



# Plastic Recycling

Plastic Recycle



PVC Stabilizer



Layered Double Hydroxide



**Sihwa Main Office**  
165, Hyeomnyeok-ro, Siheung-si, Gyeonggi-do (Jeongwang-dong)  
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<http://dsdansuk.com>



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DS DANSUK  
Promotional Video



Plastic Recycling Business  
Promotional Video

## 1 Company Introduction



## Founding Philosophy

“

**A company should keep developing and contribute to society.**

”

Since its foundation in 1965, DS Dansuk has been serving as an eco-friendly energy and materials company engaging in the business of bioenergy (bio diesel/bio heavy oil, etc.), battery recycling (recycled lead, etc.), and plastic recycling (PVC stabilizers, etc.).

The plastics recycling business is leading the fine chemical materials market with customized PVC stabilizers and hydrotalcite (LDH) products and is building a sustainable business model by promoting the post-consumer recycled (PCR) plastic business with its subsidiaries.

We aim to become a company trusted by all stakeholders based on trust and responsibility for customers and, furthermore, to become a company contributing to the development of local communities and the nation.

## Company Introduction

<b>Company Name</b>	DS DANSUK CO., LTD.
<b>Establishment Date</b>	July 1, 1965
<b>CEO</b>	Han Seung-uk, Kim Jong-woan
<b>No. of Employees</b>	416 persons (as of December 31, 2023)
<b>Head Office Location</b>	Sihwa Head Office – 165, Hyeomnyeok-ro, Siheung-si, Gyeonggi-do (Jeongwang-dong)
<b>Website</b>	<a href="http://dsdansuk.com/">http://dsdansuk.com/</a>
<b>Business Area</b>	Plastic recycling, Bioenergy, Battery recycling

# History

## PART 1.

### Establishment, laying the foundation for fine chemistry

1965  
~  
1989

- 1965 · **Founded Novel Industry Company,** developed and manufactured manganese sulphate
- 1969 · Developed and manufactured cuprous oxide and copper oxide
- 1973 · Developed and manufactured red lead and litharge
- 1982 · Designated as a prioritized small/middle-sized company for modernization
- 1984 · **Developed and manufactured PVC stabilizer**  
· Founded Novel Industrial Co., Ltd.  
· Acquired KS certification for red lead
- 1989 · Changed the company name to Dansuk Industrial Co., Ltd.



Novel Industry Company in the early days



PVC Stabilizer Facility

## PART 2.

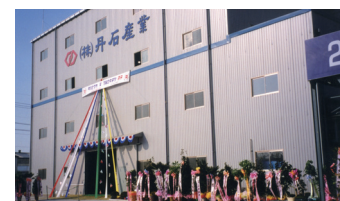
### Securing a foothold for growth through concentration of competitiveness

1995  
~  
2001

- 1995 · Relocated to Sihwa Industrial Complex, secured modern manufacturing infrastructures and research facilities
- 1996 · Selected as 'Proud small/Medium-sized company' by the department of trade and industry
- 1999 · Received the Minister of Commerce, Industry and Energy Award in the National Productivity Awards (R&D)  
· Designated as the 'Company with Excellent Productivity'
- 2000 · Received the Presidential Award for contributor to productivity improvement
- 2001 · **Completed construction of fine chemical plant building**  
· Acquired patent on electric furnace manufacturing technology  
· Venture business certification (new technology developing company)  
· Selected as a company with superior technologies



Relocation to Sihwa Industrial Complex



Completion of Fine Chemical Plant

## PART 3.

### Challenges and changes through business diversification

2005  
~  
2015

- 2005 · **Completed construction of the plant in the High-Tech Industrial Development Zone of Hunan Province, China**
- 2007 · Completed bio diesel production plant and facility construction, established glycerin production system
- 2011 · Completed construction of remelted lead plant (Soryong-dong, Gunsan-si, Jeonbuk State)
- 2012 · Completed refined oil system
- 2013 · **Completed construction of LDH plant (Osikdo-dong, Gunsan-si, Jeonbuk State)**  
· Received the USD 100 Million Export Tower Award
- 2014 · Completed bio heavy oil production plant



