

JOONG-IL, a Company dedicated to **Humanity** and **Environment**

LEAD RECYCLING FOR THE HUMAN AND THE ENVIRONMENT

Management
Philosophy at
JOONG-IL

Striving beautifully together for healthy life and happiness with a mind filled with full of dreams and challenges.

JOONG-IL exists,
striving for a beautiful nature,
a prosperous future, and above all,
for all our common happiness.



Lead, which is one of the four non-ferrous metals [lead, zinc, aluminum and copper], has been used widely and variedly throughout the long history of the mankind, and nowadays, in addition to being used as the main ingredient in various lead-acid batteries, constituting 80% of the total lead consumption, it is being used widely in other areas, such as the raw material for various inorganic compounds, PVC stabilizers, crystal glasses, radiation shielding agents and pigments.

However, in spite of contributing significantly to the development of the mankind, a debate has been raised regarding its hazardousness as consequence of improper use and carelessness in the disposal thereof. Therefore, wastes to be recycled must be strictly managed through correct processes.

Joong-il is capable of securely managing the entire recycling processes of battery scraps, from gathering, transporting, smelting and refining thereof, to lead alloying and production of lead compounds for use in the manufacture of batteries using the lead recycled therefrom.

JOONG-IL is about to embark on a new challenge.

Hello Everyone!

Thank you for your interest in our company.

Since our inception in 1976, we have been focusing only on recycling of lead and related industries and as a consequence, we have grown to become a company that plays a big role in non-ferrous metal industry.

We are about to embark on a new mission, that is, "Creation of New Values". We will commit ourselves to "Environmental Management" and "Quality Management" using our new mission, i.e., "Creation of New Values" as the basis.

We strongly feel that the Resource Recycling is the path we must take and is an inevitable challenge for improving the quality of life.

Earth's natural resources are finite. Our goal and our mission are to make the finite Earth's resources to be used infinitely by setting up renewable resource system and maximizing the efficiency of the resource recycling.

We are trying to prevent the secondary pollution accompanying the recycling activities, and in line with this objective, we are committed to a continuous research.

We are fully aware that pursuing of the activities stated is what have sustained us and made us what we are, and it is, as well as reciprocating the care you have shown to our company, our social responsibility to continuously do so.

We will not be complacent by the laurel of being the leader in the domestic recycling industry, but promise to do our utmost in becoming the world leader in the recycling industry through sustainable growth and development.

Thank you.



Management and Employees of Joong-il
and its Family Companies.

Company Introduction

JOONG-IL a leading company equipped with an integrated production system for manufacturing top quality products using its advanced manufacturing equipment/facilities and superior technology accumulated over the years from battery scraps gathered from various industrial equipment and automobiles, the products including lead ingots, lead oxides and renewable poly-propylene pellets, and these products are being supplied to various industries as the raw materials.

Today, we are living in an eco-friendly industrial age of "circulating resources", our living environment transitioning from **(production) → (usage) → (disposal)** to **(production) → (usage) → (disposal) → (recycling)**.

Eco-friendly production is an inevitable choice for establishing a sustainable industrial society.

Our Mission/ Mission Statement

"Creation of New Values"
through the use of Waste Recycling System

1. Maximization of Resource Recovery
2. Customer Satisfaction through Quality
3. Establishment of Environmentally Clean Manufacturing System

JOONG-IL is taking one step at a time toward a better future

Company History

1976~
1989

1976. 06

Incorporation of Joong-il
(Headquarter: Sanrim-dong,
Jung-gu, Seoul)

1980. 10

Plant Relocation
(From Shinjeong-dong,
Yangcheon-gu, Seoul to
Banweol Industrial Complex,
Ansan-shi)

1988. 10

Carrying out the Second
Lead Smelting Cooperative
Project, a Strategic Project
initiated by the Ministry of
Commerce and Industry

1990~
1999

1990. 04

Approval of Cooperative
Project from Small and
Medium Business Corporation
(Approval No.89-8)

1992. 11

Completion of the Plant and
Start of the Lead Smelting
Operation thereat

1994. 10

Corporate Merger (Acquisition
of Daehan Jeonjiyeon, Ltd.,
a cooperative partner in the
Cooperative Project)

1997. 06

Registration of Patent No.
0,199,665 (Method for
chemically treating lead dust,
the main component thereof
being lead sulfide)

1998. 05

Renamed to JOONG-IL
METALS INC. from Daehan
Jeonjiyeon, Ltd.

1998. 11

Acquisition of Lead Compound
Plant and Start of the Plant
Operation (Jinyeong-eup,
Gimhae, Gyeongnam)

2000~
2004

2000. 02

Elected by IBK as an
"Excellent Family Enterprises"

2002. 03

Obtaining of ISO/KS A9001:2000
Certification (Ansan)

2002. 12

Korea Technology Credit
Guarantee Fund: Selected as
Superior Technology Company

2003. 03

Obtaining of ISO/KS A9001:2000
Certification (Gimhae)

2003. 07

Registration of Utility Model No.
0322424 (Mechanism for Controlling
Molten Metal Transfer Pump)

2004. 09

Completion of the Automated Line
at Ansan Plant and Start of the
Operation thereof (Introduction
of Waste Battery Treatment
Equipment and Closed Cell
Production Facility)

2004. 12

Acquisition of KSA/ISO 14001
Certification (Ansan)

2004. 12

Recognized as CLEAN Business Site
(No. Article No. 10111, Gimhae)

2005~
2009

2005. 11

Recognized as a company for
specializing in components
and materials (MOCIE)

2006. 08

Acquisition of KSA/ISO
14001 Certification (Gimhae)

2007. 04

Establishment of Labor
Welfare Fund (Employee
Benefits and Student
Financial Aid Package)

2008. 04

Received the Award for
the Superior Management
(Chairman D. H. Kim)
from Ansan Chamber of
Commerce and Industry,
selected among its member
companies.

