Climate Classes Web Application

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Atkinson Science welcomes your comments on this User Guide. Please send an email to keith.atkinson@atkinsonscience.co.uk.

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1 Introduction

Climate classes provide a way of determining the environmental conditions in a dwelling or office when the conditions are not clearly defined by air conditioning and controls. Climate classes were developed for use in countries with a maritime climate (such as the United Kingdom). The principles of climate classes are set out in BS EN ISO 13788:2012 and also in the document *Climate Classes Web Application Theory Guide*, 22 September 2020, which you can download from the Atkinson Science web site: https://atkinsonscience.co.uk/WebApps/Construction/ClimateClasses.aspx

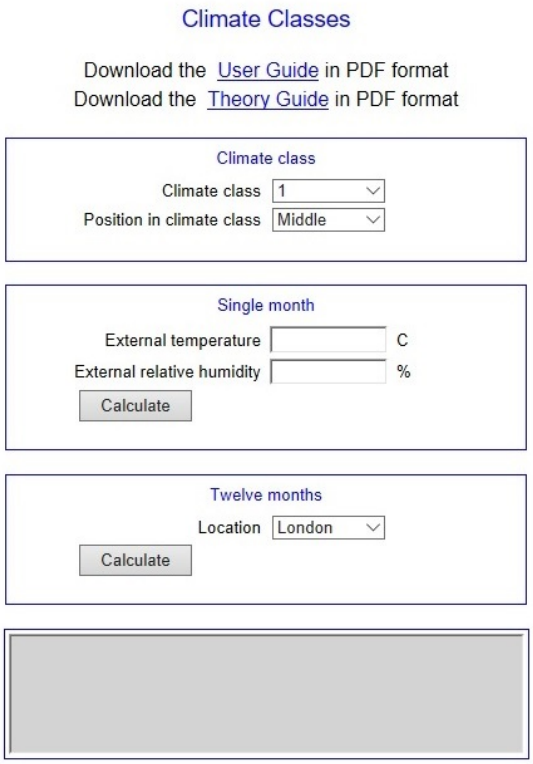
The internal temperature of the dwelling or office is assumed to 20°C. The vapour pressure inside is assumed to be higher than that outside by a *vapour pressure offset*. The size of the vapour pressure offset depends on the *climate class* of the building, which may be 1, 2, 3, 4 or 5. Buildings that have high occupancy or are used in activities that generate large quantities of moisture have a higher climate class. BS EN ISO 13788:2012 and also the *Theory Guide* give the climate class for different types of building (warehouse, office, sports hall, swimming pool etc.). The vapour pressure offset also depends on the external temperature. It is assumed that windows will be opened in summer, allowing moisture to escape and lowering the vapour pressure offset.

The vapour pressure offset is based on the mean monthly external temperature and is added to the vapour pressure corresponding to the mean monthly external relative humidity to determine the mean monthly internal relative humidity. The user can enter a single value of external temperature and a corresponding single value of external relative humidity into the web application, select the climate class and the position of the building in the climate class (top, middle or bottom), and calculate a single value of the internal relative humidity. Alternatively, the user can select a location in the UK, select the climate class and the position of the building in the climate class, and calculate the mean internal relative humidity for each month of the year. The application stores mean monthly climate data for three locations: Edinburgh, London and Manchester. Note that the vapour pressure offset for, say, the bottom of climate class 4, is same as the offset for the top of climate class 3.