Completion of LDH Plant



LDH Products

## PART 4.

### Securing future growth engines and globalization

2016  
~  
2023

- 2016 · Started bio diesel facility operation at Pyeongtaek 2 Plant
- 2017 · **Acquired affiliated company Samil Innocom (Current Dansuk Advanced Materials)**
- 2018 · Started bio diesel facility operation at Pyeongtaek Plant 1
- 2019 · **Started Pakistan Plant operation, acquired Dansuk Malaysia Plant**
- 2020 · Received the USD 200 Million Export Tower Award
- 2021 · Started bio diesel facility operation at Jecheon Plant
- 2022 · First export of bio marine fuel (BMF) to Europe  
· Received the USD 300 Million Export Tower Award
- 2023 · Started construction of LIB recycling factory, completed the construction of copper melting and casting process  
· Changed the company name to DS DANSUK CO., LTD.  
· Acquired the shares of affiliated companies DS WOOL BIO, HIVE, and **DS E&E**  
· **Listed in the marketable securities market (KOSPI)**



DS Malaysia Plant



Received the USD 300 Million Export Tower Award

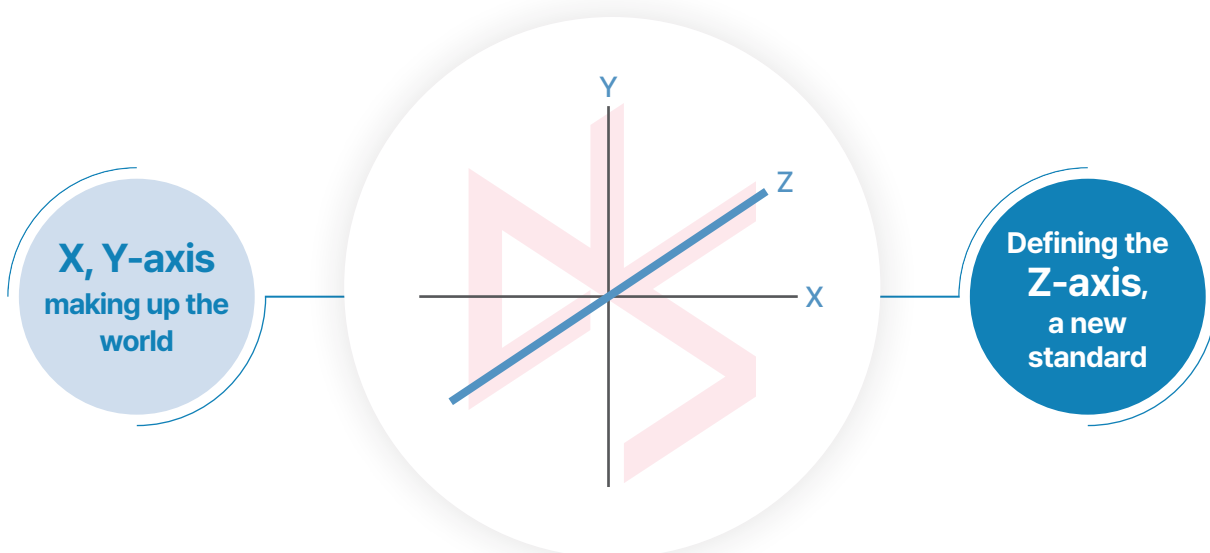
## Corporate Identity



### Define Standard

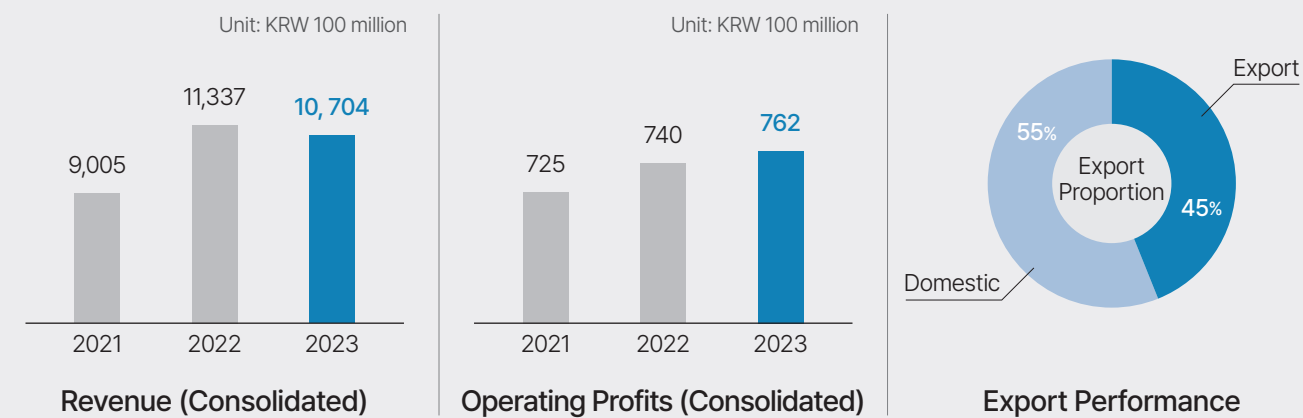
DS DANSUK, Defining the new standard.

