

PORTLAND TROUTDALE, OR, USA

WMO#: 726985

Lat: **45.55N** Long: **122.40W** Elev: **9** StdP: **101.22** Time Zone: **-8.00 (NAP)** Period: **98-10** WBAN: **24242**

Annual Heating and Humidification Design Conditions

Coldest Month	Heating DB		Humidification DP/MCDB and HR						Coldest month WS/MCDB				MCWS/PCWD to 99.6% DB	
			99.6%			99%			0.4%		1%			
	99.6%	99%	DP	HR	MCDB	DP	HR	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)
12	-3.7	-1.4	-12.3	1.3	-0.4	-7.8	1.9	0.9	14.6	2.9	14.0	2.6	7.3	80

(1)

Annual Cooling, Dehumidification, and Enthalpy Design Conditions

Hottest Month	Hottest Month DB Range	Cooling DB/MCWB						Evaporation WB/MCDB						MCWS/PCWD to 0.4% DB	
		0.4%		1%		2%		0.4%		1%		2%			
		DB	MCWB	DB	MCWB	DB	MCWB	WB	MCDB	WB	MCDB	WB	MCDB	MCWS	PCWD
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
7	13.3	32.8	19.5	31.1	19.1	28.6	18.7	21.1	30.2	20.0	28.8	19.0	27.1	3.2	300

(2)

Dehumidification DP/MCDB and HR									Enthalpy/MCDB						Hours 8 to 4 & 12.8/20.6
0.4%			1%			2%			0.4%		1%		2%		
DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	
17.7	12.7	23.3	17.1	12.2	22.4	16.1	11.5	21.6	60.4	30.3	56.8	28.6	53.6	27.3	1078

(3)

Extreme Annual Design Conditions

Extreme Annual WS			Extreme Max WB	Extreme Annual DB				n-Year Return Period Values of Extreme DB							
				Mean		Standard deviation		n=5 years		n=10 years		n=20 years		n=50 years	
1%	2.5%	5%		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
12.4	11.4	10.2	25.4	-5.2	37.9	2.5	2.2	-7.0	39.5	-8.5	40.8	-9.9	42.1	-11.7	43.7

(4)

Monthly Climatic Design Conditions

		Annual (d)	Jan (e)	Feb (f)	Mar (g)	Apr (h)	May (i)	Jun (j)	Jul (k)	Aug (l)	Sep (m)	Oct (n)	Nov (o)	Dec (p)
Temperatures, Degree-Days and Degree-Hours	Tavg	12.2	5.1	6.6	8.6	10.8	13.9	17.0	20.5	20.3	17.5	12.4	8.2	4.9
	Sd		3.11	2.29	2.76	3.02	3.43	3.19	2.91	2.56	2.91	2.90	3.18	3.35
	HDD10.0	582	153	97	62	25	4	0	0	0	0	11	69	161
	HDD18.3	2451	410	329	303	227	144	63	11	10	49	184	304	417
	CDD10.0	1375	2	2	17	48	126	209	325	318	226	86	16	2
	CDD18.3	202	0	0	0	1	8	22	77	69	24	1	0	0
	CDH23.3	2431	0	0	0	13	132	319	879	745	336	6	0	0
	CDH26.7	941	0	0	0	1	42	127	367	299	105	0	0	0
Precipitation	PrecAvg	1142	164	128	111	87	69	50	19	34	56	86	158	180
	PrecMax	1641	346	279	210	120	109	69	51	108	124	155	293	328
	PrecMin	575	27	34	33	26	24	12	1	2	1	9	20	35
	PrecSD	249.7	85.3	54.1	50.5	25.6	27.3	18.4	13.8	28.1	32.0	41.4	71.8	77.3
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	14.1	15.9	21.2	25.1	31.1	34.0	37.4	35.9	32.4	24.0	18.0	14.1
		MCWB	11.3	11.0	13.8	15.2	18.6	19.5	21.7	20.7	18.1	15.3	14.9	12.3
	2%	DB	12.4	12.8	17.6	22.3	27.3	30.2	32.8	32.5	29.1	22.2	16.1	12.4
		MCWB	10.1	8.2	11.3	14.0	16.8	18.5	20.0	19.3	17.5	14.3	12.8	10.7
	5%	DB	11.0	12.1	15.9	18.9	23.0	27.2	31.0	30.0	27.4	19.1	13.8	11.0
		MCWB	9.0	8.1	10.2	12.1	14.8	17.6	19.7	19.3	17.0	13.5	11.3	9.4
	10%	DB	9.0	10.9	13.0	17.1	21.2	23.7	27.8	27.6	24.7	17.5	12.5	8.9
		MCWB	7.6	7.6	9.1	11.1	14.2	16.1	18.6	18.5	16.1	12.7	10.3	7.4
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	12.8	11.5	14.5	16.1	19.3	20.6	23.5	22.4	20.2	18.0	16.6	12.9
		MCDB	14.5	13.4	19.9	23.1	29.7	31.4	34.1	31.3	28.8	19.8	18.0	14.6
	2%	WB	10.5	9.7	12.2	14.2	17.3	19.1	21.4	20.8	18.7	15.7	13.2	10.7
		MCDB	12.0	11.9	16.0	20.6	25.6	28.6	30.7	29.7	26.3	19.3	14.9	12.0
	5%	WB	8.7	8.5	10.8	12.8	16.0	17.9	20.2	19.7	17.9	14.6	12.0	9.2
		MCDB	9.9	10.7	14.1	17.6	22.4	26.1	28.8	28.2	24.7	17.8	13.4	10.3
	10%	WB	7.8	7.8	9.9	11.6	14.8	16.7	19.1	18.8	16.9	13.7	10.8	7.7
		MCDB	8.7	9.5	13.2	15.7	19.9	23.2	27.1	26.5	23.0	16.8	12.4	8.5
Mean Daily Temperature Range	5% DB	MDBR	4.6	6.7	8.1	9.6	10.5	11.0	13.3	13.2	12.8	8.7	5.7	4.2
		MCDBR	7.2	9.1	12.2	15.1	16.4	18.1	18.7	18.9	17.6	12.5	7.1	6.0
		MCWBR	5.1	5.7	7.1	8.3	8.1	7.9	7.5	7.5	7.6	6.4	4.7	4.9
	5% WB	MCDBR	6.4	7.3	10.3	12.5	14.3	16.3	16.7	16.8	15.3	9.8	6.4	5.8
		MCWBR	4.9	4.9	6.4	7.3	7.3	7.3	7.2	7.1	7.3	5.7	4.7	4.8
Clear Sky Solar Irradiance	taub		0.340	0.336	0.330	0.337	0.323	0.329	0.340	0.345	0.347	0.345	0.330	0.326
	taud		2.580	2.574	2.562	2.479	2.505	2.457	2.445	2.479	2.516	2.550	2.634	2.640
	Ebn,noon		772	851	907	924	945	935	921	905	875	825	782	757
	Edh,noon		64	76	87	102	103	109	109	101	90	76	60	55

Nomenclature:

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