

2021 ASHRAE Handbook - Fundamentals (SI)																	
PARANA, ARGENTINA (WMO: 873740)																	
Lat:31.7903S			Long:60.4842W			Elev:78		StdP: 100.39			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	2.7	4.0	-3.6	2.8	7.7	-2.0	3.2	8.3	11.6	12.9	10.3	13.6	1.5	180	0.408		
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	10.9	34.4	23.2	33.0	22.8	31.8	22.4	25.7	31.4	24.8	30.3	24.0	29.3	4.2	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			
24.0	19.1	29.1	23.2	18.1	28.1	22.3	17.2	27.1	79.8	31.4	76.1	30.4	72.7	29.3	28.9		
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		
10.5	9.3	8.2	DB	0.2	37.1	1.3	1.1	-0.8	37.9	-1.5	38.6	-2.3	39.2	-3.2	40.0		
			WB	-1.2	27.4	1.4	1.0	-2.2	28.1	-3.0	28.6	-3.8	29.2	-4.8	29.9		
Monthly Climatic Design Conditions																	
			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Temperatures, Degree-Days and Degree-Hours	DBAvg	18.6	25.3	24.0	21.9	18.7	15.4	12.8	12.2	13.8	15.9	18.8	21.5	23.8			
	DBStd	5.63	2.73	2.85	3.01	3.51	3.55	3.73	4.08	4.28	3.89	3.40	3.13	2.99			
	HDD10.0	47	0	0	0	0	2	12	21	11	2	0	0	0			
	HDD18.3	811	0	1	6	37	106	173	197	154	94	34	8	1			
	CDD10.0	3203	475	392	368	261	169	96	89	128	178	273	345	428			
	CDD18.3	924	217	159	116	48	15	6	6	13	19	49	103	171			
	CDH23.3	8213	2256	1407	887	288	53	12	22	94	176	403	928	1687			
	CDH26.7	3078	1008	551	279	58	7	1	2	19	46	105	310	691			
Wind		WSAvg	3.3	3.0	3.0	2.8	2.9	2.9	3.2	3.3	3.6	3.8	4.0	3.6	3.4		
Precipitation	PrecAvg	1073	133	123	151	120	63	35	34	37	59	113	116	127			
	PrecMax	1546	983	383	539	393	232	117	87	169	247	327	313	405			
	PrecMin	529	10	4	24	5	0	0	0	0	3	16	7	16			
	PrecStd	235	141	87	94	93	56	31	24	37	52	68	65	85			
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	36.7	35.2	33.2	30.6	27.5	24.9	26.1	29.2	31.0	32.2	33.4	35.7			
		MCWB	24.3	23.8	23.5	23.6	21.5	20.7	19.1	20.6	21.9	22.5	21.7	22.8			
	2%	DB	34.7	33.2	31.3	28.4	24.8	22.4	23.1	26.0	27.8	29.3	31.5	33.7			
		MCWB	23.2	23.6	22.9	21.7	19.9	19.2	18.2	18.8	19.4	20.5	21.0	22.6			
	5%	DB	33.1	31.7	29.7	26.6	22.9	20.3	20.8	23.5	25.2	27.3	30.1	32.1			
		MCWB	22.7	23.1	22.2	20.8	19.0	17.4	16.7	17.4	17.9	19.7	20.3	22.1			
	10%	DB	31.8	30.2	28.1	24.8	21.0	18.6	18.7	21.0	22.9	25.5	28.3	30.5			
		MCWB	22.5	22.5	21.2	19.8	17.6	15.7	15.3	15.9	16.1	18.4	19.7	21.2			
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	26.7	26.7	25.8	24.7	22.4	21.3	20.3	21.6	23.0	24.4	24.4	26.5			
		MCDB	32.4	31.4	31.4	29.0	26.1	24.0	24.1	27.5	29.0	30.4	30.2	32.6			
	2%	WB	25.4	25.4	24.5	23.3	20.8	19.7	18.6	19.7	20.8	22.3	22.7	25.0			
		MCDB	31.7	30.6	29.0	26.9	23.3	21.8	22.2	24.7	26.3	26.9	28.8	30.6			
	5%	WB	24.5	24.4	23.3	21.9	19.6	18.2	17.3	18.4	18.9	20.9	21.7	23.7			
		MCDB	30.6	29.4	27.5	25.1	22.1	20.2	20.2	22.6	23.3	25.4	27.2	29.3			
	10%	WB	23.7	23.4	22.1	20.7	18.4	16.6	16.0	16.7	17.4	19.7	20.7	22.5			
		MCDB	29.5	28.2	26.6	23.6	20.7	18.1	18.3	20.1	21.5	23.9	26.1	28.0			

Mean Daily Temperature Range		MDBR	10.9	10.0	9.9	8.9	8.2	8.1	8.6	9.8	10.4	10.2	11.1	11.0
	5% DB	MCDBR	12.6	12.0	11.7	11.0	9.7	9.0	10.0	12.2	13.4	12.7	13.2	12.7
		MCWBR	4.9	4.8	5.1	5.6	5.5	5.6	5.8	6.8	6.7	6.2	5.8	5.3
	5% WB	MCDBR	10.7	10.0	10.0	9.2	8.2	7.8	8.7	11.0	11.5	10.8	11.0	10.8
		MCWBR	5.2	4.9	5.5	5.4	5.2	5.5	5.7	6.7	6.7	6.2	5.8	5.3
Clear Sky Solar Irradiance	taub		0.400	0.388	0.372	0.380	0.358	0.355	0.358	0.425	0.485	0.426	0.392	0.396
	taud		2.384	2.433	2.468	2.413	2.436	2.435	2.397	2.159	1.997	2.240	2.363	2.378
	Ebn at noon		940	931	912	846	814	789	803	782	786	884	941	947
	Edn at noon		129	119	107	102	89	84	91	129	169	142	131	130
All-Sky Solar Radiation	RadAvg		7.14	6.13	5.28	3.89	2.89	2.49	2.77	3.67	4.76	5.66	6.89	7.23
	RadStd		0.47	0.47	0.44	0.50	0.25	0.27	0.29	0.33	0.41	0.47	0.40	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	N/A	N/A	N/A	+0.50	N/A	N/A	N/A	N/A	N/A			
Regional (0 neighbors)		N/A	N/A	N/A	+0.23	+0.49	+0.55	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