Our technologies come together with new ideas to discover previously unavailable possibilities, present industry standards through continuous challenges towards new things and professions, and create a new standard to make our lives more abundant.

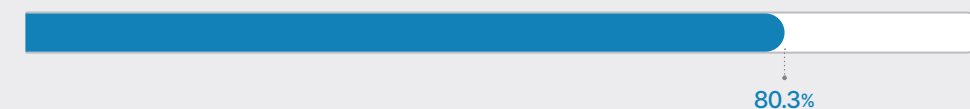


## 2 DS DANSUK Highlights \* as of 2023

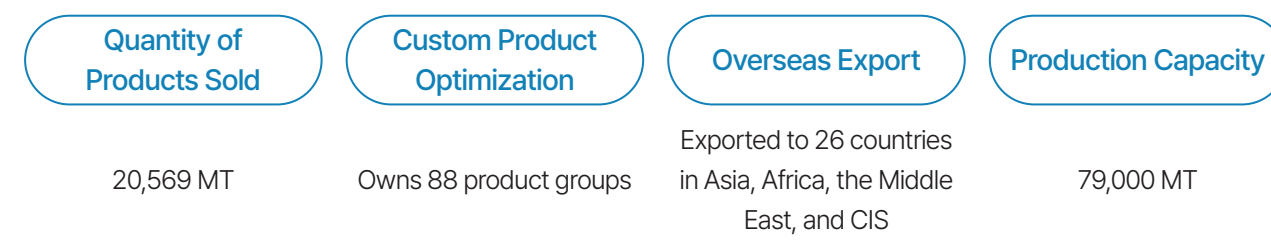
### Company Highlights



Proportion of Eco-friendly and Circular Economy Revenue



### Business Highlights





# PRODUCT PORTFOLIO

One Pack Stabilizer

Basic PVC Stabilizer

Metal Soaps

DNT-09 Series

## 3 Business and Product Overview

### One Pack Stabilizer

#### Product Information

One Pack Stabilizer is a customizable additive that improves the properties of PVC-molded products by inhibiting the degradation of chlorine and improving thermal stability during molding.

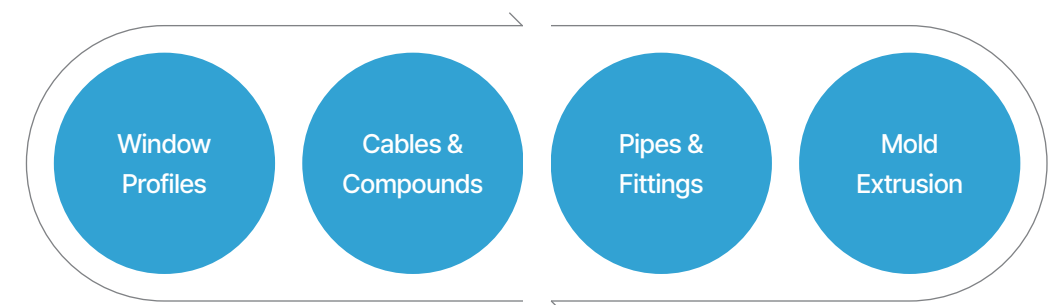
#### Development and Supply

DS DANSUK developed lead-based stabilizers in 1984 and has been leading the market by launching non-toxic stabilizer products through advanced R&D. In addition, in 2022, the One Pack Stabilizer facility at the Sihwa Plant was expanded and relocated to Gunsan Fine Chemical Plant to unify the production system. One Pack Stabilizer products are currently supplied to PVC processing companies, such as LX Hausys, KCC, Hyundai L&C, Younglim, and Kumho Petrochemical.

