

We at WISE BRIDGE Corporation are dedicated to  
“Partner for home appliance manufacturer”

## ■ About Wise Bridge

- Established in 2008 in Seoul, Korea
- Export Amount in annual average : U\$ 43 Mil
- Specialized in steel, plastic, component for home appliances

## ■ President

- Mr. Tony Jung

## ■ Awards

- *Export Achievement Award of USD 30 Mil by President of Korea, 2018*
- Export Achievement Award of USD 20 Mil by President of Korea, 2017
- Industrial Service Medal by President of Korea, 2017
- Export Achievement Award of USD 10 Mil by President of Korea, 2010

## ■ Product Application



## Clients



## Suppliers





# Introduction on Wise Bridge

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- Established for purpose of being **“Solution Provider” and reliable sourcing partner for home appliances manufacturers.**
- More than 20 years experience and accumulation with very professional knowledge.
- Current market leader of sourcing and exporting raw materials & components for Home Appliance manufacturing.
- Very close relationship with the suppliers (factories) of **Samsung, LG, Daewoo, and also other major home appliance manufacturers.**
- Efficient communication and prompt reply with customers & factories.

# Advantage of sourcing through Wise Bridge.



- Package Supply

Package supplying is available (more than 100 kinds of components for home appliances including plastics, steel, and components)

- Providing high level of Real Time Information & Technique.

Reliable information with latest trend (also expectation) & price comparison

- Operating stock by program trading. (Timing orders)

- Systemized production guide and consulting for suppliers.

- Total Solution Provider

Through our knowledge & experience of being solution provider for many home appliances manufacturers in Middle East & Far East & Europe, We can introduce new technology and best alternative products with reasonable price & utmost service from Korea and China.

# Steel

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**Cold Rolled Steel & Hot Dip Galvanized Steel**

**Prepainted / Printed Steel & Laminated Steel**

**Aluminum-coated Steel & Stainless Steel**

**Aluminum Sheet & Coil (Plain & Embossed)**

# Cold Rolled Steel & Hot Dip Galvanized Steel

<b>Cold-Rolled Steel</b>	
Thickness	For Coil : 0.15 mm ~ 3.60mm
Width	500 mm ~ 1270 mm
Length	600 mm ~ 5000 mm
Both Cross Section & Finishing	Mill Edge / Slit Edge & Dull Finish / Bright Finish
Quality Availability	CQ (SPCC), DQ (SPCD), DDQ (SPCE), DDQ-N (Stabilized Drawing Quality SPCEEN)
Standard	JIS G3141 or EN 10130
Application	For powder coating usage of refrigerator door /cabinet and Automobile.

<b>Hot Dip Galvanized Steel</b>	
Thickness	0.35 mm ~ 2.3 mm (Sheet & Coil)
Width	600 mm ~ 1,380 mm
Length	600mm ~ 5,000 mm
Coating Mass	80 ~ 650/m <sup>2</sup>
Quality Availability	CQ, Lock Foaming, DQ, DDQ (JIS Standard)
Standard	JIS G3302 or EN 10142 (Zero Spangle)
Application	For powder coating usage of refrigerator door /cabinet. For bottom plate of freezer / show case

# Prepainted / Printed Steel & Laminated Steel

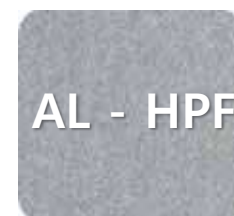
<b>Prepainted / Printed Steel</b>	
Thickness	0.35 mm ~ 2.3 mm (Sheet & Coil)
Width	500 mm ~ 1270 mm
Length	600 mm ~ 5000 mm
Slitting	Mill Edge / Slit Edge
Quality Availability	CQ, LFQ, DQ, DDQ
Standard	JIS G3312/3313
Application	Painted or Printed Steel which is normally being used for Refrigerator Door & Cabinet.

<b>Laminated Steel (PVC &amp; PET &amp; ALF)</b>	
Thickness	0.35 mm ~ 2.3 mm (Sheet & Coil)
Width	600 mm ~ 1,380 mm
Length	600mm ~ 5,000 mm
Slitting	Mill Edge / Slit Edge
Quality Availability	CQ, LFQ, DQ, DDQ
Standard	JIS G3312/3313
Application	Film Laminated Steel which is normally being used for Refrigerator Door (for Luxurious models)

# Prepainted / Printed Steel & Laminated Steel

## PRODUCT LINE-UP

### Coated Steel



### Color Steel







# Prepainted / Printed Steel & Laminated Steel



# Aluminum-coated Steel

<p>HOT DIP ALUMINUM COATED STEEL (Al : 87.6%, Si : 10%, Others : 2.4%) ASTM A525 (ASTM A463 CQ), EN10143, KS D 3544, JIS G3314 SGCC (CD)</p>	<table border="1" data-bbox="871 239 1387 394"> <thead> <tr> <th>Classification</th> <th>Al Coated Steel</th> <th>GI</th> </tr> </thead> <tbody> <tr> <td>100°C×24hr</td> <td>80%</td> <td>80%</td> </tr> <tr> <td>450°C×24hr</td> <td>80%</td> <td>15%</td> </tr> </tbody> </table> 	Classification	Al Coated Steel	GI	100°C×24hr	80%	80%	450°C×24hr	80%	15%
Classification	Al Coated Steel	GI								
100°C×24hr	80%	80%								
450°C×24hr	80%	15%								
<p style="text-align: center;">Special Feature</p>	<p style="text-align: center;">Applied items</p>									
<p>Hot-dip aluminum coated steel sheet combines the mechanical properties of cold Rolled steel sheet with aluminum's high resistance retention, heat reflection and superior rust resistance</p>	<ul style="list-style-type: none"> <li>Automotive components : muffler, exhaust pipes, fuel tanks</li> <li>Heating equipment : heat exchanger, stovepipe, pre-heater, dryer, duct.</li> <li>Construction : Walls and roofs of chemical factories, fireproof wall</li> <li>Home Electrical Appliances : Electric stove, gas range, bread machine, electric stove, toaster, frying pan, dryer Others : Steam cover, other chemical equipment</li> </ul>									

# Stainless Steel

	<p style="text-align: center;">Classification</p>		<p style="text-align: center;">Possible Production Scope</p>	
	<p style="text-align: center;">Type of Steel</p>		<p>301(L), 304(L), 304J1, 316(L), 321 409L,410, 420J1(J2), 430, 430J1L(CuN), 434, 436L, 444, 445M2</p>	
	<p style="text-align: center;">Surface</p>		<p style="text-align: center;">BA Finish</p>	<p style="text-align: center;">BB Finish</p>
	<p style="text-align: center;">Dimension (mm)</p>	<p style="text-align: center;">T</p>	<p style="text-align: center;">0.1~1.5mm</p>	<p style="text-align: center;">0.2~1.5</p>
		<p style="text-align: center;">W</p>	<p style="text-align: center;">Max. 805mm</p>	<p style="text-align: center;">Max. 1145mm</p>
<p style="text-align: center;">L</p>		<p style="text-align: center;">Min. 270mm ~ Max. 5000mm (Sheet)</p>		

# Aluminum Sheet & Coil and Embossed

## Aluminum Sheet & Coil

Product	Alloy	Temper	Thickness mm	Width mm	Length mm	Remark
Aluminium Sheet	1145 1235	H18 H16	0.2-4.0	600-1200	1000-3000	
	1035 1100					
	1200 3A21	H14 H24				
	3003 3103					
1050 1060	H22 O					



Product	Alloy	Temper	Thickness mm	Width mm	I.D mm	Re
Aluminium Coil	1070 1060 1050 1145	H18 H24	0.1-6.0	600-1700	Φ500	Without 'edge sheared
	1235 1035 1100 1200					
	3A21 3003 3103 8011	H14 H24				
	DS-1 DS-2 DS-3					



## Aluminum Embossed

Alloy	Temper	Specification (mm)			
		Base material thickness	Width	Length	Embossed depth
1070 1060 1050 1200 3A21	H14	0.30-1.5	≤1300	depending on the user's demands	0.08-0.25

Re : Customer's requirements about Alloy Temper specification is available





**Plastics for Refrigerator & Other Home Appliances**

**Extrusion ABS & Extrusion HIPS**

**High impact strength GPPS**

**SAN / EPS / PC / P.P / PBT / MPPE**

**PolyAcetal (POM)**

**PVC Compounds**

**Foam Materials (Cyclopentane / Polyol System / MDI)**

**PE compound – XLPE / Adhesive resin**

# Plastics for Refrigerator

## - Refrigerator

**“WATER DISPENSER”**  
**FX-0760, XP-4240(ABS)**  
(Thermal conductive,  
Good Process ability)

**“HANDLE”**  
**GR-4020(ABS)**  
(Extrusion ability,  
Good appearance)

**“HANDLE Supporter”**  
**HG-0760H(ABS)**  
**SD-0150(ABS)**  
**FX-0760(ABS)**  
(Metallic color,  
Good appearance)

**“DOOR CAP”**  
**HG-0760GP(ABS)**  
(High Impact strength,  
High Gloss)  
**HG-0760H(ABS)**



☐ Inside applications

**HG-0760H (ABS)**  
(High Flow,High Impact,  
Transparency)  
**AS-0151(ABS)**  
(Anti-static, High impact strength)



☐ Outside applications

**“LINER”**  
**EM-0181(ABS)**  
(High Gloss,  
Good process ability,  
Down gauging)  
**SV-0157(ABS)**  
**QU-0191S(ABS)**

**“COVER DUCT”**  
**“GUARD DAIRY”**  
**HG-1760FS(HIPS)**  
**HR-1360H(HIPS)**

**“TR CASE”**  
**HF-5661(SAN)**  
(Excellent Transparency,  
Good surface)

**“DRAWER COVER”**  
**AS-0151(ABS)**  
(Anti-static,  
High impact strength)

# Plastics for Other Home Appliances

## - Washing Machine

**“TOP COVER”**  
**SR-0320(ABS)**  
 (High temperature & Good UV resistance)  
**HP-1001(ABS)**  
 (Good chemical resistance, Good dimensional stability)

**“ ”**  
**AB-0760H(ABS)**  
**NA-0760(ABS)**  
 (High gloss, Anti bacterial)

**“DOOR”**  
**MP-0670(ABS)**  
 (High impact resistance & strength, Easy etching)

**“DOOR COVER”**  
**“CONTROL PANEL”**  
**HG-0760GP(ABS)**  
 (High temperature & Good UV resistance)



**“CONTROL PANEL”**  
**HG-0760GP(ABS)**  
 (High temperature & Good UV resistance)  
**UT-0510T(T-ABS)**  
 (Excellent transparency, Good surface, Good coloring property)

