



# The BTS U-Value Measurement System is a portable tool which is used to measure the thermal transmittance of building elements, helping to identify potential insulation upgrades and to reinforce investment decisions.

The rate of thermal transmittance (U-value) through individual building elements contributes significantly to the overall energy efficiency of a building. The lower the U-value of an element of a building's fabric, the more slowly heat is able to transmit through it, and so the better it performs as an insulator.

Our system is a complete kit for measuring U-values that includes two heat flux plates, surface temperature sensors, internal/external air temperature sensors, a data logger and a 4G modem.

The system can record measurements over a number of days or weeks in order to deliver greater accuracy and quantify the in-situ U-value of a building envelope according to the ISO 9869 methodology.



## Key Features



### Accurate Measurements

The system can measure heat flux (Q) as well as internal/external surface and air temperatures.



### Remote Access

The system can confirm when steady state conditions and ISO 9869 conformity have been met without the need for someone to attend the installation site.



### Online Data Analysis

The cloud-based interface can display a graphical representation of the data.



### High Sensitivity

Best in class sensors and instruments can deliver greater accuracy.



### Portable and Secure

The lightweight, protective case incorporates all sensors and instruments, and can be left securely locked on site.



### ISO 9869 Compliant

The resultant average U-value is compliant with ISO 9869 methodology.

## Why measure U-values?

Regardless of the construction method used, the in-situ U-value of a floor, wall or roof element can vary significantly from a calculated value. Influencing factors include inhomogeneous materials, variations in the level of moisture content of materials, exposure of an element to wind and rain, inconsistencies in building practices and workmanship and also inaccuracies embedded in material libraries used for running calculations.





## As-Built Performance Measurement

Conduct quality assurance testing to check that desired outcomes are being achieved. Improve quality and save costs by identifying issues early to prevent late-stage remedial work.