#### Characteristics

- Customized additives to meet customers' processing needs
- Prevents physicochemical deformation and improves processability during PVC thermal processing (extrusion, injection)
- Improves weather resistance by preventing oxidation and deterioration of molded parts

#### Purpose





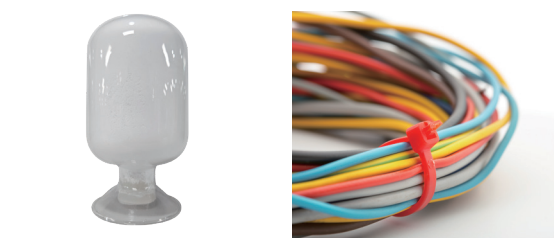
Pb-based Stabilizer

Uses	SERIES	Major Products	Appearance	Characteristics
Pipe	KN	KN-500	Bead	Highly active, excellent productivity and work stability
Cable		KN900V	Powder	Excellent heat resistance and electrical insulation
Fitting	KN	KN-506F		Good processability, excellent productivity
	LF	LF-930P2		
Window profile	LW	LW-100P		Outstanding weather resistance, excellent dynamic thermal stability
General profile	KD	KD-300M		Wide range of applications: panels, sidings, etc.
Hose	NP	NP-1		Excellent heat resistance and processability

Ca/Zn-based : based on LDH

Uses	SERIES	Major Products	Appearance	Characteristics
Cable	NC	NC110P	Powder	Excellent electrical insulation and thermal stability
	CZ	CZ127		
Pipe	NP	NP200P		Excellent dynamic thermal stability, high productivity
Fitting	NF	NF100		Excellent thermal stability and processability
Window profile	NW	NW600P		Excellent weather resistance and gloss
General profile	NH	NH350P		Excellent thermal stability and processability
Hose	CZ	CZ201	Granule	Excellent transparency and early colorfastness
Tile	DS	DS356		Excellent early colorfastness, Ba/Zn System

Powder



Granule



Bead



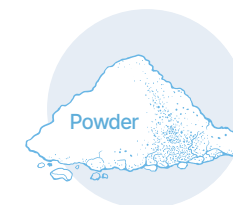
Pellet



Basic PVC Stabilizer

Product Information

One Pack Stabilizer are composed of stabilizers, internal/ external activators, antioxidants, and release agents; among them, basic stabilizers take up much of the composition and play an important role.



Development and Supply

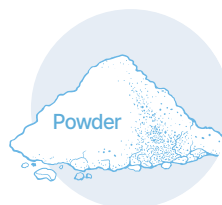
DS DANSUK has strengthened the quality of basic stabilizers and competitiveness of the production facilities to equip itself with the largest production scale in Korea and has been equipped with business competitiveness through vertical integration of PVC stabilizer products. Although the market size of basic lead-based stabilizers is shrinking due to environmental and health issues, sales are expanding to overseas markets such as Southeast Asia, the Middle East, and Russia, or are being replaced by organic tin-based, Ba-zn, Ca-zn, and Ca-zn-based stabilizers.

