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CPE | Chlorinated Polyethylene

ELASLEN

RESONAC

Elastomer Group
Basic Chemicals Business Unit
Resonac Corporation
January 19th, 2024

1. What is ELASLEN ?

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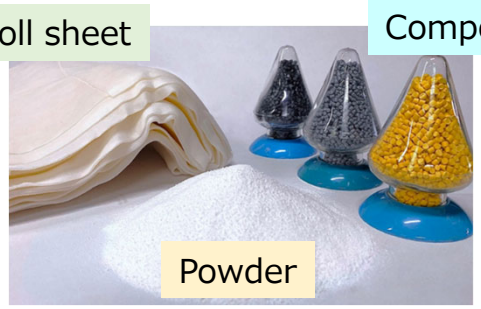
■ **ELASLEN :** Chlorinated polyethylene, flame retardant chlorinated polyethylene

✓ELASLEN is a chlorinated polyethylene developed by Showa Denko using proprietary technology and has a long history of over 50 years.
✓The main application is poly vinyl chloride(PVC) modification, which is used for industrial plates for semiconductor equipment, etc.
✓We also manufacture and sell flame-retardant compound products by utilizing our compounding and molding processing technologies based on ELASLEN.



<Plant location>

Chemical Products Group, Ogimachi Production Department, Kawasaki plant

<Major sales area>

Japan, some overseas (North America, Southeast Asia)

<Chlorinated polyethylene properties>

Light resistance, ozone resistance, weather resistance, oil resistance, chemical resistance, flame retardancy, wide operating temperature range, and bending resistance (Mainly used as a modifier)

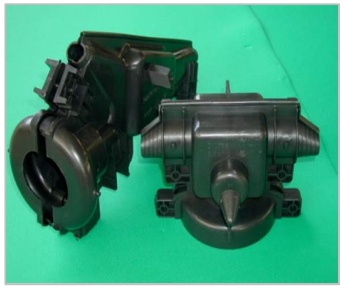
<Main application>

① Industrial PVC Plates for Semiconductor Equipment

②PVC pipe

③ABS products for home appliances

④ Flame retardant materials for electric power (protective tubes, nets, covers, etc.)



2. Characteristics

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■Recommendation of most suitable grade for your needs and application

■Lectures on how to handle ELASLEN
⇒ Wide range of support for molding and processing conditions

■Proposals for compounds that combine ELASLEN with other additives and resins, as well as a wide range of new studies

3-1. Application ①

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～“ELASLEN meets the needs of customers in a wide range of fields from industry to daily life”～

Non-cross linked

Stationery, Micro motors, Electromagnetic wave absorbing sheet

Adhesive & Coating

Rubber magnet

Solubility

Vibration-damping rubber

High filler loading

Compatibility

Alloy with various polymers TPU, PP, PE

Flexibility

Rubber elasticity

Thermoplastic elastomer

Oil resistance

Automotive parts, Building materials

Cross-linked rubber

Packing

Cable

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Processability

Impact resistance

Cold resistance Bleed resistance

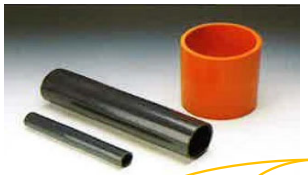
Anti-drip

Flame resistance

Ozone resistance

Weather resistance

Chemical resistance (Acid & solvent resistance)



Pipe, Semiconductor manufacturing equipment, Deformed extrusion products for construction materials

Rigid PVC

Plasticized PVC

Sheet, Agricultural PVC film

Vinyl wire, Wire harness

Flame retardant ABS

Flame retardant ABS

Flame retardant compound

Flame retardant master batch

Electrical installation materials
Abrasion resistance protective tube, Clamp covers, etc.

3-2. Application ②

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Type		Merits	Notes
Polymer alloy with thermoplastic resin (modified resin)	Poly olefin (PE、PP)	Flexibility Flame retardant (anti-drip) Low temperature resistance	Processing Temp. ＜220℃
	PVC ABS、AS Poly urethane	Processability Flame retardant (anti-drip) Impact modifier Low temperature resistance	
Thermoplastic resin (main resin)		Plasticizer-free and flexibility Flame retardant Oil resistance	
Cross-linked rubber (main resin, polymer alloy with various synthetic rubbers)		Heat resistance Ozone resistance Flame retardant Chemical & Oil resistance	Sulfur sulfide not available

4. ELASLEN Basic Information_Powder & Roll Sheet Grade

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○ Powder

-Application :
Rigid PVC, plasticized PVC, ABS, EVA, etc,
Heterogeneous polymer modification
-Properties :
Impact modification, Cold impact modification,
Flexibility, Chemical resistance, Flame retardant,
Anti-dripping, Filler loading

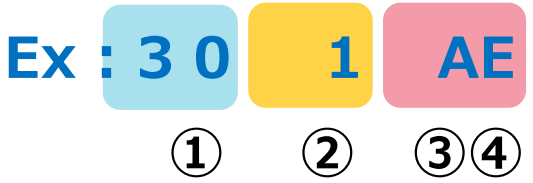
○ Roll Sheet

-Application : Alloys with cross-linked rubbers and various synthetic rubbers
-Properties : Insulation, Oil resistance, Flame resistance, Chemical resistance, etc.