## - Air Conditioner



**“BACK PANEL”**  
**HR-1360(HIPS)**  
 (Heat resistance, High impact strength)

**“CONTROL PANEL”**  
**VH-0815(FR-ABS)**  
 (Flame retardant, High thermal resistance)

**“FRONT PANEL”**  
**“GUIDE FILTER”**  
**HF-06601(ABS)**  
 (High melt flow index :3.7 at 200°c/5kg, High impact strength > Filter insert molding)  
**HG-1760SF(HIPS)**  
 (High gloss, Good process ability)

## - Vacuum Cleaner



**“HOUSING”**  
**AS-0151(ABS)**  
 (High temperature resistance, Anti static)  
**FX-0760(ABS)**  
 (Metallic color, Good appearance)

## - Air Cleaner



**“HOUSING”**  
**HG-0760GP(ABS)**  
 (High gloss, UV stability)  
**VE-0812(ABS)**  
 (Flame retardant)

## - Bidet



**“COVER”**  
**VE-0856AB(ABS)**  
 (Flame retardant)

# ABS / HIPS / SAN Material Line up

Starex	Type	Grade	Properties / Applications
Injection ABS	Standard	SD-0150W	High impact Resistance
		SD-0170	Ultra high impact ( <b>Air conditioner, Shoe hill</b> )
	High Flow	HF-0660IW	Good Flow ( <b>Vacuum cleaner, Phone receiver</b> )
	High Gloss	HG-0760H	High impact Resistance <b>(Door handle, Cover, Homebar dispenser, Vegetable box)</b>
		HG-0760GP	High impact Resistance, High Flexural Strength <b>(Housing for Home appliances)</b>
	Metal Plating	MP-0160R	Impact Resistance, High Flexural Strength <b>(Lamp housing, Handle of home appliances)</b>
	Transparent	UT-0510T	<b>Cover slide basket</b>
Extrusion ABS	Sheet for Liner using Cyclopentane , HFC134A	ST-series	Down gauging effect
		QT-series	Down gauging effect, Chemical Resistance
		QU-series	Down gauging effect, High TS
		EM-series	Down gauging effect , Crack free effect, Easy molding effect
	For HCFC141B	ES-series	Chemical Resistance
	For HFC245FA	EM-0181F	Chemical Resistance
HIPS & SAN	HIPS	HG-1760FS, HR-1360	Trim guard, Cover guide, Guard dairy, Cover guide, Case lamp, Cover duct Ref (High gloss)
	SAN	HR-5330, HF-5661	Vegetable box cover, Cover slide basket



# Extrusion ABS

## □ Characteristic of Extrusion ABS

### ★ Excellent Vacuum Forming

- Sheet thickness down, decrease rejection ratio during thermoforming

### ★ High Chemical Resistance

- Prevent crack caused by foaming agent

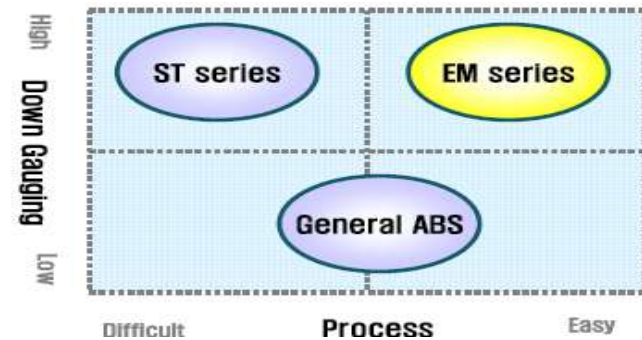
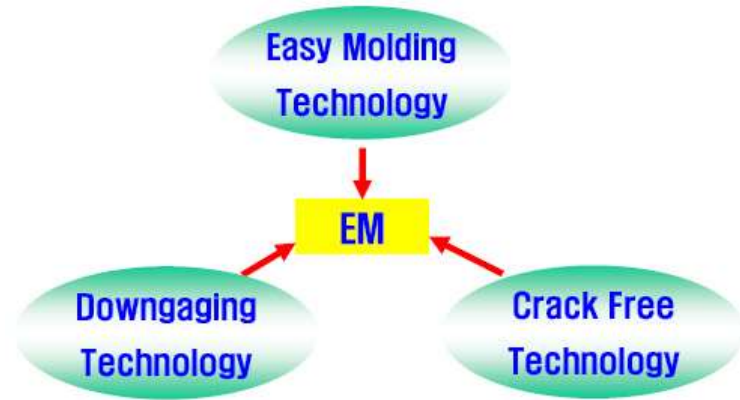
### ★ Well-balanced Mechanical Properties

- Prevent crack caused by mechanical force

### ★ Uniform Extrusion

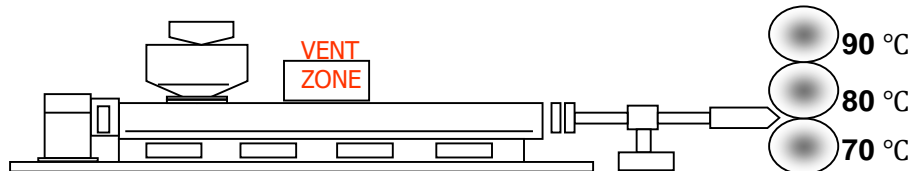
- Decrease the rejection ratio during both extrusion and thermoforming

### ★ Recycle & Non-Toxic



## □ Extrusion Condition

UNION 100 Ø- L/D 35



EM-0181 : 250°C, 6min

In spite of reduced pre-heating time, EM-0181 shows similar thickness. It makes the cycle time reduction possible

# Extrusion HIPS (H-835) SOLARENE®

We have tried to supply more benefit to your business with improved performance for many years. Now we introduce H 835 with improved stress crack resistance, rheological properties and processability required by the refrigerator liners.



H835 shows excellent anti-blowing agents properties. It means that you can reduce the thickness of sheet and allow the durability in a refrigerator liner concerning the attack of the aggressive blowing agents. The change of appearance after immersing in the blowing agents assures you why to use H 835.

Have an experience to meet the improved performance with Solarene® H 835

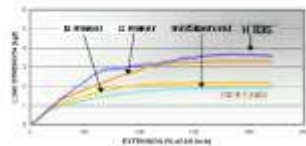
Better stress cracking resistance processability result in cost saving through downgauging less raw material, thinner liners. Also, H 835 have good adhesion with PUR foam used in refrigerator insulation



## Easy-processing

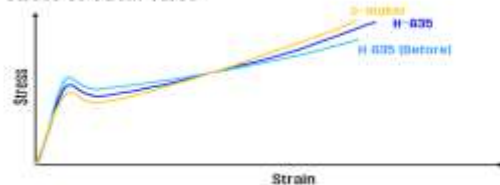
H 8350 can be more effectively processed, resulting in easy handling during extrusion & thermoforming.

### Hot Tensile Test (@130°C)



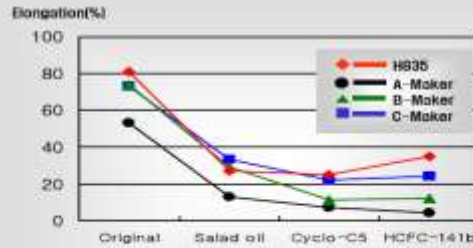
Through hot tensile test, the rheological characteristics (melt strength, elastic & plastic transformation) and thermoformability of the resin are able to be predicted.

### Stress vs Strain Curve



The HPS material with higher tensile break strength (larger difference between yield strength and break strength) more tenacious and resists chemicals. This enables the liner to be more uniformly thermoformed and reduced in thickness.

### Change of appearance



Test condition :  
 • at 23°C, 48hours  
 • immersed in oil  
 • released by C5 & 141b

## Comparison of Properties

Items	Unit	H835	A-Maker	B-Maker	C-Maker
Tensile st.	kgf/cm <sup>2</sup>	240	240	260	300
Elongation	%	75	55	80	80
Flexural st.	kgf/cm <sup>2</sup>	380	420	370	440
Flexural Modulus	kgf/cm <sup>2</sup>	18,200	19,000	18,700	18,300
Hardness (Rockwell)	L-Scale	50	55	50	65
Izod impact st.	kgcm/cm <sup>2</sup>	17	11	12	10
FDI	Joule	8	5	9	10
MFI (200°C, 5kg)	g/10min	3.4	3.6	3.8	2.2
VST (B/50)	°C	99	99.5	100	102

## Tensile Elongation Retention Ratio

### Chemicals & Conditions

Corn Salad Oil  
 : 50 min. Immersion at 23°C

Cyclo C5, HCFC 141b  
 : 50 min. Atmospheric (0.5 bar vapor pressure)

Test bars are exposed to chemicals as fixed on a constant stress jig.



### Procedures & Evaluation

- Tensile dumbbell specimens are prepared by injection molding.
- According to ASTM D 638 test method, the tensile elongation is measured for both specimen group exposed to chemicals and not.
- The tensile elongation retention ratio is calculated as follows:

$$ER \text{ ratio} = \frac{\text{Average elongation of specimens exposed to chemicals}}{\text{Average elongation of specimens not exposed to chemicals}} \times 100(\%)$$

Average elongation and tensile strength of specimens exposed to chemicals is also considered as a absolute ESCH index.

## Surface Blister



Like above tensile test, specimens are immersed in HCFC 141b, CFC 11, and cyclo-Pentane fixed on a constant stress jig for 10 sec. and are inspected after drying.

## Sheet extrusion

ITEMS		Temperature
Cylinder	C1	170 ~ 190°C
	C2	180 ~ 200°C
	C3	180 ~ 200°C
Adapter		180 ~ 200°C
Die		180 ~ 200°C
Chill roll	Top	40 ~ 80°C
	Middle	40 ~ 70°C
	Bottom	40 ~ 60°C

## Thermoforming

Heater Temp. [°C]	Heating Time (sec)	Sheet Temp. [°C]	Blowing Time (sec)	Mold Temp. [°C]
350~500	20~60	130~160	1~5	40~60

# High Impact Strength GPPS SOLARPOL®

DONGBU SOLARENE® High Strength PS G-116 HV series are high molecular, heat resistant, crystal polystyrene used where high strength is required. SOLARENE G-116 HV is designed to give enhanced fracture resistance as well as high strength, improved moldability over conventional crystals.

DONGBU SOLARENE G-116 HV series have enhanced fracture resistance (high stiffness & toughness), which enables the grade to be applied to electronic components such as light diffusion plate, refrigerator parts, etc and alternatives to some SAN resins.

