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## LISBOA/GAGO COUTINH, Portugal

WMO#: **085790**

Lat: **38.77N** Long: **9.13W** Elev: **105** StdP: **100.07** Time Zone: **0.00 (GMT)** Period: **86-10** WBAN: **99999**

### Annual Heating and Humidification Design Conditions

| | Coldest Month | Heating DB | | Humidification DP/MCDB and HR | | | | | | Coldest month WS/MCDB | | | | MCWS/PCWD to 99.6% DB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 99.6% | | | 99% | | | 0.4% | | 1% | | | | |
| | | 99.6% | 99% | DP | HR | MCDB | DP | HR | MCDB | WS | MCDB | WS | MCDB | MCWS | PCWD | |
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) | (l) | (m) | (n) | (o) | |
| (1) | **1** | **4.6** | **5.8** | **-3.0** | **3.0** | **8.3** | **-0.9** | **3.6** | **9.3** | **10.8** | **13.6** | **9.3** | **13.1** | **2.7** | **40** | (1) |

### 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 | |
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) | (l) | (m) | (n) | (o) | (p) | |
| (2) | **8** | **9.7** | **33.6** | **20.4** | **31.5** | **19.8** | **29.6** | **19.3** | **21.5** | **30.5** | **20.8** | **28.5** | **20.2** | **26.9** | **3.1** | **330** | (2) |

| Dehumidification DP/MCDB and HR | | | | | | | | | Enthalpy/MCDB | | | | | | Hours 8 to 4 & 12.8/20.6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.4% | | | 1% | | | 2% | | | 0.4% | | 1% | | 2% | | | |
| DP | HR | MCDB | DP | HR | MCDB | DP | HR | MCDB | Enth | MCDB | Enth | MCDB | Enth | MCDB | | |
| (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) | (l) | (m) | (n) | (o) | (p) | |
| **19.2** | **14.2** | **22.5** | **18.6** | **13.6** | **22.3** | **18.0** | **13.1** | **22.1** | **62.8** | **30.8** | **60.3** | **28.7** | **58.2** | **27.0** | **1557** | (3) |

### Extreme Annual Design Conditions

| Extreme Annual WS | | | Extreme Max WB | Extreme Annual DB | | | | n-Year Return Period Values of Extreme DB | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 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 | |
| (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) | (l) | (m) | (n) | (o) | (p) | |
| **8.8** | **7.7** | **6.9** | **24.7** | **2.2** | **37.3** | **1.5** | **2.0** | **1.1** | **38.8** | **0.2** | **40.0** | **-0.6** | **41.1** | **-1.7** | **42.6** | (4) |

