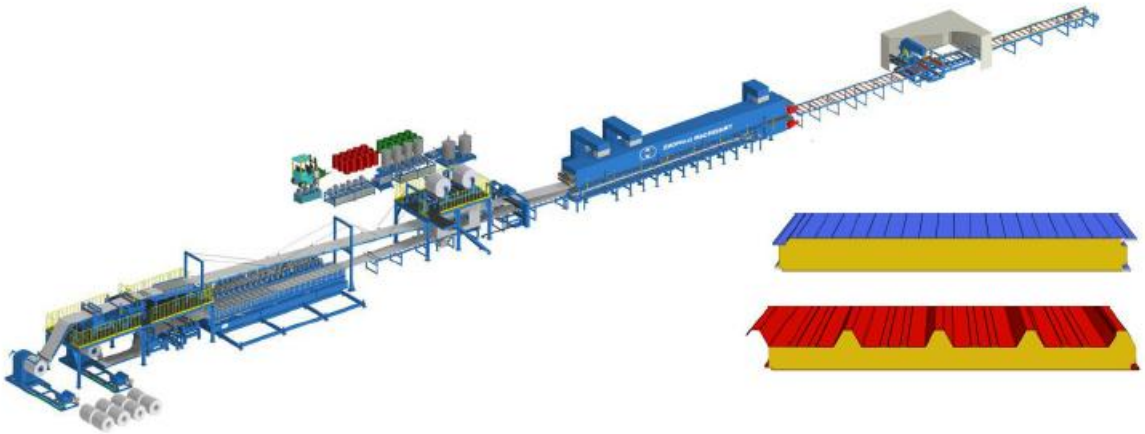
PU SANDWICH PANEL LINE
-24m Double Conveyor
141b Blow Agent



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OFFER SHEET

No.	Parts & Description	Quantity
	A. Roll Forming Line	
1.	**Coil Car and Uncoiler for Upper and Lower (Max. 10 ton)** - Hydraulic type	2 sets
2.	**3 sets machines for Top and Bottom** - Pinch roll/ Shearing - Protect film coating device for Top & Bottom facing. - 2 sets grooving rolls (Micro and Wide) for Top & Bottom	2 sets
3.	**Top Roll Forming machine for** - Width fixed type (1,000mm)	1 unit
4.	**Roll Forming machines for lower**	
	- Roof (4 Rib/ 38-250)	1 set
	- Wall panel (Hidden fix)	1 set
5.	**Traverse System by Rail for Lower Roll Forming machine**	1 line
6.	**Main body frame (Mezzanine deck) for upper roll forming**	1 unit
7.	**Free Roller Conveyors**	3 sets
8.	**Electric control**	**Included on item H**
	B. Pre-heating system for Steel Facing	
	- Pre-heating system by Electric heater - Housing	1 unit
	C. High Pressure PU foaming machine -- 2 components	
1.	**High Pressure PU foaming machine (2 components)** - 2 Flow meters - 1 Mixing head - 1 Display on monitor for each component - 2 Metering pump units for ISO, Polyol, Pentane, Catalyst. - 1 Air loading unit - 2 Feed pump sets from tank to metering pump	
	- Machine Tank system (300L x2sets) 2 Sets of polyol and Iso tanks 2 Temperature control System for Polyol & Iso tanks 2 Heat exchanger for Polyol & Iso tanks 2 Level gauge for each tank 2 Feeding pumps Necessary parts and accessories for each tank. -1set of Water chiller (30RT) ----- Buyer scope	1 unit

D.	**Foaming portal for mixing head oscillation**	
	- Foaming Portal for oscillating movement of the mixing head	1 unit
E.	**Double Belt Conveyor system, 24m**	
1.	**Double Belt Conveyor (24m)**	1 line
2.	**Heating system** for Double Belt Conveyor - Insulation housing - Auto. temperature control system - Electric Heater	1 unit
3.	**Side Guide system** by driving motor	1 unit
4.	**Side Block system** for total 9 sets. - Roof for 4 ribs - Wall - Support block for 4 ribs roof (Magnetic Type) ► Other thickness are optional items or Buyer scopes	9 sets
F.	**Cross cutter by band saw**	
1.	- Cross Cutter by band saw - Clamping unit - Housing & Dust Collector ---------- Buyer scope	1 unit
G.	**Electric Control System(PLC)**	
	- Electric control system for seller scopes (incl. Synchronization system)	1 unit

TECHNICAL DATA

1. Roll Forming Line

Coil (Raw material)	: Pre-painted steel sheet
Coil (steel sheet) thickness	: Exterior (Lower) facing : 0.3-0.8mm
	: Interior (Upper) facing : 0.3-0.8mm
Coil weight	: Max. 10 ton
Coil width	: 1220, 1080, Max1250mm (3~4 kinds steel)
Machine length	: About 95m
Coil inner diameter	: Ø508mm
Coil outer diameter	: Max Ø1,100mm
Line speed	: 0m ~ 8m/min
Hydraulic pressure	: Max. 150kg/ cm^2
Pneumatic pressure	: Approx. 4 ~ 9kg/cm^2
Electric power source	: 380v or 440v × 50Hz
Forming type	: Roof 4 rib and, Wall panels