2 Using the Climate Classes web application

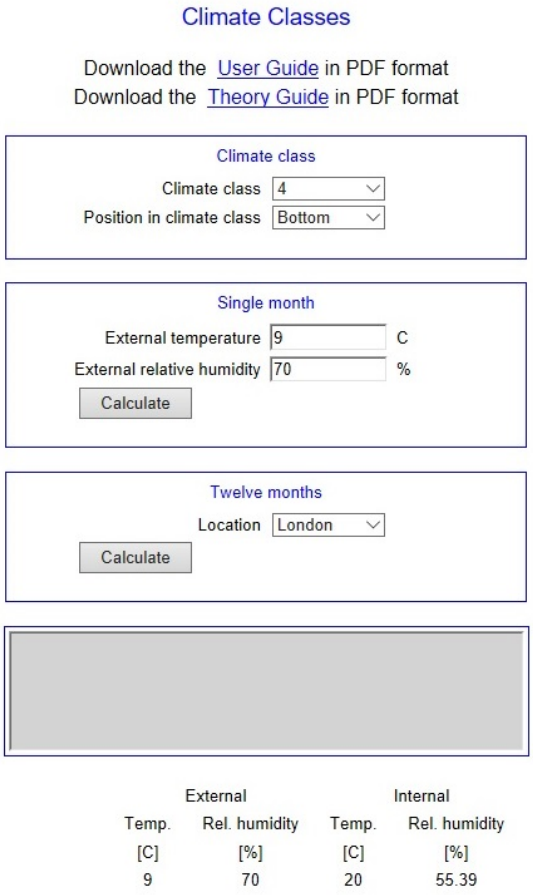
The user interface of the Climate Classes web application is shown in Figure 1. The user chooses the climate class of the building and the position of the building in the climate class from the two drop-down lists.

Figure 1 User interface of the Climate Classes web application



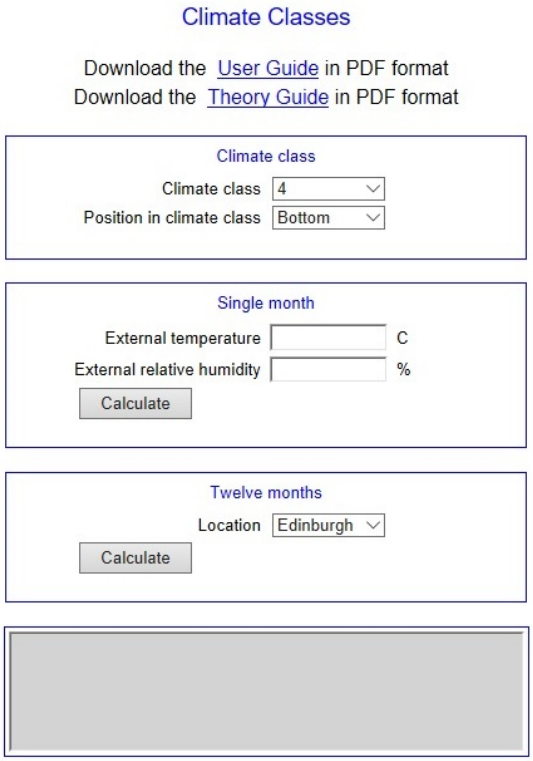
The user can then enter a single external temperature and a single external relative humidity and click the corresponding Calculate button. Figure 2 shows the output when the web application is used in this way. The user may not enter a value of temperature less than −5°C or greater than 25°C or a value of relative humidity less than 0.1% or greater than 100%. If the user's input is outside of these bounds then the application will display an error message.

Figure 2 Calculation of internal RH for a single month



Alternatively, the user can select a location, click the corresponding Calculate button, and obtain the internal relative humidity for each month of the year. Figure 3 shows the output when the web application is used in this way.

Figure 3 Calculation of internal RH for twelve months



Month	External Temp. [C]	External Rel. humidity [%]	Internal Temp. [C]	Internal Rel. humidity [%]
Jan	3.5	83	20	57.27
Feb	3.7	81	20	56.68
Mar	5.3	78	20	56.37
Apr	7	75	20	56.20
May	9.9	75	20	58.78
Jun	12.8	75	20	62.65
Jul	14.7	76	20	66.71
Aug	14.4	78	20	67.53
Sep	12.1	80	20	64.61
Oct	9.2	82	20	61.53
Nov	5.8	83	20	58.63
Dec	4.3	84	20	58.02

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