

2021 ASHRAE Handbook - Fundamentals (SI)								SAN CARLOS DE BARILOCHE, ARGENTINA (WMO: 877650)											
Lat:41.1475S			Long:71.1642W			Elev:840		StdP: 91.63			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	-6.9	-5.1	-11.0	1.6	1.9	-9.2	1.9	2.1	17.6	6.7	15.3	5.8	1.5	140	0.785				
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	14.8	28.9	14.6	26.9	13.6	24.9	12.9	15.6	25.7	14.6	24.2	13.7	22.7	5.2	290				
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					
11.8	9.5	17.9	10.5	8.7	16.8	9.6	8.2	16.0	46.6	25.7	43.4	24.1	41.0	22.7	21.3				
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				
15.2	13.7	12.5	DB	-11.2	32.3	3.2	1.4	-13.5	33.3	-15.3	34.2	-17.2	35.0	-19.5	36.0				
			WB	-11.7	17.9	3.2	1.2	-14.0	18.7	-15.9	19.5	-17.6	20.2	-19.9	21.1				
Monthly Climatic Design Conditions																			
			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Temperatures, Degree-Days and Degree-Hours	DBAvg	8.6	15.1	15.0	12.3	8.6	5.8	3.3	2.6	3.6	5.6	8.2	10.7	13.2					
	DBStd	5.27	3.17	3.40	3.09	2.93	2.86	2.94	2.95	2.64	2.66	2.76	2.94	3.22					
	HDD10.0	1074	2	2	12	60	133	200	229	198	132	71	26	8					
	HDD18.3	3559	108	103	189	291	389	450	488	456	381	314	230	161					
	CDD10.0	579	161	142	83	19	3	1	0	1	2	14	46	109					
	CDD18.3	22	8	9	2	0	0	0	0	0	0	0	0	3					
	CDH23.3	746	266	253	66	2	0	0	0	0	0	4	29	127					
	CDH26.7	181	69	72	12	0	0	0	0	0	0	1	3	25					
Wind		WSAvg	5.7	6.7	5.7	5.3	5.1	4.4	5.0	4.9	5.0	5.3	6.2	7.1	7.2				
Precipitation	PrecAvg	791	23	21	29	59	122	153	125	115	57	43	29	29					
	PrecMax	1138	106	84	129	174	344	400	242	307	164	182	113	190					
	PrecMin	506	0	0	1	0	7	5	15	16	3	0	0	0					
	PrecStd	160	25	21	25	42	85	86	57	66	37	41	26	33					
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	31.2	31.7	28.1	22.2	16.1	12.4	12.0	14.9	18.8	23.1	26.8	29.2					
		MCWB	15.2	15.7	15.1	11.9	9.8	7.8	6.9	7.9	8.7	10.4	12.5	14.6					
	2%	DB	28.8	28.9	25.1	19.5	13.8	10.2	9.9	11.9	15.9	19.9	23.3	26.7					
		MCWB	14.5	14.5	13.5	10.7	9.0	6.9	6.2	6.8	7.4	9.2	11.3	13.1					
	5%	DB	26.4	26.5	22.5	16.9	12.1	9.1	8.3	9.9	13.8	17.2	21.0	24.2					
		MCWB	13.5	13.8	12.5	9.7	8.2	6.1	5.3	5.8	6.6	8.4	10.3	12.3					
	10%	DB	24.1	24.0	20.1	14.8	10.8	7.9	7.1	8.2	11.6	14.9	18.2	21.8					
		MCWB	12.7	12.9	11.5	9.2	7.5	5.4	4.5	5.0	5.8	7.7	9.3	11.5					
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	17.2	16.8	16.3	13.1	11.2	9.1	8.6	9.0	9.6	12.0	13.2	15.6					
		MCDB	27.3	27.5	25.9	19.5	14.0	11.2	10.2	12.5	16.6	19.4	24.0	26.5					
	2%	WB	15.5	15.6	14.4	11.8	10.0	7.7	6.8	7.7	8.3	10.4	12.0	14.1					
		MCDB	25.4	25.9	22.9	17.1	13.0	9.8	8.9	10.6	14.2	17.8	21.3	24.7					
	5%	WB	14.4	14.6	13.2	10.7	8.8	6.5	5.7	6.5	7.2	9.2	11.0	13.0					
		MCDB	24.2	24.1	20.8	15.3	11.4	8.5	7.8	9.3	12.2	15.7	19.3	22.3					
	10%	WB	13.4	13.6	12.1	9.7	7.9	5.5	4.7	5.2	6.3	8.2	9.9	11.9					
		MCDB	22.3	22.3	18.7	13.8	10.3	7.4	6.7	7.7	10.5	14.0	17.0	20.4					

Mean Daily Temperature Range		MDBR	14.8	15.1	14.1	11.8	8.8	7.1	7.8	8.5	10.8	11.8	12.9	13.6
	5% DB	MCDBR	20.6	20.7	19.5	17.5	11.5	8.9	10.2	11.8	15.9	18.1	19.3	20.2
		MCWBR	9.2	9.3	10.0	10.1	7.8	6.5	7.2	7.6	9.1	9.5	9.5	9.3
	5% WB	MCDBR	17.9	17.9	16.8	13.7	9.6	7.4	8.4	9.7	13.0	14.8	16.2	17.5
		MCWBR	8.5	8.6	9.0	8.6	7.0	5.8	6.5	6.8	9.1	9.5	9.5	9.3
Clear Sky Solar Irradiance	taub		0.298	0.304	0.294	0.289	0.281	0.271	0.267	0.284	0.296	0.298	0.298	0.302
	taud		2.592	2.567	2.595	2.592	2.589	2.555	2.552	2.522	2.514	2.537	2.560	2.558
	Ebn at noon		1032	1000	968	906	846	820	853	896	949	995	1026	1033
	Edn at noon		102	99	88	75	64	60	65	79	93	101	104	106
All-Sky Solar Radiation	RadAvg		7.91	6.83	5.07	3.28	1.97	1.43	1.70	2.42	3.88	5.34	6.94	7.81
	RadStd		0.38	0.33	0.29	0.26	0.26	0.20	0.20	0.26	0.42	0.40	0.45	0.58
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	+0.86	N/A	N/A	N/A	N/A	N/A	N/A			
Regional (0 neighbors)		N/A	N/A	N/A	+0.56	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