2021 ASHRAE Handbook - Foundamentals (SI)

SAN JULIAN, ARGENTINA (WMO: 879090)

Lat:**49.3083S**	Long:**67.8031W**	Elev:**62**	StdP: **100.58**	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%	99.6% DP	99.6% HR	99.6% MCDB	99% DP	99% HR	99% MCDB	0.4% WS	0.4% MCDB	1% WS	1% MCDB	MCWS	PCWD	
7	**-4.1**	**-2.7**	**-9.8**	**1.6**	**9.8**	**-7.9**	**1.9**	**6.1**	**21.4**	**6.1**	**20.5**	**4.4**	**5.3**	**270**	**0.899**

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% DB	0.4% MCWB	1% DB	1% MCWB	2% DB	2% MCWB	0.4% WB	0.4% MCDB	1% WB	1% MCDB	2% WB	2% MCDB	MCWS	PCWD
1	**11.0**	**27.9**	**15.8**	**25.8**	**14.7**	**23.9**	**13.8**	**16.7**	**26.1**	**15.6**	**24.2**	**14.6**	**22.4**	**11.5**	**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	
12.7	**9.2**	**18.5**	**11.7**	**8.6**	**17.7**	**10.8**	**8.1**	**17.1**	**47.2**	**26.4**	**44.0**	**24.4**	**41.2**	**22.4**	**21.8**

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
21.1	**18.7**	**15.5**	DB	**-6.9**	**32.7**	**2.0**	**2.3**	**-8.3**	**34.4**	**-9.5**	**35.7**	**-10.6**	**37.0**	**-12.1**	**38.7**
			WB	**-7.3**	**18.8**	**1.9**	**1.1**	**-8.7**	**19.6**	**-9.8**	**20.3**	**-10.9**	**20.9**	**-12.3**	**21.8**

Monthly Climatic Design Conditions

			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperatures, Degree-Days and Degree-Hours	DBAvg		**9.9**	**15.6**	**15.3**	**13.5**	**10.3**	**6.9**	**3.8**	**3.5**	**5.2**	**7.8**	**10.2**	**12.7**	**14.7**
	DBStd		**5.48**	**3.27**	**3.97**	**3.63**	**3.42**	**3.46**	**3.28**	**3.27**	**2.96**	**3.41**	**3.51**	**3.49**	**3.46**
	HDD10.0		**834**	**1**	**3**	**8**	**37**	**108**	**187**	**202**	**151**	**83**	**40**	**11**	**3**
	HDD18.3		**3111**	**96**	**101**	**156**	**242**	**355**	**435**	**458**	**407**	**317**	**252**	**171**	**122**
	CDD10.0		**812**	**176**	**152**	**116**	**45**	**12**	**2**	**2**	**3**	**17**	**47**	**93**	**148**
	CDD18.3		**48**	**12**	**17**	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**9**
	CDH23.3		**543**	**151**	**179**	**60**	**4**	**0**	**0**	**0**	**0**	**1**	**8**	**41**	**100**
	CDH26.7		**128**	**35**	**58**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**6**	**18**
Wind	WSAvg		**7.7**	**8.4**	**8.0**	**7.2**	**7.4**	**6.8**	**6.9**	**7.0**	**7.3**	**7.6**	**7.9**	**8.6**	**8.6**
Precipitation	PrecAvg		**240**	**17**	**22**	**24**	**18**	**27**	**27**	**25**	**19**	**17**	**19**	**15**	**22**
	PrecMax		**503**	**44**	**77**	**106**	**66**	**66**	**182**	**104**	**60**	**62**	**66**	**49**	**112**
	PrecMin		**115**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**
	PrecStd		**76**	**11**	**18**	**27**	**16**	**18**	**30**	**28**	**17**	**15**	**13**	**12**	**23**
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB	**30.4**	**32.5**	**28.0**	**23.5**	**18.7**	**14.5**	**14.7**	**16.1**	**20.8**	**24.3**	**27.5**	**29.0**
		MCWB	**16.8**	**17.5**	**16.5**	**14.0**	**11.8**	**8.5**	**8.7**	**9.5**	**11.3**	**12.7**	**14.9**	**15.8**
	2%	DB	**27.0**	**28.0**	**24.9**	**20.7**	**16.0**	**12.0**	**11.6**	**13.8**	**17.4**	**21.1**	**24.2**	**26.0**
		MCWB	**15.3**	**16.0**	**14.3**	**12.7**	**10.0**	**7.4**	**7.0**	**7.9**	**9.5**	**11.4**	**13.5**	**14.3**
	5%	DB	**24.6**	**25.2**	**22.2**	**18.5**	**14.3**	**10.2**	**10.1**	**12.0**	**15.7**	**19.0**	**22.0**	**23.8**
		MCWB	**14.3**	**15.0**	**13.2**	**11.4**	**9.1**	**6.1**	**6.0**	**6.8**	**8.7**	**10.3**	**12.1**	**13.2**
	10%	DB	**22.5**	**22.7**	**20.0**	**16.4**	**12.5**	**8.7**	**8.6**	**10.4**	**13.9**	**16.9**	**19.6**	**21.7**
		MCWB	**13.2**	**14.1**	**12.1**	**10.1**	**7.9**	**5.4**	**4.9**	**5.9**	**7.9**	**9.3**	**10.8**	**12.2**
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB	**17.8**	**18.7**	**17.0**	**14.9**	**12.4**	**9.4**	**9.2**	**10.5**	**12.0**	**13.8**	**15.6**	**17.2**
		MCDB	**27.6**	**29.0**	**27.0**	**21.8**	**17.4**	**13.1**	**13.7**	**14.8**	**18.7**	**22.6**	**25.8**	**27.5**
	2%	WB	**16.3**	**16.8**	**15.2**	**13.2**	**10.8**	**7.8**	**7.4**	**8.5**	**10.2**	**12.0**	**14.0**	**15.2**
		MCDB	**25.2**	**26.3**	**22.8**	**19.7**	**15.1**	**11.1**	**11.2**	**12.8**	**16.3**	**19.5**	**22.9**	**24.0**
	5%	WB	**15.0**	**15.7**	**14.0**	**11.9**	**9.6**	**6.7**	**6.3**	**7.4**	**9.2**	**10.9**	**12.7**	**14.0**
		MCDB	**23.3**	**24.2**	**20.7**	**17.4**	**13.3**	**9.6**	**9.3**	**11.3**	**14.8**	**17.6**	**20.6**	**22.2**
	10%	WB	**14.0**	**14.5**	**12.9**	**10.7**	**8.4**	**5.7**	**5.3**	**6.2**	**8.1**	**9.8**	**11.5**	**12.9**
		MCDB	**21.3**	**21.6**	**18.7**	**15.6**	**11.7**	**8.2**	**7.9**	**9.6**	**13.2**	**16.1**	**18.6**	**20.4**