Items	Product Name	Packing Unit	Characteristics and Uses
Lead-based Stabilizers	TLS	25kg paper bag 500kg bag	<ul style="list-style-type: none"><li>· (Tribasic lead sulfate) Leading lead-based heat stabilizer for PVC</li><li>· Strong acid scavenger for excellent thermal stability, weather resistance, and electrical insulation</li><li>· Excellent moisture resistance and caking resistance due to surface treatment with basic fatty acids</li><li>· Excellent dispersibility, but cannot be used alone due to lack of activity</li><li>· Widely used in soft and hard products, mainly used for cable shielding, pipes and fittings, and construction materials</li></ul>
	DLP		<ul style="list-style-type: none"><li>· (Dibasic lead phosphate) Excellent heat stability and weather resistance (ability to absorb UV light)</li><li>· Excellent moisture resistance and caking resistance due to surface treatment with basic fatty acids</li><li>· Excellent dispersibility, but cannot be used alone due to lack of activity</li><li>· Suitable for outdoor products, mainly used for outdoor window frames</li></ul>
	DBL	10kg paper bag	<ul style="list-style-type: none"><li>· (Dibasic lead stearate) Excellent activity, heat resistance, water resistance, and electrical insulation</li><li>· Mainly used for hard extrusion and injection molding / No blooming, also used for soft formulations</li></ul>
	Pb-St	25kg paper bag	<ul style="list-style-type: none"><li>· (Lead stearate) Used as stabilizer and active material, used for various applications, both hard and soft</li></ul>

## Metal Soaps

### Product Information

Metallic Stearate are important raw materials for One Pack Stabilizer and are additives with active functions such as softening and mold release of PVC.



### Development and Supply

DS DANSUK's Metallic Stearate are also used as auxiliary raw materials for our One Pack Stabilizer to enhance quality and cost competitiveness, and we continue to supply them to the plastic molding industry and the polyolefin neutralizer and One Pack Stabilizer markets, not only in Korea but also overseas.

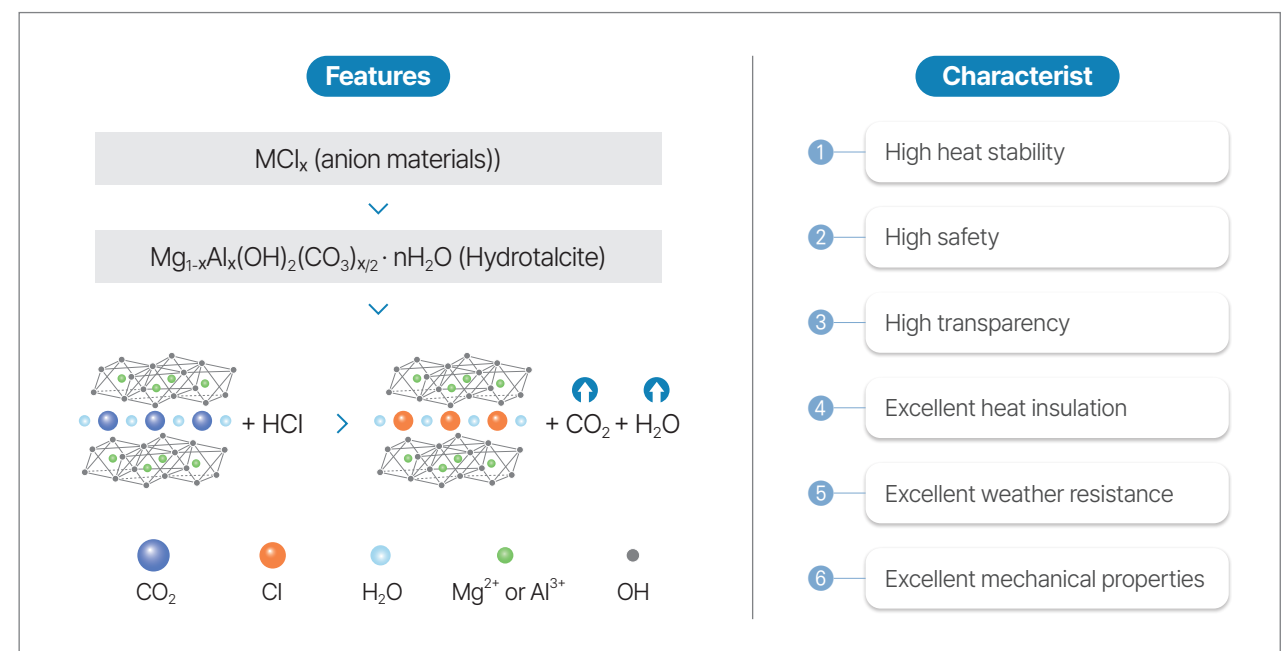
Items	Product Name	Packing Unit	Characteristics and Uses
Metallic Stearate	Zn-St	20kg paper bag	<ul style="list-style-type: none"> <li>· (Zinc stearate) The white powdered product with light apparent specific gravity is non-toxic and economical</li> <li>· Prevents initial coloring and plate-out, but causes Zn-Burning</li> <li>· Used not only as a PVC heat stabilizer but also for various uses, including activator for PS and ABS, pigment dispersant, release agent, lubricant, cosmetics, and others</li> </ul>
	Ca-St		<ul style="list-style-type: none"> <li>· (Calcium stearate) Non-toxic, excellent activation, used as a stabilizer, release agent, activator, and neutralizer</li> <li>· Synergistic when used together with zinc compounds and epoxy compounds</li> <li>· May cause plate-out when used in large quantities</li> </ul>
	Ba-St		<ul style="list-style-type: none"> <li>· Used for various processing (extrusion, injection molding, calendaring) due to its excellent activation, gelling, and heat resistance</li> <li>· Synergistic when used together with Cd compounds, Zn compounds, and epoxy compounds</li> <li>· May cause plate-out when used in large quantities</li> </ul>

