### Top Quality, Top Price, Top Trust

With 3-Top spirits we will come true to the target and do our best to open The Novel Land Mark in the chemical world.

# **PVC · PLASTIC**

Special additives & chemicals









1990	SD KOREA establishment
1999	PU colorant production
2000	PU Additives & Plastic Compound production
	Technology Patent for PU colorant

2003	Flame Retardant production
2005	Technical Innovation Business Company
2006	PVC Flame Retardant Plasticizer & Viscosity Depressant production
2007	Technical Patent for LDPE foam FR Compound
2009	Technical Patent for SUSC additives
2010	PTC Compound and SLF production

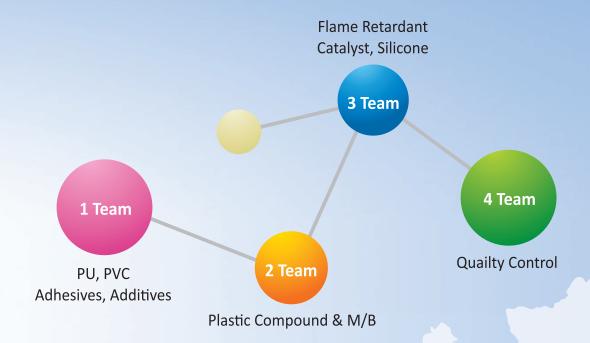
2011	Promising company in Kyeonggi State
	Eco-friendly FR PP Compound production
	PU bonding agent

2012	Catalyst & Processing additive start	

2013 Functional Film production

# **Major business products**





# **R&D** Center

All members of R&D center are majored in chemical science.

Top advanced and high qualified people are working to improve the existing product quality and to develop the new performance products.





# **PVC·PLASTIC**





















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## 01 FR Plasticizer

SFR flame retardant is low viscosity liquid type FR plasticizer of phosphoric organic ester chemicals.

#### ■ Product Feature

- Effective liquid FR product for PVC which does not give any defects to decrease transparency and thermal stability. This is very important in sign flex sheet and bill-board display.
- To maximize flame retardant efficiency, small amount dosage of  $Sb_2O_3$  can be recommended as a synergist. However, in this case, transparent property may be decreased and smoke density increase.

### Application

- Advertising sign flex-sheet, Bill-board display, Banner, Roofing, Tarpaulin

Product	Product Sp. Gr. (25°C)		P Contents	Color	
SFR-65	1.20↓	250↓	6.4↑	Yellowish liquid	

### **■ Performance Benefits**

- High flame retardant efficiency
- Good transparency and excellent light transmittance
- Good thermal and weather stability
- Good plasticizer property and compatibility
- No migration and blooming

■ **Dosage**: 10.0 ~ 30.0 phr

■ Packing: 250kg in steel drum





# **02** Bonding Agent

SBA is the promoter to improve bonding strength between interface of PVC and fiber. In the case of only PVC paste sol, it can be applied and is better in the points of sol viscosity stability called pot life.

#### ■ Product Feature

- Reactive polyurethane adhesive of one component system.
- Effective in increasing bonding strength.
- Strong adhesion is firmly anchored through penetration of PVC sol into polyester fiber structure.

### Application

- Tarpaulin, Artificial leather, Sign flex, Roofing cover, PVC coating to textile and metal

Product	Туре	Sp. Gr. (25°C)	Viscosity (cps, 25°C)	Liquid Color	Bonding Strength, 4% (Ib.f/inch2)
SBA-2013P	Phthalate	1.05	20,000	Yellowish	>20
SBA-2023NP	Non-phthalate	1.05	40,000	Yellowish	>15

→ Bonding Strength is variable in 2 factors of dosage and processing conditions.
Firstly, increasing dosage is proportionally bonding strength up
Secondly, processing conditions: temperature, gelling time, pressure, semi or 100% PVC sol coating

### **■ Performance Benefits**

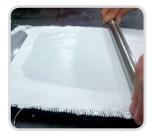
- Eco-friendly non-phthalate bonding agent, SBA-2023NP

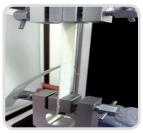
Bonding strength depends on the factors.