Pass line (height)	: 1,250mm from floor
2. Panel & Insulation	
Panel types	: Roof 4 rib and, Wall panel
Panel length	: Min. 2,000mm ~ Max. 15,000mm
	: Cover width : (Fixed type)
Panel width	- Roof 1,000mm
	- Wall 1,000mm
Panel thickness	: 30~100mm
Foam property	: PU-rigid foam
Foam Density	: Approx. 35~50 kg/m3
Metering unit	: High pressure pump system (2 comp.)
PU foam poured by	: Oscillating mixing head
Foaming pressure	: Max. 0.5 bar/cm²
3. Factory and Others	
Size of factory (Minimum)	: Min. 110m(L) × 24m(W) × 7m(H)
	: Approx. 6m/min. at 50mm thickness Max 8m/min
	: Depending upon panel thickness, the property of Polyol & Iso and curing times
Length of double belt	: 24,000mm (24m)
Required height for Work	: 1,250mm
Inner height of building	: Min. 7m
Air compressor	: Min. 10Hp
Air pressure	: Approx. 4~10 bar
Temperature of Factory	: 15°C ~ 25°C
Temperature of PU tank storage	: 22°C ~ 25°C
Relative humidity	: 60 ~ 70%
4. Electrical Requirement	
Total electric consumption	: Approx. 500kw with heating system
Voltage	: 380V/50Hz or 440V/50Hz
Voltage tolerance	: ±5%
Frequency(tolerance)	: 50Hz (±1%)
Control cabinet Lighting voltage	: 220 or 110V AC
Valve and Senor voltage:	: 24V DC
PLC	: Siemens or Mitsubishi PLC
Emergency switch	: Min. 7 switch in total line

SPECIFICATIONS:

A. Roll Forming (Profiling) Line

Highlights

- This line consists of a coil car, an uncoiler and an upper / lower roll forming machine.
- In this line, the most important features are the quality of roll and the electric synchronization with the Double Belt Conveyor.
- The rolls have to go through several heat treatments and precision processing treatments and after that, hard chrome plating process assures a life span of more than 10 years. Where is not this case, the rolls are easily worn away and have a far shorter life span, resulting in a lower quality of panel.
- The Hard chrome plating assures a higher degree of strength and protects the color coil (steel sheet) paint from peeling off while forming the coil.
- The electric synchronization is designed to ensure the very same speed in uncoiling, roll forming and double-conveying the steel sheet. Further, the speed of the upper coil and lower coil should also be the same. If not, the panel production cannot be successfully completed and production facilities themselves might also become damaged.

A-1-1. Coil Car

- This is a carriage to transport and deliver a bundle of the rolled steel sheet (coil) to the uncoiler.
- Up-lift & down-lift are achieved by the use of a hydraulic cylinder which moves right and left supported by 4 wheels by 4 wheels on a rail. Two units are needed for Upper Coil and Lower Coil operation.
- **Type** : 4-wheel driving by hydraulic power
- **Coil weight** : Max. 10 ton
- **Coil width** : Max. 1,250mm
- **Lift** : Hydraulic cylinder
- **Traveling** : Geared motor
- **Rail** : 15kg rail
- **Main body** : Welded steel structure

A-1-2. Uncoiler, 2 sets

- The steel sheet (coil) is mounted on an uncoiler by the coil car at which point 4 wedges are expanded, and then 4 wedges are expanded, fixed by hydraulic power, and then driven by a motor.
- A rubber roller is mounted above the uncoiler for the purpose of preventing the coil (steel sheet) from suddenly uncoiling and over-uncoiling in motion.
- **Type** : Cantilever type moving left & Right (100mm)
- **Drum** : 4-link collapsible wedge
- **Loading capacity** : Max. 10 ton
- **Drum opening & closing distance** : Ø482 ~ Ø517mm
- **Drum opening & closing drive** : Hydraulic cylinder
- **Shaft** : Ø260mm
- **Drum drive** : A.C 2.2kw geared motor
- **Snub roll** : Ø200mm × 400mm (rubber coated) (checking the movement of a coil)
- **Snub roll up-down** : Air cylinder
- **Coil centering** : Hydraulic cylinder (□140mm × 500 stroke)
- **Drum brake** : Ø400mm × 100mm(W) wheel (band brake)
- **Main body** : Welded steel structure

A.2. 3 sets

- This equipment consists of a Pinch roll, a Shearing machine
- This unit is separately installed for both the upper and lower coils.

A.2-1. Pinch Roll

- A pinch roll is used to prevent the coil moving backwards and to move it forwards by pinching coil.
- **Type** : Top roll lifting type by hydraulic cylinder
- **Roller** : Ø200mm × 1,300mm(L) - 2pcs (rubber coated)
- **Top roll lifting** : Air cylinder
- **Drive** : 2.2kw × 1/50 gear motor
- **Main body** : Welded steel structure

A.2-2. Cut-off (Shearing) device

- It is composed of a compressed air cylinder powered knife that is designed to initially set the roll forming M/C cutting pattern, that later cuts the steel sheet into a uniform panel length.

A-3. Upper roll forming machine – Width Fixed type (1,000mm)

- The upper roll forming unit is primarily responsible for shaping the forms of both sides of the lower coil (steel sheet) for the use of roof & wall (incl. Inner) panels' joint parts. It has an easy-to-exchange setting, in the case of various panel shapes being required for production.
- A fixed reducing gear is conveniently located in the base frame, which permits speedy exchange of the roll forming units.

SPECIFICATIONS

- **Forming shape**

Side	**:** Roof and Cold room, Wall panel
Surface	**:** Flat and wide grooves, micro wave (3 kinds)

- **Forming machine**

Type	: Width Fixed type (1,000mm)
Main bed	: I-beam (600mm × 190mm) & steel plate × 2 sets
Roll pitch	: Approx. 400mm
Roll stages	**:** Approx. 12 stages
Roll shaft diameter	: Ø80mm × 1,500 mm (L)
Bearing	**:** Taper bearing (#2212)
Up & Down adjustment	**:** Screw handle
Width adjustment	**:** By AC Inverter
Bead roll shaft dia.	**:** Ø82mm × 1,500mm(L)
Production speed	: Max. 10m/min

- **Forming roll**

Material : SCM-21
Surface of roll : Hard chromium coated

- **Drive motor**

Type : AC gear motor speed
Motor : 5.5kw AC gear motor
Reducer : Reducer (I=1/29)

- **Side guide roll & free roll**

Type : Width Fixed type (1,000mm)
Roller : Ø100mm × 100 mm (L)
Surface of roll : Hard chromium coated
Free roll : Ø50mm × 400 mm (L)

- It is also designed to cut without any need for stopping the production line.