○ Handling Notice

-Processing Temp : Less than 220 deg.C is recommended to prevent thermal degradation
-Stabilizer : The use of ZnO-based stabilizers is strictly prohibited because they are dechlorination accelerators.
1. PVC type : Ca-Zn stabilizer recommended
2. Non-PVC type : Synthetic hydrotalcite stabilizer recommended

○ ELASLEN Grade Name



1. Chloride content
⇒ 20、25、**30**、35、40、45wt%

2. Molecular weight
Hight ← 1M、1、2、**2N**、2G、3J、4F → Low

3. Crystal residue
Low ← **A** : Amorphous B : Semi-crystal

4. Roll Sheet
Ending with "**E**"

5. Grade map_Powder

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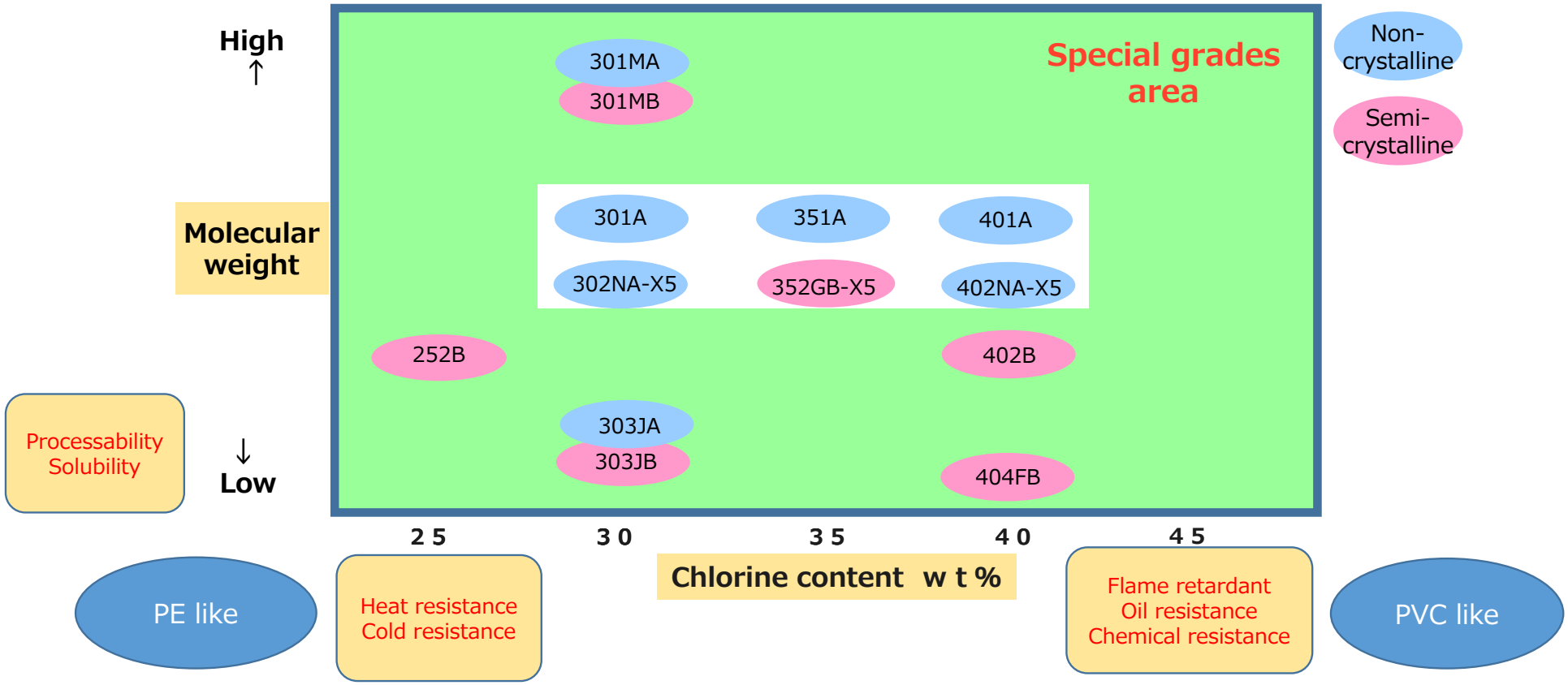
Mechanical properties
Abrasion resistance
High filler loading

～ Raw material PE molecular weight, chlorine content, crystalline or not ～
Wide range of products



