Soarnol™

Ethylene-vinyl alcohol copolymer **High gas barrier resin**

Caring about the earth's future!
Bringing comfort to every aspect of your life!

http://www.soarnol.com/

Soarnol, an ethylene-vinyl alcohol copolymer, is an indispensable material in the food product industry. It is utilized extensively to make packaging films, bottles and paper containers that preserve flavor and freshness.
Its superlative property lies in the ability fully to adjust its functions in accordance with the application. For example, its solvent barrier and oil resistance can be utilized for industry pipe production. Engineering plastics can be created thanks to its mechanical strength and non-electrostatic properties. We are working with our customers to create new functions and applications, and to expand further the possibilities of Soarnol.

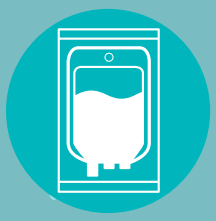
Aroma retentive

Juice carton

Toothpaste tube

Gas barrier property

Food packaging



Medical packaging

Mechanically strong, High rigidity, Non-electrostatic

Engineering plastic

Plastic nail

Printability

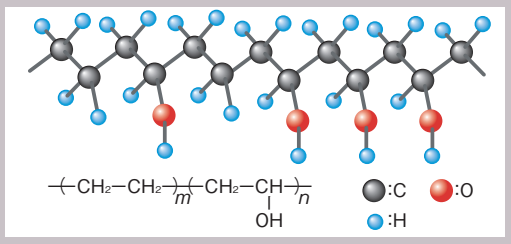
Design properties

Durable

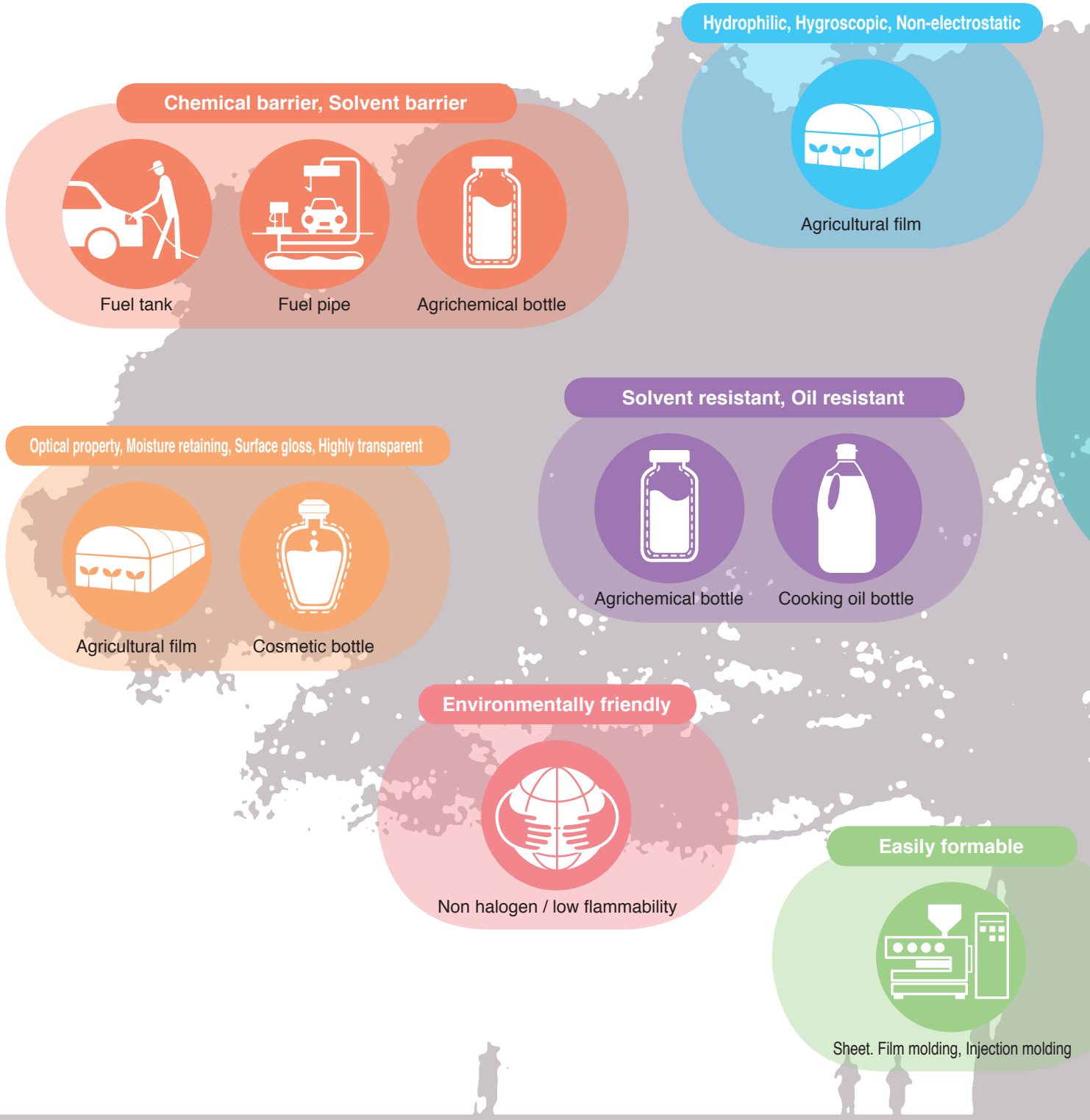
Under floor heating pipe

Soarnol emits no toxic gases when burned, and its combustion heat is half that of polyethylene, making it an environmentally friendly material.

Soarnol is an ethylene-vinyl alcohol copolymer developed by MITSUBISHI CHEMICAL after long years work, using its proprietary manufacturing techniques.
It combines the high gas barrier, oil resistance and transparency of polyvinyl alcohol with the moisture resistance and co-extrusion processability of the polyethylene unit.



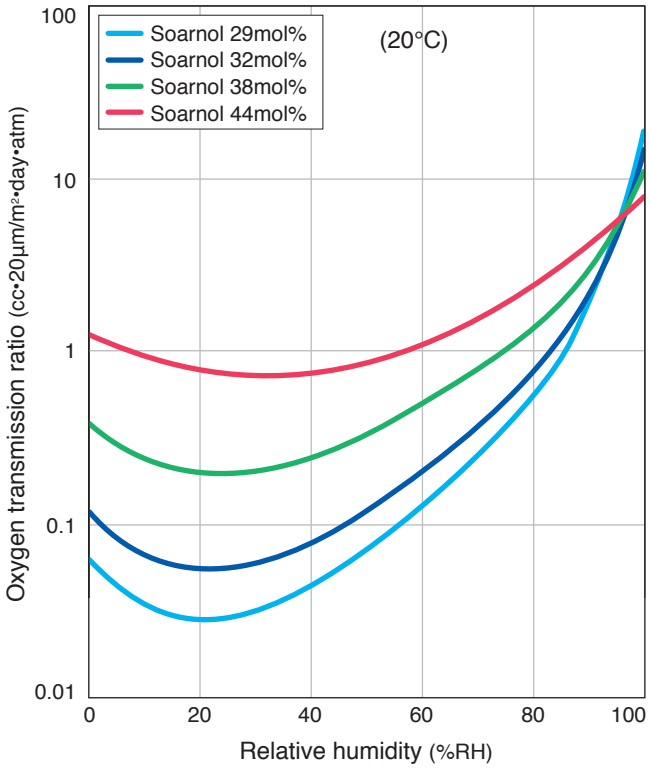
Soarnol and its infinite applications evolve together with our customers.



Mainly composed of carbon, oxygen and hydrogen.

