2021 ASHRAE Handbook - Foundamentals (SI)

RIO GALLEGOS, ARGENTINA (WMO: 879250)

Lat:**51.6117S**	Long:**69.3081W**	Elev:**19**	StdP: **101.10**	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	-7.0	-5.0	-10.2	1.6	1.9	-8.8	1.8	4.3	16.9	4.1	14.9	4.3	2.5	270	0.847

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	11.1	24.2	13.7	22.2	12.6	20.8	11.8	14.7	22.1	13.6	20.5	12.6	18.8	8.3	250

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	
11.2	8.3	15.6	10.2	7.8	14.9	9.2	7.3	14.1	41.3	22.0	38.4	20.6	35.7	18.9	19.4

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
18.2	15.7	14.0	DB	-10.7	29.1	3.2	1.9	-13.0	30.5	-14.8	31.6	-16.6	32.7	-18.9	34.1
			WB	-11.1	17.2	3.2	1.1	-13.4	18.0	-15.3	18.6	-17.0	19.3	-19.3	20.0

Monthly Climatic Design Conditions

		Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperatures, Degree-Days and Degree-Hours	DBAvg	7.9	13.5	13.1	11.3	8.1	4.6	1.7	1.8	3.4	6.0	8.5	10.6	12.5
	DBStd	5.09	2.80	3.29	3.16	2.93	2.92	3.20	2.98	2.60	2.67	2.71	2.87	2.78
	HDD10.0	1199	3	7	22	72	169	248	256	204	123	63	26	8
	HDD18.3	3818	151	148	219	308	427	498	513	463	370	306	232	183
	CDD10.0	430	112	94	62	14	1	0	0	0	3	16	44	84
	CDD18.3	7	2	3	1	0	0	0	0	0	0	0	0	1
	CDH23.3	113	31	51	10	1	0	0	0	0	0	0	4	16
	CDH26.7	17	3	10	2	0	0	0	0	0	0	0	1	2
Wind	WSAvg	6.3	7.5	6.9	6.4	6.0	5.2	5.2	5.3	5.7	6.0	6.9	7.5	7.6
Precipitation	PrecAvg	257	29	25	22	23	22	21	19	15	13	16	21	28
	PrecMax	416	91	72	75	95	80	93	63	41	38	56	98	78
	PrecMin	127	4	1	1	2	0	0	1	1	0	0	0	2
	PrecStd	66	18	16	18	18	15	19	13	11	9	15	18	19
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4% DB	26.3	28.1	24.4	19.2	14.7	12.0	11.2	13.0	17.3	20.9	23.5	25.2	
	0.4% MCWB	14.4	15.9	14.3	11.4	9.2	6.9	6.7	7.0	9.0	10.9	12.5	14.0	
	2% DB	23.8	24.8	21.2	17.0	12.2	9.2	8.7	10.7	15.0	18.2	20.9	22.2	
	2% MCWB	13.2	14.6	12.4	10.2	7.8	5.9	5.1	5.7	7.8	9.4	11.3	12.2	
	5% DB	21.8	21.9	19.1	15.1	10.8	7.3	7.1	9.1	13.0	16.2	18.8	20.2	
	5% MCWB	12.2	13.0	11.2	9.3	7.0	4.8	4.2	4.9	6.7	8.4	10.1	11.2	
	10% DB	19.8	19.6	17.1	13.2	9.2	6.1	5.9	7.8	11.1	14.8	16.9	18.4	
	10% MCWB	11.1	11.7	10.3	8.3	6.2	4.1	3.4	4.2	5.9	7.6	9.2	10.3	
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4% WB	15.7	16.8	15.0	12.7	10.1	7.7	7.0	7.7	9.7	11.5	13.3	15.0	
	0.4% MCDB	24.3	26.1	22.4	17.8	13.3	10.6	9.7	11.7	16.1	19.1	21.3	22.8	
	2% WB	14.1	15.1	13.2	10.9	8.7	6.3	5.5	6.2	8.3	10.2	11.9	13.4	
	2% MCDB	21.8	22.7	19.2	15.3	11.0	8.2	7.7	9.4	13.5	17.0	19.1	20.3	
	5% WB	12.9	13.8	12.2	10.0	7.6	5.2	4.6	5.3	7.3	9.1	10.8	12.2	
	5% MCDB	19.6	20.5	17.6	13.8	9.6	6.9	6.5	8.1	11.8	15.3	17.2	18.5	
	10% WB	11.9	12.5	11.1	9.1	6.6	4.3	3.7	4.5	6.3	8.1	9.8	11.1	
	10% MCDB	18.1	18.1	16.0	12.7	8.7	6.0	5.5	6.9	10.1	13.5	15.6	17.3	

Mean Daily Temperature Range														
	5% DB	MDBR	11.1	11.2	10.5	9.5	7.7	6.4	6.5	7.4	9.5	11.4	11.3	11.0
		MCDBR	14.0	14.7	13.1	11.7	9.5	7.0	7.2	9.1	12.1	14.1	14.2	13.7
		MCWBR	6.6	7.2	6.6	7.0	6.3	5.1	5.1	5.7	6.7	7.5	7.0	6.6
	5% WB	MCDBR	12.6	14.1	12.0	10.9	8.2	6.4	6.8	8.2	11.2	13.4	12.8	12.5
		MCWBR	6.7	7.3	6.6	7.0	6.2	5.1	5.3	5.7	6.7	7.5	7.0	6.6

Clear Sky Solar Irradiance													
	taub	0.321	0.317	0.307	0.299	0.280	0.274	0.280	0.295	0.305	0.313	0.313	0.317
	taud	2.544	2.561	2.586	2.578	2.553	2.476	2.515	2.543	2.528	2.517	2.537	2.544
	Ebn at noon	988	956	909	818	727	660	712	808	893	950	990	1000
	Edn at noon	101	93	79	64	49	44	49	64	82	96	102	103

All-Sky Solar Radiation													
	RadAvg	5.94	4.99	3.47	2.08	1.13	0.77	0.96	1.74	3.04	4.61	5.69	6.17
	RadStd	0.37	0.25	0.21	0.10	0.08	0.07	0.06	0.10	0.19	0.15	0.32	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	-88	N/A	N/A	N/A	
Regional (0 neighbors)	N/A	+0.75	N/A	N/A	N/A	-0.40	-84	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 Edh,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
Elev	Elevation, m	MCWB	Mean coincident wet bulb temperature, °C	Tavg	Average temperature, °C
Enth	Enthalpy, kJ/kg	MCWBR	Mean coincident wet bulb temp. range, °C	Time Zone	Hours ahead or behind UTC
HDDn	Heating degree-days base n°C, °C-day	MCWS	Mean coincident wind speed, m/s	WB	Wet bulb temperature, °C
		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