

Product requirement document

ABEE1025 UNNC

Product name	U- value calculator	Author	Songyue Li
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1 INTRODUCTION

1.1 BACKGROUND

As a major standard for evaluating the thermal insulation level of building materials, the U-value plays a vital role in Architectural environment engineering. Generally, the U-value needs to be calculated manually through known data.

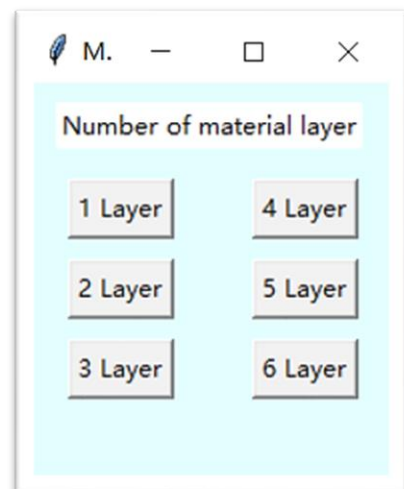
1.2 MARKET DEMAND

Because the office software people usually use (such as excel, word and the scientific calculator provided by the computer) does not support U-value calculation functions, people need a U-value calculator that is easy to install and use.

2 PRODUCT OVERVIEW

2.1 MAIN FUNCTION

The program can calculate the U-value of building elements with up to six layers of materials. In the future version, people will also be able to calculate the U-value



of walls, roofs and floors more easily by selecting the type of building elements.

2.2 SOFTWARE ALGORITHM

The software achieves quick calculation of U-value by embedding U-value calculation formula (refer to PCM CIBSE Guide A) into the program.

$$R = \frac{\lambda}{d}$$

$$R_T = R_{si} + R_1 + R_2 + \dots + R_{se}$$

$$U = \frac{1}{R_T}$$

The screenshot shows a software window titled "General calculation" with a light blue background. It contains several input fields and a calculation button. The inputs are arranged in two rows: the top row has fields for R_{si} (value 14), λ (value 18), λ_2 (value 15), and R_{se} (value 8); the bottom row has fields for d (value 2) and d_2 (value 5). Below these fields is a "Calculate" button. At the bottom of the window, the result "U-value=0.02941" is displayed.

3 SIMILAR PRODUCTS ANALYSIS

3.1 SIMILARITY AND DIFFERENCE

At present, most U-value calculators on the market support U-value calculation for building's walls, roofs and floors, but most of them use their built-in data for calculation, which has low freedom of calculation, and the user interface is complex, which is not easy to

use. This product uses a simple interface, enabling users to operate directly and calculate more different kinds of materials.

3.2 ADVANTAGES AND DISADVANTAGES

Compared with other products on the market, this product has the advantages of smaller size, more convenient operation and freer calculation. However, it has not established enough databases yet, so people must consult the thermal conductivity of materials before using this calculator.