Instructions for using conditions analysis spreadsheet.

I have sent a copy of the spreadsheet with no operational data. I would suggest that you keep this as a blank and make use copies of it. I do a full year of data for each location in its own spreadsheet, with 15 minute intervals. This gives nearly 36,000 readings, if you take readings less frequently than this then no problem, if you want to take readings more frequently then either you need to do 6 months (or whatever) per spreadsheet, or copy the formulae down from line 35,000 to whatever number you need to get to. I do 15 minute readings, partly because that is what the BMS is set to and partly because that interval gives reasonably stable readings, with less probability of being affected by people standing near the sensor.

There are three worksheets in this spreadsheet.

**TNA targets**

The left worksheet is called “TNA targets”, this is where the targets are entered. I have set this for standard paper archive type vaults

You should enter the name of the specific storage location into cell **I6.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Min Temp | Max Temp | Diurnal temp | Min RH | Max RH | Diurnal RH |
| 13 | 20 | 2 | 35 | 60 | 10 |

This sheet should be pretty simple. If you are using this to analyse data for specialist storage areas then you can change the targets here and they will be updated throughout the spreadsheet, ensuring that everything is working to the same targets.

**Readings**

This is the worksheet where you enter the data.



This is the first six columns from rows 9 to 14. Across most of the worksheet row 10 is the column names, except in the first 4 columns where the column name is in row 9. This is because I had to move the name up one row to put a formulae in row 10 for the graph calculation.

When you enter the data you put it in from row 11 downwards, and only enter the Date, RH and Temperature, all the other columns are calculated from those three columns.



Here I have pasted in some data, column one fills the number in with a formula, it has then seen that there are two readings from january first so the second one is shown as the last one for the day, whereas for the second of january there is only one reading so the sheet has done the calculations for that one. The data used here is from a specialist storage area, for film storage, which is why the Temperature is considerably lower than a paper vault would be.

If you enter readings up to the middle of a day, for instance from downloading data at that time, resetting the TinyTag or whatever, and then later add data for the rest of that day the sheet will see that there is more data and recalculate which is the last reading of that day.

I always transfer the data through a second, blank, spreadsheet. We get our BMS data as text files



What I do is copy the date/time and RH into a worksheet of a blank spreadsheet, and then copy and paste the temperature data into the third column, then copy all three columns at the same time into the final spreadsheet. This avoids the sheet showing errors during the copying process. Once the data is copied there will be a pause while the spreadsheet calculates, this will depend on the amount of data and the speed of the pc you are working on. At the end of this process you should see that the sheet will have calculated the days involved, the graph should have updated itself and the report also.

**Report**

This worksheet contains reporting on the most used data. You should not need to edit this worksheet at all. It takes the location name from TNA targets, and all the other data on this sheet is taken from calculations on the Readings sheet.

|  |  |  |
| --- | --- | --- |
| Location | SR 1 |  |
|  |  |  |
| Dates covered | 01/01/2017 | 25/06/2017 |
|  |  |  |
| TNA Targets |  |  |
|  | Min temperature | 13.00 °C |
|  | Max temperature | 20.00 °C |
|  | Min RH | 35.00 %RH |
|  | Max Rh | 60.00 %RH |
|  | Temperature Diurnal | 2.00 °C |
|  | RH Diurnal | 10.00 %RH |
|  |  |  |
| Number of days covered by readings | 176 |
|  |  |  |
| NUMBER of days readings outside TNA targets |  |
|  |  |  |
| Temperature |  | 0 |
| RH |  | 0 |
| Temperature diurnal change |  | 0 |
| RH diurnal change |  | 0 |
|  |  |  |
| PERCENTAGE of days readings outside TNA targets |  |
|  |  |  |
| Temperature |  | 0.00% |
| RH |  | 0.00% |
| Temperature diurnal change |  | 0.00% |
| RH diurnal change |  | 0.00% |
|  |  |  |
|  |  |  |
| Highest Temperature recorded | 19.25 °C |
| Lowest Temperature recorded | 17.77 °C |
| Highest Diurnal Temperature change recorded | 0.77 °C |
|  |  |  |
| Highest RH recorded |  | 50.03 %RH |
| Lowest RH recorded |  | 43.05 %RH |
| Highest Diurnal RH change recorded | 3.06 %RH |
|  |  |  |
| Average Temperature |  | 18.25 °C |
| Average Diurnal Temperature change | 0.30 °C |
| Average RH |  | 45.29 %RH |
| Average Diurnal RH change |  | 1.10 %RH |

You can see that the report has details of the name of the storage area, and the TNA targets used in the calculations. There are then the number of days covered by the readings, and the number and percentage of days when readings are outside the targets. Also shown are details of the highest, lowest and largest diurnal change for both temperature and Rh. There is also data for average temperature, Rh and diurnal changes in both.

Below that on the sheet are shown the percentage of time when mould growth could start and could continue, as these require different conditions. Mould growth requires higher temperature/Rh to start than to continue. There is also shown the number and percentage of days when Dew Point is reached, all of these should be zero. There is a report showing the Preservation Index and PI lifetime. These are derived from the Image Permanence Institute, and are calibrated for film and the worst types of paper such as newspaper. The Pi is not considered particularly accurate, partly because of this calibration and partly because knowledge has moved on. I find it useful as it provides figures which can be used to scare finance people, if you show them that some change, for instance turning off air conditioning units will reduce the life expectancy of archives by 30 or 40%, and then say that the life expectancy would have been 500 years, so they have taken 200 years off, it can often make them think about what they are doing.