6-1. Grade list_Powder & Roll sheet

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Item	Method	Unit	Non-crystalline							Semi-crystalline					
			301MA	301A (301AE)	351A (351AE)	401A (401AE)	302NA-X5 (302NE-X5)	402NA-X5 (402NE-X5)	303JA	252B	303JB	301MB	352GB-X5	402B	404FB
Appearance	–	–	Powder	Powder (Sheet)	Powder (Sheet)	Powder (Sheet)	Powder (Sheet)	Powder (Sheet)	Powder	Powder	Powder	Powder	Powder	Powder	Powder
(Basic Property)															
Chlorine Content	REC method*	wt%	30.0～33.0	30.0～33.0	34.0～37.0	38.0～41.0	28.0～31.0	37.5～40.5	30.0～33.0	22.0～25.0	30.0～33.0	29.0～32.0	34.0～37.0	37.5～41.5	38.0～41.0
Specific Gravity	JIS K7112 reference	–	1.10～1.14	1.10～1.14	1.14～1.18	1.18～1.22	1.08～1.12	1.18～1.22	1.10～1.14	1.05～1.09	1.12～1.15	1.12～1.16	1.16～1.20	1.19～1.23	1.19～1.23
Water	REC method*	wt%	≦1.0	≦1.0	≦1.0	≦1.0	≦1.0	≦1.0	≦1.0	≦1.0	≦1.0	≦1.0	≦1.0	≦1.0	≦1.0

*Resonac method

The below are typical values, not guaranteed.

(Melting Property)															
Melt Flow Rate	JIS K7210 reference 180℃ 21.6kg	g/10min	0.1	1.6	1.4	1.2	12	8	120	3	25	<0.1	0.8	1.2	25
Mooney Viscosity	JIS K6300 reference ML121 1+4	–	–	85	90	115	45	70	20	–	–	–	–	–	–
(Physical Property)															
Crystallinity	DSC method	J/g	<2	<2	<2	<2	<2	<2	<2	35	50	20	20	10	29
(Mechanical Property)															
Tensile Strength	JIS K6251 reference	MPa	11.8	11.8	9.8	8.8	8.8	6.9	6.9	15	12.7	15	12.7	15	16.7
Elongation		%	900	1000	950	750	850	700	800	850	750	420	400	500	550
100% Modulus		MPa	1	1	0.9	0.9	1	0.9	1.5	3.1	2.5	3.9	2.5	2.5	2.5
Hardness	JIS K6253 reference	Type A	60	58	56	58	58	58	60	82	78	76	76	65	80
Brittle Temp	JIS K6261 reference	℃	<-70	<-70	<-70	<-70	<-70	-55	<-70	-60	-60	-60	-60	-55	-55
Freezing Point		℃	-32	-32	-24	-15	-33	-15	-24	-27	-16	-18	-17	-8	-1

6-2. Grade list_Powder & Roll sheet

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Item	Method	Unit	Non-crystalline							Semi-crystalline					
			301MA	301A (301AE)	351A (351AE)	401A (401AE)	302NA-X5 (302NE-X5)	402NA-X5 (402NE-X5)	303JA	252B	303JB	301MB	352GB-X5	402B	404FB
Appearance	–	–	Powder	Powder (Sheet)	Powder (Sheet)	Powder (Sheet)	Powder (Sheet)	Powder (Sheet)	Powder	Powder	Powder	Powder	Powder	Powder	Powder

The below are typical values, not guaranteed.

(Electrical Property)															
Volume Resistivity	ASTM D257	Ω- c m	2×10^{15}	3×10^{15}	2×10^{15}	1×10^{15}	3×10^{15}	1×10^{15}	3×10^{15}	4×10^{16}	4×10^{15}	3×10^{15}	3×10^{16}	1×10^{16}	2×10^{15}
Dielectric Tangent	ASTM D150	–	1×10^{-2}	1×10^{-2}	2×10^{-2}	4×10^{-2}	1×10^{-2}	4×10^{-2}	1×10^{-2}	5×10^{-3}	7×10^{-3}	5×10^{-3}	9×10^{-3}	1×10^{-2}	9×10^{-3}
Dielectric Content		%	4.3	4.3	4.5	4.7	4.3	4.7	4.3	3.6	3.7	4	4	4.4	4
Application ◎ : most suitable ○ : applicable	Cable jacket					◎		◎		◎	○		○	◎	◎
	Rigid PVC modifier			◎	◎	○					○				○
	Flexible PVC modifier		○		○	◎		○		○		◎	◎	○	
	Thermoplastic elastomer									○	○	◎	◎	○	○
	FR ABS modifier								○	◎	◎				
	Rubber		◎	○		○	◎	○	◎						
	Magnetic rubber		○	◎	◎		○	○							
	Adhesive/Coating							◎							

Blocking may occur depending on the storage conditions of this product.
Our responsibility on this product is limited to the requirements at time of manufacture.
DO NOT use ELASLEN as the raw materials or the additives of the products which are ingested into, implanted in or contact with human body such as pharmaceuticals, medical device, food, cosmetic, etc.
We recommend you to consult with us before use because the applications as specified above are examples.
Read the Safety Data Sheet (SDS) before use.
The design of ELASLEN listed above may change for improvement without previous notice.