## Characteristics:

- High mol. weight
- High heat resistance
- Good moldability
- Enhanced toughness
- Excellent clarity
- Low volatiles

## Processing:

- Extrusion
- Molding

## Applications:

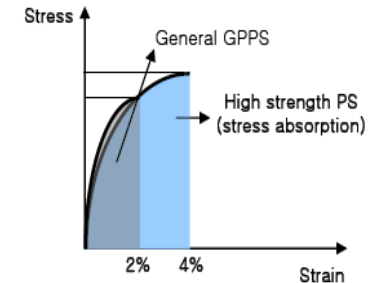
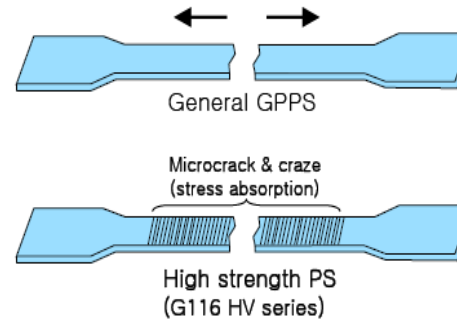
- Extrusion sheets (Light diffusion plate)
- XPS insulation board, Foamed trays, OPS
- Refrigerator trays
- Alternative to a SAN.

## Typical properties of SOLARENE G-116 series:

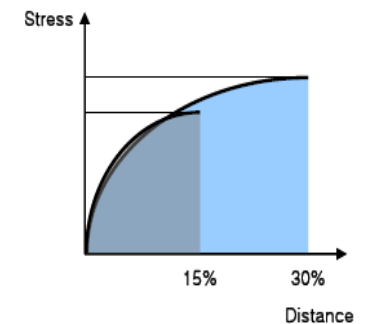
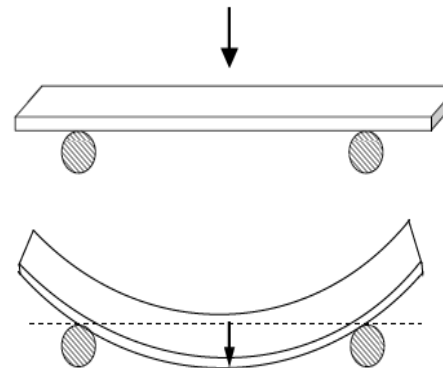
Properties	Conditions	Unit	Test method	G-116 series	
				G-1160 HV	G-1161 HV
<b>Rheological</b>					
Melt Flow Index	200°C, 5kg	g/10min.	ASTM D 1238	1.3	2.0
<b>Optical</b>					
Transparency	3mmt	%	Dongbu method	90	90
Haze	3mmt	%	Dongbu method	0.5	0.5
<b>Thermal</b>					
Vicat Softening Point	B/50	°C	ASTM D 1525	105	101
HDT (Unannealed)	1.8 MPa	°C	ASTM D 648	85	80
<b>Mechanical</b>					
Tensile Strength	50mm/min.	kg/cm <sup>2</sup>	ASTM D 638	580	570
Elongation	50mm/min.	%	ASTM D 638	3	3
Flexural Strength	3.2mm	kg/cm <sup>2</sup>	ASTM D 790	1,100	1,000
Flexural Modulus	3.2mm	kg/cm <sup>2</sup>	ASTM D 790	33,000	33,000
Izod Impact Strength	Notched	kg·cm/cm	ASTM D 256	2.0	2.0
Rockwell Hardness	L scale	-	ASTM D 785	102	101
<b>Flammability</b>					
Flammability	1.6 mm	-	UL 94	HB	HB
<b>Processing Conditions</b>					
Melt temp. (Injection)	-	°C	-	180 ~ 260	
Mold temp. (Injection)	-	°C	-	10 ~ 60	
Melt temp. (Flat film)	-	°C	-	210 ~ 240	

\* Above data are typical values and intended to serve as guide only, not as specification limits.

## Tensile test









## Flexural test



The high stress & shock absorption characteristics of DONGBU SOLARENE G-116 HV series allows parts produced with this resin to be durable (dimensional stability).

# SAN / EPS / P.P / PC / PBT / MPPE

<p><b><u>SAN</u></b></p> 	<p><b><u>EPS</u></b></p> 	<p><b><u>P.P</u></b></p> 
<p>The SAN resin is copolymer of Acrylonitrile(AN) having chemical resistance and Styrene(SM) of processability, and shows excellent tensile strength, flexural strength, impact resistance, creep resistance, wear resistance, and chemical resistance compared with GPPS. And it is used for electric and electronic parts, automobile, and industrial machinery, etc  <a href="#">SAN</a>, <a href="#">SAN/GF</a></p>	<p>The EPS resin, produced by suspension polymerization, is divided into flame retardant, general-purpose and low foaming products by purpose. EPS products are manufactured through a processing procedure that includes preliminary foaming, digestion and molding, and it is lightweight, retentive of warmth, impact-resistant and of good processability. It is widely used in adiabatic materials, impact-absorbing packaging materials, fishery box, Robot tray and special.  <a href="#">Flame Retardant, General, Low Pentane and Other Categories.</a></p>	<p>It has properties such as hardness, slippery, softness, flexibility, non-rusting, easy to shape and color, etc.  <b>HOMOPOLYMER</b>                      -Injection - households, crate, syringe, outdoor chair, etc                      - Yarn - woven bag, rope, fishing net, etc                      - Extrusion - packaging film, pipe, etc                      - Fiber - carpet, diaper, non-woven fabric, etc  <b>BLOCK COPOLYMER</b>                      -battery case, outdoor chair, pail drum, etc  <b>RANDOM COPOLYMER</b>                      food container, sheet, stationery file, hot water pipe, etc</p>
<p><b><u>PC</u></b></p> 	<p><b><u>PBT</u></b></p> 	<p><b><u>MPPE</u></b></p> 
<p>The PC is a Polycarbonate resin with excellent impact strength, heat-resistance and dimensional stability, that is widely used in electric and electronic products, precision equipments, automobile, medical instruments and household.</p>	<p>Among various engineering plastics, PBT (Polybutylenterephthalate) resin is a crystalline resin with particularly excellent heat-resistance, chemical-resistance and electrical characteristics in combination with a fast crystallization speed. Thus it is known as the most balanced resin of good material property for a short molding cycle, weatherability, friction resistance, wear-resistance, dimensional stability and heat-resisting aging and economic evaluation.</p>	<p>Modified polyphenylene ether(MPPE) is an alloy of high impact polystyrene(HIPS) and polyphenylene ether(PPE) which is also called as polyphenylene oxide(PPO). staren MPPE(modified Poyl(phenylene ether)) is available in general heat resistant, flame retardant and heat resistant, general glass fiber reinforced, and flame retardant glass fiber reinforced grades.</p>

# PolyAcetal (POM)

## Poly-Acetal (POM)



The resin is highly crystalline, and has a great combination of toughness and rigidity. It is also resistant to fatigue, creep, and to abrasion thanks to its property of self-lubrication..

Automotive	Engine/Fuel parts	Radiator drain cock Water valve body Fuel tank cap Carburetor parts Gas control valve
	Electric parts	Heater fan Heater control lever Air controller valve
	Interior parts	Door handle Door lock Sun visor bracket Seat belt parts
	Exterior parts	Out door handle Door lock
	Other parts	Oil tank check valve Speed meter parts Fastener, Clip Ball joints
Electronic	Tape recorder VTR Cassette tape player Personal computer parts Facsimile	
Machinery	Vending machine Bicycle Clock Camera Optical machine	
Misc.	Lighter case Spray nozzle Pencil cap Fastener Toy parts Pipe binding Fluid gage	

# PVC Compounds

## Soft PVC



- **G series** apply in refrigerator gaskets that are suitable for refrigerator interior liners.
- **SG series** apply in general gaskets that are suitable for sealing glasses in the window frames and for preventing outside air from inflowing.

Product			G Series			SG Series	
Test items	Test method (ASTM)	Unit	105	107	112	101	103
1. Specific gravity	D792	-	1.22	1.24	1.26	1.26	1.26
2. Hardness	D2240	Shore A	61	67	70	67	68
3. Tensile strength	D638	kg/cm <sup>2</sup>	100	145	150	120	140
4. Elongation	D638	%	290	330	355	290	330
5. Brittleness temperature	D746	°C	-35	-28	-28	-32	-34

## Rigid PVC



- **PR series** for general rigid extrusion molding products are used for a furniture panel, photo frame, refrigerator door frame, and outdoor building materials.
- **SH series** for air conditioner curtains seal spaces.

Product			PR Series			SH Series	
Test items	Test method (ASTM)	Unit	123	130	151R	131R	130
1. Specific gravity	D792	-	1.43	1.44	1.48	1.49	1.27
2. Hardness	D2240	Shore D	80	76	80	82	-
		Shore A	-	-	-	-	68
3. Tensile strength	D638	kg/cm <sup>2</sup>	450	440	465	470	130
4. Elongation	D638	%	130	95	50	70	310
5. Flexural strength	D790	kg/cm <sup>2</sup>	750	710	760	860	770
6. Flexural modulus	D790	kg/cm <sup>2</sup>	32,900	30,500	34,500	36,100	-
7. Izod impact strength	D256	kg·cm/cm	10	90	10	5	-
8. V.S.P.(1kg load)	D1525	°C	92	90	90	89	-