## DNT-09 Series

### Hydrotalcite / LDH (Layered Double Hydroxide)

Hydrotalcite is a layered double hydroxide (LDH), a structure containing carbonate ions (CO<sub>3</sub><sup>2-</sup>) and crystalline water between plate-like layers composed of magnesium hydroxide and aluminum hydroxide. Unlike lead-based additives, it is composed of substances that are harmless to humans. Hydrotalcite has the ability to capture targeted anions through a unique anion exchange between the two plate layers. It can be used in various kinds of resins in combination with other additives to improve the properties and stability of the resin.

### Features and Characteristics of Hydrotalcite



### Application of Hydrotalcite

Items	Uses
Non-toxic PVC heat stabilizers	An eco-friendly material without heavy metals that is added with other additives in PVC resin to provide high thermal stability
Ziegler-Natta catalytic neutralizers	Effectively removes catalyst residues left after polymerization of polyolefins(PE/PP) to prevent resin decomposition
Anti-chlorine agents	Used in the polymerization of polyurethane – especially spandex – to maintain physical properties and impart high anti-chlorine ability
Flame retardants	A substance composed of hydroxylated inorganic compounds that imparts high flame-retardant effect to various resins
Other additives	Used to scavenge various halogen substances and as an antacid

## DNT-09



### Product Information

Our DNT-09 is the most universal product used as a PVC stabilizer and polyolefin neutralizer. It is added to PVC resin to quickly scavenge hydrogen chloride (HCl) and chlorine (Cl) generated by PVC degradation within the hydrotalcite layer through ion exchange to prevent PVC degradation. It is used as an eco-friendly, non-toxic heat stabilizer without heavy metals compared to PVC heat stabilizers with lead or tin. It effectively removes catalyst residue generated after polymerization of polyolefin and prevents resin decomposition.

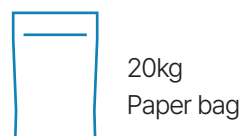
### Product Specifications

Contents	Unit	Standard
Appearance	-	White Powder
Molar ratio MgO/Al <sub>2</sub> O <sub>3</sub>	-	4.3 ± 0.2
Loss on Drying	%	Max 0.5
Particle size (mean)	μm	Max 5.0
Bulk Density	g/cc	0.3 ± 0.05
Heavy Metal contents	ppm	Max 50

### Application

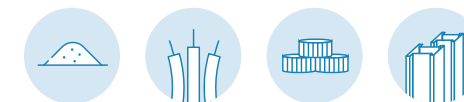
Items	Uses
Non-toxic PVC heat stabilizers	An eco-friendly material without heavy metals that is added with other additives in PVC resin to provide high thermal stability
Ziegler-Natta catalytic neutralizers	Effectively removes catalyst residues left after polymerization of polyolefins(PE/PP) to prevent resin decomposition
Other additives	Used to scavenge various halogen substances and as an antacid (halogen scavenger)

### Packing Unit



20kg  
Paper bag

## DNT-09N



### Product Information

Our DNT-09N is a product that improves electrical insulation performance by controlling the sodium (Na) content in the product to an extremely small amount through a special process. It is applied to PVC wires and cables for its excellent dispersion and outstanding electricity insulation. It is added to PVC resin to quickly scavenge hydrogen chloride (HCl) and chlorine (Cl) generated by PVC degradation within the hydrotalcite layer through ion exchange to prevent PVC degradation. It is used as an eco-friendly, non-toxic heat stabilizer without heavy metals compared to PVC heat stabilizers with lead or tin.