Dependence on relative humidity of oxygen transmission ratio

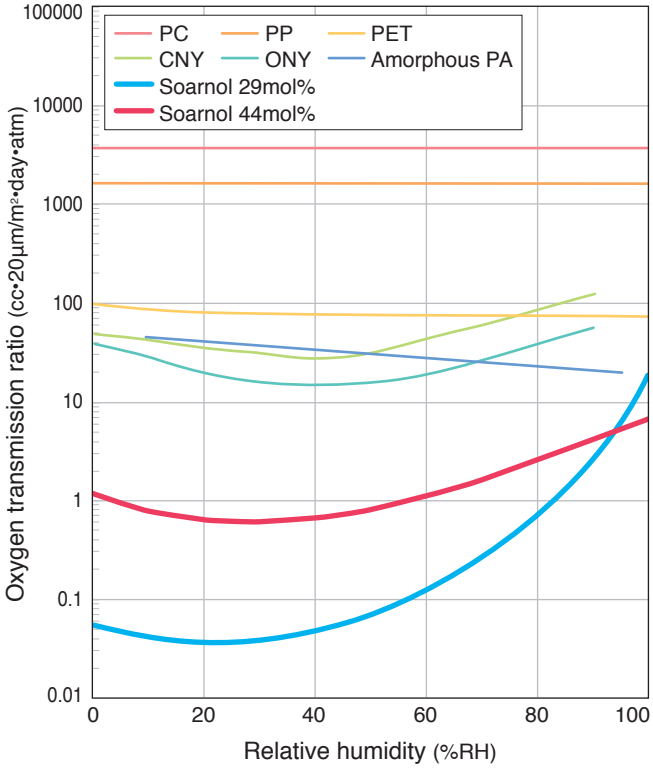
The lower ethylene content Soarnol has the lower O_2 permeability.



Measure ; OXTRAN 2/20

Oxygen permeability comparison between Soarnol and other resins

Soarnol exhibits lower oxygen permeability than other resins.



Measure ; OXTRAN 2/20

Gas barriers

Soarnol also has low gas permeability for various gasses.

Sample	Gas transmission ratio (cc•20μm/m²•day•atm)		
	N_2	CO_2	He
Soarnol 29mol%	0.018	0.49	110
Soarnol 32mol%	0.024	0.62	120
Soarnol 38mol%	0.041	1.30	180
Soarnol 44mol%	0.100	4.40	320
ONy	11	180	1700
PET	7.8	96	2600
OPP	600	10500	25000

Measuring condition ; Differential pressure type GTR, 20°C, dry

Chemical resistance

Soarnol has high resistance to organic solvents.

Chemical name	Apparent changing	Weight changing
Ketones	No change	◎
Esters	No change	◎
Aliphatic hydrocarbons	No change	◎
Gasoline, Diesel oil etc	No change	◎
A type of oil	No change	◎
Liquified Freon gas	No change	◎
Alcohols	Whitening by lower alcohol	◎～△
Aromatic hydrocarbon	No change	○
Distilled water	No change	△
inorganic acid aqueous solution	Depends on concentration	△
Sodium hydrate aqueous solution	No change	△

inorganic acid aqueous solution ; sulfuric acid, nitric acid, hydrochloric acid
◎ : +0.01% or less ○ : +0.03% or less △ : +3% or less
Specimen : 3mm × 100mmϕ, Dipping at 23°C for 7 days

Grade and property of Soarnol

■ General grade

Soarnol's oxygen barrier capability changes depending on the ethylene content.
The optimum grade can be selected in accordance with the application, forming method and the like.

		D2908	DT2904	DC3212	DC3203	E3808	ET3803R	A4412	AT4403
Ethylene conent	mol%	29		32		38		44	
Density	g/cm³	1.21		1.19		1.17		1.14	
Melting temperature*1	°C	188		183		173		164	
Crystallizing temperature*1	°C	163		160		152		144	
Glass transition temperature*1	°C	62		61		58		55	
MFR*2	g/10min	8	3.8	12	3.8	8	4.0	12	3.5
OTR*3	cc 20μm/m² day atm	0.2		0.3		0.7		1.5	
	cm³ 20μm/m² 24hrs Mpa	2		3		7		15	
Mechanical property*4	Tensile strength MPa	93		86		74		61	
	Flexural strength MPa	141		128		107		90	

*1 Measured by DSC method *2 210°C, 21.168N{2,160gf} *3 OXTRAN 2/20, 20°C×65%RH
*4 Tensile test ; ISO527, Flexural test ; ISO178
The above figures are Nippon Gohsei's measured values and are not guaranteed.