- Provide good adhesion between interface of PVC and fiber
- Little change of viscosity by time
- Lower viscosity and good dispersion

■ **Dosage** : 2.0 ~ 8.0 %

■ Packing: 20kg in steel drum





# **03** Viscosity Stabilizer

SVD Viscosity Stabilizer is for stabilizing and controlling the viscosity of paste PVC sol.

- It is able to control the viscosity of paste PVC sol in which viscosity is very important to meet processing conditions according to each PVC sol coating machine and applications.
- By the mixing and aging or storage time of PVC paste sol the viscosity gradually increase as much as plasticizer penetrate into PVC paste resin.
- PVC plastic sol should be adequately stabilized according to processing conditions.
- To decrease the production cost of PVC sol per kg, inorganic filler dosage like CaCo₃ is used more. As much as increasing the dosage of inorganic filler the viscosity is going up in proportion of CaCo<sub>3</sub>. In this case the viscosity should be adjusted for the smooth working conditions

### Application

- Construction: Wall paper, PVC floor, Sign flex, Tarpaulin - Garment : Artificial leather, PVC glove, Textile coating

- Automotive : Automotive underbody coating

- Others : Sleeve cover, Dip coating, Toys

Product	Product Sp. Gr. (25°C)		Liquid Color	
SVD-604	0.84↓	40↓	Yellowish	

■ **Dosage** : 3.0 ~ 10.0 phr

■ Packing: 170kg in steel drum







# 04 UV Stabilizer

SUV stabilizer is a benzophenone and benzotriazole type UV-absorber for PVC, plastics and organic polymers.

Most effective UV absorber in PVC applications is SUV-40 and SUV-P

### **■ Product Feature**

- Strong UV absorption property
- Excellent photostability against light exposure
- Retarding discoloration and maintaining physical property

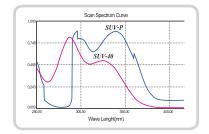
### Application

- Tarpaulin, Advertizing sign flex sheet, PVC floor sheet, Out-door applications

Product	Product Type		Molecular Weight	Appearance
SUV-40 Benzophenone		1.16	326.4g/mol	Yellowish powder
SUV-P Benzotriazole		1.38	225g/mol	Yellowish powder

■ **Dosage**: 0.3 ~ 0.5 phr

■ Packing: 25kg in fiber drum with inner plastic bag





# Plastic Compatibilizer

# 05 Coupling Agent

SBP Coupling Agents are chemically modified compatibilizer with MA, maleic anhydride which is organic chemicals as active functional component.

Its function helps increasing compatibility when co-mixing and co-extruding with non-compatible plastic resin.

Finally homogeneous material is produced by SBP coupling agent.

It is called compatibilizer or coupling agent and in some case it is called bonding agent.

#### Product Feature

- This chemical functional group reacts with other active organic materials and form strong bonds.
- New composites of materials bridged with coupling agent are being served for Neo-concept plastics such as WPC, Automotive, Washing machine and other plastics
- It is applied for improvement of chemical and physical properties between plastic resin and fillers like wood powder, coated glass fiber, talc

Product	Density	MFI (190°C)	MA Graft (%)	Appearance	Resin
SBP-14 NS	0.94	0.8↓	0.5个	Light Yellow	PE
SBP-15 NSW	0.94	4.0↓	1.0个	Light Yellow	PE
SBP-20 NS	0.96	200↓	0.8个	Pale Yellowish	PP
SBP-20 NSW	1.00	250↓	1.0个	Pale Yellowish	PP

### Application

- FR Cable compound, WPC, Plastic compound of automotive and washing machine
- Dispersant for plastic resin and pigment, filler and inorganic materials
- Adhesive synergist for hot melt adhesive resin compound

■ **Dosage**: 10 ~ 20% per inorganic filler weight

■ Packing: 20kg in paper bag, 500kg in bulk bag





# **06** FR Electric Insulation Cover Compound

FR electric Insulation Cover compound is specially designed for all of electric plastic cover. It is used in high voltage electrical pole and utilities to prevent a short-circuit and electric leakage. In house, factory and surrounding facility or building it is mainly applied for protective plastic cover against high voltage electric danger and damage.