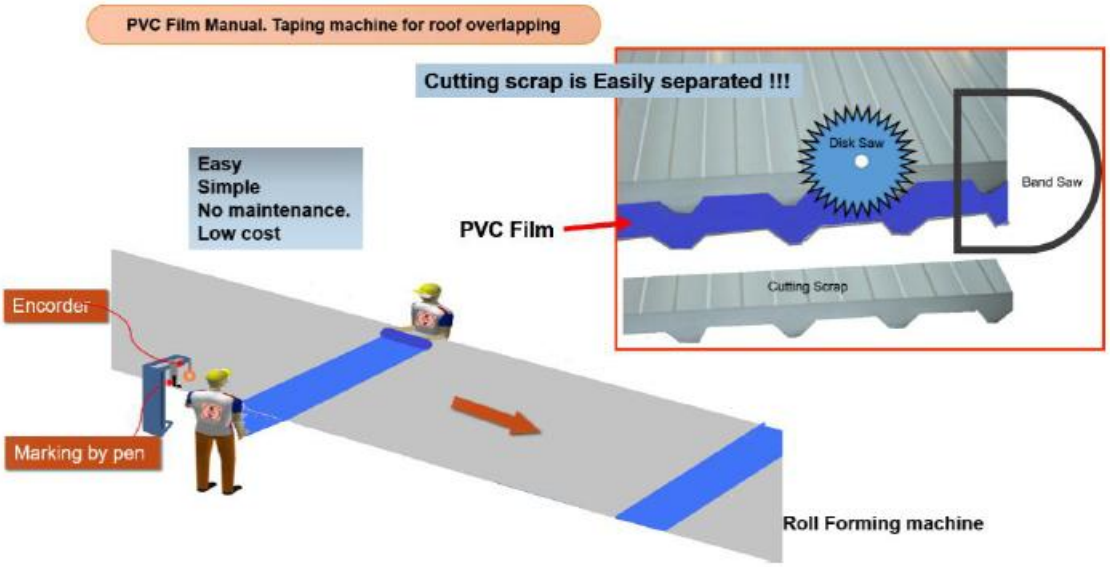
Type : Down cutting type of cutting mold
Cutting speed : 0.5sec
Capacity : 1.0mm(T) × 1,250mm(L)

Shear : Air cylinder
Main frame : Welded steel structure

A-2-3. Protect film coating device for lower facing

- This machine is designed for protecting panel skin by sticking the protect film while controlling tension of the protect film.
- 1 rolls of the film should be set, and each is connected without stopping the line.
- Roll Shaft : Ø70mm × max. 1,300mm(L)

PVC FILM & GROOVING ROLLS



A-4. Lower roll forming m/c

- Lower steel roll forming unit forms, Roof 2 & 4 rib and Wall panel

- Type for installation are moveable rail type
- Roll driving is gear box type.

SPECIFICATIONS:

- **Forming shape** : Roof 4 rib panel
  Wall panel
- **Forming machine**
  Type : fixed type
  Roll stages : Roof 4 rib : 18stage
  Wall panel : 12 stage
  Roll pitch : 400~500mm
  Roll shaft diameter : Ø50mm × 400 mm (L)
  Main bed : I-beam (600mm × 190mm) & steel plate ×4 sets
  Bearing : Taper & ball bearing
  Grooving roll : Wide grooving and micro wave for SS and Siding panel
- **Forming roll**
  Material : SCM-21
  Surface of roll : Hard chromium coated
- **Bottom drive motor**
  Type : A.C motor speed control type
  Motor : 5.5Kw, gear motor
- **Side guide roll**
  Type : Fixed type for Roof
  Width fixed type (1,000mm)
  Roller : Ø100mm × 100mm(L)
  Surface of roll : Hard chromium coated

A-5. Traverse System by Rail for Lower Roll Forming machine

Main frame : Welded steel structure

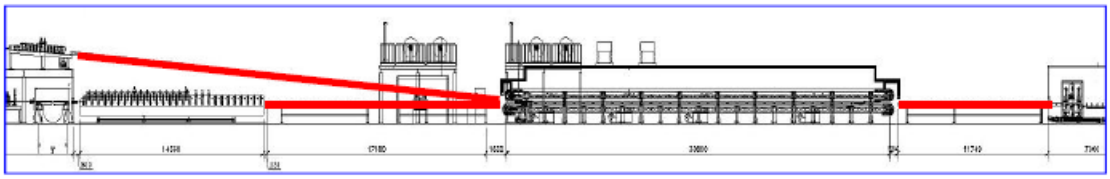
- **Lower roll forming machine will be moved by traverse system with rail.**
- **Driving by motor**

A-6. Main body frame for roll forming line (Mezzanine deck)

- Steel structure for upper roll forming machine

A-7. Free roller conveyor--- 3 Sets

- **Type** : Free roll conveyor
- **Roller** : ø60 ㎜×1,200mm(L)
- **Quantity (3Sets)** : Between roll foaming line and double conveyor -2sets
  Between Double conveyor and cross cutter -1set
- **Frame** : Channel & Steel plate



A-8. Electric control system

- This unit is separately mounted in both the upper and lower forming line.
- The main control panel immediately beside PU foaming unit controls the speed of the whole line when in manual mode
- Roll forming unit has the small manual-control panel for testing the roll forming unit' s Operation
- **Type Stand box type --- Main** : 2 sets / operating panel: 2 sets
- Electric 380v or 440v × 50Hz