■ Special Grades

We also have a variety of special grades that respond to particular market needs.

Characteristics	Comparison with general grade	Application
Soft type	Flexibility and flex-crack resistance are improved while the gas barrier and transparency of EVOH nearly same	Bag in box, Film
Thermoforming type	Grades for easy thermoforming at thermoform-ability of EVOH	Cup,Tray
Retortable type	Film whitening and delamination after retort processing can be reduced.	Film, Sheet, Bottle
High ethylene Low ethylene	Low etylene content (25mol%) and high etylene content (48mol%) grade also are available	Drawing High barrier

We also offer the grades listed below, according to the desired application and processing method.
Please contact about these products.

■ **Fuel tank grade, Pipe grade, Injection grade**
■ **Solution type, Powder type**
■ **Purging agent, Re-grind agent**

Application of Soarnol

Cosmetic bottle
HDPE//Soarnol//HDPE

Cosmetic tube
LDPE//Soarnol//LDPE

Beverage paper carton
Paper//Soarnol//LDPE(Inside)

Beverage cup
PS//Soarnol//PS

Ham packaging
PET//LDPE//Soarnol//LDPE

Rice tray
PP//Soarnol//PP

Pet food tray
PP//Soarnol//PP

Mayonnaise bottle
LDPE//Soarnol//LDPE

Jelly cup
PP//Soarnol//PP

Individual packaging for cake
PA//Soarnol//PA//LDPE

Bag in box
LLDPE//Soarnol//LLDPE

Balloon
Ny/Soarnol//LDPE

Engineering plastic
Soarlite (Injection grade)

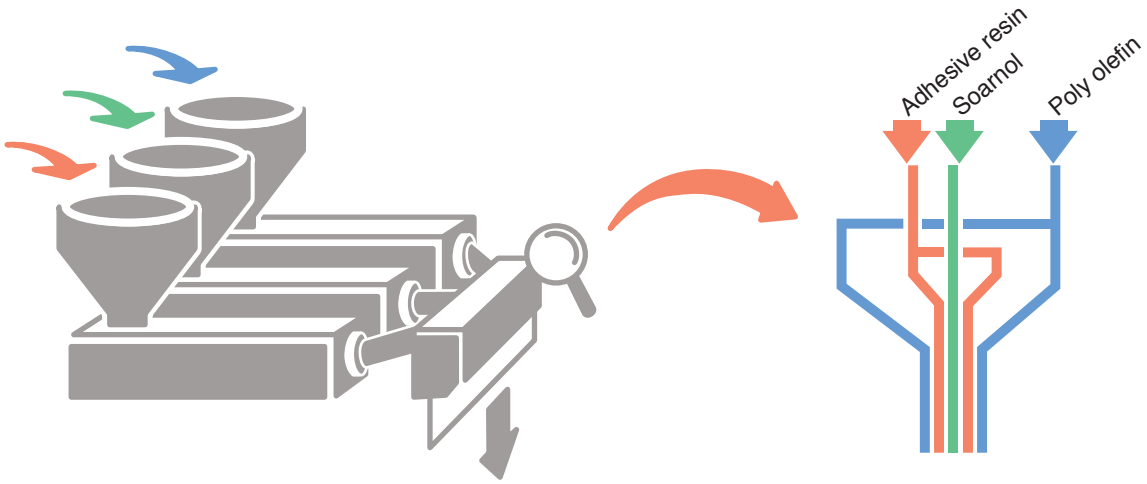
Outer packaging for
fresh meat
LDPE//Soarnol//LDPE

Under floor heating pipe
PEX//Soarnol//PEX

Gasoline tank
HDPE//Soarnol//HDPE

Molding for Soarnol

Soarnol is film laminated after forming processes such as co-extrusion with other resins and film processing, and used widely as the middle layer of multi-layer laminates to produce packaging film, bottles, tubes, and sheets. For example, water-resistant, moisture-resistant laminated film with heat sealing properties can be made by multi-stratifying with polyolefin via an adhesive resin layer, thus maximizing Soarnol's barrier capabilities. Also, an even tougher high barrier film can be created by laminating with nylon. The resins to be laminated vary depending on the type of food or drink product and storage method, and the method of secondary processing.