### **■ Product Feature**

- Excellent FR property (UL94 V₀)
- No electric conductivity and excellent resistancy against high voltage electricity
- Excellent weatherability and durability against long time exposure in out-door
- No migration, no blooming, no water-flow mark

Product	Sp. Gr.	MFI	Resin	Appearance	Remarks
SEF-910H	1.24↓	2.20	PE	Black Pellet	FR Comp.
SPE-1004BLK	1.0↓	4.0	PE	Black Pellet	Non-FR Comp.
SPP-1007GY	1.30↓	12	PP	Grey Pellet	FR Comp.
SPP-1037GY	1.30↓	12	PP	Grey Pellet	Non-FR Comp.

### Application

- Electric plastic cover to prevent short circuit and electric leakage
- Gauge case to check electric consumption quantity
- Packing: 25kg is paper bag, 500kg in bulk bag







# Part 3 Plastic Compound

# 07 HF-FR Insulation Sheet Compound

Electronic Insulation Compound is for halogen free insulation sheet and film with functions of eco-friendly non-toxic flame retardancy and thermal resistancy at high temperature. Its product is spreadly applied to replace conventional type FR using film and sheet. In some applications and country, halogen type FR is prohibited.

#### ■ Product Feature

- Excellent flame retardancy (UL94 V<sub>o</sub>)
- Excellent heat resistant
- Eco-friendly, Halogen Free FR
- Excellent machinability

Product	Sp. Gr.	FR content (%)	MFI (g/10min.)	Resin	Appearance
SPP-1018BLK	1.30	20↑	2.0	PP	Black pellet chip
SPE-229W	1.30	20↑	1.5	PE	White pellet chip

### Application

- SPP-1018BLK : Electronic insulation FR sheet
  - Electronic devices, note book computer, projector, LCD/ PDP TV, monitor, smart phone
- SPE-229W: Automotive door seal trimming film
  - To prevent leakage of water and noise in the automotive door profile







# 08 Heat Shrinkable Tube Compound

Heat Shrinkable Tube Compound is radiation cross-linked EVA product for heat shrinkable tube of harness and protective tube which is to protect the electric cable, pipe line and important parts. SPE compound is a base material for heat shrinkable tube consisting of EVA, FR and specific additives and has a specific property to be able to appear cross-linked matric system by the process of high frequency radiation through extension process by high pressure many kinds of size tube is made.

#### Product Feature

- Excellent protection against contaminated water, air and dust.
- Excellent electric property to prevent the short circuit caused from high surge electricity
- Good insulation and bending flexibility
- Excellent close adhesion and shrink down to max. 50%
- Satisfaction of UL94 Vo and FMVSS 302
- Main color : Black, on request : Red, blue, Yellow

### Application

- Automotive parts : fuel line, brake line, steering wheel line
- Electric / Electronic cable terminal
- Protective line and pipe

Product	Sp. Gr. (25°C)	MFI (g/10min.)	FR / Resin	Appearance
SPE-222	0.95	1.4	Non-FR / EVA	Pellet chip
SEF-224ND	1.21	2.4	FR / EVA	Pellet chip
SEF225HF	1.27	1.6	Halogen free FR / EVA	Pellet chip

■ Packing: 25kg is paper bag, 500kg in bulk bag







# **Plastic Compound**

# 09 CD Tube Compound

Corrugated Tube Compound is material to satisfy all of properties of corrugated tube for electric & electronic and automotive cable assembly. Main purpose to use CD Tube is to protect inner wire and cable against high mechanical stress, heat, sunshine, abrasion, vibration, and variable environments.

Another application is for tube to make surrounding circumstance clean, tidy and same through aligning several cables to single cable tube assembly.

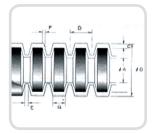
#### ■ Product Feature

- Good heat resistance and weatherability
- Excellent cold impact strength
- High tensile strength and bending stability
- Good flame retardancy: FMVSS 302 / UL 94 V1
- Main color : Black On request : blue, red, yellow, orange

### Application

- Automotive wire and cable assembly tube
- Ship and train cable protection
- Construction cable line protection tube
- Electric switch cabinet

Product	Sp. Gr. (25°C)	MFI (g/10min)	FR	Hardness	Resin	Appearance
SCD-2020HB	1.3	0.7	UL94 V1	High	PP+Nylon	Black pellet
SCD-2013LB	1.3	0.5	UL94 V1	Low	PP	Black pellet





# 10 Breathable Film Compound

Breathable PE Compound is suitable for micro-size hole film by T-die and Inflation Extrusion machine. Through many small size hole, air and vapor is able to pass. However water and liquid do not pass. By the theory of particle size breathable film can be produced by the specific film process: 2 way stretch (MD/CD) stretch to make micro-size hole less than  $10\mu m$ .

