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Mitsubishi Chemical
Functional Products, Inc.

Recycling Machine of ALPOLIC® and ALPOLIC®/fr

1. Recycling methods

ALPOLIC and ALPOIC/fr can be recycled. Actually in Japan, most of waste of ALPOLIC and ALPOLIC/fr is collected to recycling facilities, where aluminum skin and core materials are separated. After separation, the recovered aluminum is re-melt to ingot, and the recovered core material is returned to ALPOLIC production.

Our recycling method is based on "Embossing and Heating Method," in which ALPOLIC panels are firstly cut into long strips of 80 to 300mm wide, and then strips are embossed under ambient temperature and instantaneously heated on the surface with heater. There are several types of machines based on Embossing and Heating Methods, depending on the pressure range and heating method. We recommend “High Pressure and Low Temperature Machine” among the machine types.

2. High Pressure and Low Temperature Machine

(1) Outline of machine

The machine includes embossing and instantaneous heating procedures. Embossing gives plastic deformation on aluminum skins and generates shearing stress in the interface between skin and core. Subsequently, instantaneous heating on the skin surface enables separation between skin and core. The machine consists of embossing roll unit and heating unit with gas burner.

(2) Characteristics

This machine is characterized with the following advantages:

a. Roll temperature is relatively low, and there is no worry about burns due to heated aluminum skin.
b. There is no concern about fire, because flame is not used for heating. Smoke extraction facility is not required, because no smoke grows due to oxidation of paint film.
c. It is easy to adjust the operating conditions, when the machine is going to start. Further adjustment is not necessary due to variation of surface finishes.

3. Specifications

(1) Size of ALPOLIC

Panel thickness:	3mm, 4mm & 6mm
Panel width:	80mm to 300mm
Panel length:	300mm to 3000mm

(2) Feed speed

3 m/min to 12 m/min

Note 1: Feed speed depends of the panel width, panel thickness, temperature and roll surface conditions.

Note 2: Protective film must be removed before recycling.

(3) Equipment

	Items	Descriptions
a	Panel inlet unit	Roller conveyor with width controller, 1 unit
b	Embossing roll unit	
	Embossing roll	Roll diameter: 400mm, Work length: 500-700mm Max temperature: 150°C
	Driving method	2-motor drive, 2-axis driving method Motor capacity: 2.2kW, induction motor, 2 units Control: By inverter
	Press method	By hydraulic press unit
c	Heating unit	Oil heating with electrical heater, 15kW.

4. Price estimate

   Total: US$ 63,840 FOB Tokyo

   Breakdown:

Items	Price in US$
Panel inlet unit	2,400
Emboss roll	32,000
Heating unit	7,840
Motor with speed reduction	3,200
Hydraulic press unit	2,400
Pipe layout	2,400
Electricity control box	5,600
Test operation	800
Transportation to Port	800
General administration	6,400
Total	63,840

5. References

   Appendix 1: Photographs of example of recycling machine.

   Appendix 2: Elevations of comparable machine. The drawing is not of the exact above machine.