# Cyclopentane / Polyol System / MDI

Material	SPECS	Packing																																								
<p><b>Cyclopentane</b></p>	<p><b>Description</b></p> <p>Cyclopentane is a volatile liquid. As it has low reactivity and low boiling point, it is used as blowing agent.</p> <p>HS Code : 2902-19-0000</p> <p><b>Specification</b></p> <table border="1" data-bbox="415 464 1483 649"> <thead> <tr> <th>Item</th> <th>Specification</th> <th>Unit</th> <th>Test Method</th> </tr> </thead> <tbody> <tr> <td>Specific Gravity, 15.56/15.56°C</td> <td>0.738~0.758</td> <td></td> <td>ASTM D4052</td> </tr> <tr> <td>Appearance</td> <td>Colorless</td> <td></td> <td>Visual</td> </tr> <tr> <td>Odor</td> <td>Like a Gasoline</td> <td></td> <td></td> </tr> <tr> <td>Aromatic Content</td> <td>Max. 5</td> <td>vol-%</td> <td>G.C</td> </tr> <tr> <td>Purity</td> <td>Min. 95</td> <td>wt-%</td> <td>G.C</td> </tr> </tbody> </table>	Item	Specification	Unit	Test Method	Specific Gravity, 15.56/15.56°C	0.738~0.758		ASTM D4052	Appearance	Colorless		Visual	Odor	Like a Gasoline			Aromatic Content	Max. 5	vol-%	G.C	Purity	Min. 95	wt-%	G.C	<p>16.7 Tons ISO Tank or 148kgs Steel Drum</p>																
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<p><b>Polyol System</b></p>	<p>Rigid PU foam is used for refrigerator, reefer container, insulation materials, tank insulation, insulation double pipe, cool air warehouse because it has strength in heat-insulation, magnetic, light weight, simplicity of production and diversity comparing to other heat-insulation materials.</p> <table border="1" data-bbox="426 802 1483 1001"> <thead> <tr> <th>Series</th> <th>Usage</th> <th>Density (kg/m<sup>3</sup>)</th> <th>Property</th> <th>System Name</th> <th>TDS</th> <th>MSDS</th> </tr> </thead> <tbody> <tr> <td>KIF-3000</td> <td>System for refrigerator</td> <td>22~24</td> <td>c-Pentane system</td> <td>KIF-3023CF</td> <td></td> <td></td> </tr> <tr> <td rowspan="2">KIF-3600</td> <td rowspan="2">SHOW CASE</td> <td>22~23</td> <td>HCFC-141b</td> <td>KIF-3601</td> <td></td> <td></td> </tr> <tr> <td>25~26</td> <td>system</td> <td>KIF-3602</td> <td></td> <td></td> </tr> </tbody> </table>	Series	Usage	Density (kg/m <sup>3</sup> )	Property	System Name	TDS	MSDS	KIF-3000	System for refrigerator	22~24	c-Pentane system	KIF-3023CF			KIF-3600	SHOW CASE	22~23	HCFC-141b	KIF-3601			25~26	system	KIF-3602			<p>200kgs Drum</p>														
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<p><b>Crude MDI (Isocyanate)</b></p>	<table border="1" data-bbox="426 1045 1543 1346"> <thead> <tr> <th>Appearance</th> <th colspan="4">Brown liquid</th> </tr> </thead> <tbody> <tr> <td>NCO content</td> <td>31 ± 0.5</td> <td>wt. %</td> <td colspan="2">ASTM D 1638-74</td> </tr> <tr> <td>Viscosity at 25 °C</td> <td>200 ± 30</td> <td>cps</td> <td colspan="2">DIN 51 550</td> </tr> <tr> <td>Density at 25 °C</td> <td>1.23</td> <td>g/cm<sup>3</sup></td> <td colspan="2">DIN 51 757</td> </tr> <tr> <td>Acidity as HCl</td> <td>less than 0.1</td> <td>wt. %</td> <td colspan="2">ASTM D 1638-74</td> </tr> <tr> <td>Total chlorine</td> <td>less than 0.5</td> <td>wt. %</td> <td colspan="2">ASTM D 1638-74</td> </tr> <tr> <td>Vapor pressure at 25 °C</td> <td>less than 10<sup>-4</sup></td> <td>mbar</td> <td colspan="2">-</td> </tr> <tr> <td>Flash point</td> <td>Above 200</td> <td>°C</td> <td colspan="2">DIN ISO 2588</td> </tr> </tbody> </table>	Appearance	Brown liquid				NCO content	31 ± 0.5	wt. %	ASTM D 1638-74		Viscosity at 25 °C	200 ± 30	cps	DIN 51 550		Density at 25 °C	1.23	g/cm <sup>3</sup>	DIN 51 757		Acidity as HCl	less than 0.1	wt. %	ASTM D 1638-74		Total chlorine	less than 0.5	wt. %	ASTM D 1638-74		Vapor pressure at 25 °C	less than 10 <sup>-4</sup>	mbar	-		Flash point	Above 200	°C	DIN ISO 2588		<p>250kgs Drum</p>
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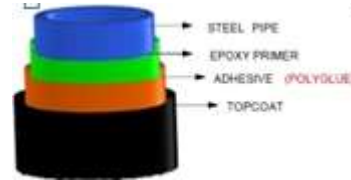
# PE compound - Adhesive Polyolefin

## Application of POLYGLUE



### Steel Pipe Coating ( PP & PE )

Structure  
Steel / Epoxy / Polyglue / Top coat (PE or PP)  
Grade  
LE149V / LE200T / LE851P / RE340B  
Application  
Anti-corrosion steel pipe for oil & gas transportation

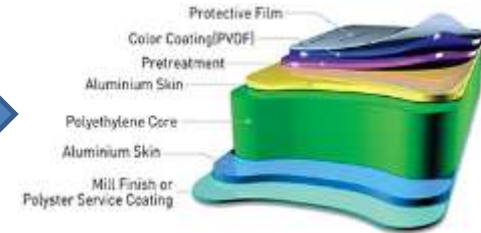


### For PPR pipe



### Aluminum Composite Panel

Structure  
Aluminum / Polyglue / PE/Polyglue / Aluminum  
Grade  
LE102T / LE149V / GE310PL / GE300N / VE750S  
Application  
Interior & exterior decoration panel for construction



### Aluminum Composite Pipe

Structure  
PE or PP / Polyglue / AL / Polyglue / PE or PP  
Grade  
LE102T / LE200T / RE160 / GP420P etc.  
Application  
Hot & cold water pipe for drinking or heating

### Multi-layer Film & Bottle etc.

Structure  
PE or PP / Polyglue / Nylon or EVOH etc.  
Grade  
LE320V / RE340B / HB530  
Application  
Food packaging / Agrochemical bottle / Cosmetics tube & etc.



### Coupling Agent

Grade  
GE200C / GP820M / GN210M / GV230C  
Application  
Coupling agent (FR / Mineral Filler / Wood composite)



# PE compound - Crosslinkable PE – PEX-B

## Polylink® - Crosslinkable PE(Pipe)

Drinking water pipe, floor heating pipe,  
Aluminum composite pipe



### The advantage of POLYLINK®

We developed various kinds of POLYLINK which have different Melt flow index and density to satisfy customer' demands (gloss, flexibility, surface smoothness, processability, etc.)

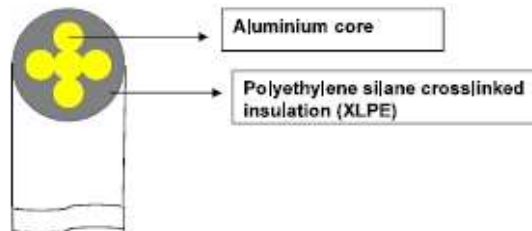
Applications

- >XP650 : Aluminum composite pipe, floor heating and drinking water pipe
- >XP460 : Improved flexibility from XP670
- >XP690 : Improved surface quality from XP670 (More gloss)
- >XL120 : Low voltage wire/cable insulation
- >XL120R : Increased line speed from XL120 (High flow)

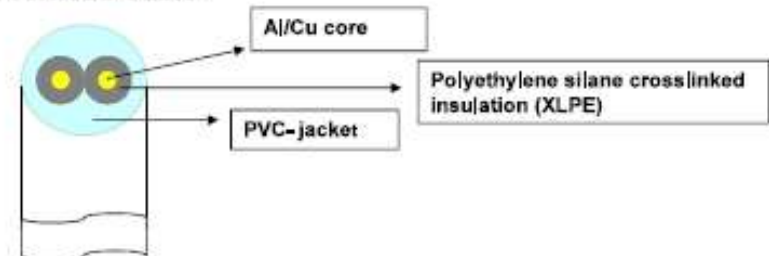
## Crosslinkable PE(Cable)

### Application - Cable Elements

For below 1 KV (Low Voltage Cable)



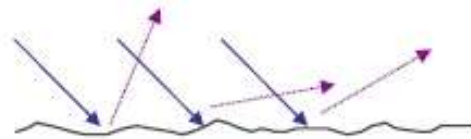
For insulated Overhead Cable



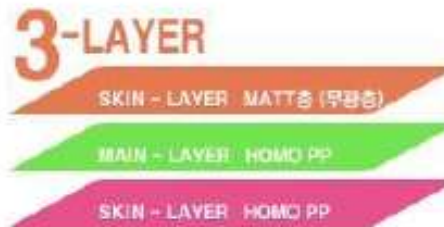
# PE compound - Matt Composite

## i-Lux<sup>®</sup> - Matt composite -

Matt surface is created through a scattered reflection on a rough surface



Matt !



### Main Use

- Covers of publications (Books, Magazines, Catalogues)
- Packaging-related Product (Food, Candy, Medicine, Toy, CD, Cosmetics, Shopping bags)
- Commercial Prints (posters, Calendars, Catalogues)
- Matt Transcription, Synthetic Paper Skin



# PE compound – Plamer® & Brespol®

## Plasmer® for Automobile application

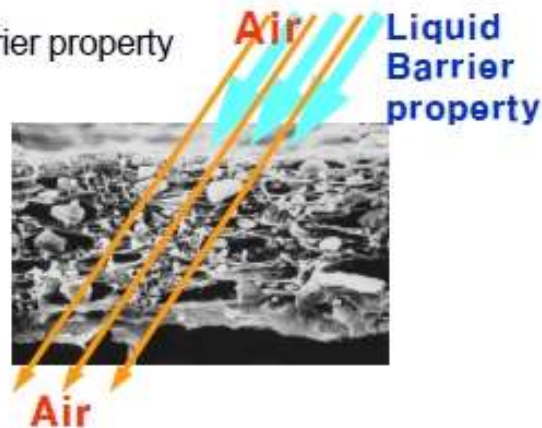
- |                   |                       |
|-------------------|-----------------------|
| ● Air bag cover   | ● Interior Skin Sheet |
| ● Air intake hose | ● Glass run           |
| ● Dust cover      | ● Cowl top strip      |
| ● Bus mold cover  | ● Cable protector     |



## Brespol® - Breathable Compound -

Baby diapers, surgical gowns, etc

Soft touch, Barrier property  
Against liquid





# Components

---

**Compressor**

**Control Board**

**Copper & Steel Tubes**

**Evaporator & Condenser**

**Heater / Bimetal & Thermal fuse**

**Fan motor & Blade**

**Thermostat & Damper & Defrost timer**

# Compressor

## H Series

Ultra-efficient, low noise, low vibration and wide cooling capacity range, good matching. Using refrigerant R600a, R134a and R290, the cooling capacity range is from 80W to 410W.

## C Series

Ultra-small installation space, cost-effective, low noise and low vibration. Using refrigerant R600a and R134a, the cooling capacity range is from 50W to 140W.



## E Series

Reliable structure, easy starting and wide voltage operation. Using refrigerant R600a, R134a and R290, the cooling capacity range is from 50W to 210W.