### **■ Product Feature**

- Breathable Compound consists of PE resin and CaCO<sub>3</sub> as main component.
- In the stretching process, the film is extended 2.0 to 3.5 times toward MD, CD direction.
- Micro-size hole on film surface allow vapor and steam through, not water and liquid.

### Application

- Baby diapers
- Sanitary pads for women
- Disposal protective and waterproof suit
- Industrial and agricultural film



Product	Sp. Gr. (25°C)	MFI (g/10min.)	Appearance	Processing Machine
SPE-2010BC	1.2 ~ 1.4	1.4	White Pellet Chip	Inflation(blown)
SPE-2011BC	1.1 ~ 1.3	2.4	White Pellet Chip	T-die

■ Packing: 25kg in paper bag, 500kg in bulk bag







# 11 AL Composite Compound

SPE-212FR is PE FR compound for aluminum composite panel (ACP) of out-door use of construction. AL composite panel is very light than conventional cement block and wood and also is semi-permanent, excellent insulation performance against high and cold temperature and no-decomposition and corrosion. Also out-side appearance is wonderful.

Because of many benefits, ACP product is widely used as construction material.

#### ■ Product Feature

- Halogen free PE FR compound which is eco-friendly materials with non-toxic and low smoke.
- The fire regulations of ASTM, UL, DIN, BS and KSF can be satisfied.
- Excellent adhesive property into AL sheet.

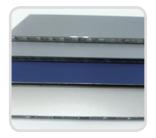
### Application

- Aluminum composite panel (ACP)

Product	Appearance	Sp. Gr. (25°C)	FR Type	MFI (g/10min.)
SPE-212FR	Pellet chip	1.45	Mg(OH)₂	1.0 ±0.2

#### ■ Product Feature

- Eco-friendly, Halogen Free FR
- Excellent flame retardant
- Excellent machinability
- Competitive price





# 12 PE Master Batch

## 12-1. Color Master Batch

SPE Color Master Batch is that excellent dispersion and a great performer which is suitable for polyolefin plastic compound and injection & extrusion processing.

Because of unique properties SPE color M/B do not allow any undispersed gel or particle appear on the surface of plastic and does not flow mark.

#### **■ Product Feature**

- High concentrated pigment and color strength
- Good dispersion
- No blooming, no flow mark
- No heavy metal, no phthalate

Product	Appearance	Sp. Gr. (25°C)	MFI (g/10min.)	Dosage (phr)
SPE-1025BLK	Black chip	1.10	1.5 ±0.2	3.0 ~ 5.0
SPE-200W	White chip(A)	1.20	2.5 ±0.2	3.0 ~ 5.0
SPE-2030W	White chip(R)	1.69	4.2 ±0.5	3.0 ~ 5.0
SPE-500BL	Blue chip	0.98	20 ±2.0	3.0 ~ 5.0
SPE-4004Y	Yellow chip	1.20	15 ±2.0	3.0 ~ 5.0
SPE-6016R	Red chip	0.95	8.0 ±1.0	3.0 ~ 5.0
SPE-700G	Green chip	0.95	12.0 ±1.0	3.0 ~ 5.0





### 12-2. Functional Master Batch

SPE Functional Master Batch is various and a great performer to be able to cover every requirements. Excellent dispersion and high melt flow property as well as high concentration is superior to general used functional master batch. And the performance and advantage are greater. Actually FR master batch is used greatly in PE tarpaulin.