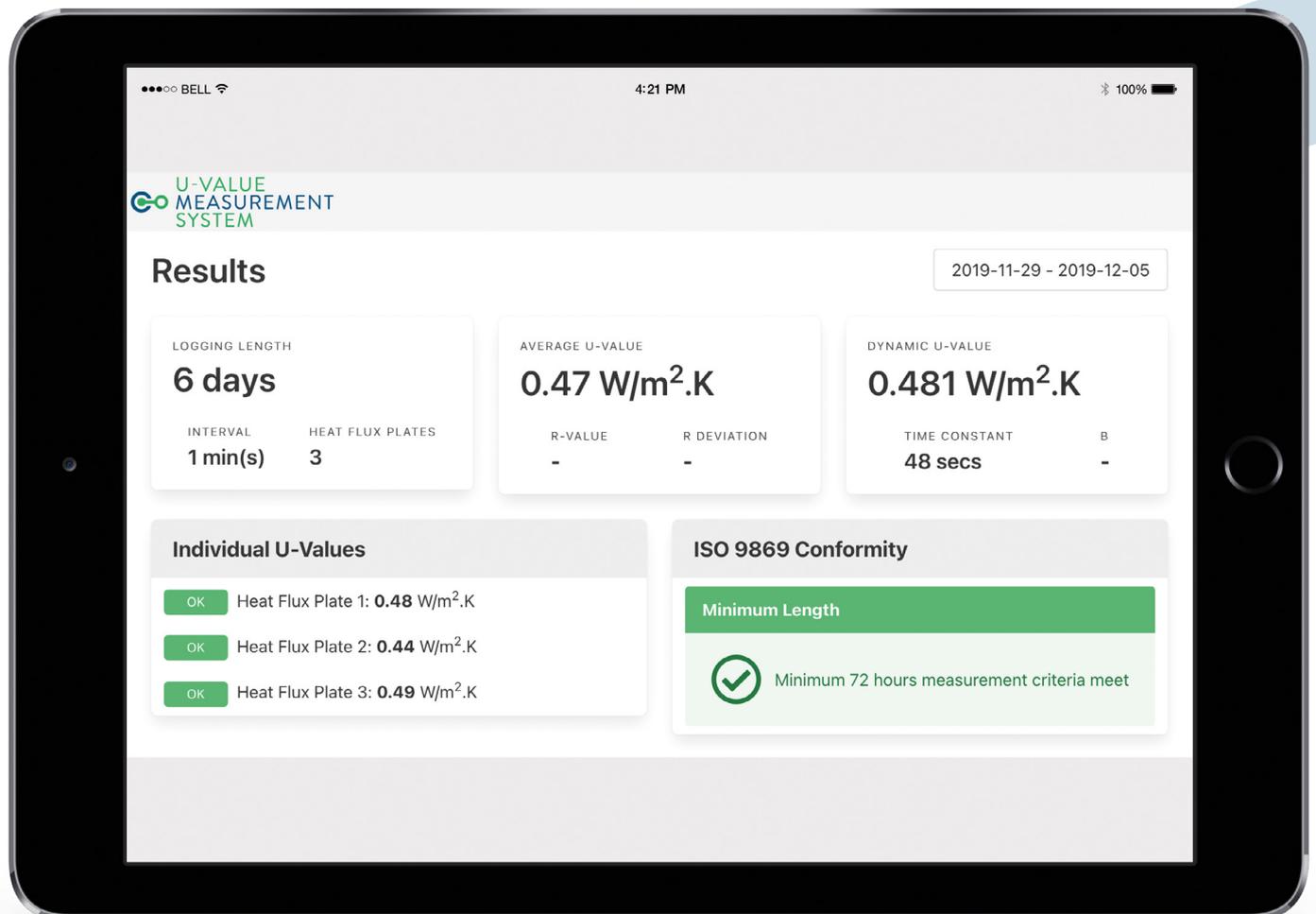


## Retrofit Performance Improvement

Quantify the baseline vs the actual delivered performance. Determine the true energy, running cost and CO<sub>2</sub> savings delivered by improvements.

## How are U-values measured?

1. The heat flowing through the building element is measured over a number of days using heat flux plates.
2. At the same time, the surface temperature as well as internal & external ambient air temperatures are recorded.
3. The heat flux (measured in W/m<sup>2</sup>) is calculated and divided by the temperature difference (internal to external) to produce a U-value (measured in W/m<sup>2</sup>K).
4. After a sufficient period of time (typically 7 days) and once a validity criteria has been met, an average U-value will be presented that adheres to ISO 9869 Part 1.



## Pricing



### Complete U-value System

£2,500

Comprising:

1 x data logger, 2 x heat flux plates, 3 x Surface temperature sensors, 2 x air temperature sensors, 1 x 4G modem, 1 x protective case

## Technical Specification

### KIT OVERVIEW

<b>Power</b>	100 to 240 Vac, 50/60 Hz
<b>Max Consumption</b>	8VA
<b>Average Consumption</b>	3.6 W @ 240V
<b>Measurements</b>	Max 8 channels
<b>Logging interval</b>	Configurable from 1 second to 1 hour. Recommended: 1 minute
<b>Maximum logging time</b>	Up to 40 days based on 1 min logging interval
<b>Data connection</b>	USB or RJ45 ethernet
<b>Power Connection</b>	Socket: IEC C14. Lead: 3m IEC C13 to UK 3-pin plug (as standard)
<b>Environmental Conditions</b>	Case: 0 to 50°C, 80% RH up to 30°C. Sensors: -30 to 70°C
<b>Protection</b>	Case: IP30. Sensors: IP44 minimum
<b>Dimensions</b>	336 x 300 x 148 mm

### HEAT FLUX PLATE

<b>Measurement Range</b>	-2000 to +2000 W/m <sup>2</sup>
<b>Accuracy</b>	± 3%
<b>Nominal Sensitivity</b>	60 x 10 <sup>-6</sup> V/(W/m <sup>2</sup> )
<b>Resolution</b>	0.02 W/m <sup>2</sup>
<b>Cable Diameter</b>	4 x 10 <sup>-3</sup> m
<b>Cable Length</b>	5m

### TEMPERATURE SENSORS

<b>Type</b>	PT100 3-Wire RTD 1/3 DIN
<b>Measurement Range</b>	-50 to 250°C
<b>Accuracy</b>	± 0.1°C
<b>Cable Length</b>	5m

### 4G MODEM

<b>Module</b>	4G (LTE) - Cat 4 up to 150 Mbps
<b>Management</b>	HTTP/HTTPS web interface, SSH, Modbus, SMS configuration
<b>VPN</b>	OpenVPN, IPSEC, GRE, PPTP

## Contact

For more information about our U-value Measurement System please contact Build Test Solutions using the details provided:

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