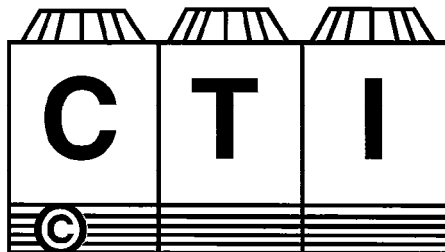


COOLING TOWER MANUAL



Chapter 4 Recommendations For Winter Operation Of Water Cooling Towers

COOLING TOWER INSTITUTE

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Recommendations For Winter Operation
Of Water Cooling Towers

**RECOMMENDATIONS
FOR
WINTER OPERATION
OF
WATER COOLING TOWERS**

by

Sub-Committee of Engineering Standards and Maintenance Committee

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RECOMMENDATIONS FOR WINTER OPERATION OF INDUSTRIAL CLASS INDUCED DRAFT AND NATURAL DRAFT WATER COOLING TOWERS

INTRODUCTION

This Cooling Tower Institute (CTI) publication is intended to provide guidelines for winter operation of industrial water cooling towers, and represents the consensus of both manufacturers and users throughout the industry, with a wide range of experience in this field. However, the CTI emphasizes that these are recommendations only and are not necessarily "fail safe".

Although these recommendations are directed towards industrial cooling towers, the principals are valid, for the most part, for HVAC (air conditioning) towers. As an additional consideration, it is recommended that HVAC towers, with an integral cold water basin, be equipped with an immersion type basin heater (ref. CTI TP 75-A).

Proper winter operation of any water cooling tower relies heavily on operator inspection and control. This is essential not only for control of ice formation (to reduce or eliminate costly ice damage), but also to maintain cold (return) water temperature at the proper level, for efficient plant operation. When falling ambient *dry bulb* temperatures reach 45°F, normal operating procedures should be suspended, and a ***Winter Operational Plan*** be put into action, with regular visual inspection of critical tower areas on 2 - 4 hour intervals.

I. INDUCED DRAFT COUNTERFLOW COOLING TOWERS

A visual inspection of the tower, especially in the louver and fill areas, should be made every 4 hours, as long as the ambient air temperature is in the range of 20-45°F. For air temperatures below 20°F, the frequency of the inspections should be increased to 2 hour intervals. Cold (return) water temperature from the tower should be monitored continually, and not allowed to drop below the 50-60°F range.

The following operational variables can be controlled to maintain proper cold water temperature, and limit ice formation on the tower:

1. **Plant Heat Load** should be maintained at the highest possible level. Avoid extended periods of operation at low heat load, and **NEVER** operate without heat load.
2. **Circulating Water Flow** should be maintained at the highest possible rate by operating all useable pumps, with uniform and even distribution over tower fill. All distribution headers, laterals, and nozzles should be clean, intact and in good repair. Avoid reduced water flow to any particular tower area. **DO NOT** attempt to shut down water flow to a cell, unless the distribution valve shuts off tight. The partition wall at the adjacent (active) cell must be watertight. Any trickle or drip leakage into an inactive cell will result in localized ice buildup, which ultimately will break loose and damage tower components in its path as it falls.

If so equipped, the tower **Hot Water Bypass** into the cold water basin should **NOT** be used on a partial basis, thereby reducing flow to active cells. Utilize **FULL BYPASS ONLY**, when minimal heat load is available, and/or cells cannot be hydraulically isolated. Also, during cold weather start-up, full bypass should be used until the basin water temperature rises to the desired level, above 60°F. Then close the bypass and circulate the **TOTAL** flow over the tower.