

Design Study of Green Walls – an Analysis of Green Walls Effect of the Indoor Environment

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The focus of this project is to determine from experiment if green walls have an effect on the pollution degree from carbon dioxide (CO₂) in single-person offices and how to design the most effective green wall. Minimizing CO₂ pollution in offices is important because peoples decision-making are affected when the CO₂ concentration is above 2000 ppm. Therefore it is in the companies' best interest to minimize CO₂ concentration in the indoor air. Plants have been seen as an energy efficient way of achieving a better indoor environment, because they reduce the pollutants in the air. Furthermore they can be used as a recreational tool for the employees to enhance their work effort.

Since green walls have two proposes it matters how the design looks and works. It is important that the plants have the best growing conditions, such as the right amount of light, water, temperature, nutrients and a good growing media. Color, scent, size and quantity have to be considered as well.

The experiment shows that the plants do reduce the amount of CO₂ in a single person's office without mechanical or natural ventilation. The effect is greater with high concentration of CO₂. The air changes are shown in the table below.

	With plants	Without plants
Test 1	0,107	0,093
Test 2	0,111	0,090
Test 3	0,117	0,093

Table 1 Result from experiment. (ach)

During the experiment the humidity was above the recommended 35-50 %, therefore it is necessary in the design to minimize the ratio between the growing surface and number of plants to reduce the vaporization. The before stated requirements are fulfilled in the design below. The design relies on solar driven or rechargeable battery pumps to water the plants.



Picture 1 Final design