

Cooling Technology Institute

Long Term Storage Procedures For Cooling Towers



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FOREWORD

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This guideline document summarizes the best current state of knowledge regarding the specific subject. This document represents a consensus of those individual members who have reviewed this document, its scope and provisions. It is intended to aid all users or potential users of cooling towers.

Approved by the CTI Executive Board.



This document has been reviewed and approved as part of CTI's Five Year Review Cycle. This document is again subject to review in 2007.

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The following procedures are recommended for the long-term storage of industrial scale cooling towers. In general, long term storage is for an extended period of more than one year, but these recommendations can also be modified for seasonal storage. The techniques are divided between Mechanical Equipment Storage (Article I) and Wood Structure and Related Components (Article II). These two groups of components require the most attention because they will deteriorate rapidly if preventive measures are not taken.

I. MECHANICAL EQUIPMENT STORAGE

The proper storage of the mechanical components can be done by either warehousing the rotating equipment, or leaving it in place. Warehousing is the safer, but costlier method. Generally, warehousing of mechanical components should be considered only if the storage is known to last many years.

The more convenient method of storage would be to leave mechanical components on the tower. Precautions to properly lubricate and guard against corrosion caused by moisture build-up must be taken. These techniques are outlined below.

1. WAREHOUSING METHOD

A. Disassembly Storage

1. Organizing Components As Sets

- a. Be careful to keep all components marked and stored as sets.
- b. Minor variations in wear patterns, size, hardware, etc. can present major re-assembly problems.

2. Gear Reducers

- a. Drain old lubricating oil and refill gearbox to maximum extent possible. Lubrication oil should be of manufacturer's recommended grade. Overfill should be sufficient level to submerge all bearings and gear surfaces. The vent hole may be the best location for adding oil. After overfilling with lubrication oil, plug all ports. Attach a "warning" tag to the gearbox stating that the gearbox has been "overfilled". If the gear reducer does not allow for submersion of all bearings and gear surfaces, consult gear manufacturer for recommendation.
- b. Coat shafts' exposed surface area with a suitable rust inhibitor.
- c. Lubricate all grease points.
- d. To establish a positive moisture barrier, use VCI (Vapor Corrosion Inhibitor) wrap to enclose entire gearbox.

3. Fans

- a. If fan blades are removed from the hub (e.g. to minimize required storage space) number-match blades with their position on the hub.

- b. Store blades, hubs, and center seal disc together with original hardware.

4. Driveshafts

- a. Disconnect drive shafts leaving hubs on the gear shaft and the motorshaft.
- b. Store in community with gearbox, fan and motor.

5. Electric Fan Motors

- a. Remove accumulated grease from internal bearing cavity.
- b. Lubricate motor bearings.
- c. Check main bearings for wear/corrosion.
- d. To establish a positive moisture barrier, enclose entire motor in VCI wrap.

B. Intact Assembly Storage

If space permits, it is possible to remove the entire fan, gear, electric motor, driveshaft and unitized support assembly in one piece – eliminating the need for disconnecting anything but the electric wiring and the gear oil and vent lines. Follow corrosion preventive procedures noted above.

2. IN-SITU METHOD FOR STORAGE OF MECHANICAL EQUIPMENT COMPONENTS

A. Gear Reducers

1. To prevent corrosion damage to gears, bearings, and other metallic components the gearbox should either be overfilled with new lubrication oil or use a vapor phase rust inhibitor. If using overfill method, drain old lubricating oil and refill gearbox to maximum extent possible. Lubrication oil should be manufacture's recommended grade.

Overfill location should be of sufficient level to submerge all bearings and gear surfaces. If the gear reducer does not allow for submersion of all bearings and gear surfaces, consult gear manufacturer for recommendation. Note if there is an external oil sight glass being used which is vented to atmosphere, it should be plugged to prevent lubrication oil from spilling during the overfill process. If a vapor phase rust inhibitor is used, it must be either replenished periodically or the gearbox should be plugged to prevent the protective vapor from deteriorating or escaping the gearbox.

2. If a vapor phase inhibitor is used, periodically check the gearbox for condensation build-up. If water is present, it should be removed immediately.
3. Allow the gear reducer to rotate freely, being driven by a windmilling fan.
4. Prevent water build-up from condensation within the gear reducer and periodically drain condensed water from the gear reducer as required.