

2021 ASHRAE Handbook - Fundamentals (SI)																	
BASE ESPERANZA, ANTARCTICA (WMO: 889630)																	
Lat: <b>63.3989S</b>			Long: <b>56.9978W</b>			Elev: <b>24</b>		StdP: <b>101.04</b>			Time zone: <b>-3.00 (W03)</b>			Period: <b>94-19</b>		WBAN: <b>99999</b>	
Annual Heating, Humidification, and Ventilation Design Conditions																	
Coldest Month	Heating DB		Humidification DP/MCDB and HR						Coldest month WS/MCDB				MCWS/PCWD to 99.6% DB		WSF		
			99.6%			99%			0.4%		1%						
	99.6%	99%	DP	HR	MCDB	DP	HR	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD			
7	-24.9	-22.7	-30.4	0.2	-23.9	-28.0	0.3	-22.0	33.0	-16.2	30.6	-17.4	11.5	230	1.158		
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		
1	4.1	8.6	4.3	7.2	3.4	6.1	2.8	4.7	7.5	3.9	6.4	3.2	5.4	9.6	270		
Dehumidification DP/MCDB and HR									Enthalpy/MCDB						Extreme Max WB		
0.4%			1%			2%			0.4%		1%		2%				
DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB			
2.6	4.6	4.6	1.9	4.3	3.8	1.4	4.2	3.3	18.4	7.6	16.9	6.6	15.5	5.6	10.8		
Extreme Annual Design Conditions																	
Extreme Annual WS				Extreme Annual Temperature				n-Year Return Period Values of Extreme Temperature									
				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		
26.4	22.5	20.3	DB	-26.8	12.0	2.4	1.7	-28.5	13.2	-29.9	14.2	-31.3	15.2	-33.0	16.4		
			WB	-27.0	7.1	2.3	1.4	-28.7	8.1	-30.0	8.9	-31.3	9.7	-33.0	10.7		
Monthly Climatic Design Conditions																	
			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Temperatures, Degree-Days and Degree-Hours	DBAvg	-4.6	1.5	1.1	-1.8	-6.0	-7.4	-10.3	-11.3	-9.7	-6.9	-3.8	-1.0	1.0			
	DBStd	6.88	1.92	2.91	4.44	5.84	6.01	6.75	7.06	6.53	6.62	5.39	3.18	2.04			
	HDD10.0	5321	263	250	365	480	539	608	661	610	506	429	330	280			
	HDD18.3	8362	522	483	623	730	797	858	919	868	756	687	580	538			
	CDD10.0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	CDD18.3	0	0	0	0	0	0	0	0	0	0	0	0	0			
	CDH23.3	0	0	0	0	0	0	0	0	0	0	0	0	0			
	CDH26.7	0	0	0	0	0	0	0	0	0	0	0	0	0			
Wind		WSAvg	7.3	5.7	6.7	7.3	7.6	7.1	7.8	7.8	7.9	8.3	8.1	7.1	6.3		
Precipitation	PrecAvg	516	47	44	57	42	42	37	36	44	46	43	45	41			
	PrecMax	1202	140	123	122	110	110	95	90	153	207	184	146	110			
	PrecMin	181	2	0	3	4	1	3	0	0	0	7	5	4			
	PrecStd	229	34	29	31	25	27	24	24	38	40	36	32	28			
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	9.7	10.2	9.9	7.0	9.6	5.6	5.5	4.5	6.8	7.5	8.2	8.3			
		MCWB	5.6	5.3	5.3	3.0	4.5	1.5	1.9	1.2	2.8	3.1	4.1	3.9			
	2%	DB	7.3	8.0	7.0	4.6	5.1	3.0	2.2	2.0	4.4	5.5	6.1	6.5			
		MCWB	3.8	3.9	3.3	2.0	2.0	0.3	0.2	0.1	1.4	2.2	2.7	3.0			
	5%	DB	5.9	6.7	5.1	3.1	2.6	1.2	0.7	0.7	2.9	4.0	4.5	5.2			
		MCWB	3.0	3.3	2.5	1.2	0.7	-0.2	-0.2	-0.4	0.7	1.3	1.8	2.2			
	10%	DB	4.8	5.4	3.8	1.9	1.2	-0.2	-0.5	-0.3	1.5	2.6	3.3	4.2			
		MCWB	2.3	2.6	1.8	0.6	0.1	-1.1	-1.2	-1.2	0.2	0.7	1.1	1.6			
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	6.0	5.9	5.7	3.9	5.1	2.0	2.2	1.7	3.4	4.0	4.7	4.7			
		MCDB	8.7	9.7	9.4	6.0	9.1	4.2	4.6	3.3	6.1	6.2	7.5	7.1			
	2%	WB	4.2	4.3	3.8	2.4	2.3	0.8	0.6	0.5	1.7	2.6	3.2	3.5			
		MCDB	6.6	7.1	6.2	4.0	4.4	2.3	1.6	1.6	3.6	4.9	5.5	5.9			
	5%	WB	3.3	3.6	2.8	1.5	1.1	0.0	-0.2	-0.3	1.0	1.6	2.2	2.6			
		MCDB	5.3	6.1	4.5	2.7	2.4	1.2	0.7	0.6	2.5	3.5	4.0	4.6			
	10%	WB	2.6	2.9	2.0	0.6	0.1	-1.0	-1.2	-1.2	0.3	0.9	1.4	1.9			
		MCDB	4.4	5.0	3.5	1.7	1.1	-0.2	-0.3	-0.3	1.5	2.3	2.9	3.7			

