

# Development on New Vacuum Insulation Panel, “Chip-Vacua”

Muneto Yamada

Nojihigashi 3-3-1-3 Kusatsu city Shiga, Japan

[yamada.muneto@national.jp](mailto:yamada.muneto@national.jp)

## 1 Introduction

We have developed Vacuum Insulation Panel of high performance, “U-Vacua”, which provides more than 10 times the heat insulation of conventional rigid urethane foam. The thermal conductivity is as low as  $0.0020\text{W}/(\text{m}\cdot\text{K})$  (24deg C). U-Vacua is applied to refrigerator and greatly contributes to its energy saving. On the other hand, we have been requiring adjustable and shapeable Vacuum Insulation Panel. So we have started to develop the new Vacuum Insulation Panel, “Chip-Vacua”, which has above properties for wider application.

## 2 CHIP Manufacturing Technology

In conventional manufacturing process core material is inserted into the envelope and evacuated from unsealed part of the envelope, which is heat-sealed when required pressure is accomplished. That is why conventional manufacturing process can only produce square and flat insulation panels.

So we have developed CHIP (Component of Heat Insulation Pattern) manufacturing technology, which can heat-seal the entire surface of the laminated films along the core material for improvement of VIP application.(Figure1) In CHIP manufacturing process core material are located between two laminated films and evacuated. Finally this new process heat-seals the entire surface of the laminated films containing the core material.

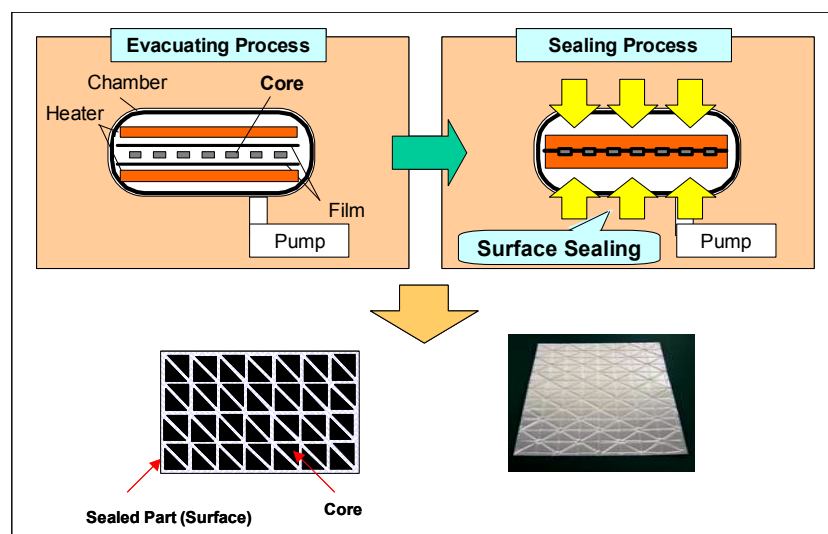


Figure1: CHIP Manufacturing Process

### 3 Product's Features

The features of the product made by new manufacturing process are as bellows:

1. Insulation Property 5 times the heat insulation of conventional rigid urethane foam and 10 times that of glass wool. Thermal conductivity of 0.0050W/(m·K) (24deg C), [Effective insulation ratio:90%]
2. Flexibility It can consist of many individual vacuum insulation cell, which makes the insulation material flexible.
3. Shapeable It can be molded to any shape for wider application.
- 7 Handling Conventional Vacuum Insulation Panel is required careful handling to keep its vacuum level but it can maintain high insulation property because each insulation cell is independent.

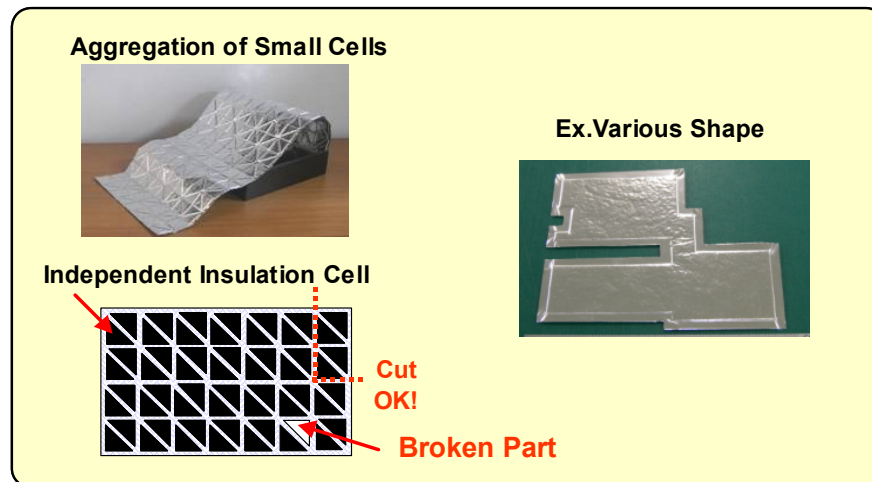


Figure 2: Feature for Chip-Vacua

### 4 Application

*Chip-Vacua* can be applied to various objects conventional square and flat Vacuum Insulation Panel cannot applied to. We hope *Chip-Vacua* contributes to energy saving and comfortable life at new fields such as housing (floor heating, bath tubs, etc.) and life material (winter wear, bedclothes, etc.), utilizing these application properties.

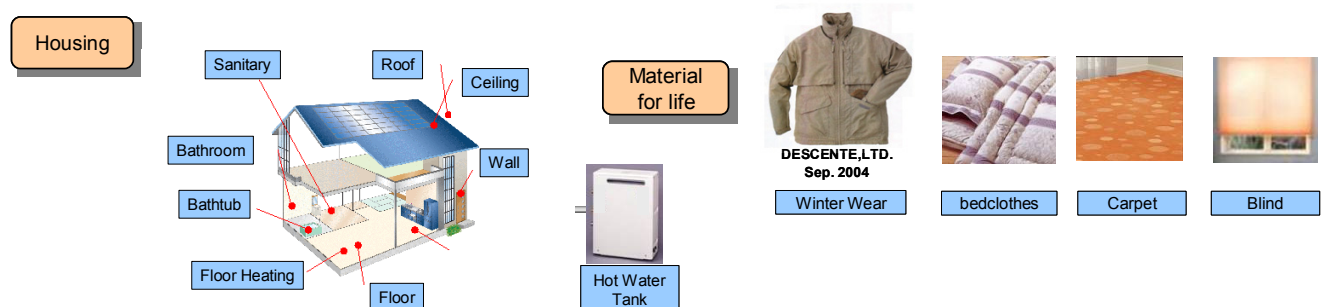


Figure 3: Application Example