## X Series

Ultra-small form factor, wider speed range, low noise and low vibration. Using refrigerant R600a, the cooling capacity range is from 40W to 220W.

## Light Weight Series

Ultra-high cooling capacity, good overload capability, suitable for light commercial product. the cooling capacity range is from 480W to 2000W.



## F Series

Medium efficiency, economy high efficiency, low noise and low vibration. Using refrigerant R600a, the cooling capacity range is from 50W to 140W.

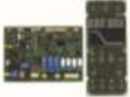

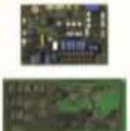



## V Series

Ultra-efficient, low noise, low vibration, good overload capability and ultra-low installation height. Using refrigerant R600a and R290, the cooling capacity range is from 40W to 280W.

## Y Series

Low installation space, cost-effective, low noise and low vibration. Using refrigerant R600a, the cooling capacity range is from 50W to 96W.



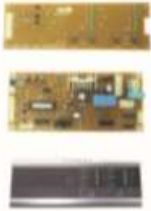


## System Controller for Commercial Refrigerator of Special Purpose

System Controller	Item	Spec (Dimension)	Product
	Blast Chiller	Main : 200×139 Display : 241×102	
	Dough Conditioner	Main : 200×140 Display : 281×127	
	Extreme Low Temperature / Medical Purpose	Main : 235×150 Display : 149×55	

System Controller	Item	Spec (Dimension)	Product
	Kimchi	Main : 180×100 Display : 168×95	
	Ice Cream / Bakery	Main : 180×130 Display : 151×47	
	Chocolate	Main : 138×115 Display : 106×49	

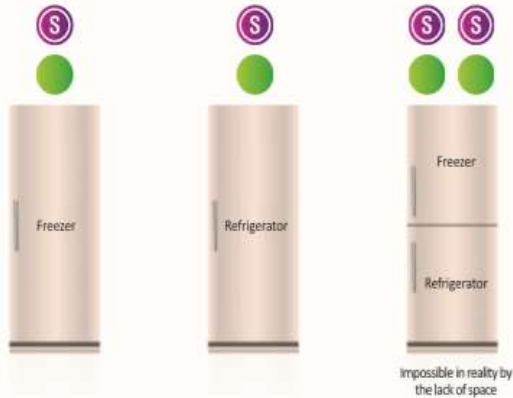


# Control Board

System Controller	Item	Spec (Dimension)	Product
	Tuna / Multi-purpose	Main : 171x52 DISPLAY : 179x59	
	Meat Broth	Main : 180x78 Display : 190x60	
	Slushie	Main : 220x70 Display : 170x65	

System Controller	Item	Spec (Dimension)	Product
	Backbar	Main : 185x80 Display : 105x30	
	Ice Maker	Main : 140x120 Display : 130x40	

## System(500L) Applied with General-purpose Controller [ One Controller, One Compressor ]



- Large Compressor(1hp)
- Medium Compressor(1/2hp)
- Small Compressor(1/4hp)
- General-purpose Controller
- Dedicated Controller
- Stepping Motor
- Additional Customized Functions

Compressor Price(USD) for Each Capability(hp)					Necessary Capability(hp) by Each Size of Refrigerator			
hp	1/8	1/4	1/2	1		500L	1100L	1700L
Price	15	20	30	200	Freezer	1/3	2/3	1
					refrigerator	1/4	1/2	1

## System(500L) Applied with Dedicated Controller (One Controller, Multi Compressors)



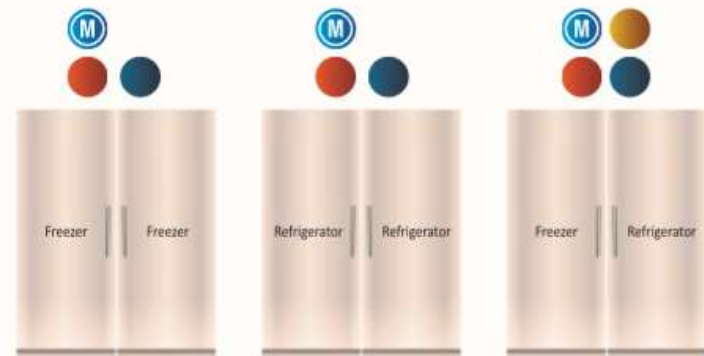
### Comparison of Total Cost(USD, EA)

Parts	General-purpose Controller			Dedicated Controller		
	Unit Price	Quantity	Total	Unit Price	Quantity	Total
Small Compressor	20	2	40	20	1	20
General-purpose Controller	20	2	40			
Dedicated Controller				30	1	30
Stepping		0		20	1	20
The Other Key Parts for Cooling Cycle	50	2	100	50	1	50
Additional Function	-	-	-	0 <sup>***</sup>	1	0 <sup>***</sup>
<b>Total</b>			<b>180</b>			<b>120<sup>***</sup></b>

## System(1100L) Applied with General-purpose Controller (One Controller, One Compressor)



## System(1100L) Applied with Dedicated Controller (One Controller, Multi Compressors)



Comparison of Total Cost(USD, EA)

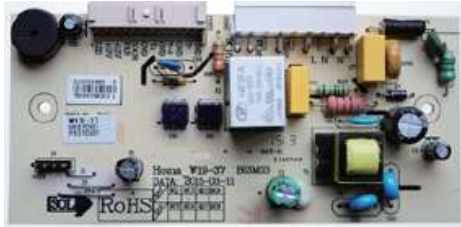
Parts	General-purpose Controller		
	Unit Price	Quantity	Total
Small Compressor	20	2	40
General-purpose Controller	20	2	40
Stepping		0	
The Other Key Parts for Cooling Cycle	50	2	100
Additional Function	-	-	-
<b>Total</b>			<b>180</b>

Comparison of Total Cost(USD, EA)

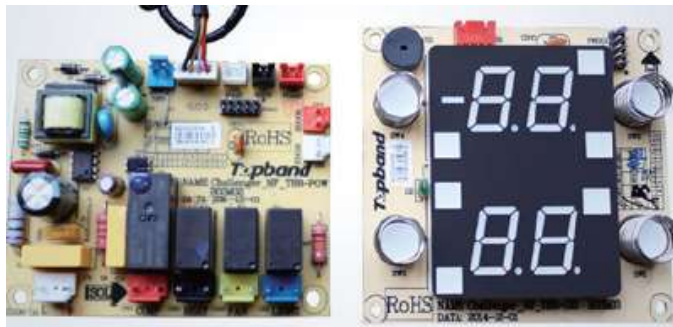
Parts	Dedicated Controller		
	Unit Price	Quantity	Total
Medium Compressor	30	1	30
Dedicated Controller	30	1	30
Stepping	20	1	20
The Other Key Parts for Cooling Cycle	70	1	70
Additional Function	0~∞	1	0~∞
<b>Total</b>			<b>150~∞</b>

## Refrigerator controller

### E- thermostat for refrigerator



- Our customers score top ratings in energy labeling using energy saving controls with integrated defrost functions controlled by time and temperature.

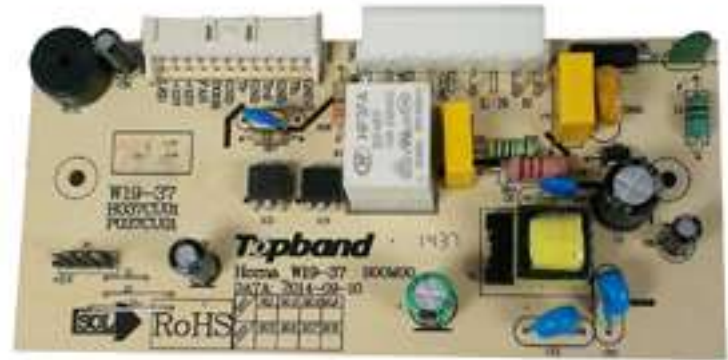


- For single fridges and freezers or combos
- Single or dual compressors
- Defrost mechanism time controlled or heated

# Controller

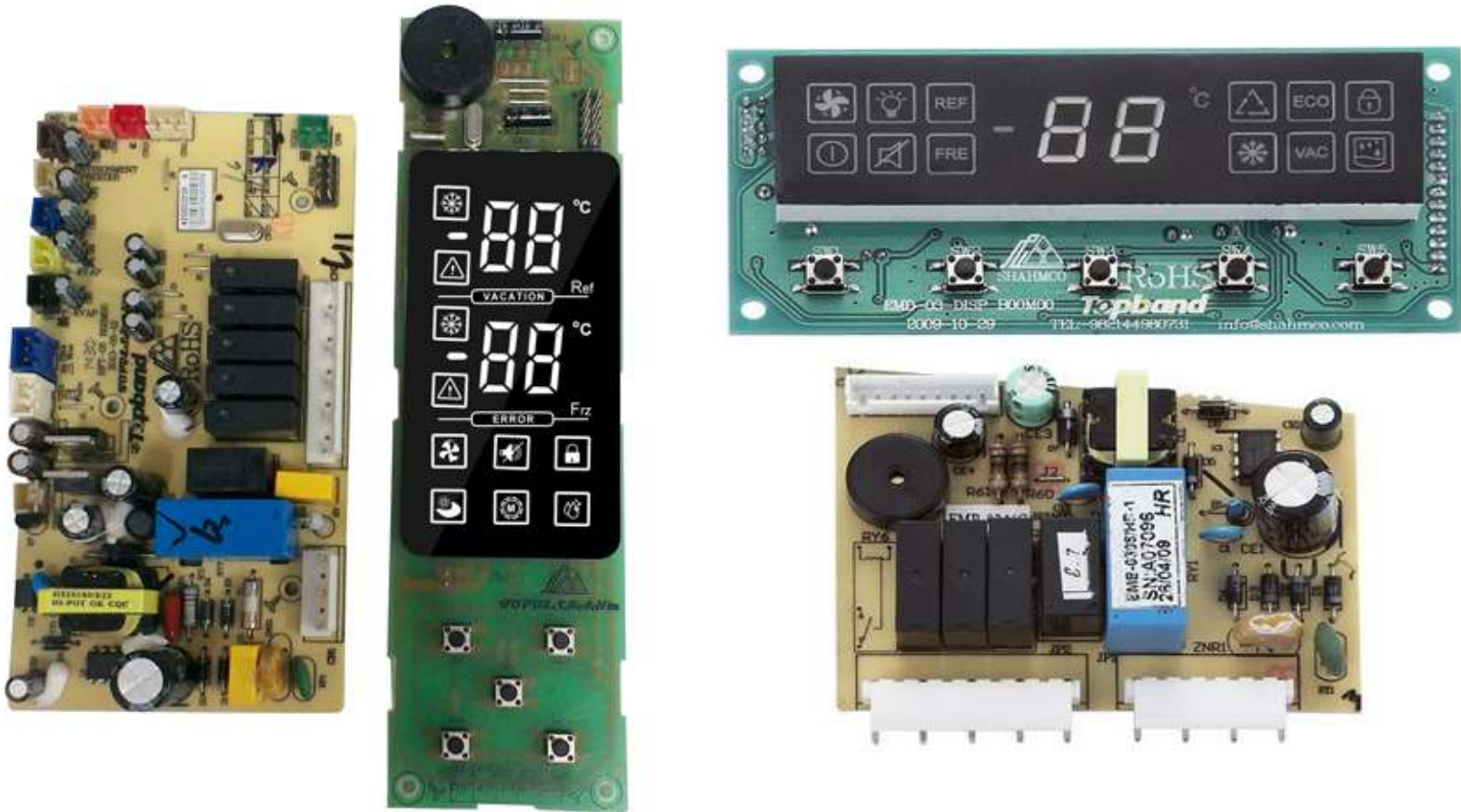
Refrigerator controller  
with single cycle and  
single system