### Monthly Climatic Design Conditions

| | | | | Annual (d) | Jan (e) | Feb (f) | Mar (g) | Apr (h) | May (i) | Jun (j) | Jul (k) | Aug (l) | Sep (m) | Oct (n) | Nov (o) | Dec (p) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (5) | Temperatures, Degree-Days and Degree-Hours | Tavg | | **17.0** | **11.0** | **12.0** | **14.3** | **15.1** | **17.8** | **20.8** | **23.0** | **23.3** | **21.7** | **18.3** | **14.3** | **11.8** | (5) |
| (6) | | Sd | | | **2.36** | **2.11** | **2.51** | **2.80** | **2.90** | **2.87** | **2.91** | **2.64** | **2.52** | **2.42** | **2.42** | **2.43** | (6) |
| (7) | | HDD10.0 | | **38** | **17** | **7** | **2** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **11** | (7) |
| (8) | | HDD18.3 | | **1045** | **228** | **177** | **126** | **104** | **45** | **6** | **0** | **0** | **2** | **31** | **123** | **203** | (8) |
| (9) | | CDD10.0 | | **2583** | **47** | **63** | **136** | **154** | **241** | **324** | **402** | **413** | **351** | **256** | **130** | **66** | (9) |
| (10) | | CDD18.3 | | **549** | **0** | **0** | **2** | **8** | **28** | **80** | **144** | **155** | **103** | **28** | **1** | **0** | (10) |
| (11) | | CDH23.3 | | **3511** | **0** | **0** | **12** | **46** | **188** | **514** | **1078** | **1059** | **531** | **84** | **0** | **0** | (11) |
| (12) | | CDH26.7 | | **1238** | **0** | **0** | **1** | **6** | **56** | **176** | **426** | **399** | **163** | **12** | **0** | **0** | (12) |
| (13) | Precipitation | PrecAvg | | **713** | **104** | **104** | **67** | **59** | **37** | **23** | **4** | **3** | **23** | **74** | **110** | **105** | (13) |
| (14) | | PrecMax | | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (14) |
| (15) | | PrecMin | | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (15) |
| (16) | | PrecSD | | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (16) |
| (17) | Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures | 0.4% | DB | | **17.5** | **19.3** | **24.9** | **27.3** | **31.5** | **33.6** | **36.4** | **36.2** | **33.8** | **28.1** | **22.1** | **17.9** | (17) |
| (18) | | | MCWB | | **13.8** | **13.9** | **14.6** | **17.3** | **19.3** | **20.4** | **21.2** | **20.9** | **20.1** | **17.6** | **16.4** | **15.9** | (18) |
| (19) | | 2% | DB | | **16.2** | **17.7** | **22.5** | **24.5** | **28.0** | **30.9** | **33.5** | **33.5** | **30.7** | **25.6** | **20.1** | **17.1** | (19) |
| (20) | | | MCWB | | **13.9** | **12.9** | **14.4** | **15.7** | **17.3** | **19.5** | **20.4** | **20.5** | **19.1** | **17.6** | **16.5** | **15.5** | (20) |
| (21) | | 5% | DB | | **15.4** | **16.4** | **20.6** | **22.0** | **25.2** | **28.6** | **31.2** | **31.0** | **28.4** | **23.7** | **19.0** | **16.5** | (21) |
| (22) | | | MCWB | | **13.4** | **12.8** | **13.9** | **14.9** | **16.8** | **19.0** | **20.1** | **19.8** | **18.7** | **17.2** | **15.9** | **14.9** | (22) |
| (23) | | 10% | DB | | **14.7** | **15.4** | **18.6** | **19.7** | **22.7** | **26.3** | **28.7** | **28.6** | **26.2** | **22.0** | **17.9** | **15.6** | (23) |
| (24) | | | MCWB | | **12.8** | **12.5** | **13.2** | **14.1** | **16.2** | **18.3** | **19.4** | **19.2** | **18.2** | **16.9** | **15.2** | **13.9** | (24) |
| (25) | Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures | 0.4% | WB | | **15.6** | **15.4** | **16.4** | **18.5** | **20.5** | **21.6** | **22.4** | **22.5** | **21.4** | **20.4** | **18.8** | **16.7** | (25) |
| (26) | | | MCDB | | **16.3** | **16.9** | **21.7** | **25.3** | **28.2** | **31.0** | **33.1** | **32.3** | **29.1** | **23.4** | **20.4** | **17.3** | (26) |
| (27) | | 2% | WB | | **14.7** | **14.7** | **15.3** | **16.6** | **18.5** | **20.6** | **21.5** | **21.5** | **20.5** | **19.5** | **17.7** | **16.1** | (27) |
| (28) | | | MCDB | | **15.7** | **16.3** | **19.3** | **22.2** | **25.6** | **28.8** | **31.2** | **29.9** | **26.6** | **22.5** | **19.1** | **16.9** | (28) |
| (29) | | 5% | WB | | **14.0** | **13.8** | **14.7** | **15.6** | **17.5** | **19.7** | **20.6** | **20.7** | **19.9** | **18.8** | **16.8** | **15.2** | (29) |
| (30) | | | MCDB | | **15.0** | **15.6** | **18.4** | **20.1** | **23.4** | **26.8** | **29.2** | **27.9** | **25.0** | **21.6** | **18.3** | **16.2** | (30) |
| (31) | | 10% | WB | | **13.1** | **13.1** | **14.0** | **14.7** | **16.6** | **18.7** | **19.9** | **20.1** | **19.3** | **18.1** | **15.7** | **14.2** | (31) |
| (32) | | | MCDB | | **14.4** | **14.8** | **17.6** | **18.5** | **21.6** | **25.0** | **27.3** | **26.5** | **23.9** | **20.7** | **17.3** | **15.3** | (32) |
| (33) | Mean Daily Temperature Range | | MDBR | | **5.6** | **6.2** | **7.3** | **7.3** | **7.9** | **8.9** | **9.9** | **9.7** | **8.5** | **6.7** | **5.7** | **5.1** | (33) |
| (34) | | 5% DB | MCDBR | | **5.7** | **7.5** | **10.6** | **11.0** | **12.3** | **12.8** | **13.4** | **13.4** | **12.2** | **9.5** | **6.7** | **5.0** | (34) |
| (35) | | | MCWBR | | **4.0** | **4.4** | **5.2** | **5.4** | **5.7** | **5.5** | **5.2** | **5.1** | **4.7** | **4.2** | **3.9** | **3.8** | (35) |
| (36) | | 5% WB | MCDBR | | **4.5** | **6.0** | **8.6** | **9.3** | **10.1** | **11.5** | **12.1** | **11.1** | **9.1** | **6.9** | **5.2** | **4.1** | (36) |
| (37) | | | MCWBR | | **3.9** | **4.1** | **4.6** | **4.9** | **5.3** | **5.4** | **5.1** | **4.7** | **4.1** | **3.7** | **3.8** | **3.8** | (37) |
| (38) | Clear Sky Solar Irradiance | taub | | | **0.348** | **0.371** | **0.360** | **0.362** | **0.354** | **0.357** | **0.343** | **0.356** | **0.364** | **0.365** | **0.364** | **0.367** | (38) |
| (39) | | taud | | | **2.588** | **2.485** | **2.494** | **2.409** | **2.417** | **2.389** | **2.441** | **2.434** | **2.471** | **2.544** | **2.575** | **2.561** | (39) |
| (40) | | Ebn,noon | | | **830** | **851** | **900** | **915** | **924** | **918** | **928** | **909** | **883** | **847** | **802** | **777** | (40) |
| (41) | | Edh,noon | | | **73** | **92** | **99** | **114** | **116** | **119** | **112** | **110** | **100** | **85** | **74** | **72** | (41) |

Nomenclature: See separate page