

TABLE 1. AVERAGE MAXIMUM WATER MAIN TEMPERATURES*

STATE	CITY	TEMP. F.	STATE	CITY	TEMP. F.	STATE	CITY	TEMP. F.
Ala.	Birmingham	84	Mass.	Lowell	50	Pa.	Altoona	74
	Mobile	73		Lynn	68		Erie	75
Ariz.	Phoenix	81		New Bedford	70		Johnstown	74
	Tucson	80		Salem	68		McKeesport	82
Calif.	Anaheim	60		Worcester	76		Philadelphia	83
	Berkeley	69	Mich.	Detroit	77		Pittsburgh	81
	Fresno	72		Flint	70	R. I.	Providence	68
	Fullerton	75		Grand Rapids	84	S. C.	Charleston	80
	Glendale	68		Highland Park	77		Greenville	81
	Los Angeles	75		Jackson	56		Spartanburg	78
	Oakland	69		Kalamazoo	53	S. D.	Rapid City	55
	Ontario	70		Lansing	64	Tenn.	Chattanooga	84
	Pasadena	82		Saginaw	82		Knoxville	89
	Pomona	75	Minn.	Duluth	55		Memphis	70
	Riverside	78		Minneapolis	80		Nashville	90
	Sacramento	72		St. Paul	77	Texas	Amarillo	65
	San Bernardino	65	Mo.	Jefferson City	82		Austin	90
	San Diego	82		Kansas City	84		Beaumont	86
	San Francisco	62		St. Joseph	84		Dallas	86
	Whittier	75		St. Louis	85		Fort Worth	84
Colo.	Denver	75		Springfield	70		Galveston	90
Conn.	Bridgeport	66	Nebr.	Lincoln	63		Houston	84
	Hartford	73		Omaha	87		Port Arthur	83
	New Haven	76	Nev.	Reno	61		San Antonio	76
	Waterbury	72	N. H.	Manchester	76		Wichita Falls	85
D. C.	Washington	84	N. J.	Jersey City	63	Utah	Logan	44
Del.	Wilmington	83		Newark	74		Salt Lake City	60
Fla.	Jacksonville	80		Paterson	78	Va.	Fredericksburg	75
	Miami	80		Trenton	79		Lynchburg	73
	Tampa	77	N. Y.	Albany	68		Norfolk	80
Ga.	Atlanta	87		Buffalo	75	Wash.	Olympia	58
	Macon	80		Jamaica	56		Seattle	62
Ill.	Chicago	76		Mt. Vernon	74		Spokane	51
	Cicero	76		New Rochelle	75		Tacoma	57
	Evanston	73		New York	72	W. Va.	Charleston	85
	Peoria	67		Rochester	70		Huntington	78
	Rockford	59		Schenectady	60		Wheeling	78
	Springfield	82		Syracuse	74	Wis.	La Crosse	54
Ind.	Evansville	86		Utica	69		Madison	58
	Gary	75		Yonkers	70		Milwaukee	70
	Indianapolis	80	N. C.	Asheville	74		Racine	68
	South Bend	61		Charlotte	85			
	Terre Haute	82		Winston-Salem	82			
Iowa	Cedar Rapids	78	N. M.	Albuquerque	65			
	Des Moines	77	Ohio	Akron	76			
	Sioux City	62		Canton	50			
Kans.	Concordia	57		Cincinnati	84	PROV- VINCE		
	Kansas City	86		Cleveland	74			
	Topeka	88		Columbus	82			
	Wichita	72		Dayton	60			
Ky.	Louisville	85		Lakewood	82	Alta.	Calgary	64
La.	Baton Rouge	85		Springfield	72	B. C.	Vancouver	60
	New Orleans	85		Toledo	83	Ont.	London	50
Me.	Augusta	60	Okla.	Oklahoma City	82		Toronto	63
Md.	Baltimore	75		Tulsa	85	P. E. I.	Charlottetown	48
Mass.	Boston	80	Ore.	Eugene	60	Que.	Montreal	78
	Cambridge	70		Portland	64		Quebec	68
	Fall River	76						

*These averages taken from various city water main locations, with some actual values slightly higher and some lower than values shown.

cleaning and servicing of individual units without affecting the room as a whole, group control of the water and power may be employed.

AIR DEHUMIDIFICATION WITH WASHERS

Moisture removal from an air-vapor mixture can be accomplished by use of an air washer so long as the temperature of the spray medium is lower than the dew-point of the air passing through the unit. The final dry-bulb temperature and the relative humidity of the air leaving a dehumidifier washer are dependent upon: the air velocity, the length of air travel through the sprays, the dry- and wet-bulb temperatures of the entering air, the spray temperature, the number of spray banks and nozzles, the quantity of spray medium handled, and the effectiveness of the nozzles in breaking the spray into a fine mist.

Both sensible and latent heat are removed in the process of dehumidification by cooling. Abstraction of sensible heat occurs during the entire time that the air is in contact with the spray medium. Latent heat removal takes place as condensation occurs. Therefore, the lower the spray temperature the greater the amount of moisture removal per pound of dry air, all other conditions remaining the same. Washers with two or more banks of sprays are usually selected for comfort air conditioning installations. Such washers will cool the air to within 1 or 2 F of the leaving spray water temperature.

Where a limited supply of cold water is available multiple stage washers may be used to an advantage. The cool water is pumped through the multiple spray systems in series. By this arrangement the entering air is cooled first by the warmer water and finally by the cooler water which gives the maximum amount of cooling with the minimum amount of water. The approximate temperatures of water from wells at depths of 30 to 60 ft are given in Fig 3¹. Frequently the temperature of the city water main supply is low enough during the summer to permit an appreciable cooling effect. Table 1 lists the maximum city water main temperatures for various localities in the United States and Canada.

Air washers using refrigerated spray generally have their own recirculating pumps. These pumps deliver to the sprays a mixture of water from the washer sump, which has not been re-cooled, and refrigerated water. The quantities of each are controlled by a three-way or mixing valve actuated by a dew-point thermostat located in the washer air outlet or by humidity controllers located in the conditioned space.

ATMOSPHERIC WATER COOLING EQUIPMENT

In the operation of a refrigerating plant or a condensing turbine, one of the main problems is the removal and dissipation of heat from the compressed refrigerant or the discharged steam. This is accomplished ordinarily by first transferring the heat of the gas to water in a heat exchanger, from which water it may then be dissipated in a number of ways. If the plant is situated on the banks of a river or lake, an intake may be taken up-stream or at a considerable distance from the discharge, to prevent mixing of the heated discharged water with the inlet water. If the source of cooling water is a city supply or a well, the discharge water may be run into the nearest sewer or open waterway. Lacking an unlimited water supply, or in cases where purchased water is too expensive or where the water available contains dissolved salts which would form scale on the heat-exchanging apparatus, it is necessary to recirculate the water, and to cool it after each passage through the heat-