Non-frost  
three door/ four door  
refrigerator controller



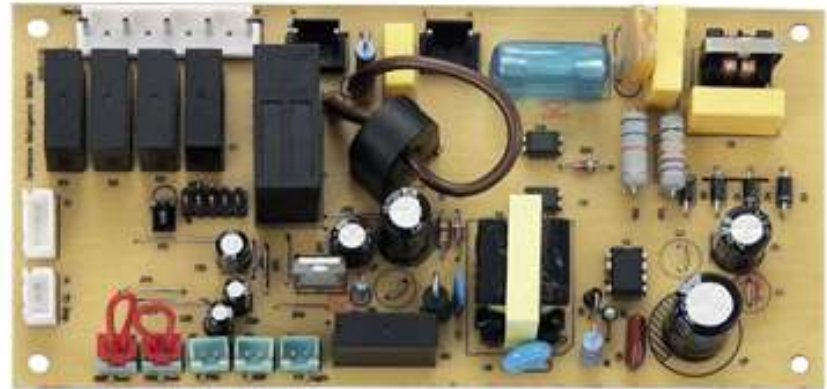
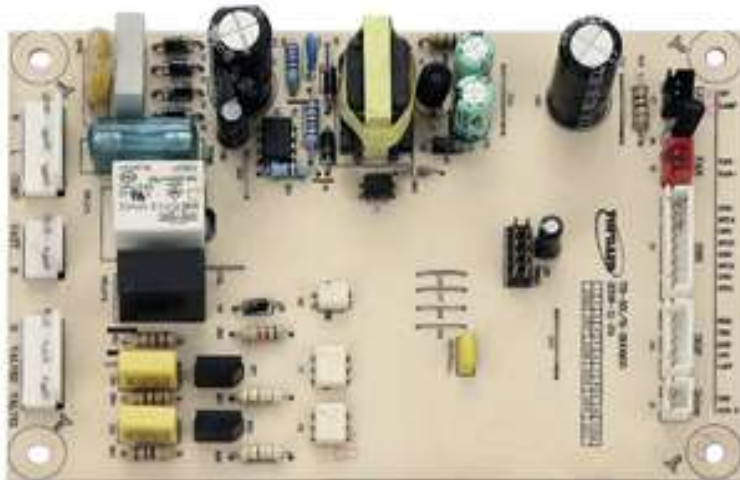
# Controller

LED display Refrigerator controller of multi cycle control system



# Controller

TN Segment LCD display controller



# Controller

Blue light LED Multi door  
frost free refrigerator  
controller



White light LED Multi door  
frost free refrigerator  
controller





# Copper & Steel Tubes

**Copper Tube**

**Capillary Tube**

**Connector Tube**

**Single/Double Wall Steel Tube**

**Electric Welded Steel Tube**

**Continuous Zinc and PVF Coating**

**Suction pipe**

**Heat exchanger**



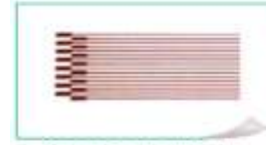
Cut Ends



Punch Sealed Ends



Caulked and Pinch Sealed Ends



Cap Sealed Ends



Beaded Ends



Level Wound Coil



Pancake Copper Tube



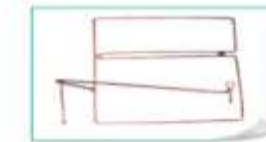
Capillary Tube (L/W)



Tin - Plated Capillary Tube (Thermostat)



Expand pipe



HOT PIPE



HOT PIPE



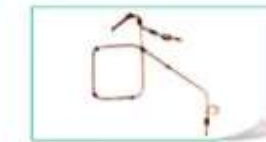
Connect pipe



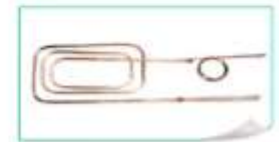
Connect pipe



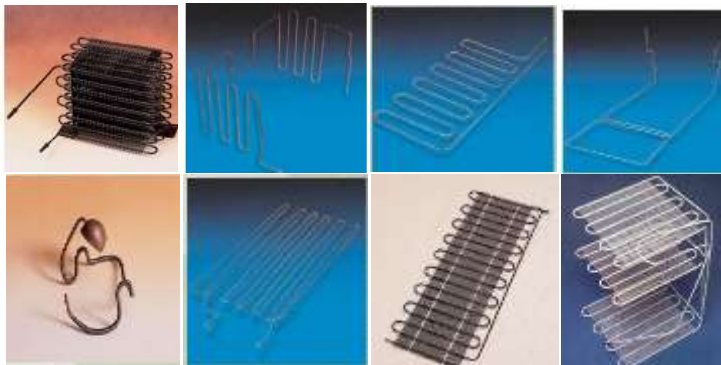
Suction ASS'Y



Suction ASS'Y



Suction ASS'Y



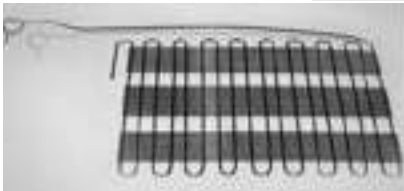
# Evaporator & Condenser

Fin type Evaporator

Roll bond type Evaporator

Condenser

Condenser



Fin Cross type



Side by Side type



Canted type



Top mount type Bottom freezer type



## 1) General Introduction

The latest model Fin Evaporator with high efficiency. Super Cleanness for R134a Refrigerant. Acknowledged of ISO-9001 in Evaporator

## 2) Characteristics (Super Clean Evaporator)

With independent fins adopted, the high efficient heat capacity is achieved. With tube expansion system adopted, more tight contact between fins and tubes for higher efficiency is achieved. Pitches of fins can be freely engineered

Roll Bond type

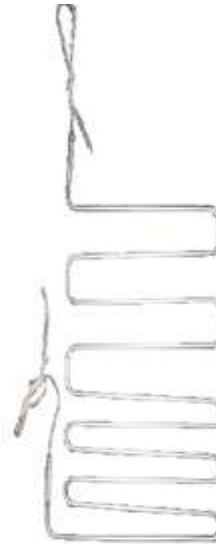


# Heater and Bimetal & Thermal Fuse

## Heater

### AL-TUBE HEATER

AL-Tube is included the silicon heater.  
 External appearance is solid and made freezer's ice and frost  
 to liquidizing for optimum cooling efficiency.  
 Application : Heater for removing frost



### GLASS TUBE HEATER

Heat thermal efficiency, heat proof is very good  
 to use for electric heater and refrigerator's defrost heater  
 because glass heater has quick response of heat generation



### PVC HEATER

PVC Cord Heater to Al-Foil by heating process, welded.  
 Application : Refrigerator, Automobile seat etc.



## Bimetal & Thermal Fuse



# Fan Motor & Blade

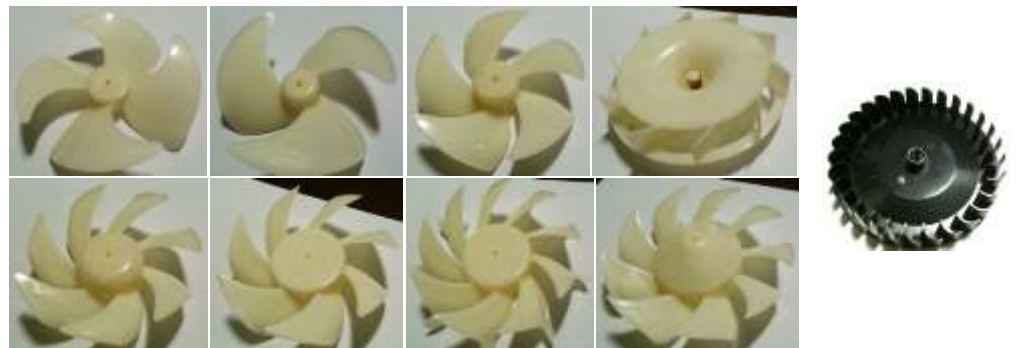
Refrigerator motor  
for Evaporation  
Refrigerator motor  
for condenser cooling  
Air conditioner motor  
Drain pump motor  
Vacuum cleaner motor  
Dish washer motor  
Air cleaner motor

## AC Motors



Ø90, CW, 4wings  
Ø90, CCW, 5wings  
Ø95, CW, 29wings  
Ø100, CW, 4wings  
Ø100, CCW, 7wings  
Ø110, CCW, 3wings  
Ø110, CCW, 4wings  
Ø110, CCW, 7wings  
Ø110, CCW, 9wings  
Ø110, CCW, 10wings  
Ø146, CCW, 3wings  
Ø150, CCW, 5wings

## Blades



# Thermostat & Damper & Defrost timer

- Thermostat
- Push buttonThermostat
- CCI Thermostat
- Damper Thermostat
- Defrost timer

## Thermostats



## Defrost Timer



SWITCH : 250VAC 5A COSΦ=0.5-1

MOTOR : 220-240VAC 50/60Hz

CYCLE TIME

- 6 HOURS 35 MIN ± 10 MIN (60Hz)

- 7 HOURS 54 MIN ± 12 MIN (50Hz)

DEFROST TIME

- 5 MIN 50 SEC ± 2 MIN (60Hz)

- 7 MIN ± 2 MIN 24SEC (50Hz)



