

2021 ASHRAE Handbook - Fundamentals (SI)																
BASE SAN MARTIN, ANTARCTICA (WMO: 890660)																
Lat:68.13S			Long:67.104W			Elev:7		StdP: 101.24		Time zone:-3.00 (W03)			Period:94-19		WBAN:99999	
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	-29.8	-26.5	-35.2	0.1	-28.8	-31.4	0.2	-26.3	40.4	-16.0	30.4	-14.2	1.3	140	1.026	
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	3.5	6.4	2.7	5.6	2.1	4.9	1.6	3.2	5.6	2.6	4.8	2.1	4.2	5.2	0	
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		
1.3	4.2	3.0	0.7	4.0	2.4	0.3	3.9	2.0	15.7	5.7	14.4	5.0	13.4	4.3	6.7	
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	
28.4	22.1	17.7	DB	-31.4	8.7	4.3	1.1	-34.5	9.5	-37.0	10.1	-39.5	10.8	-42.6	11.6	
			WB	-31.6	5.0	4.0	0.9	-34.5	5.7	-36.8	6.2	-39.1	6.7	-42.0	7.3	
Monthly Climatic Design Conditions																
			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperatures, Degree-Days and Degree-Hours	DBAvg	-4.4	1.8	1.0	-0.7	-3.4	-4.1	-8.6	-11.9	-11.4	-9.0	-4.9	-2.1	0.8		
	DBStd	6.74	1.67	1.94	2.71	3.45	4.21	5.81	7.48	7.51	7.24	5.08	3.45	1.95		
	HDD10.0	5258	254	253	332	402	436	557	679	664	569	463	362	286		
	HDD18.3	8300	512	486	590	652	694	807	938	923	819	722	612	544		
	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	4.7	4.0	4.4	4.8	5.5	4.8	4.9	4.4	4.7	4.9	5.0	5.1	4.5	
Precipitation	PrecAvg	687	53	55	63	56	57	46	48	57	65	74	65	46		
	PrecMax	1011	98	95	109	108	113	83	86	91	92	134	107	109		
	PrecMin	463	27	30	36	16	33	20	19	15	40	39	24	11		
	PrecStd	142	22	17	14	21	18	17	16	17	14	22	25	22		
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	7.5	6.9	6.8	5.9	6.2	4.6	4.8	3.9	5.7	6.2	6.3	7.0		
		MCWB	3.6	3.0	3.6	2.7	3.0	1.5	1.4	1.3	2.2	3.3	2.6	2.8		
	2%	DB	6.0	5.7	5.1	4.0	4.2	2.4	2.5	1.9	4.0	4.7	4.7	5.6		
		MCWB	2.2	1.9	2.1	1.0	1.5	0.4	0.1	0.3	1.2	1.9	1.4	1.8		
	5%	DB	5.2	4.7	3.9	2.2	2.8	0.2	0.1	0.3	2.5	3.5	3.5	4.7		
		MCWB	1.7	1.4	1.1	0.1	0.4	-0.7	-1.4	-0.9	0.3	1.0	0.7	1.2		
	10%	DB	4.5	3.9	2.8	1.0	1.4	-1.3	-1.9	-1.5	0.7	1.9	2.3	3.8		
		MCWB	1.3	0.9	0.5	-0.4	-0.3	-2.1	-2.8	-2.4	-0.7	0.1	0.2	0.7		
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	4.3	3.6	3.9	2.9	3.1	2.0	1.7	1.7	2.6	3.7	3.0	3.4		
		MCDB	6.8	6.4	6.3	5.5	5.5	4.0	4.1	2.9	4.7	5.7	5.6	6.3		
	2%	WB	2.9	2.5	2.4	1.4	1.8	0.4	0.2	0.3	1.4	2.2	1.9	2.4		
		MCDB	5.1	4.6	4.6	3.3	3.7	1.9	2.2	1.6	3.6	4.3	3.9	4.8		
	5%	WB	2.2	2.0	1.5	0.5	0.7	-0.7	-1.4	-0.9	0.4	1.2	1.1	1.7		
		MCDB	4.2	3.9	3.2	1.8	2.3	0.3	-0.1	0.2	2.2	3.1	3.0	3.9		
	10%	WB	1.8	1.4	0.8	-0.3	-0.3	-2.0	-2.9	-2.4	-0.7	0.1	0.4	1.1		
		MCDB	3.7	3.2	2.3	0.9	1.2	-1.4	-1.9	-1.5	0.7	1.8	2.1	3.0		

Mean Daily Temperature Range		MDBR	3.5	3.5	3.9	3.9	4.3	5.3	6.9	7.5	7.4	6.2	5.1	3.8
	5% DB	MCDBR	4.7	4.7	5.4	5.2	5.6	6.2	7.8	8.3	7.2	6.8	5.6	4.9
		MCWBR	3.0	3.0	3.7	3.7	4.0	5.1	6.8	7.2	5.5	5.2	3.8	3.2
	5% WB	MCDBR	4.1	4.2	4.8	4.9	5.2	6.0	7.9	7.9	7.2	6.7	5.6	4.6
		MCWBR	2.9	2.9	3.6	3.6	4.1	5.1	7.1	7.1	5.5	5.2	3.8	3.2
Clear Sky Solar Irradiance	taub		0.269	0.263	0.243	0.201	N/A	N/A	0.140	0.196	0.236	0.251	0.259	0.269
	taud		2.328	2.361	2.366	2.219	N/A	N/A	1.908	2.098	2.224	2.226	2.255	2.273
	Ebn at noon		982	929	842	632	N/A	0	135	603	822	930	987	998
	Edn at noon		107	89	66	37	N/A	0	6	40	74	101	114	117
All-Sky Solar Radiation	RadAvg		7.21	4.75	2.29	0.64	0.08	0.00	0.02	0.38	1.62	4.19	6.81	8.33
	RadStd		0.32	0.31	0.19	0.06	0.01	0.00	0.00	0.03	0.14	0.23	0.31	0.41
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	N/A	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