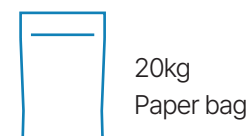
### Product Specifications

Contents	Unit	Standard
Appearance	-	White Powder
Molar ratio MgO/Al <sub>2</sub> O <sub>3</sub>	-	4.3 ± 0.2
Loss on Drying	%	Max 0.5
Particle size (mean)	μm	Max 5.0
Bulk Density	g/cc	0.3 ± 0.05
Na contents	ppm	Max 300
Heavy Metal contents	ppm	Max 50

### Application

Items	Uses
Electric cable additives	Reduces electrical resistance of PVC cables with low sodium content to provide electrical insulation effect
Non-toxic PVC heat stabilizers	An eco-friendly material without heavy metals that is added with other additives in PVC resin to provide high thermal stability
Other additives	Used to scavenge various halogen substances and as an antacid (halogen scavenger)

### Packing Unit



20kg  
Paper bag



## DNT-09S



### Product Information

Our DNT-09S is a product with controlled interlayer water of hydrotalcite that is added in the polymerization of polyurethane – especially spandex – to improve fiber characteristics. It imparts anti-chlorine properties to spandex fibers, allowing hydrogen chloride (HCl) and chlorine (Cl) to be quickly scavenged in the hydrotalcite interlayers through ion exchanges, improving the elastic life of the fiber.

### Product Specifications

Contents		Unit	Standard
Appearance	L	-	Min 94.0
	b	-	Max 4.0
Loss on Drying (For 2h at 240°C)		%	Max 3.0
Ash (For 1h at 700°C)		%	65.0 ± 3.0
Particle size (Mean)		μm	Max 3.0
pH		-	9.0 ± 1.0
Coating level		%	Max 3.0

### Application

Items	Uses
Anti-chlorine agents	Used in the manufacture of synthetic fibers, such as spandex, to give the fiber anti-chlorine properties
Flame retardants	A substance composed of hydroxylated inorganic compounds that imparts high flame-retardant effect to various resins
Other additives	Used to scavenge various halogen substances and as an antacid (halogen scavenger)

### Packing Unit



20kg  
Aluminum bag

## DNT-09T



### Product Information

Our DNT-09T is a synthetic hydromagnesite, which is composed of magnesium carbonate and magnesium hydroxide. This product is added to the polymerization of polyurethanes, especially spandex, to improve the properties of the fiber. It imparts anti-chlorine properties to spandex fibers and contributes in particular to the whiteness of the fiber

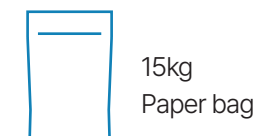
### Product Specifications

Contents	Unit	Standard
Appearance (AHPA. L)	-	Min 99.0
Moisture	%	Max 1.5
Particle Size (Mean)	μm	Max 5.0
Bulk Density	g/cc	Min 0.25

### Application

Items	Uses
Anti-chlorine agents	Used in the manufacture of synthetic fibers, such as spandex, to give the fiber anti-chlorine properties
Flame retardants	A substance composed of hydroxylated inorganic compounds that imparts high flame-retardant effect to various resins
Other additives	Used to scavenge various halogen substances and as an antacid (halogen scavenger)

