

2021 ASHRAE Handbook - Fundamentals (SI)						EL CALAFATE INTL, ARGENTINA (WMO: 879040)											
Lat: 50.2844S		Long: 72.0514W		Elev: 204		StdP: 98.90			Time zone: -3.00 (W03)			Period: 03-19		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			
6	-8.6	-6.6	-10.8	1.5	-2.6	-9.2	1.8	0.4	14.5	7.3	13.2	8.0	2.0	140	0.760		
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		
2	9.8	22.2	13.1	20.8	12.1	19.5	11.4	13.9	21.0	12.9	19.6	12.1	18.4	7.4	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			
10.4	8.1	15.9	9.2	7.4	14.9	8.3	7.0	14.4	39.6	21.0	37.1	19.6	35.0	18.6	17.8		
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	
14.7	13.2	11.9	DB	-11.5	25.5	2.9	1.9	-13.6	26.8	-15.2	27.9	-16.8	29.0	-18.9	30.3		
			WB	-11.7	15.6	2.8	1.0	-13.8	16.3	-15.4	16.9	-17.0	17.5	-19.1	18.2		
Monthly Climatic Design Conditions																	
			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Temperatures, Degree-Days and Degree-Hours	DBAvg	7.5	13.4	13.7	11.2	7.2	4.1	1.2	1.3	2.6	5.4	7.7	10.3	12.0			
	DBStd	5.26	2.63	2.91	2.68	2.93	3.12	3.63	3.33	2.89	2.57	2.55	2.78	2.49			
	HDD10.0	1319	4	3	17	92	183	264	269	228	139	79	31	9			
	HDD18.3	3964	153	132	222	333	441	513	528	487	389	329	242	196			
	CDD10.0	402	109	107	54	9	1	1	0	0	1	8	39	72			
	CDD18.3	4	1	3	0	0	0	0	0	0	0	0	0	0			
	CDH23.3	21	6	14	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	4.9	6.6	5.7	5.0	4.4	3.6	3.5	3.3	3.6	4.4	5.3	6.4	6.5		
Precipitation	PrecAvg	184	9	10	19	26	28	22	20	17	14	11	8	14			
	PrecMax	326	23	25	105	71	72	67	46	32	43	31	29	52			
	PrecMin	79	3	0	0	3	6	4	6	7	2	0	1	0			
	PrecStd	66	6	8	29	20	19	19	12	7	12	9	7	14			
	Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	24.1	25.4	21.4	18.8	15.0	13.9	12.0	12.8	15.2	18.4	20.9	21.5		
MCWB			13.7	14.3	12.4	11.5	9.2	7.9	6.3	6.7	7.9	8.8	11.7	12.0			
2%		DB	21.8	23.0	19.5	16.0	12.8	10.5	9.7	10.7	13.4	16.1	18.6	20.0			
		MCWB	12.7	14.0	11.5	9.5	7.8	6.0	5.2	5.7	6.8	8.1	10.3	11.2			
5%		DB	20.3	21.3	18.0	14.4	11.1	8.4	8.0	9.2	12.0	14.6	17.2	18.5			
		MCWB	11.7	12.9	10.8	8.6	6.5	4.7	4.1	4.7	6.1	7.5	9.5	10.2			
10%		DB	19.0	19.5	16.6	13.0	9.6	6.7	6.7	7.8	10.7	13.3	15.9	17.1			
		MCWB	11.1	11.9	10.2	7.9	5.6	3.5	3.3	3.9	5.3	6.8	8.8	9.4			
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	14.5	15.7	13.4	12.3	10.1	8.1	7.1	7.6	8.5	9.7	12.5	13.6			
		MCDB	21.2	22.3	19.6	18.0	14.0	13.2	11.3	11.6	13.6	16.7	19.1	19.0			
	2%	WB	13.4	14.4	12.3	10.2	8.6	6.4	5.5	6.3	7.5	8.6	11.1	11.7			
		MCDB	20.5	21.6	18.1	14.5	11.8	9.8	9.2	9.5	12.2	14.8	17.1	18.4			
	5%	WB	12.5	13.4	11.5	9.3	7.2	5.0	4.6	5.3	6.7	7.9	10.1	10.7			
		MCDB	19.2	20.4	16.8	13.5	10.5	8.1	7.7	8.5	10.7	13.8	16.0	17.2			
	10%	WB	11.7	12.4	10.7	8.3	6.1	3.8	3.6	4.3	5.9	7.2	9.2	10.0			
		MCDB	18.1	18.9	15.7	12.5	9.0	6.3	6.4	7.3	9.7	12.8	15.2	16.0			

Mean Daily Temperature Range		MDBR	9.4	9.8	9.5	9.9	8.4	7.2	7.7	8.3	9.6	10.2	9.5	8.9
	5% DB	MCDBR	11.6	12.1	11.0	11.4	10.0	8.6	8.9	10.0	11.3	11.9	11.2	10.8
		MCWBR	6.0	6.5	6.2	7.1	6.5	5.9	6.0	6.4	6.5	6.4	5.9	5.6
	5% WB	MCDBR	11.1	11.4	10.4	10.7	9.2	8.2	8.7	9.4	9.6	11.0	10.7	10.1
		MCWBR	6.2	6.9	6.5	7.0	6.6	6.0	6.1	6.5	6.5	6.4	5.9	5.6
Clear Sky Solar Irradiance	taub		0.306	0.304	0.291	0.280	0.259	0.245	0.248	0.266	0.286	0.297	0.298	0.307
	taud		2.564	2.576	2.608	2.607	2.546	2.426	2.408	2.458	2.501	2.533	2.555	2.542
	Ebn at noon		1007	976	935	857	777	722	766	851	922	972	1010	1013
	Edn at noon		100	92	79	63	51	48	55	70	85	95	100	104
All-Sky Solar Radiation	RadAvg		6.09	5.10	3.55	2.15	1.22	0.83	1.03	1.79	3.06	4.45	5.72	6.22
	RadStd		0.36	0.26	0.20	0.13	0.10	0.07	0.10	0.16	0.23	0.23	0.31	0.40
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