### ■ Product Feature

- High functional property
- Good dispersion
- No heavy metal and no phthalate

Function	Product	Appearance	Sp. Gr. (25°C)	MFI (g/10min.)	Dosage (phr)
	SPE-HD220FR	Pellet chip	1.55	22 ±1.0	15.0 ~ 30.0
Halogen FR	SPE-2009FR	Pellet chip	2	0.2 ±0.1	15.0 ~ 30.0
	SPE-2022FR	Pellet chip	1.5	19 ±1	15.0 ~ 30.0
HF-FR	SPE-220FR	Pellet chip	2.13	22	15.0 ~ 30.0
пг-гк	SPE-229FR	Pellet chip	1.25	1.25 ±0.2	15.0 ~ 30.0
Anti-Static	SPE-201AS	Pellet chip	0.94	25 ±5.0	3.0 ~ 5.0
Anti-Static	SPP-202AS	Pellet chip	0.92	36 ±2.0	3.0 ~ 5.0
LIV/ Agont	SPE-231UV	Pellet chip	0.93	5.0 ±1.0	3.0 ~ 5.0
UV Agent	SPP-233UV	Pellet chip	0.92	45 ±5.0	3.0 ~ 5.0
Synergist	SPE-209	Pellet chip	1.50	0.8 ±0.2	10.0 ~ 20.0







# 13 TPU Master Batch

SU TPU Color Master Batch is excellent dispersion and a great performer for every colorful sheet and film. In which any undispersed gel and particle is not allowed to appear on the surface.

### ■ Product Feature

- High concentrated pigment and color strength
- Good dispersion
- No blooming, no flow mark
- No heavy metal and no phthalate

Product	Appearance	Sp. Gr. (25°C)	MFI (g/10min.)	Dosage (phr)
SUB-100	Black chip	1.34	2.49	3.0 ~ 10.0
SUW-200	White chip	1.83	62	3.0 ~ 10.0
SUBL-530	Blue chip	1.5	50	3.0 ~ 10.0
SUY-401	Yellow chip	1.49	27	3.0 ~ 10.0
SUR-631	Red chip	1.34	59	3.0 ~ 10.0
SUBR-810	Brown chip	1.5	39	3.0 ~ 10.0
SUBE-320K	Beige chip	1.5	39	3.0 ~ 10.0
SUV-200	UV stabilizer	1.15	67	3.0 ~ 5.0
SUT-42	Talc M/B	1.30	1.20	5.0 ~ 20.0





## 14 XPS Master Batch

SPS functional Master Batch for cross linked polystylene(XPS) is good dispersion and a great performer for colorful XPS product which is applied for construction insulation sheet to increase the insulation function from high and cold temperature.

Currently it is greatly used and continuously the consumption will be increased Because of high concept of thermal insulation about energy saving.

#### ■ Product Feature

- High concentrated pigment and color strength
- Good dispersion
- No blooming, no flow mark
- No heavy metal and no phthalate

### Application

- Insulating materials for XPS

Product	Appearance	Sp. Gr. (25°C)	MFI (g/10min.)	Dosage (phr)	Remarks
SPS-6009R	Pellet chip	1.00	12 ±1.0	3.0 ~ 5.0	Red
GP-50S	Pellet chip	1.73	0.40 ±0.05	2.0 ~ 3.0	Talc





# **15** WPC Additives

Wood Plastic Composite (WPC) Additives are effective performancers for WPC compound.

WPC is currently used to replace natural wood and timber that has many faults such as durability, decay, harmful heavy metal problem and natural decomposition.

WPC can be semi-permanent construction materials and especially recycled.

### WPC compound:

1. Polyolefin resin 2. Wood powder 3. Coupling agent 4. Color

5. UV stabilize 7. Anti-mildew agent 8. Inorganic filler 6. Processing aid

#### Product Feature

- High concentration and excellent dispersion
- Eco-friendly and non-toxic material
- No migration, no blooming, no flow mark

### Application

- Outdoor bridge, stair, stand, bench
- House wall, pence, terrace
- Park walkway, stage, roof, flowerpot





#### Color

Product	Color	Sp. Gr. (25°C)	MFI (g/10min.)	Dosage (phr)	Appearance
SPE-6010R	Red	1.3	20 ±1.0	2.0 ~ 5.0	Pellet chip
SPE-6012BR	Brown	1.1	22 ±1.0	2.0 ~ 5.0	Pellet chip
SPE-6013BR	Dark Brown	1.1	9.0 ±1.0	2.0 ~ 5.0	Pellet chip

