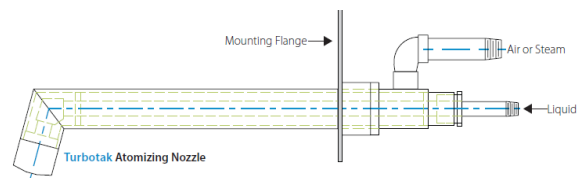
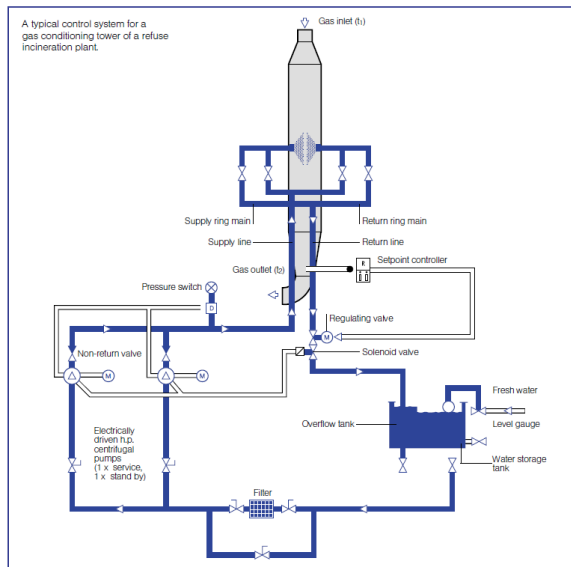


PRODUCT BULLETIN

SPRAY EVAPORATIVE COOLERS

In anticipation of more stringent regulations for the control of dioxin / furan I-TEQ emissions from steel producing electric arc furnaces, cement kilns, and secondary aluminum recovery operations, Amerair re-introduces its spray evaporative cooler product line.

The first of the two design features upon which successful spray evaporative coolers are based is proper spray atomization. To this end Amerair offers both hydraulic “spill back” and compressed air atomized nozzles. Spill back spray nozzles utilize high pressure hydraulic pumps with return throttling valves to provide the feed spray as shown in the schematic below:



Alternately, compressed air atomization systems are used when lower gas volumes or lower inlet temperatures dictate. An example of such is shown to the right.

Proper application of either spray technology requires thorough knowledge of heat and mass transfer through the evaporative cooling process. Amerair utilizes proprietary software that accounts for: nozzle atomization performance, controlled temperature differential and ground level adiabatic saturation temperature to determine the heat and mass transfer rate to set the tower residence time. This ensures continuous dry operation at the tower outlet.

The second design feature required for successful evaporative cooler design is proper gas flow distribution that ensures spray distribution in the gas and eliminates side wall wetting. Amerair utilizes CFD modeling in all of its spray tower designs to position and size its proprietary inlet and outlet distribution devices for proper flow distribution and flawless performance.

Gas Conditions and Nozzle Performance

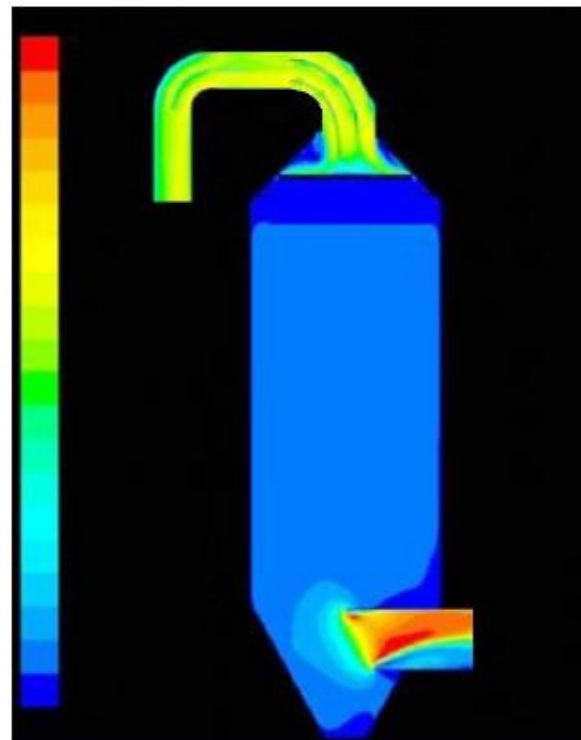
INLET TEMPERATURE: deg F	720	Gas Volume Inlet ACFM	64637
OUTLET TEMPERATURE: deg F	320	Added H ₂ O ACFM	75425
WET BULB TEMP: deg F	151	Added Compressed Air ACFM	667.92
		Total Vol	726049
		Vessel Section area	1519.8