B. Pre-heating system by Electric heater

HIGHLIGHTS

- This unit is used for preheating the upper and lower steel sheet to a moderate temperature after the roll forming process.
- As polyurethane reacts chemically under moderate heat, the heating process for the steel sheet activates the PUR and makes the adhesive strength between the steel sheet and the polyurethane foam board stronger.
- The heating mechanism is a heated air current by Gas or Electric heater and directed to the upper and lower steel sheet.
- The temperature sensor is mounted on upper and lower brackets, which make the actual temperature setting adjustable to a desired temperature.
- In order to prevent heat loss, the housing is of a tunnel type and the heated air is supplied directly into the tunnel.
- The temperature of a steel sheet is a moderate 40 ~60°C after preheating. A higher temperature might make the PUR reacted earlier and form a lower quality of panel.
- **Temp. of Circulating air** : Max. 90°C, adjustable
- **Steel sheet temperature** : 40°C ~ 60°C
- **Temperature control type** : Auto. Control
- **Heating room Size** : Steel plate structure insulated panel about 4m(L) × 3m(W) × 3.5m(H)

- **Heating capacity** : 40 kw
- **Heating way** : Electric heater

C. High Pressure PUR foaming machine, 2 components system

HIGHLIGHTS

- The most important parts of this unit is the Mixing head, Nozzle, High Pressure Pump and the Temperature Control of main components, Polyol and ISO.
- The high Pressure PU foaming machine is the crucial unit for proper panel production.
- The flow volume of 2 components is measured and displayed and indicated on monitor.
- The mixed PU material is outputted from outlet pipe of the mixing head onto the lower facing layer while moving crosswise along the Foaming Portal.

This machine mainly consists of:

- ✓ 1 set of piping and flexible hose incl. mixing head,
- ✓ 2 sets flow meter for Iso and Polyol, Pentane, Catalyst display on monitor
- ✓ 2 sets of Iso and Polyol pressure gauge for delivery side
- ✓ 2 components metering system for Iso and Polyol (A2VK 28cc)
- ✓ 2 sets mixing chambers
- ✓ 1 set of Pentane mixing unit by static mixer at near mixing head
- ✓ 2 sets for filter for Iso and Polyol
- ✓ 2 sets feeding pump from machine tanks to metering pumps
- ✓ 1 set of Air loading unit
- ✓ Necessary accessories and parts

2 sets of tank station

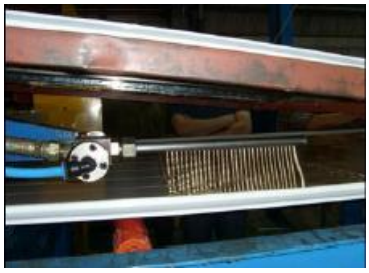
- ✓ 2 sets x 500 liter for Polyol & Iso
- ✓ 2 Temperature control system incl. heater for Iso & Polyol tanks
- ✓ 2 Level gauge for all tanks
- ✓ 2 Heat exchanger for Iso & Polyol work tank
- ✓ 2 Feeding pump
- ✓ All piping and flexible hose , fitting.

- ✓ Necessary accessories and parts
- ✓ Chiller for Iso & Polyol work tanks (30RT) ------- Buyer scope

Technical data

- **Each pumps output of Polyol and Isocyanate** : Max.32ℓ/min at 50 Hz
- **Dispensing pressure** : Max. 220 bar / Min. 60 bar
- **Required viscosity** : Max. 2,000mPas
- **Discharging for work tanks** : Dry air or Nitrogen

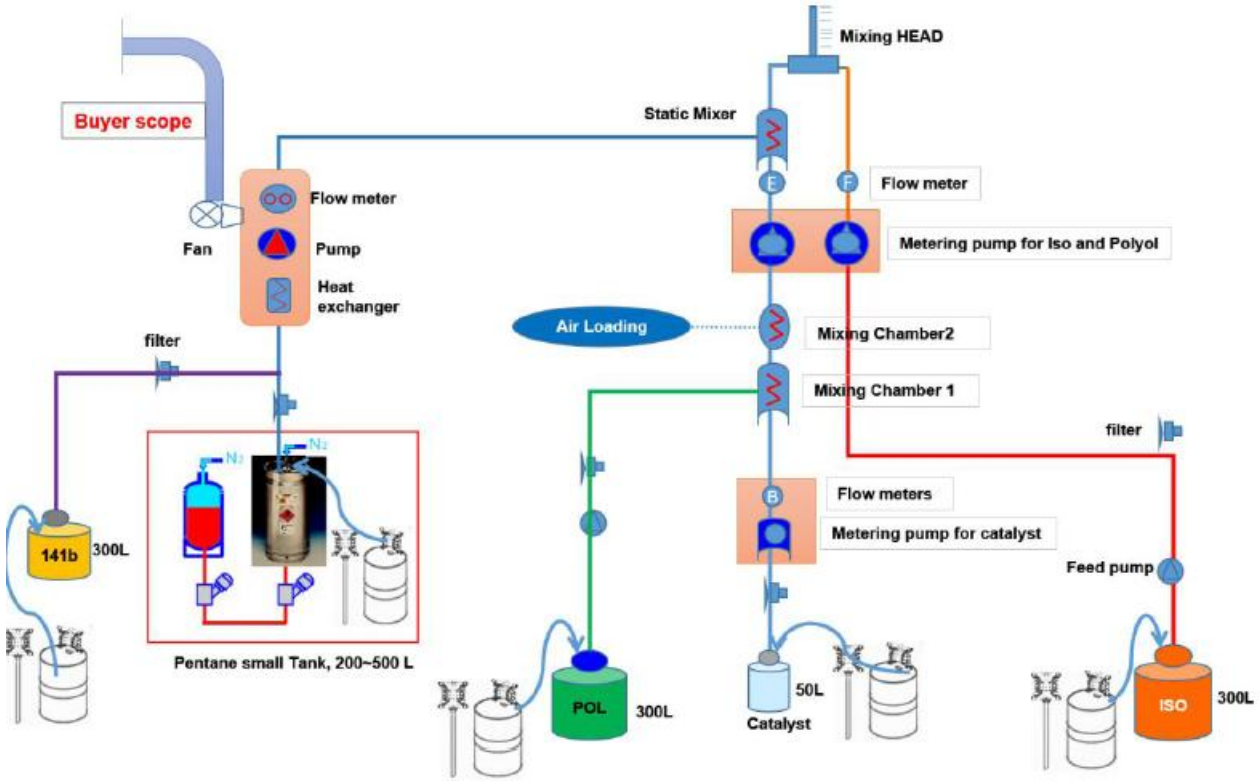




SPECIFICATIONS (MODULES)