### Coupling Agent

Product	Density	MFI (g/10min.)	MA graft (%)	Resin	Appearance
SBP-15NSW	0.9	4.0↓ (190°C)	1.0个	PE	Yellowish chip
SBP-20NSW	1.0	250↓ (230°C)	1.0个	PP	Yellowish chip

# 16 Silicone Multi-Functional Agent

SSI is silicone concentrated master batch which has multi functional performance as processing aid. It is able to allow chemical engineer to solve many specific problems at operating extrusion and injection. It is high molecular weight polymer. Migration or blooming does not appear on the surface of products.

#### ■ Product Feature

- Excellent processing improvement
- Excellent surface slip and scratch resistance
- Good lubricant property and melt pressure decrease
- Good surface gloss appearance

### Application

- Processing aid for plastic compound
- Good surface appearance for injection products
- Decrease the die-build up like fish-eye
- Good slip property on the surface of plastic film
- Decrease melting pressure in processing machine

Product	MFI (g/10min.)	SI Content (%)	Dosage (phr)	Appearance
SSI-25PE	4	25↓	1.0 ~ 10	PE Pellet Chip
SSI-50PE	5	50↓	0.1 ~ 5.0	PE Pellet Chip
SSI-25PP	10	25↓	1.0 ~ 10	PP Pellet Chip
SSI-50PP	15	50↓	0.1 ~ 5.0	PP Pellet Chip







# 17 PU Foam Backing olefin film

SBF-20R is PE film that has a creative function of hot melt adhesive about 200°C in lamination process between surface of PU foam and film.

It helps providing convenient workability at covering the automotive sheet onto car seat pad as substitute for fabric net that have been long time using conventionally.

#### **■ Product Feature**

- Decrease production cost
- Easy workability when covering the automotive sheet onto car seat pad
- Good appearance and slippage property on the surface of film
- Excellent hot tacky function on PU surface

### Application

- Automotive seat cover and carpet
- HMA film on surface of PU foam



Physical Property	Result Specification
Appearance	Red color film
Thickness(μm)	20↓
Width(mm)	1,475 mm
Specific gravity(20°C)	1.1↓

### **■ Film Lamination Conditions**

- Roll temperature : First roll 200°C, Second roll 210°C

- Roll speed: 15m/min - Roll pressure: 7kg

- Roll material: 1. bottom roll: rubber

2. upper roll: epoxy coated steel roll

■ Packing: 1 roll - Width 1,475mm x Length 3,000 ~ 6,000mm x Thickness 20µm

# 18 TPU film

TPU film is manufactured by the process of extrusion machine such as inflation, T-die and calendar. It has excellent properties than PVC and PE film.

Due to the unique properties of TPU elastomers the applications is very diversified as substitutes for conventional film like PVC

TPU film also has no harmful chemical components restricted from environment regulations It is well known as credible eco-friendly products and quickly replacing general film like PVC film

### Application

- Automotive parts
- Sport wear
- Fabric / Textile lamination
- Sheet and Accessory







No.	Test	TPU Film		PVC Film	Test Spec
		Polyester Type	Polyether Type	PVCFIIM	(ASTM)
1	Transparency	Excellent	Good	Bad	
2	Low Temp. Flexibility	Excellent	Excellent	Bad	
3	Resistance to Oil	Excellent	Good	Bad	
4	Tensile Strength	Excellent	Good	Bad	D412
5	Elongation	Excellent	Good	Bad	D412
6	Abrasion Resistance	Excellent	Excellent	Good	
7	Tear Strength	Excellent	Excellent	Good	D624
8	Eco-Friendly	Excellent	Excellent	Bad	REACH

■ Packing : Roll packing by standard size on needs

# 19 Plastic Part

- Elastic Brim Cover Compound for Automotive
- Elastic Hose Compound for Automotive
- FR Electric Insulation Rack Compound
- FR Electric Insulation Space Compound
- Coupling Agent for EVA Electric Cable

## 20 Ink

- Ink for PET Film
- Tattoo Ink for Body

# 21 Special Additives

- UV Stabilizer
- Antioxidant
- FR Agent for textile







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