

Packaging materials manufacturing

# SUDA sangyo Corporation Ryuyo Factory



Hot air heat pump

## Introduction of CO<sub>2</sub> hot air heat pump and new drying system reduces running cost and CO<sub>2</sub>

To take advantage of the exhaust heat generated from the new VOC (volatile organic compounds) processor, a CO<sub>2</sub> hot air heat pump was installed at the Ryuyo Factory for use during the hot-air drying process when laminating film.



Packaging film

### The decisive factor

#### Cost reduction through effective use of exhaust heat

The decision to install the heat pump came after it was recognized that the effective use of exhaust gas from the VOC processor saves running costs and reduces primary energy consumption.

### Advantages

#### Reduction of the running cost

Running cost was roughly 75% less per year.

#### Reduction of the energy consumption

By controlling boiler usage, primary energy consumption was reduced by crude oil equivalent of about 60% per year.

- Conditions for calculating primary energy consumption
- ◎ Power (daytime) ... 9.97MJ/kWh (\*1)
- ◎ Heavy oil ... 39.1MJ/L (\*1)

\*1: Act of the Rational Use of Energy

#### Reduction of the CO<sub>2</sub> emissions

Compared to before installation, a yearly reduction of 72% has been achieved. Together with recovering heat exhaust with the hot air heat pump, this has contributed significantly to the reduction of the environmental burden.

Furthermore, approval by the Domestic Credit System enabled the application of government subsidy.

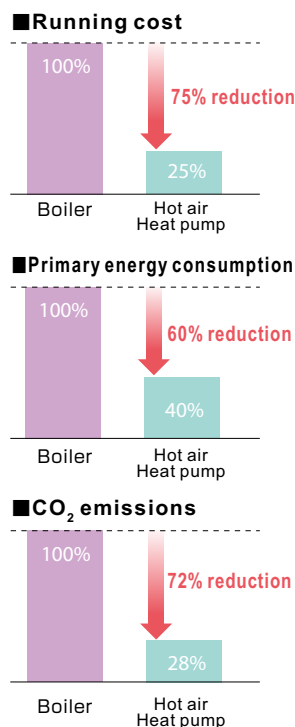
- Conditions for calculating CO<sub>2</sub> emissions
- ◎ Power (daytime) ... 0.473kg-CO<sub>2</sub>/kWh (\*2)
- ◎ Heavy oil ... 2.71 kg-CO<sub>2</sub>/L (\*3)

\*2: Chubu Electric Power Co., Inc. FY2011 fiscal value

\*3: Act on Promotion of Global Warming Countermeasures

#### Contributes to stable quality

The temperature of warm air generated from the hot air heat pump is 80°C, which is enough for a stable supply of sufficient heat for the drying process.



Ever since the company was founded, Suda sangyo Corporation, a processor and seller of packaging material, has consistently expanded its business in the packaging sector. Today, it is mainly engaged in food-related plastic film packaging with a "total production system" in which they handle everything from planning and design, to shipping within the company – providing one-stop service, giving them the flexibility to meet the various needs of their customers.

The Ryuyo Factory built in 1989 operates as the heart of the company and its "total production system".



### Company Profile

Company name

**Suda sangyo Corporation  
Ryuyo Factory**

Location

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Shizuoka Prefecture**

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<http://www.suda-sangyo.co.jp>

**In search of a system which achieves both economical advantage in harmony with consideration for environment**

President Suda of Suda sangyo says "He chose the hot air heat pump because it could both cut operating costs in the coming age and be considerate to the environment".

Suda sangyo Corp.  
President  
Mr. Morihiko Suda



In 2010, in response to the VOC (volatile organic compound) emissions regulations, the company that mainly manufactures plastic film food packaging materials installed a VOC processor. By heating the VOC to as high as 800°C, the processor makes it harmless. In the meantime it generates about 55°C of exhaust heat that is discharged to the outside. Wondering if there could be a way to effectively use this heat, members gathered ideas.