- There is a common base frame made of welded steel construction for supporting the metering units, filters and electrical pressure switches.
- Each metering unit is separately fitted for the Polyol and Isocyanate, and consists of an axial piston pump, coupling, flanged A.C motor, pump support and safety valve.
- The pump output can be adjusted infinitely by hand-wheel and scales fitted to the pump housing.
- There is an automatic flushing device for the double mechanical shaft seal.
- The pressure control device is separately fitted for the polyol and isocyanate circulating system and consists of a pressure valve set at 250 bar.
- It is possible to control the minimum admissible pump pre-pressure as well as the minimum and maximum admissible foam pressure. The control unit consists of an electronic pressure gauge and indication device for the pre-pressure as well as for the high pressure circuit.
- There is a component filter, designed as edge filter for polyol and isocyanate.
- The edge filter is cleaned manually.
- Electric control panel is PLC type including additional component metering unit.

4comp. PU machine flow diagram including Pentane system (PU machine)



D. Foaming portal for mixing head oscillation

HIGHLIGHTS

- The oscillating movement of the mixing head is essential to achieve an optimum application of the PUR-mixture onto the lower facing layer.
- The mixing head is actuated by means of an A.C servo motor and its toothed belt enables a free programmable oscillating movement across the total panel width. There is no noise from the movement of the Foaming Portal.
- While moving, the speed of the oscillating movement, moving width and level are adjustable.
- It also possible to select a separate speed for every panel type to be produced while displaying the speed condition graphically at the monitor.
- This system ensures production that every panel type has a constant quantity and quality once the optimum oscillating characteristic has been determined.
- In particular, for roof type panels with deep ribs, the oscillating speed may be selected in such a way that the speed of the mixing head is reduced when moving across the deep ribs. In this case, more foam is applied (poured) into the deep ribs in order to avoid differences in density as well as avoid overlapping of the foam.

TECHNICAL DATA

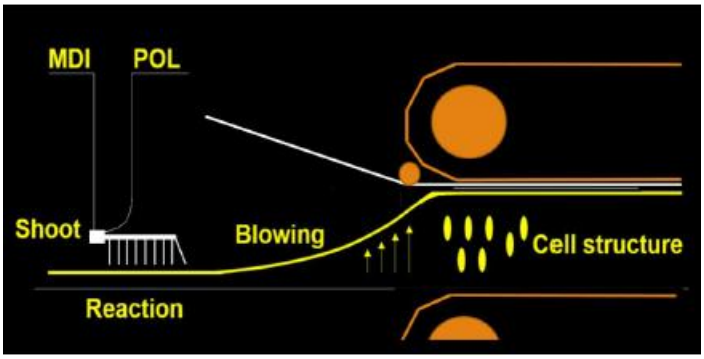
- **Frequency of oscillating stroke** : Max. 120 strokes/ min.(Speed adjustable) At 1,000mm panel width
- **Acceleration and deceleration** : Infinitely adjustable of the linear drive unit
- **Max. speed of the linear drive unit** : 2.5m/s, infinitely adjustable
- **Range of longitudinal movement** : Approx. 2,000m
- **Production height** : 1,250mm
- **Height adjustment of mixing head** : ±100mm
- **Power requirement for linear drive unit** : Approx. 4.4kw

SPECIFICATIONS (MODULES)

- A rail structure made of welded steel construction
- A base frame, moveable on rails in a longitudinal direction including the manually operated clamping device, made of welded steel construction to support the linear drive unit.
- A Linear drive unit consisting of
  - ✓ **A.C servo motor**
  - ✓ **Brushless Tacho-generator**
  - ✓ **Integrated incremental transmitter - toothed belt drive**
  - ✓ **precision type flat rail guiding the oscillating carriage**
- An oscillating carriage to support the mixing head. When the plant stops and change of nozzle occurs, the mixing head and nozzle are automatically flushed with polyol. Flushing takes place outside the foam application area, and residues are collected in a plastic bag.
- The oscillation width of the carriage is limited by an electro mechanically operated limit switches and a hydraulically operated shock absorber.
- The high-pressure mixhead can be operated continually.
- The wire drag guide includes component hoses for supplying the mixing head with PUR components.
- There is height adjustment setting of the linear drive unit, manually operated by means of a hand wheel, in order to position the fan nozzle at an optimal distance to the facing layer.
- The storage programmed control unit for the oscillating movement of the carriage includes a drive amplifier.



PIR Foaming



E. Double belt conveyor system --- 24m

HIGHLIGHTS

- The PU foam component mixture applied to the lower facing layer is conveyed in a synchronization motion with the upper facing layer along the double belt for curing.
- This unit is a crucial part and plays a core role ensuring the highest standards of sandwich panel.
- This unit principally consists of a driving motor, upper & lower slats, a hydraulic cylinder to contain the rising pressure and side guide & side block to prevent PUR foam from leaking out of the sides.
- The most important parts of this unit are the slats that need a precision metal-working process and requires the most precise degree in evenness and variation of units.
- A lower and upper slat chain belt which can be considered as a permanently moving mold. On both sides, lateral sealing chains seal off the foam and also contain the lateral foam pressure.
- As the PU foaming pressure is very high, several hydraulic cylinders are needed to control the foaming pressure, which are connected with the upper and lower belt conveyor. The hydraulic cylinder are designed to shift the upper belt conveyor up and down for the required panel thickness.


WHAT IS THE ROLE OF DOUBLE BELT CONVEYOR?

- The double belt is designed to contain the uprising pressure during the foam reactive process by the action of a screw jack ensure the required sandwich panel thickness.
- The double belt conveyor conveys a continuous panel from PU foaming portal to the cross cutter while containing upper, lower and lateral uprising pressure while keeping up the uniform thickness and steel surface of the finished PU panel.

