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COOLING TOWER FIELD PERFORMANCE TESTING

Introduction

The purpose of a cooling tower test can be varied such as:

1. Acceptance Test - conducted to verify that a new or rebuilt tower meets contract performance specification requirements
2. Status Test - conducted to determine the thermal capability or actual operating parameters of an older tower. This type test is often used as a baseline test conducted prior to upgrade.

The cooling tower test will be conducted in accordance with the Cooling Technology Institute (CTI) Acceptance Test Code for Water-Cooling Towers ATC-105. This test code provides details as to how a cooling tower is to be tested, what test instrumentation is to be used, acceptable test conditions, and how the results are to be interpreted.

A cooling tower performance test requires the measurement of the following parameters:

1. Hot water temperature
2. Cold water temperature
3. Wet-bulb temperature
4. Dry-bulb temperature (natural draft only)
5. Circulating water flow rate
6. Fan power (mechanical draft only)
7. Make-up and blow-down temperature and flow (where applicable)

Measurements may be taken either manually or using electronic data acquisition methods.

Pre-Test Activity

The cooling tower owner or his representative is responsible for preparing the cooling tower prior to the test.

Test preparation normally includes the following:

1. Installation of pitot taps for water flow measurement (see attached pitot tap details and typical locations). Provide information as to the diameter of the circulating water piping at the water flow measurement location so that an appropriate sized pitot tube will be available
2. Provision of a safe means of access to the pitot taps such as scaffolding or a manlift
3. Provision of electric power (110 VAC) for operation of certain instruments
4. Installation of thermometer taps on the water inlet and outlet of the cooling tower
5. Provision of an electrician or other qualified person for access to MCC to take fan motor power readings
6. Provision of all work permits and safety clearance as required to conduct the test
7. Provide performance curves and other tower design information as required
8. Provision of make-up and blow-down instrumentation or isolation where required.

Attached is a file with typical test tap locations and details for the required pitot taps. The pitot taps can be installed in individual riser pipes or in the main supply line as long as it is a straight run.

Operating Conditions

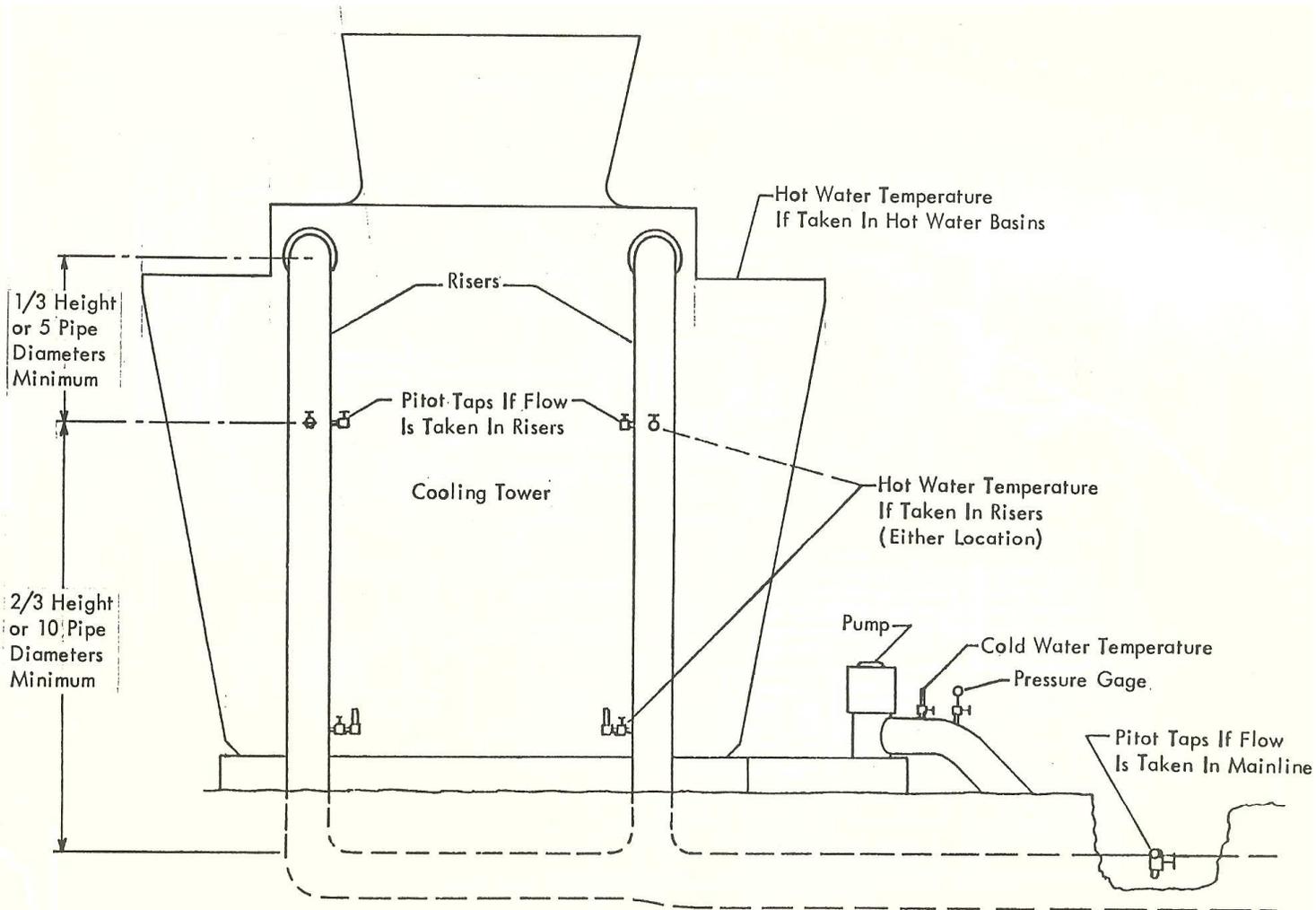
The tower owner must also insure that the test is conducted at a time when plant operating conditions, tower condition, and weather are suitable for testing.