Mean Daily Temperature Range		MDBR	4.1	4.6	5.2	5.6	6.6	6.4	7.0	7.0	6.9	6.0	4.8	4.2
	5% DB	MCDBR	6.3	7.3	6.7	7.3	8.9	8.0	8.7	8.4	7.7	7.2	6.8	6.1
		MCWBR	3.9	4.5	4.3	5.4	6.8	6.3	7.5	7.4	5.7	5.0	4.5	3.9
	5% WB	MCDBR	5.9	6.7	6.0	7.0	7.7	7.6	8.4	7.8	7.0	6.6	6.1	5.7
		MCWBR	4.0	4.5	4.4	5.6	6.2	6.5	7.6	7.0	5.7	5.0	4.5	3.9
Clear Sky Solar Irradiance	taub		0.293	0.289	0.275	0.247	0.180	0.153	0.168	0.236	0.264	0.285	0.285	0.292
	taud		2.419	2.434	2.439	2.344	2.032	1.923	1.989	2.221	2.301	2.320	2.367	2.375
	Ebn at noon		978	931	855	699	456	257	452	683	843	922	981	992
	Edn at noon		104	91	72	49	26	13	25	53	80	101	109	112
All-Sky Solar Radiation	RadAvg		5.72	3.99	2.19	0.92	0.26	0.08	0.17	0.72	2.02	3.85	5.66	6.49
	RadStd		0.37	0.21	0.17	0.07	0.02	0.00	0.01	0.05	0.14	0.18	0.29	0.42
Historical Trends														
	DBAvg	Heating		Cooling			Degree-Days							
		99% DB	99% DP	1% DB	1% WB	1% DP	HDD10.0	HDD18.3	CDD10.0	CDD18.3				
Station Only	N/A	+1.91	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Regional (0 neighbors)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				

CDDn	Cooling degree-days base n°C, °C-day	Lat	Latitude, °	Period	Years used to calculate the design conditions
CDHn	Cooling degree-hours base n°C, °C-hour	Long	Longitude, °	Sd	Standard deviation of daily average temperature, °C
DB	Dry bulb temperature, °C	MCDB	Mean coincident dry bulb temperature, °C	StdP	Standard pressure at station elevation, kPa
DP	Dew point temperature, °C	MCDBR	Mean coincident dry bulb temp. range, °C	taub	Clear sky optical depth for beam irradiance
Ebn,noon	Clear sky beam normal and diffuse horizontal irradiances at solar noon, W/m2	MCDP	Mean coincident dew point temperature, °C	taud	Clear sky optical depth for diffuse irradiance
Edh,noon		MCWB	Mean coincident wet bulb temperature, °C	Tavg	Average temperature, °C
Elev	Elevation, m	MCWBR	Mean coincident wet bulb temp. range, °C	Time Zone	Hours ahead or behind UTC
Enth	Enthalpy, kJ/kg	MCWS	Mean coincident wind speed, m/s	WB	Wet bulb temperature, °C
HDDn	Heating degree-days base n°C, °C-day	MDBR	Mean dry bulb temp. range, °C	Hours 8/4 & 12.8/20.6	Number of hours between 8 a.m. and 4 p.m with DB between 12.8 and 20.6 °C
PCWD	Prevailing coincident wind direction, °,0 = North, 90 = East	WS	Wind speed, m/s	HR	Humidity ratio, g of moisture per kg of dry air