WE MAKE ALL MACHINES BY KOREAN ENGINEERS & TECHNOLOGY

- To meet the high standards required for the sandwich panels to be produced, our special technology concerning the design and manufacturing measures of the double belt has been manufactured to the following guidelines.
- By slat chain guidance system on the right of the drive wheel, any pitching phenomenon of the slats caused by dropping onto the tooth of the wheel does not occur. By this technique, any distortion and scratching of the panel surface is avoided and this results in an utmost uniform panel surface appearance. The chain guide is made of special steel with a high endurance rating.
- Korean high precision manufacturing methods such as its narrow air gap tolerances and vertical offset between the slats as well as the parallelism between upper and lower chain belts are necessary to achieve a high standard of panel surface appearance.
- For the drive unit of the double belt, two electronically controlled DC type motors have been selected, and are mounted separately on the upper and lower slat chain belt. The motor of the lower belt serves as a pilot drive and is electronically synchronized with the motor of the upper belt to achieve a fully uniform and parallel movement of both slat chain belts. By this electronic synchronization, scratches on panel surface and any decrease of adhesive strength are avoided.
- By means of several electrically operated sets of screw jack, the upper and lower slat chain belts are locked to each other in order to contain the foam's pressure. Panel thickness is adjusted by exchangeable distance pieces which also serve as limit stops for the upper slat chain belt.
- The thickness of our slats is over 12mm and our slats are the result of our own metal working technology, which assures our product of a 20 year working life with uniform flatness. The slats less than 10mm and without any special metal processing, cannot be employed about 2 years after installation. A good quality panel has no variation of

thickness, is flat and has no surface scratching, which can be only produced from a highly precise slat.

TECHNICAL DATA

- **Length of the distance between axles** : 24,000mm
- **Working height of lower chain belt** : Approx. 1,250mm
- **Slat width** : 220mm
- **Slat length** : 1,350mm
- **Slat thickness** : Approx. 10~12mm
- **Number of slats per chain belt** : Approx. 500
- **Lifting distance of upper chain belt (required during maintenance)** : Max. 300mm
- **Panel thickness** : Min. 35~max. 200mm
- **Foaming pressure** : Max. 0.5 bar/cm2
- **Deflection of slats** : Max. 0.05mm
- **Lifting time of upper chain belt to max. height** : Approx. 1 minutes
- **Power requirement for drive** : Approx. 2 × 7.5kw
- **Power requirement for screw jack unit** : Approx. 7.5kw
- **Max. speed** : Max 10m/min

SPECIFICATIONS (MODULES)

- The upper and lower frame is made of welded steel construction.
- Hardened and ground guiding rails for supporting the bearings of the slat chains in a longitudinal directions
- Slats made of welded steel construction including roller bearings, pin with PU-bushes, lubricator nipple, etc.
- Hydraulic cylinders for lifting and lowering the upper slat chain belt as well as for locking the upper and lower slat chain belt to compensate for the foaming pressure.
- A hydraulic unit for actuating the hydraulic cylinders including control valves and pressure switches.
- Ring type steel distance pieces for 4 different panel thickness according to production Program.
- Returning wheels keep on returning the upper and lower slat conveyor by rotating with chain.
- A drive unit consisting of two frequency-controlled A.C. motors driving separately the upper and lower slat chain belt, and an electric synchronization system. The lower drive unit serves as a pilot drive for the entire plan.
- An automatic tension adjustment device to automatically adjust the tension of slat conveyor.
- One planet gear with clutch and flange for the upper and lower slat chain belt and which also support the motors.

E-2. Heating system for double conveyor

HIGHLIGHTS

- PU foam dispensed between the upper and lower coil has the perfect chemical reaction and curing process at regular temperature. This unit is designed for providing a heated air to maintain a regular temperature for such process.
- Electric heater is the ideal power for heating device that must provide the heated air separately to the upper and lower slat conveyor.
- Automatic temperature control unit with overheat-proof device must be also included for a safe and good quality panel.
- The insulated panel is needed for the housings in order to maintain the general temperature.

TECHNICAL DATA

- **Design** : Air circular system by Electric Heater or Gas burner
- **Circulating air quantity** : About 18,000m3/h
- **Temperature control** : Automatic control
- **Frame** : Steel plate & square pipe
- **Insulation** : 50mm Glass wool panel
- **Heater** : Electric Heater or Gas burner
- **Fan motor** : 15kw, A.C motor
- **Fan capacity** : 420m3/min
- **Temperature control panel** : Automatic control system
- **Plate (slat) temperature** : +40°C ~ +70°C
- **Max. Temp. of circulating air** : +120°C

SPECIFICATIONS (MODULES)

- Installed beside double conveyor
- Heated-air circulating equipment to suck out & in air and filters
- Duct and channel for air flow
- Automatic Control device with multi-step switch and control panel
- Overheated-air isolating device
- The panel housing for heating system to endure a high temperature.

E-3. Side sealing, guiding system

HIGHLIGHTS

- This unit is designed for preventing PU foam from leaking out of panel lateral by a set of plastic blocks and maintaining uniform foaming while double belt conveyor presses PU foaming pressure and conveys PU panel.
- This unit consists of lateral supporting & driving device, side blocks for lateral sealing
- Automatic temperature control unit with overheat-proof device must be also included for a safe and good quality panel.
- The driving device of plastic block set is synchronized with double belt conveyor, so they move at the same speed.