### Packing Unit



15kg  
Paper bag

## 4 Current Business Sites

### Head Office, Sihwa Plant

165, Hyeomnyeok-ro, Siheung-si, Gyeonggi-do

**Factory Area** | Land 26,193m<sup>2</sup> / Building 17,190m<sup>2</sup>

**Main Products** | Bio Diesel / Bio Heavy Oil, Bio Marine Fuel, PVC Stabilizer

PVC Stabilizer Capacity: About 21,000 tons/year



### Pyeongtaek Bio Plant 1

216, Pyeongtaekhangman-gil, Poseung-eup, Pyeongtaek-si, Gyeonggi-do

**Factory Area** | Land 20,810m<sup>2</sup> / Building 4,003m<sup>2</sup>

**Main Products** | Bio Diesel

### Jecheon Bio Plant

39, Cheongpungho-ro 24-gil, Geumseong-myeon, Jecheon-si, Chungcheongbuk-do

**Factory Area** | Land 6,785m<sup>2</sup> / Building 1,921m<sup>2</sup>

**Main Products** | Bio Diesel

### Gunsan Fine Chemicals Plant

137, Muyeok-ro, Gunsan-si, Jeonbuk State

**Factory Area** | Land 19,853m<sup>2</sup> / Building 5,379m<sup>2</sup>

**Main Products** | LDH / Hydrotalcite, One Pack Stabilizer

· LDH Capacity: about 18,000 tons/year  
One Pack Stabilizer Capacity: about 40,000 tons/year

### Pyeongtaek Bio Plant 2

11, Poseunggongdansunhwan-ro, Poseung-eup, Pyeongtaek-si, Gyeonggi-do

**Factory Area** | Land 2,060m<sup>2</sup> / Building 1,693m<sup>2</sup>

**Main Products** | Bio Diesel

### Gunsan Recycling Plant

10, Seohae-ro, Gunsan-si, Jeonbuk State

**Factory Area** | Land 37,083m<sup>2</sup> / Building 7,429m<sup>2</sup>

**Main Products** | Remelted Lead (Pb), Lead alloy (Pb Alloy), Copper alloy



## Domestic Affiliates and Overseas Sites

### Domestic Affiliates



### DS Advanced Materials

43, Ogyegongdan-gil, Geumho-eup, Yeongcheon-si, Gyeongsangbuk-do

**Factory Area** | Land 18,040m<sup>2</sup> / Building 1,887m<sup>2</sup>

**Main Products** | EP compound, PCR plastics



### DS E&E

100, Wolchongongdan-ro, Gunbuk-myeon, Haman-gun, Gyeongsangnam-do

**Factory Area** | Land 2,135m<sup>2</sup> / Building 340m<sup>2</sup>

**Main Products** | Recycled plastic materials (ABS, PP, HIPS, etc.)

### DS Metal Materials

25-4, Cheomdangjeop 4-ro, Sandong-myeon, Gumi-si, Gyeongsangbuk-do

**Factory Area** | Land 3,425m<sup>2</sup> / Building 1,218.2m<sup>2</sup>

**Main Products** | Litharge, etc.

### DS WOOIL BIO

48-7, Jageunhansul-gil, Bibong-myeon, Cheongyang-gun, Chungcheongnam-do

**Factory Area** | Land 4,752m<sup>2</sup> / Building 900m<sup>2</sup>

**Main Products** | Animal fat

### HIVE

52, Udusan-gil, Wonju-si, Gangwon State

**Factory Area** | Land 1,813m<sup>2</sup> / Building 479m<sup>2</sup>

**Main Products** | Cooking oil (soybean oil and 6 others)

### Overseas Sites



### Dansuk Malaysia

81700 Pasir Gudang, Johor, Malaysia

**Factory Area** | Land 16,500m<sup>2</sup> / Building 7,152m<sup>2</sup>

**Main Products** | PVC stabilizers, non-toxic stabilizers



### Dansuk Pakistan

Estate Rawind Road, Lahore, Pakistan

**Factory Area** | Land 3,630m<sup>2</sup> / Building 2,475m<sup>2</sup>

**Main Products** | PVC stabilizers, lead-based stabilizers



### Dansuk Zhuzhou China

51 Yulu Industrial Park, Huanghe N Rd, Tianyuan District, Zhuzhou, Hunan, China

**Factory Area** | Land 34,327m<sup>2</sup> / Building 4,026m<sup>2</sup>

**Main Products** | Raw material SCM, new material development