**Introduction of CO₂ hot air heat pump and new drying system reduces running cost and CO₂**

To take advantage of the exhaust heat generated from the new VOC (volatile organic compounds) processor, a CO₂ hot air heat pump was installed at the Ryuyo Factory for use during the hot-air drying process when laminating film.

### 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 CO₂ 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 CO₂ emissions
  - Power (daytime) ... 0.473kg-CO₂/kWh (*2)
  - Heavy oil ... 2.71 kg-CO₂/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.

---

*Graph figures courtesy of Suda Sangyo Corporation

---

**Company Profile**

**Suda Sangyo Corporation Ryuyo Factory**

**Location**
1745-1 Takagi, Iwata City, Shizuoka Prefecture

**Phone**
+81-538-66-7155

**Website**
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”.

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.

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.

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 CO₂ 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.”