

2021 ASHRAE Handbook - Fundamentals (SI)																	
MAR DEL PLATA, ARGENTINA (WMO: 876920)																	
Lat:37.9322S			Long:57.5814W			Elev:21		StdP: 101.07			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	-1.1	0.1	-4.7	2.5	3.5	-3.0	2.9	3.6	11.6	10.2	10.4	9.8	2.0	320	0.541		
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	11.0	31.3	21.2	29.3	20.5	27.5	20.0	23.2	28.0	22.3	26.5	21.5	25.3	6.7	340		
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			
21.9	16.6	24.9	21.0	15.7	24.0	20.2	14.9	23.2	69.1	27.8	65.6	26.4	62.7	25.4	28.8		
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		
10.5	9.5	8.5	DB	-3.4	35.7	1.4	1.7	-4.3	36.9	-5.1	37.8	-5.9	38.8	-6.9	40.0		
			WB	-3.9	25.3	1.4	1.4	-4.9	26.3	-5.8	27.1	-6.5	27.9	-7.6	28.9		
Monthly Climatic Design Conditions																	
			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Temperatures, Degree-Days and Degree-Hours	DBAvg	14.0	20.3	19.7	18.0	14.6	11.7	8.7	7.9	9.3	10.4	13.2	15.8	18.8			
	DBStd	5.32	3.27	3.27	3.32	3.13	3.07	2.76	2.90	3.08	2.96	3.19	3.31	3.66			
	HDD10.0	242	0	0	0	2	17	57	78	51	30	8	1	0			
	HDD18.3	1833	18	22	49	117	207	288	322	281	238	163	89	39			
	CDD10.0	1704	319	271	247	142	69	19	14	28	42	106	176	273			
	CDD18.3	254	79	59	37	6	1	0	0	1	0	3	14	54			
	CDH23.3	1869	572	378	204	37	6	0	0	6	4	39	143	481			
	CDH26.7	577	191	115	48	4	0	0	0	1	1	5	33	179			
Wind		WSAvg	4.0	4.5	4.2	3.9	3.6	3.3	3.7	3.7	4.0	4.2	4.4	4.5	4.7		
Precipitation	PrecAvg	902	96	78	99	85	65	60	56	65	58	84	77	95			
	PrecMax	1405	206	303	267	370	239	174	173	195	157	254	188	331			
	PrecMin	558	21	11	8	1	5	2	0	2	5	6	18	6			
	PrecStd	191	50	49	55	80	43	41	38	51	36	50	40	54			
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	34.6	32.9	30.9	26.8	23.9	19.0	19.2	23.1	23.0	27.1	30.1	34.0			
		MCWB	22.3	22.5	21.4	19.4	17.8	14.6	14.6	16.4	15.8	18.5	19.2	21.9			
	2%	DB	31.0	30.0	27.9	24.1	20.4	16.9	16.4	19.0	20.1	24.0	27.1	31.0			
		MCWB	21.6	21.4	20.7	18.2	16.0	13.2	12.8	13.9	13.9	16.8	18.6	20.5			
	5%	DB	28.7	27.7	25.5	22.1	18.5	15.2	14.5	16.7	18.0	21.5	24.7	28.3			
		MCWB	20.7	20.7	19.7	17.2	14.7	12.2	11.3	12.0	12.9	15.6	17.6	19.7			
	10%	DB	26.4	25.3	23.6	20.2	17.0	14.0	12.9	14.8	16.0	19.1	22.2	25.9			
		MCWB	20.0	20.3	19.3	16.9	14.2	11.4	10.5	11.0	11.9	14.4	16.7	19.1			
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	24.2	24.4	23.4	21.4	18.9	17.1	16.6	17.9	17.4	20.3	21.1	23.7			
		MCDB	30.0	29.1	27.1	23.8	21.8	17.9	18.4	20.9	20.7	25.0	26.4	30.4			
	2%	WB	23.0	23.1	22.1	19.9	17.2	14.8	13.8	14.9	15.2	17.9	19.7	22.2			
		MCDB	28.1	27.1	25.5	21.8	19.2	15.8	15.3	17.5	18.4	22.4	24.6	27.9			
	5%	WB	22.1	22.1	21.0	18.6	16.0	13.2	12.1	13.1	13.9	16.6	18.6	21.0			
		MCDB	26.5	25.5	23.9	20.8	17.5	14.4	13.5	15.4	16.7	20.1	22.8	25.8			
	10%	WB	21.2	21.2	20.1	17.4	14.8	11.8	11.0	11.7	12.7	15.2	17.6	19.8			
		MCDB	25.2	24.3	22.7	19.8	16.5	13.5	12.5	13.9	15.0	18.2	21.3	24.1			

Mean Daily Temperature Range		MDBR	11.0	10.1	9.9	10.1	9.5	9.3	9.1	9.5	9.7	9.6	10.7	11.4
	5% DB	MCDBR	15.2	14.0	13.0	13.1	11.9	11.0	11.4	13.2	13.5	14.6	15.2	16.5
		MCWBR	7.4	7.0	6.9	7.7	7.7	7.7	7.8	8.3	8.3	8.4	8.1	7.8
	5% WB	MCDBR	12.2	10.9	10.1	10.1	9.2	8.1	8.6	10.4	11.2	11.9	12.3	13.3
		MCWBR	6.8	6.4	6.2	6.8	6.8	6.8	6.8	7.4	8.3	8.4	8.1	7.8
Clear Sky Solar Irradiance	taub		0.402	0.384	0.363	0.356	0.346	0.339	0.347	0.397	0.419	0.391	0.376	0.386
	taud		2.362	2.429	2.481	2.451	2.445	2.451	2.402	2.226	2.176	2.321	2.394	2.384
	Ebn at noon		930	924	903	842	785	758	772	777	827	905	950	951
	Edn at noon		130	116	102	92	80	74	82	113	135	128	125	128
All-Sky Solar Radiation	RadAvg		7.21	6.23	4.91	3.53	2.39	1.92	2.07	2.82	4.08	5.36	6.64	7.53
	RadStd		0.30	0.42	0.31	0.36	0.21	0.17	0.18	0.30	0.31	0.52	0.34	0.38
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	+0.68	N/A	N/A	N/A	N/A	N/A	+29			
Regional (0 neighbors)		N/A	N/A	N/A	+0.70	N/A	N/A	N/A	N/A	N/A	+33			

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