Quality Management Office  
Technical Service Section  
Section Chief  
Mr. Tomofumi Yamamoto



Heat pump unit with VOC processor attached to the upper portion



It was around then that the installation of a heat pump to use for the hot air drying process was proposed. By recovering the heat exhaust from the VOC processor as the heat source for the hot air heat pump, it would not only eliminate waste, but also reduce the environmental burden. By lowering the rate of boiler's operation, costs would also be reduced. As a system that could achieve both economical advantage with environmental consideration, the heat pump was just what the company needed.

**The effects started to become apparent only one year after installation**

"The hot air heat pump was built into the dry laminator that performs the laminating process. Laminating is a process in which several layers of film that have various functions are glued together. The hot air from the heat pump is used to dry the adhesive during this process.



Dry laminator

It has been one year since installation, and the effects are steadily becoming apparent. In one year, primary energy consumption was reduced by a crude oil equivalent of 60%, running costs went down by 75%, and 72% of CO<sub>2</sub> emissions were cut.

Adding to the popularity on site are features such as a simple ON/OFF switch that is linked with the system making it easy to operate, and low maintenance because unlike a boiler, the heat pump has no filters or other consumables to change.

**The client's trust comes first**

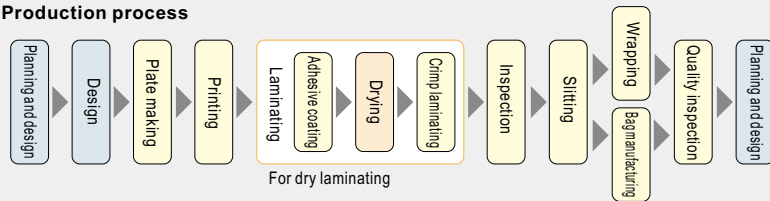
Section Chief Yamamoto insists that while cost is important, at the top of the list are quality and trust, saying, "If we make an error, it will affect our clients' credibility, not only ours. For this reason we cannot compromise quality."

For example, if the temperature of the hot air is too low, the organic solvent, which is the adhesive, will not dry completely. If this happens, the smell of the solvent will remain in the bag. This is a compelling issue for a company that works closely with the food industry. However, with the hot air heat pump, the air generated is about 80°C. This clears the criteria, eliminating the worry of such problems.

Suda sangyo is always coming up with ideas in order to meet the diverse needs of their clients. Installing the heat pump was an extension of these efforts.

Considering further installations for the future, President Suda says, "We can strongly appeal product differentiation through cost reduction and lower environmental impact because of the heat pump, to the client."

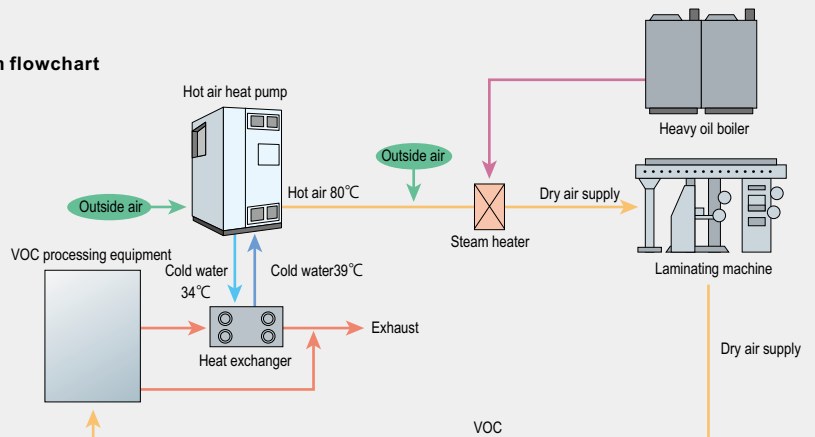
**Production process**



**Facilities overview**

CO<sub>2</sub> hot air heat pump Mayekawa Mfg Co. Ltd.  
 Heating capacity : 108.1kW Cooling capacity : 82.6kW Power consumption : 27.2kW  
 Refrigerant : R744 (CO<sub>2</sub>) Hot air airflow : 92.0m<sup>3</sup>/min  
 \*Hot air temperature : 80°C Air inlet temperature : 10°C Heat source water outlet temperature : For 15°C

**System flowchart**



[information obtained November 2012]