## Damper Thermostats

- Application : Refrigerator
- Feature : 1) Temp. : -20°C ~ +15°C  
2) Cold control by opening and shutting the flow of cold air in refrigerator without electrical characteristic only by mechanical operation



### Specification

Model	Operating Temperature (°C)							
	Cold		Normal				Warm1	
	Close	Open	Close	Open	Close	Open	Close	Open
SEC-D10IG	-7	1	-3±1.5	5±1.5	1	9	—	—
SEC-30IG	-6.5	3	-3±1.5	6.5±1.5	-1	10.5	—	—
SEC-50IG	-8.8	-2	-4±1.5	2±1.5	-0.5	5.3	—	—
SEC-D50IT	-14	-6	-6.5±1.5	-0.5	0.5	6	—	—
SEC-D60IL	-18	-5	-7.5±1.5	6.5	0.5	13.5	—	—



# Special Components

**AC-Input Fan BLDC motor for Refrigerator**

**DC-Input Fan BLDC motor for Refrigerator**

**LED Lamp**

**Air Filter**

**Name Plate**

**Package (Polpack)**

**Molds**

# AC-Input Fan BLDC motor for Refrigerator

As we recently received all responsibility to promote & develop the export sales of AC - BLDC Motor from our Korean manufacturer, In order for your any consideration on AC - BLDC motor, we'd like to explain our AC - BLDC motor more in details as follows :

## (a). History of Our AC-BLDC Motor :

- Our AC - BLDC motor was originally developed by LG Electronics by themselves for LG own refrigerator.
- Two years ago, our current Korean mill took over all production line and also license & sales from LG Electronics.
- Our current Korean mill is now only supplying their AC/ BLDC motor for LG refrigerator with annual q'ty 1,000,000 set.
- Our current Korean mill have never supplied their AC / BLDC motor to other refrigerator mills than LG due to our mill's full production capacity to LG only.
- As we achieved the 1st order (annual consumption 300,000pcs) from overseas major refrigerator maker who wanted to adapt LG's new technology,

## (b). Characteristics of Our AC / BLDC Motor :

Referring to our SPECS Sheet including drawing and picture of our AC / BLDC motor as attached, Most refrigerator makers want to use BLDC motor for energy saving (to reduce power consumption). However, in order to use BLDC motor, refrigerator must equip control board or any convertor inside refrigerator to use BLDC motor. LG just developed new AC - BLDC motor to be used for refrigerator without any installation of control board or convertor Our AC - BLDC motor has PCB to change AC input into DC by itself. T'fore, our AC - BLDC motor can be used for any refrigerator aiming & achieving lower power consumption as under :

- AC Motor used by most refrigetator mills : Input Power - from 5 watt ~ 8 watt.
- **Our AC - BLDC motor : Input Power - 2.25 watt.**

Even though the price of AC - BLDC motor is much higher than AC motor, conidering of life cycle of refrigerator, innitial cost to purchase our AC - BLDC motor than AC motor can be covered by lower power consumption



# AC-Input Fan BLDC motor for Refrigerator

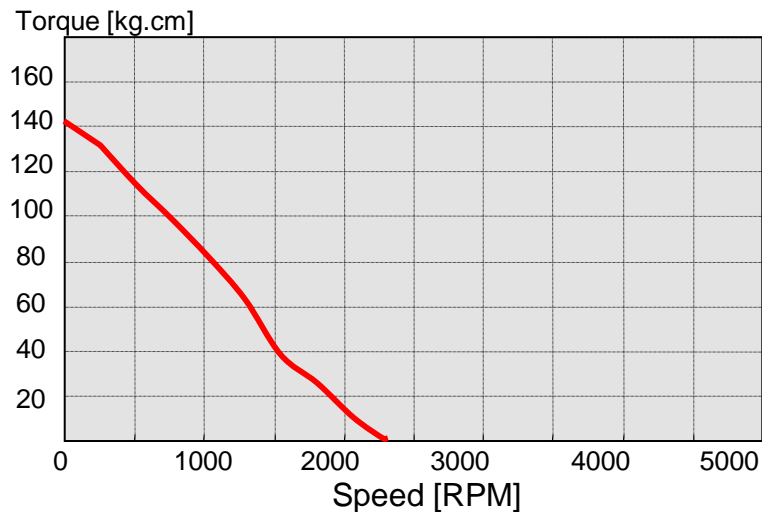
Figure



Performance

Item	Circular Type
Input Voltage	AC 115V
Input Power (at rated, $\Phi$ 168 Fan)	3.0 W
Noise	30 dB

Speed - Torque Curve



Features

- *No need additional circuits  
( Only AC 115V ~ 230V required )*
- *Motor Drive Method : 2 Phase Unipolar*
- *Sealing : Dust Protected Structure*
- *Water Proof for Evaporator (Urethane)*
- *Included Motor Drive Circuit*

# DC-Input Fan BLDC motor for Refrigerator

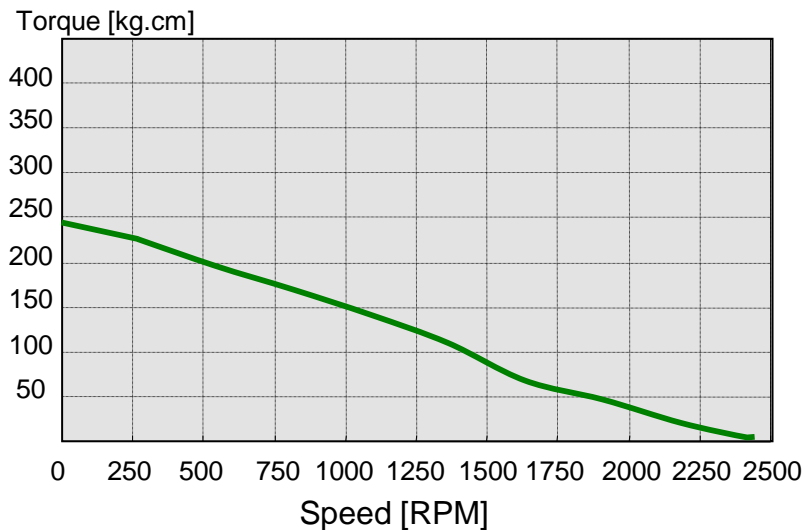
Figure



Performance

Item	New type BLDC Motor
Input Voltage	DC 6 ~ 15V
Input Power (at rated, $\Phi$ 150 Fan)	1.5~4.0 W
Noise (at no load)	27 dB

Speed – Torque Curve

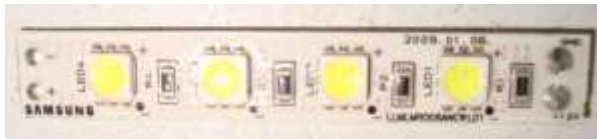


Features

- *Speed control by varying input voltage*
- *High efficiency by permanent magnet rotor*
- *Motor Drive : 3 Phase Bi-Directional*
- *Included Motor Drive Circuit*
- *Water Proof (Urethane)*

To make the food look more fresh & To make mild light, the most of home appliance manufacturers are now using LED LAMP. and the LED technology has been recognised and widely applauded. T'fore, we'd like to have your kind attention on our proposal of LED lamp.

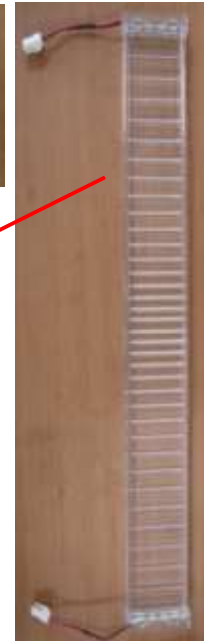
## 1.SMD Bar type LED lamp for SBS Refrigerator



SMD Bar type LED lamp



Installation



Case



## 2.Base type LED Lamp for Normal Refrigerator



There are only a few manufacturers for LED lamp in the world. Our Korean factory is No. 1 and the next one is "Philips".



Our Korean mill is No. 1 market share for LED lamp especially for Refrigerator and other LED manufacturer can not compete with our quality due to our company's patents on key function & mechanism of LED lamp.

Currently our factory is main supplier of LED lamp for Whirlpool & Electrolux & Samsung & LG.

# LED Lamp



Item	SPECS	Remarks
Led lamp	C40 E14/2 230V 2.3W	2.3W is our standard which is improved from 2.1W
	C27B E14/2 230V 1.6W	It is equivalent model for E14/2 to be made with Korean origin
Led lamp + Socket	C27 Harness BL type 230V 1.6W (Lamp + socket)	It is advance model which contains socket, without base (baseless type lamp + socket)

### C27 Harness BL Type

**Lamp**

**Socket**

+

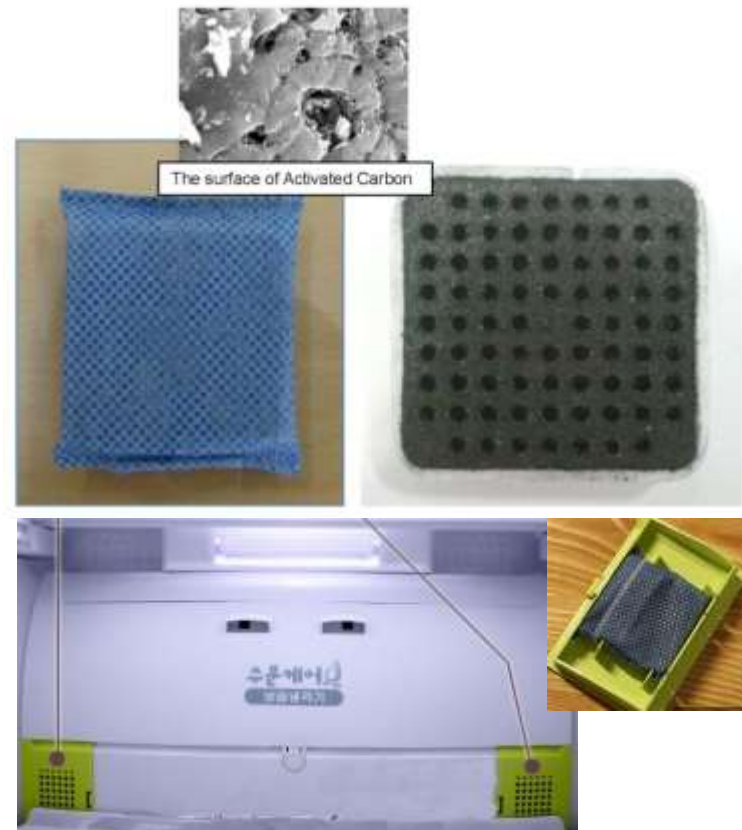
➔

**BL (Baseless)  
Type  
C27 230V 1.6W**

Our NEW item, Air filter is new & environment-friendly item which was developed with high-end technology with photo-rainy catalyst. Generally, Deodorization function is proceeded through the presence of a catalyst of air filter. All of normal photo-catalyst must have a mininum light (more than 380nm's UV) for operating deodorization. However, Our Photo-Rainy catalyst air filter can activate not only infrared ray but also ultraviolet & visible ray. This can be made your internal refrigerator deodorization performance better compare with normal deodorization.