	Diameter	% in Class	wt area	Size Class base
ENTER DROPLET SIZE	COL 1	COL 2		
DISTRIBUTION IN COLUMN	368.2	0.01	428.8	398
AND % IN EACH CLASS IN	321.3	0.01	3241.5	357
COLUMN 2 (19 entries for	345.5	0.06	28728	364
each in required units	302.5	0.74	26540	225
are microns) (begin with	156.5	3.11	226174	174
largest and end with	127.8	7.20	365458	142
smallest	101.7	11.37	362257	113
	81	14.40	28892	90
	63.9	13.43	172190	71
	51.3	12.83	106221	57
	40.5	9.85	50726	45
	32.4	8.43	27791	36
	25.2	4.89	9746.8	28
	20.7	4.44	5972.5	23
	16.2	3.10	2522.9	18
	12.6	2.02	1005	14
	9.9	1.17	359.76	11

Evaporative Tracking, time & temp

	0.00	720	320.8	320.5	274.1	179.6	1422	114.8	91.4	72.5	57.6	45.9	36.5	28.8	22.0	18.5	14.4	11.3	9.0	7.2	32	726049
0.02	682.5	286.5	320.2	270.8	176.2	128.9	111.4	86.0	69.0	54.1	42.4	32.9	25.1	19.1	14.4	9.9	5.7	0.0	0.0	0.0	0.0	72010
0.04	650.4	322.2	320.9	267.5	172.0	126.6	109.1	84.6	67.7	50.7	38.9	29.3	21.3	15.1	9.9	2.8	0.0	0.0	0.0	0.0	0.0	692290
0.06	621.5	320.1	320.8	264.4	169.8	124.4	104.9	81.4	62.4	47.4	36.5	26.8	17.7	11.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	664504
0.08	596.0	327.1	320.9	261.4	166.6	120.4	101.9	78.4	59.3	44.3	32.3	22.4	14.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	646887
0.10	572.5	324.3	320.8	258.5	163.9	120.5	99.9	75.4	56.3	41.2	29.1	19.1	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	630252
0.12	550.6	321.5	319.2	255.8	161.1	120.7	96.1	72.6	53.4	38.3	26.1	15.8	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	615000
0.14	528.8	318.8	317.5	253.1	158.4	121.0	92.4	69.8	50.6	35.4	23.1	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	611876
0.16	520.0	316.2	320.9	250.5	155.8	118.4	90.8	67.1	47.9	32.6	20.2	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	621740
0.18	526.7	312.7	327.4	248.0	153.3	115.8	88.2	64.6	45.3	29.9	17.3	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	592290
0.20	492.8	311.3	324.9	245.5	150.8	113.3	85.7	82.0	42.7	27.2	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	584457
0.22	461.3	306.9	322.4	243.1	148.4	110.8	83.2	80.2	24.6	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	578292
0.24	430.7	306.5	320.2	240.8	146.0	108.5	80.8	57.1	37.7	22.0	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	571882
0.26	401.1	304.2	320.7	238.4	143.7	106.2	78.5	54.7	26.3	16.5	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	565599
0.28	424.4	320.0	326.7	236.2	141.4	103.8	76.2	52.4	23.8	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	559264
0.30	444.6	298.8	320.5	234.0	139.2	101.7	74.0	50.1	30.8	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	552946
0.32	427.4	297.6	291.3	231.8	137.1	99.5	71.7	47.9	28.2	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	551406
0.34	430.7	296.5	289.2	229.7	134.9	97.3	69.5	45.7	25.9	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	547217
0.36	424.6	292.3	307.0	227.6	132.7	95.1	67.4	43.4	23.6	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	542996
0.38	419.0	291.2	294.9	225.4	130.5	93.0	65.2	41.2	21.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	541113
0.40	414.0	289.2	292.9	223.4	128.6	91.0	63.1	39.1	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	537046
0.42	409.4	287.2	289.9	221.4	126.6	89.9	61.1	37.0	16.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	534180
0.44	405.0	285.2	278.9	219.4	124.5	88.9	59.0	34.9	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	531514
0.46	401.0	283.2	276.9	217.4	122.5	86.8	56.9	32.8	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	529031
0.48	397.2	281.2	274.9	215.4	120.5	82.8	54.9	30.8	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	526730
0.50	393.8	279.2	272.9	213.3	118.4	80.7	52.8	28.5	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	524654
0.52	389.6	277.2	270.9	211.4	116.4	78.7	50.7	26.4	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	522792
0.54	387.7	275.3	268.9	209.4	114.5	76.7	48.7	24.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	520980
0.56	386.1	273.4	267.1	207.5	112.6	74.8	46.8	22.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	519206
0.58	382.7	271.5	265.2	205.7	110.7	72.9	44.9	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	517600
0.60	381.4	269.6	263.3	203.7	108.8	71.0	42.9	18.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	516162

CFD Model



Whether meeting CISWI standards, EAF I-TEQ requirements or other process gas cooling needs, let the experts at Amerair provide the correct tower application and sizing.