

Fluorocarbon-Free Thermal Insulation • •

What is thermal insulation?



Recently, highly insulated houses that improve the efficiency of heating and cooling are getting popular. Improving the insulation performance of buildings is also desirable as a measure to prevent climate change.

There are many types of thermal insulation, and some foam plastic insulation uses fluorocarbons.

Fluorocarbons are harmless, odorless, and make fine bubbles in plastic, yielding high insulation performance, leading to the use of significant amount of fluorocarbons in this application.

However, fluorocarbons emitted from this insulation deplete the ozone layer and contribute to climate change. For this reason, today foam plastic insulation freeing itself from fluorocarbons and insulation such as extruded polystyrene, high expanded polyethylene and phenolic foam, which historically depend on fluorocarbons, are now almost fluorocarbon-free.

However, in the field of rigid urethane foam insulation, the use of fluorocarbon HCFC141b has been greatly reduced and replaced mainly with HFCs. In 2006, almost 6,000 tons (around 5.6 million tons of CO₂ equivalent) of HFCs were newly used, part of which was emitted during manufacturing and the rest of which will be gradually emitted over a long period of time. Most of the HFCs used are HFC245fa and HFC365mfc. Although these two types of HFCs are not targeted under the Kyoto Protocol, their use must be reduced to prevent climate change as they are still powerful greenhouse gases.



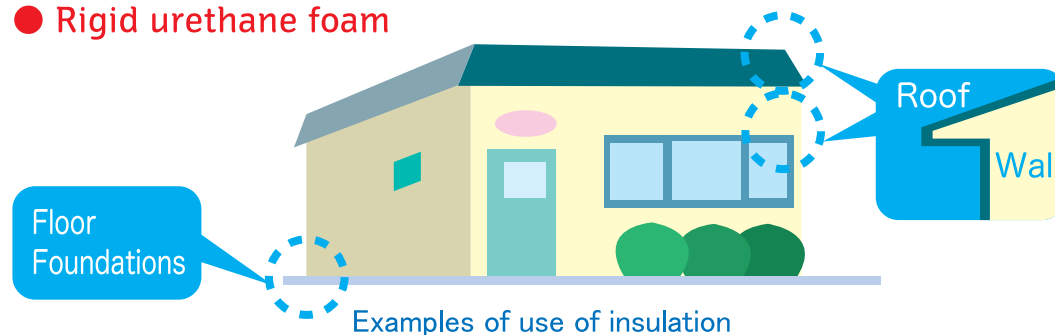
Major insulation types

Completely or almost fluorocarbon-free

- Non-foam-plastic insulation (Glass wool etc.)
- Extruded polystyrene foam
- Phenolic foam
- High expanded polyethylene foam
- Expanded polystyrene foam

Using fluorocarbons

- Rigid urethane foam



Examples of use of insulation

The focus of this pamphlet is rigid urethane foam insulation, for which it is particularly desirable to be fluorocarbon-free.

Fluorocarbon-Free Rigid Urethane Foam Insulation • • • • •

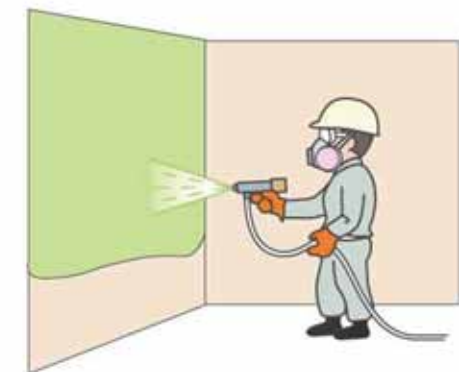
There are two types of rigid urethane foam: sprayed on site (Sprayed-Type) and formed in factories (Pre-formed). Fluorocarbon-free products are commercially available for both types.

Fluorocarbon-free sprayed-type rigid urethane foam

An insulation layer is formed and integrated with the building materials by using a blowing agent on site, taking advantage of the product's self-adherence properties.

Fluorocarbon-free sprayed type rigid urethane foam includes the method of spraying CO₂ directly as a blowing agent and the method of reacting chemical substances with water to produce CO₂ to create foam.

As a sprayed-type, the foam does not have joints, which are a cause of heat loss, and is quick and simple to install, this type represents a major part of rigid urethane foam insulation. However, fluorocarbon-free sprayed-type insulation represents around just 10% of the domestic market.



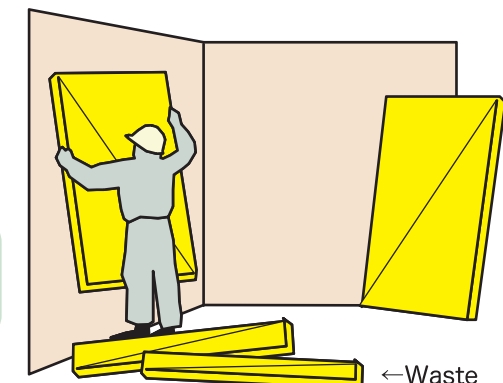
Application on site

<Usage Example>

Housing complexes and factories etc.

Fluorocarbon-free pre-formed rigid urethane foam

At the factory compounds such as cyclopentane are reacted with urethane to create foam. The shipment amount of pre-formed foam is less than that of site-applied foam, most of the factory-made foam has now been replaced with fluorocarbon-free alternatives.



Boards are attached to concrete walls

<Usage Example>

Detached houses and vending machines etc.



※For Sprayed-type rigid urethane foam, since fluorocarbon-free products have a lower insulation performance than fluorocarbon-based products, a thicker layer is required. Also, for both sprayed-type and pre-formed rigid urethane foam, special treatment and equipment is required in some cases, leading to relatively higher cost at present.