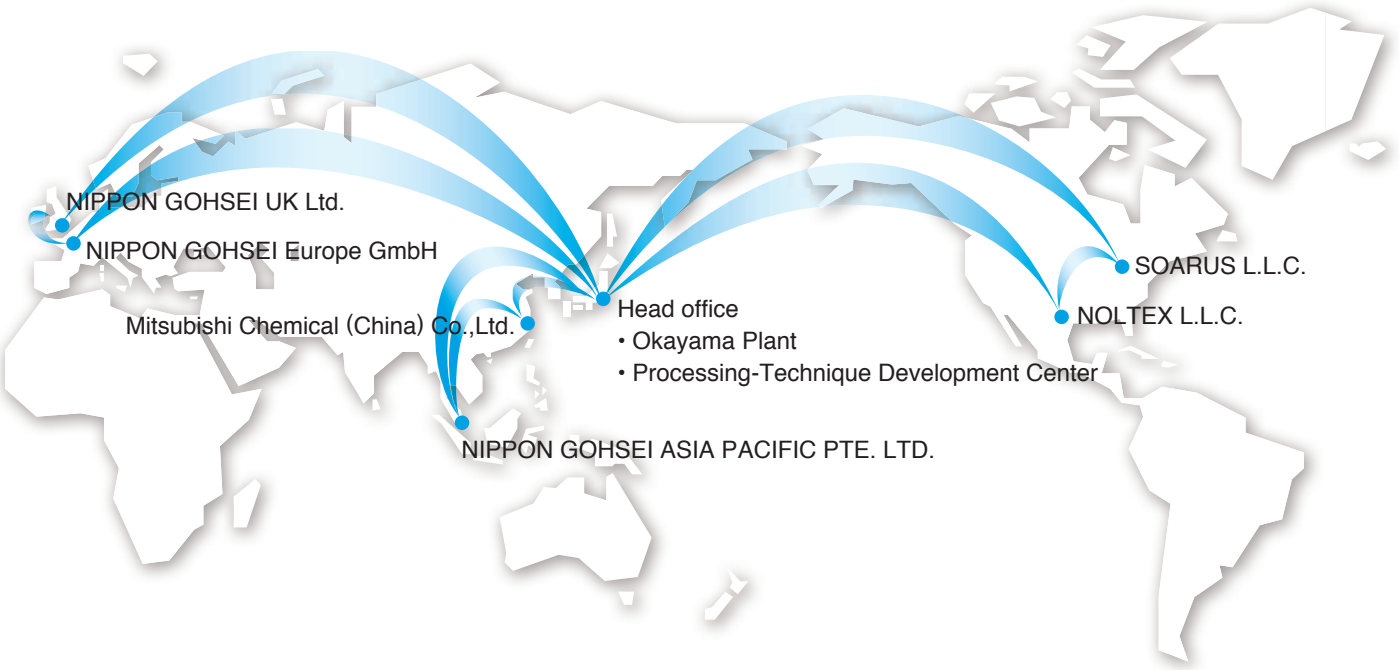


Food Hygiene of Soarnol

Soarnol does not contain any heavy metals or other harmful substances.
It conforms to the food hygiene regulations in all countries.

Japan	Ministry of Welfare Notice (No. 370) Japan Hygienic Association Voluntary Standards for Polyolefin and others
U.S.A.	US FDA 21CFR Part177
EU	Commission Regulation (EU) No.10 / 2011 and its amendments

Please contact us to inquire about food product hygiene for the various Soarnol brands or for food hygiene conformity in other countries.



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