

## Internal and External Environmental Conditions (element 4)

The measurement and monitoring of internal and external environmental conditions enables the researcher to understand the thermal and other environmental conditions in a building. When analysed in relation to occupancy and energy use, these parameters can assist in understanding the relationship between comfort levels, energy use and environmental conditions.

### Level 1: Spot measurements

<b>Cost:</b> ₹₹	<b>Time:</b> ⌚	<b>Skills:</b> 🙌🙌
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Spot measurements are relatively simple to undertake, with a small amount of training in how to use the equipment and how to record and analyse the data correctly and accurately. They are useful if the installation of remote monitoring and/or long-term data loggers is not possible. Spot measurements are one-off measurements of (most common parameters):

- Temperature (°C)
- Relative Humidity (%RH)

When balancing time, resources and intent of a study, it is important to establish what parameters are 'needed' vs. what is 'nice to have'. Temperature and RH are generally needed when doing any basic evaluation.

#### Potential tools needed:

- Pen and paper for notes (it can be helpful to prepare a form for collected data listing rooms and times, etc.)
- Specific meters for parameters to be measured

**How:** ANSI/ASHRAE Standard 55 provides standard methods for measurements.

**Timing:** Generally spot measurements are taken during times of interviews and questionnaire distribution especially when querying thermal comfort. When distributing thermal comfort questionnaires it is important to get spot measurements of the environmental conditions under which the occupants are considering in their responses.

**Potential barriers:** In residential scenarios occupants are not always comfortable with researchers entering certain rooms or moving/handling furniture and furnishings to ensure standardised conditions (eg. Removing blinds to get accurate light levels, asking occupants to be quiet in their own homes in order for accurate sound measurements to take place).

Calibration of environmental meters: in reality the accuracy of the equipment varies despite similar make and model being used. In addition to this, the need to plug in some equipment places constraints on the results.

