other signs of deterioration
- Tightness of assembled joints of a fiberglass or plastic tower
- Any evidence of tearing or cracking in the structure

FAN DECK

- Steel corrosion or wood decay of the fan deck material
- Condition of the fan deck support members and tightness between the fan deck and the supports
- Air leaks between adjoining fan deck panels
- Fan deck overlays are properly attached and overlay material condition
- Replacing ACB overlays immediately, regardless of condition

STAIRWAY

- Wood decay or steel corrosion
- Loose treads, handrails, or deteriorated stringers
- Tightness of bolted connections and hardware condition

LADDER AND HANDRAIL

- General condition of material
- Tightness of all connections between the ladder and the tower
- Check the welds on steel and aluminum ladders

INTERIOR WALKWAY

- Broken or deteriorated treads and rails on wood or fiberglass walkways
- Corrosion on steel walkways
- Tightness of connections between the walkway and the tower structure

COLD WATER BASIN

- Buildup of sludge and accumulated debris
- General condition of sump, sump screen, and anti-cavitation device
- Corrosion or loss of metal in components
- Signs of leaks or breakdown of sealing material in wood, steel and fiberglass basins

DISTRIBUTION BASIN

- Deterioration of the basic material
- Wood decay, steel corrosion
- Leaks between adjoining panels
- Integrity of basin support members
- Tightness of bolted joints in steel or fiberglass basins

PIPING

- Corrosion and loss of coating material in iron pipe
- Leaks and for tightness of bolted joints
- Deterioration on PVC or fiberglass pipe

BASIN FLOW-CONTROL VALVES

- Corrosion or signs of wear
- Operate valve manually through its full range of travel and reset the valves to balance water flow to all basin sections

SPRAY NOZZLES

- Clogging or signs of internal wear.
- All nozzle components (such as removable splash plates) are in place and working properly
- Loss of material resulting from corrosion or erosion
- Connection to branch pipe or distribution basin floor
-

DRIFT (MIST) ELIMINATORS

- Debris in air passages
- Components properly installed
- Seals condition
- Rot and decay in wood blades and frames

FILL-PACKING

- **Splash fill:** sagging, broken or decaying splash bars or excessive buildup of scale. Fallen or misplaced splash bars. Supporting grids in place and evenly spaced in the tower. Coating on steel grids, the condition of the welds on stainless wire grids, and the general condition of fiberglass grids.
- **Film fill:** buildup of scale, algae, or other contaminants on the surface of the sheets. Erosion, sagging, torn sheets, or evidence of ice damage. Condition of support members.

LOUVERS

- Louvers are in place
- Deterioration of the base material, such as wood rot or corrosion of steel louvers
- Scale buildup or biological growth
- Condition of louver support members, and of the connections between the louvers (supports) and the tower
- Replacing ACB louvers immediately regardless of condition

BELT DRIVE FAN SYSTEM

- Corrosion or loss of metal in the pulley grooves or on the webs
- Tightness of bushings holding the pulleys on the shafts
- Belt tension and alignment. Signs of wear, such as cracks and gouges
- Fan shaft bearing lubricant
- Condition of shafts and seals
- Loose or damaged bearings. Tightness and condition of all connections between the bearing housing and the support
- Corrosion or other damage in the support itself, and tightness of connections between the support and the tower structure.

DIRECT DRIVE FAN SYSTEM

- Tightness of fan bushing on the motor shaft
- Joints between the motor mount and its support
-

GEAR BOX

- Oil level, oil quality (water, metal shavings, or sludge), oil leaks around seals
- Backlash: amount of free rotation before the gear teeth engage fully
- Endplay: amount of movement in the gear box output shaft
- Excessive deposits outside of the case
- Tightness of all hardware connecting the gear box to the support

DRIVE SHAFT AND COUPLINGS

- Alignment (use a dial indicator or optical device)
- Corrosion or other damage on the tube, particularly near any welds
- Connections between the tube and the flex elements, and between the coupling halves and the motor and gear box shafts.
- Signs of corrosion or fatigue in metallic flex
- Cracks and brittleness in elastomeric flex elements
- If your drive shaft includes a mid-span bearing, check the bearing carefully, adding lubricant as necessary. Check alignment of both shafts and make sure that bearing hold-down hardware is tight and in good condition.

FAN

- Broken or missing blades.
- Corrosion or erosion of the blades
- Check the condition and tightness of the hub and the bushings between the hub and shaft
- Corrosion or erosion in fixed-pitch fan blades
- Connections between the blades and hub. Condition and tightness of the bushing between the hub and shaft.
- Corrosion, erosion, or excessive buildup of in adjustable-pitch fans. Pitch angle of each blade. Tightness and condition of the hardware attaching the blades to the hub. Connections between the hub cover and the fan hub.

FAN CYLINDER (SHROUDS)

- Overall condition of the material, paying particular attention to any welds in steel shrouds
- Condition and tightness of all assembly and hold-down hardware
- Leaks between adjoining stack segments.
- Fan blade tip clearance all around the cylinder

MECHANICAL EQUIPMENT SUPPORT

- Corrosion or loss of metal in steel components
- Tightness of connections between the mechanical equipment and the support, and between the support and the tower structure.
- Tightness and condition of all bolted connections
- Wood towers: iron rot wherever the support contacts the structure.
- Steel and fiberglass towers: all bolted connections between the support and the structure itself.

MAKEUP VALVE

- Opens and closes properly.