For acceptance purposes, the test shall be conducted within the following limitations and variations from design shall not be exceeded:

Wet-bulb temperature	+/- 15 deg F
Range	+/- 20%
Circulating water flow	+/- 10%
Wind velocity	average 10 miles per hr one-minute duration 15 miles per hr

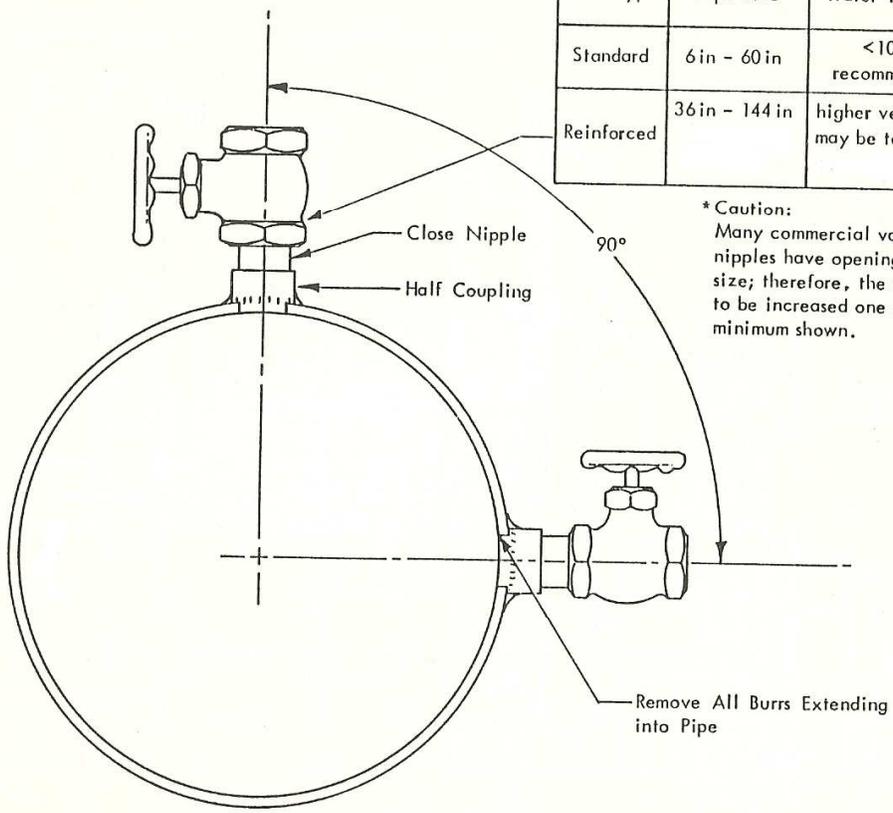
Test Report

A preliminary analysis of the test data will be conducted on site when possible. A final report including all raw data and capability calculations will be issued within a reasonable time. Any deviations from the requirements of ATC-105 will be noted in the report.



LOCATION OF TYPICAL TEST TAPS

Gate Valve or Equal for Pitot Taps			
Pitot Type	Pipe Size	Water Velocity	Valve and Nipple Opening*
Standard	6 in - 60 in	<10 fps recommended	≥1 in*
Reinforced	36 in - 144 in	higher velocities may be tolerated	≥1-3/4 in*



* Caution:
 Many commercial valves and/or heavy wall pipe nipples have openings less than their nominal size; therefore, the nominal size used may have to be increased one or more sizes larger than the minimum shown.

PITOT TAP DETAILS