## ▷ Characteristic & Merit

Part	Characteristic & Merit
Function	<b><u>No need any light</u></b> It have deodorization & sterilization effective without any light inside of Refrigerator
Deodorization	<b><u>Power Deodorization</u></b> It can be easily remove the strong smell of food through Methyl mercaptane, Trimethylamine & Ammonia which coated with Photo-Rainy catalyst
Sterilizing & Antibacterial	<b><u>Best Bactericidal effect</u></b> It is the best to remove bacteria such as colon bacillus, staphylococcu when dark too.
Material	<b><u>Activated Carbon protection</u></b> It can minimize the damage of Carbon's specific surface area because of coated with Photo-Rainy catalyst
Life time	<b><u>Semi-permanent</u></b> Photo-Rainy catalyst Air filter can be used semipermanently



\* The Performance of Deodorization : More than 95% (Max. 99%).

Our factory is No.1 supplier in Korea who is supplying many kinds of current world major home appliances manufacturer's name plate (Electrolux, Samsung etc). The quality is proven by world customers as you see our name plate list. We can make the name plate as your customised size & design and it can make better impact on your current precious name plate. If you need more effect on name plate, our product is the best choice on you.

## ▷ Characteristic & Merit

Contents	Our Available Pattern
Design	We can design for your any request
Size	We can matching your prefer size (Price can be adjusted by your size)
Type & Color	Please select which type & color is eligible for you (Press, Plating press, 3DG, Inret, Color)
Material	Please advise us your choice of materials (Aluminum, Urethane, Copper)

### 3DG / URETHANE



### PRESS / ALUMINUM



### INRET / COPPER



## What is Smart air pack

✚ New concept of packing solution (protective material) which consist of specially designed material (Air + LLDPE (Linear Low Density Polyethylene) + Nylon)

Eco- friendly solution . By using air to from specially designed tube, Smart air pack can save from Breakage and damage during transportation and save resource based material needed vs. molded pulp and form related material.

The smart air pack product line is an innovative and efficient inflatable packaging solution.

This unique design keeps a series of adjoining tubes securely inflated to cushion and protect products during shipment.

The air tubes are connected via a series of patented one-way valves – if one air chamber is punctured, the others remain inflated.

## Smart air pack

**Rohs – Rohs free**

**No need special mold**

**No need big ware house – smaller ware house space**

**Diverse application regardless of size and shape of a product**

**Eco friendly material**

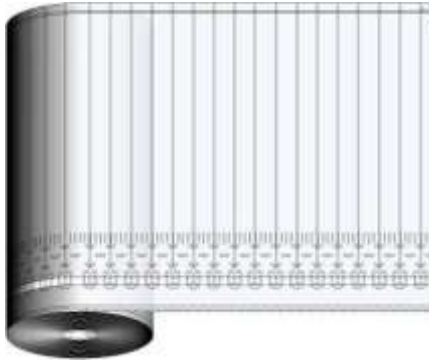
**Easy disposal / EPS : Smart air pack = 95:1)**

**Easy operation – special tool for inflation – working process simplification**

**Shorten packing process**

# Package (Polpack)

## A Process 2 Layer “-” type Design



[1process(Assemble 2films)]

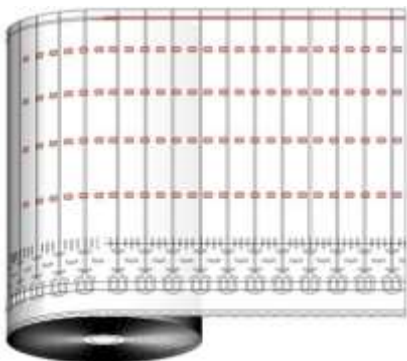


[Point (folding) Sealing process]

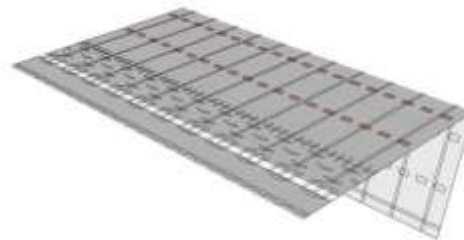


[Application]

## C Process 3 Layer : “Bag” type Design



[A]



[Folding process and side sealing Process]









[Application]









# Package (Polpack)

## Packing process simplification

Item	Before	Packing	End	
Smart air Pack				<b>Worker :</b> <b>Need 1.2 worker</b>
Pulp Pad				<b>Worker :</b> <b>3Workers</b>
Time	Smart air pack : 3 second Pulp Pad : 20 second	Smart air pack : 7 second Pulp Pad : 5 second	Total - Smart air pack : 10 second Pulp Pad : 25 second	Time
Worker	Smart air pack : 1.2 worker Pulp Pad : 3.0workers			

# Package (Polpack)

## Stock Space – Smaller ware house

	Product	Application	Ware house	Ref
EPS				<b>5t Truck 1</b> :1,000 Set :1 Day Capa  <b>EVERY DAY</b>
Smart air pack				<b>Pallet 1ea</b> :5,000 Set :5 Day Capa  <b>5t Truck</b> 50,000 Set 分  <b>6TIEMS/1YEAR</b>



- Benefit :**
- No need of big ware house for packing
  - No need to sort out packing component
  - Reduce unnecessary movement before and during packing

# Package (Polpack) – Waterpurifier



# Package (Polpack) - Application

## CAR AUDIO



+ 1DIN



+ 2DIN



+ OEM

## TONER



+ L/R Type



+ U Bag



+ L Type

# Package (Polpack) - Application

## CCTV



+ Dome Camera



+ Bullet Camera



+ Camera Lens

## PLAYER



+ DVD



+ DVR



+ BDP

# Package (Polpack) – Air Pump

## Air Inflation Equipment



Air Compressor : 1.0[Hp]/10l Electricity 220V

+



[Air Inflation Tool: Manual]



[AIR FOOT S/W Pedal]

+

[Air Inflation Tool: Semi-auto]



# Solution for Molding



Inner door V/F



Inner liner V/F



Door foam



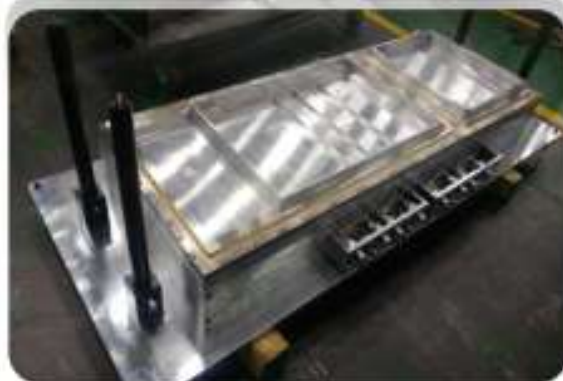
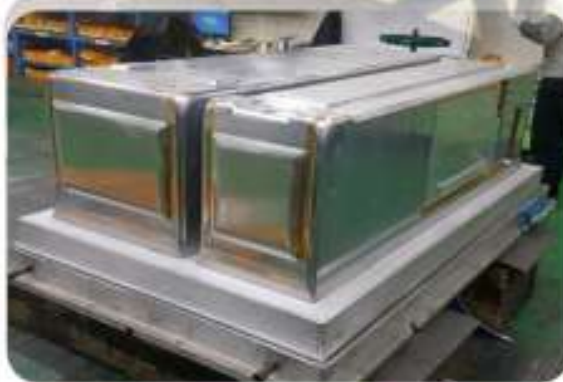
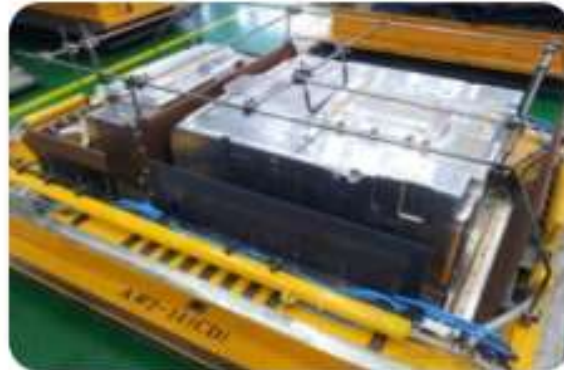
Door plate



Cabinet foam

# Thermoforming / Vacuum forming molds

For Inner Doors and Liners





# P/U forming molds

For Doors and Cabinets



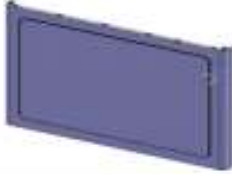
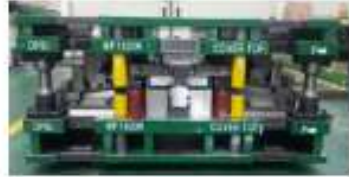
# Piercing & Trimming Tool and Machine



For Doors and Cabinets




# Stamping Parts

Refrigerator Outer Door Tandem Die	
Part Image	Tool Image
	
<ul style="list-style-type: none"> <li>- Material : PCM/SUS Material</li> <li>- Feature : 3D Bending</li> </ul>	

Washing Machine Cover Top Tandem Die	
Part Image	Tool Image
	
<ul style="list-style-type: none"> <li>- Material : VCM / PCM Material</li> <li>- Feature : Double Cam Bending</li> </ul>	

Refrigerator Chassis Comp Progressive Die	
Part Image	Tool Image
	
<ul style="list-style-type: none"> <li>- Material : GI Material</li> <li>- Feature : 10Stage</li> </ul>	

Dish Washer Tub Bottom Tandem Die	
Part Image	Tool Image
	
<ul style="list-style-type: none"> <li>- Material : STS430 Material</li> <li>- Feature : Hydraulic Press / Die Cushion</li> </ul>	

Washing Machine Frame Tandem Die	
Part Image	Tool Image
	
<ul style="list-style-type: none"> <li>- Material : PCM Material</li> <li>- Feature : Draw / Pier / Bend</li> </ul>	

Dish Washer Door Front Tandem Die	
Part Image	Tool Image
	
<ul style="list-style-type: none"> <li>- Material : STS430 / DY01 Material</li> <li>- Feature : 3D Bending</li> </ul>	



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