Mean Daily Temperature Range		MDBR	**11.0**	**10.7**	**10.3**	**9.4**	**7.7**	**6.1**	**6.3**	**7.7**	**9.1**	**10.4**	**10.7**	**10.8**
	5% DB	MCDBR	**14.8**	**15.4**	**13.8**	**11.9**	**9.9**	**7.7**	**8.1**	**9.9**	**11.7**	**13.5**	**14.4**	**14.7**
		MCWBR	**7.1**	**7.0**	**6.8**	**6.8**	**6.3**	**5.2**	**5.3**	**6.0**	**6.6**	**7.1**	**7.1**	**6.8**
	5% WB	MCDBR	**13.8**	**14.2**	**12.0**	**11.2**	**9.0**	**7.0**	**7.6**	**9.4**	**11.0**	**12.5**	**13.6**	**13.7**
		MCWBR	**7.2**	**7.2**	**6.7**	**7.0**	**6.2**	**5.2**	**5.5**	**6.3**	**6.6**	**7.1**	**7.1**	**6.8**
Clear Sky Solar Irradiance	taub		**0.326**	**0.326**	**0.313**	**0.306**	**0.288**	**0.278**	**0.277**	**0.293**	**0.305**	**0.312**	**0.316**	**0.326**
	taud		**2.537**	**2.543**	**2.571**	**2.569**	**2.567**	**2.527**	**2.559**	**2.560**	**2.540**	**2.528**	**2.529**	**2.523**
	Ebn at noon		**987**	**954**	**914**	**829**	**751**	**704**	**755**	**832**	**907**	**959**	**991**	**995**
	Edn at noon		**104**	**96**	**83**	**68**	**53**	**47**	**52**	**66**	**84**	**97**	**104**	**107**
All-Sky Solar Radiation	RadAvg		**6.86**	**5.72**	**4.01**	**2.47**	**1.39**	**0.95**	**1.13**	**2.02**	**3.36**	**5.14**	**6.44**	**7.04**
	RadStd		**0.35**	**0.23**	**0.25**	**0.11**	**0.07**	**0.07**	**0.08**	**0.13**	**0.21**	**0.15**	**0.33**	**0.45**

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