E-3-1. Side guide & drive system

- Side guiding device is mounted on both left and right side, which prevent PU foam with strong uprising pressure from leaking out of panel lateral by the side blocks
- In the case of adjusting the panel width, one of two side guiding device has to be fixed, then another side guiding device has to be moved to inner side of double conveyor.
- **Type** : Lack gear type
- **Guide** : Welded steel plate, The precise guide moving device
- **Sliding** : L.M bearing & leak gear
- **Motor** : AC 1.5X2, moving the system at the same speed as panel production

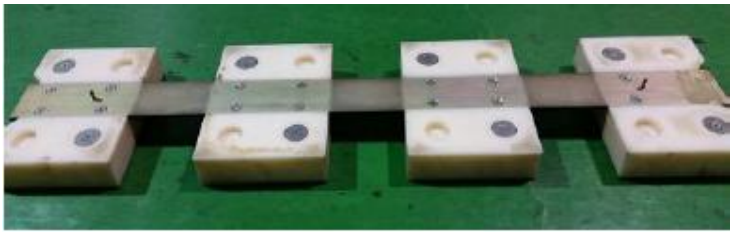
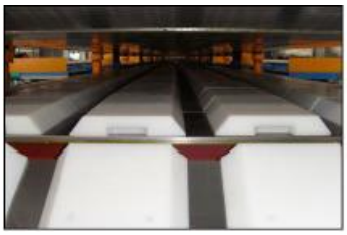
- **Jack screw** : M1.5 X 1-10 – 8sets
- **Up-down** : L.M bearing & guide post



F-3-2. Side & Support blocks

- Chain are fixed type
- Side blocks are changeable type
- Ureatac will supply the chain supported side block upon customer request. less time to exchange the plastic blocks.
- **Type** : Lack gear type
- **Material (side block)** : P.E.
- **Side and support blocks** : Total 3 kinds
  Roof 50mm (T) ---------- 1 kind
  Support block for roof---------- 1 kind
  Boltless panel 50mm(T) ---------- 1 kind
- **Joint** : Chain #40

The other side blocks are option or has to prepare at Buyer side.

F. Cross cutter by band saw

HIGHLIGHTS

- The perfect cutting unit has to have the cutting speed is synchronized with the panel conveying speed.
  This cutting unit has to be also operated by the manual or automatic control.
- The gantry is set at the rear and the saw unit is positioned at the right-hand side as viewed from direction of production. In this position, the band saw blade may also be exchanged.

- The cross cutter is designed in such a way that the saw band can be changed without production stop since the exchange takes only 1~2 minute.
- The double belt line conveys the sandwich panel at a pre-adjusted speed.
- An incremental encoder is installed at the turning shaft of the double belt measures the length of the endless panel.
- The pulses are transferred to the microprocessor control of the saw.
- The band saw waits for the start signal depending on the panel length and then accelerates the X-axle to maximum speed so that the speeds of the endless panel and the band saw are equal.
- After synchronization of both speeds and offset control, the clamping units are pneumatically actuated to clamp the front and back of panel and then the band saw carries out the first cut from left to right front direction (traversing).

- The saw band is turned by an angle of +90. The saw unit is in motion until the second blade section has also left the cut. The cut panel is lying on a non-driven roller conveyor and is pushed out of the operating area of the saw by the panel coming from behind
- The saw unit returns to the starting position at a maximum speed and turns about180°. At this position the band saw waits for the next start signal (depending on the length of the sandwich panel) and the above described procedure starts again.
  Cutting direction is now from right to left.
- Operating panel is equipped out of housing and Panel can be automatically cut without worker in case the data of panel length and quantity.
- Automatic or manual work is optional and manual work is used for cutting to a desired length of panel once panel is cut by automatic work.

TECHNICAL DATA

- **Dimensions** : Approx. 2,000 (L) x 5,200(W) x 5,020 mm (H)
- **Saw unit**
  - ✓ **Saw drive**
  - ✓ **Cutting speed** : 10~50 m/min., infinitely adjustable
  - ✓ **Cutting width** : Max. 1,300 mm
  - ✓ **Cutting thickness** : Max. 200 mm

- ✓ **Diameter of tread wheel** : Approx. 2000 mm

SPECIFICATIONS (MODULES)

- **Band saw width** : 16 ~ 25 mm
- **Band saw length** : Approx. 7,300 mm
- **Traversing axle**
  - ✓ **Cutting accuracy** : ±2mm
  - ✓ **Angle accuracy** : ±1 mm at 1,000 mm in panel width

SPECIFICATIONS:

- **Cutting unit** : Main frame / band saw drive / turning device / Driven by speed synchronization motor
- **Shifting device from rear to front (panel moving direction)**
  - ✓ **Shift by air cylinder / max. speed** : 25m/min.
- **Clamping device to right (Cutting direction)**
  - ✓ Mounted in the rear and front and clamped by an upper clamping device.
  - ✓ Upper parts driven by two air cylinders and lower parts by two air cylinder.
    Upper : Ø80mm × 200mm – 4ea
    Lower : Ø80mm × 50mm – 4ea
  - ✓ Designed for containing panel vibration, softening the cut parts and anti-noise
- **Electrical control device**
- **Cutting capacity**
  - ✓ **Minimum cut length** : 2,000mm at 6m/min.
    Panel thickness : 35~ 200mm
    Machine follows the max. production speed (10m/min.).
- **Cleaning unit**
  - ✓ **Cleaning unit :** suction channel and brush hoses, Cleaning roll

Housing and Dust Collector ---------- Buyer Scope

REFERENCE DATA

I-1 YEARLY PRODUCTION CAPACITY IN 24M DOUBLE CONVEYOR	
PRODUCTION SPEED	: Approx. 8 m/min (50mm T standar)
1 hour production	: 480m^2
1 day production (8hour working per day)	: 3840m^2
1 year production (300 working days)	: 1,152,000m^2
Efficiency 80%	: 921,000m^2

Yearly Production Capacity : Approx. 921,000m^2 9 (one shift working)

In case of 3 shift working, --- Over 1,800,000m^2

I-2 Required man power	
▪ Roll Forming Machine	1
▪ PU Foaming	3
▪ Cross Cutter	1
▪ Cooling, Stacker & Packing	1
TOTAL	**7 PERSON**
REQUIRED STEEL WIDTH	
▪ Roof Panel (4 rib panel)	: 1,080mm + 1,220mm
▪ Wall Panel	: 1,080 mm + 1,080 mm

INSTALLATION AND MAINTENANCE

MAIN CONDITIONS	
1-1.Assembly and training	
▪ Assembly and Training Period	
✓ **Assembly**	: Max. 1.5 months
✓ **Training and Try out**	: 2 weeks
▪ Delegation of Korean engineer	
✓ **Electric engineer**	: 1 persons
✓ **Mechanical engineer**	: 3 persons
1-2. For Seller engineers' board, lodging and communication	
▪ Meals, board and lodging cost of the engineers have to be paid by the buyer during assembly and try out, training, maintenance service.	
1-3. Inspection	
▪ Buyer's inspection shall be final	
1-4. Maintenance Service	
▪ Maintenance cost free for guaranteed period below.	

✓ **Electric and electronics parts**	: 1 year
✓ **Machinery parts**	: 1 year

The below documents will be supplied before, during or after installing:

- Instruction manual
- Maintenance manual
- Machine lay-out
- Electric Flow diagram

SCOPE OF BUYER'S RESPONSIBILITY

The following lists have to be provided or installed by the buyer at his own cost and risk in due time (in advance of or during Installation)

2-1. Production building(factory) conditions

- Production building including illumination and crane (10ton : 1 unit)
- All factory foundations
- Foundation pits, piping, cable duct including covers
- The Buyer should do all electrical wiring & piping works outside the machines.

2-2. All raw materials for test run

- **Coil :** Required amount **-->** Max. 10ton
  - ✓ **Material :** Color Coated steel sheet (Coil)
- ISO (MDI) & Polyol , Additives, Blowing agent, 141B, Pentane
- DOP and Methylene chloride
- The engineer of the raw material (ISO/ Polyol) has to be delegated at assembly site during tryout and training.

2-3. Tank stations for raw materials

- **Storage tank 2 sets (Each 10~30 m3) for PU raw materials.**
  - ✓ Temperature control system incl. heater for Iso & Polyol tanks
  - ✓ Level gauge for all tanks
  - ✓ Automatic feeding pump from storage tanks to machine tanks
  - ✓ Necessary accessories and parts
- **All piping**
  - ✓ **Drum** → storage tanks
  - ✓ **Storage tanks** → machine tanks
- **N2 or dried air discharging system and piping**

2-4. The refrigerating machine (water chiller) & air compressor incl. air dryer for whole production line and Tanks

- 1 sets of water chiller incl. all piping for Iso & Polyol machine tanks
- 1 set of air compressor and Air dryer, filters incl. all piping (capacity : 10~20Hp)
- All piping and fittings

2-5. The electric and automatic voltage regulator (AVR)

- The electric main connection to the central control cabinet as well as to the control cabinet for roll foaming, mineral wool, cross cutter and stacker.
- Electric power of 380v□5%, 50Hz has to be supplied to factory but in the case where fluctuation of mains electricity is over 380 □ 5%, buyer has to prepare AVR for protection of machinery and electronic control panel.

2-6. Gas burner & Blower for Heating system if customer use gas burner.

2-7. Side Blocks & Papers by panel thickness

2-8. Housing & Dust collector for cross cutter

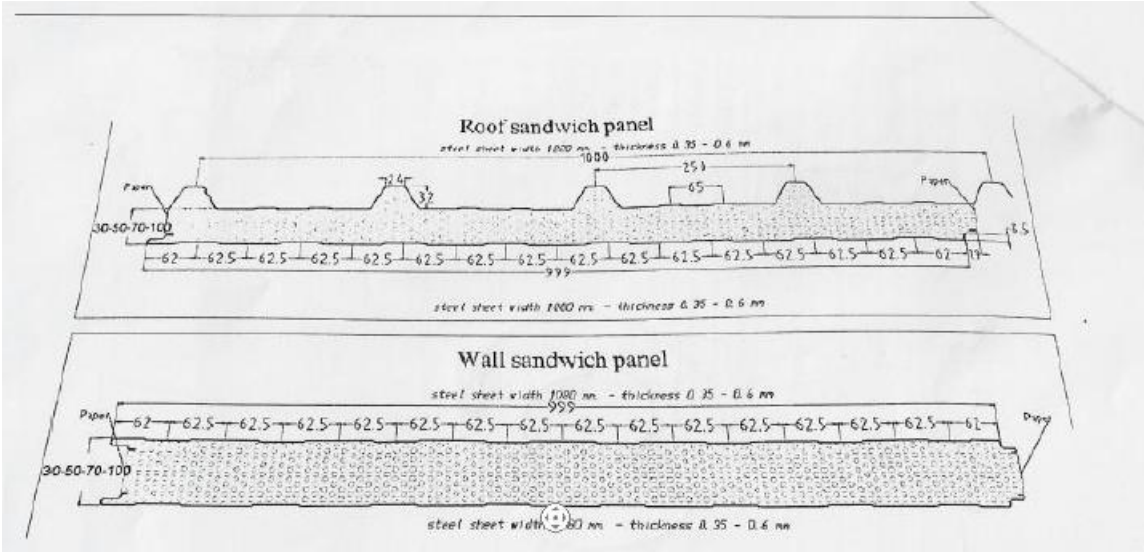
2-9. Buyer's workers & engineers for Assembly and Training

- Engineers of the buyer for the purposes of training and operation
  - ✓ **Mechanical engineer -** 1 persons
  - ✓ **Electric engineer -** 1 persons
  - ✓ **Chemical engineer -** 1 persons
- 10 Engineers of the buyer have to work together with China engineers at assembly.

2-10. Device & Equipment for Assembly

- Transport equipment, forklift truck, crane and hoists.
- Oil greases and lubricants.
- Lockable room for storage and office, rest incl. telephone.
- Tools (oxygen cutting m/c, optical leveler, anchor drilling m/c, grinder, electric welding machine, etc.)

CUSTOMER REQUIRED PANEL- NEED TO CONFIRM



PRODUCTION LINE LAYOUT