2008. 11

Expansion of Ansan Plant
Site (10,499m² → 20,970m²)

2009. 11

Received USD 20 Million
Export Tower Award at the
46th Trade Day

2010~

2010. 03

Received an Award (Minister
of Strategy and Finance) at the
44th Article of the Tax Day

2010. 10

Start of the Construction of
New Plant

2011. 12

Received USD 30 Million
Export Tower Award at the
48th Trade Day

2011. 12

Completion of the New Plant

2012. 07

Business Spin-off
(Human Resources-wise) →
New Business Entity, i.e.,
Joong-il Metal Oxides Inc.
being established at Gimhae

2015. 03

Received an Award
(the Director of the Office of
National Tax Administration) at
the 44th Article of the Tax Day

2015. 06

Received the SME Merit
Award [Industry] Award

Service at **JOONG-IL**, a Service that you can trust

Joong-il, in order to achieve the goal of becoming a first-class enterprise, firstly, establishes the quality, environment, health and safety policies, secondly, ensures the quality reliability and safety of the product, and thirdly, follows the following to meet the customer satisfaction:

Quality Policy

- Achieving the quality characteristics meeting the customers' needs
- Competitive pricing and meeting of delivery schedule through continuous improvement in manufacturing processes
- Company-wide activities for improving the quality

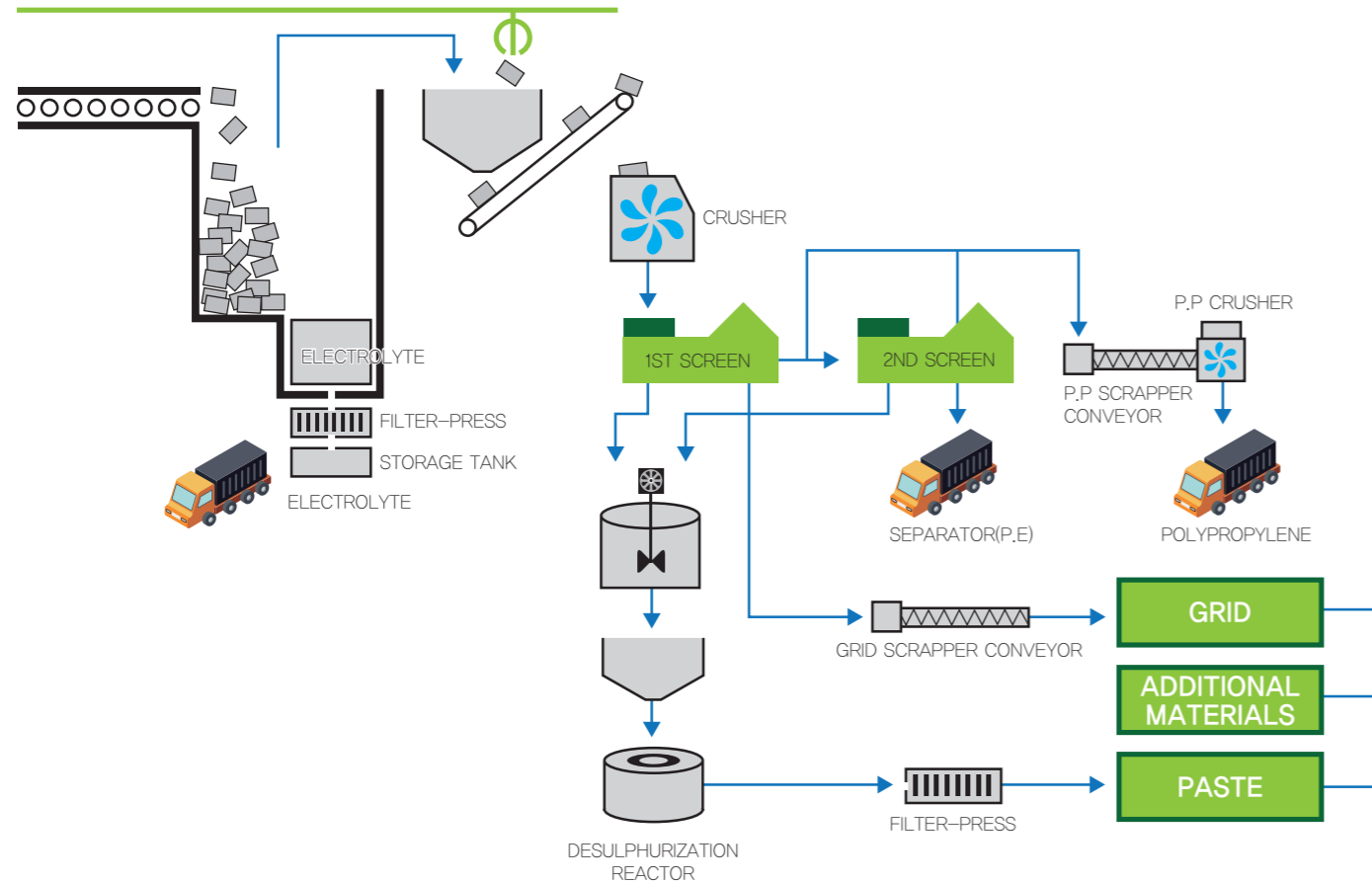
Environmental Policy

- Establishment of eco-friendly management system
- Fostering of clean environment through continuous environment improvement
- Complying with relevant environmental laws and regulations in addition to independently setting up and operating of control standards
- Establishing of environment management system through setting up of goals in environment and regular reviewing thereof

Health and Safety Environmental Policy

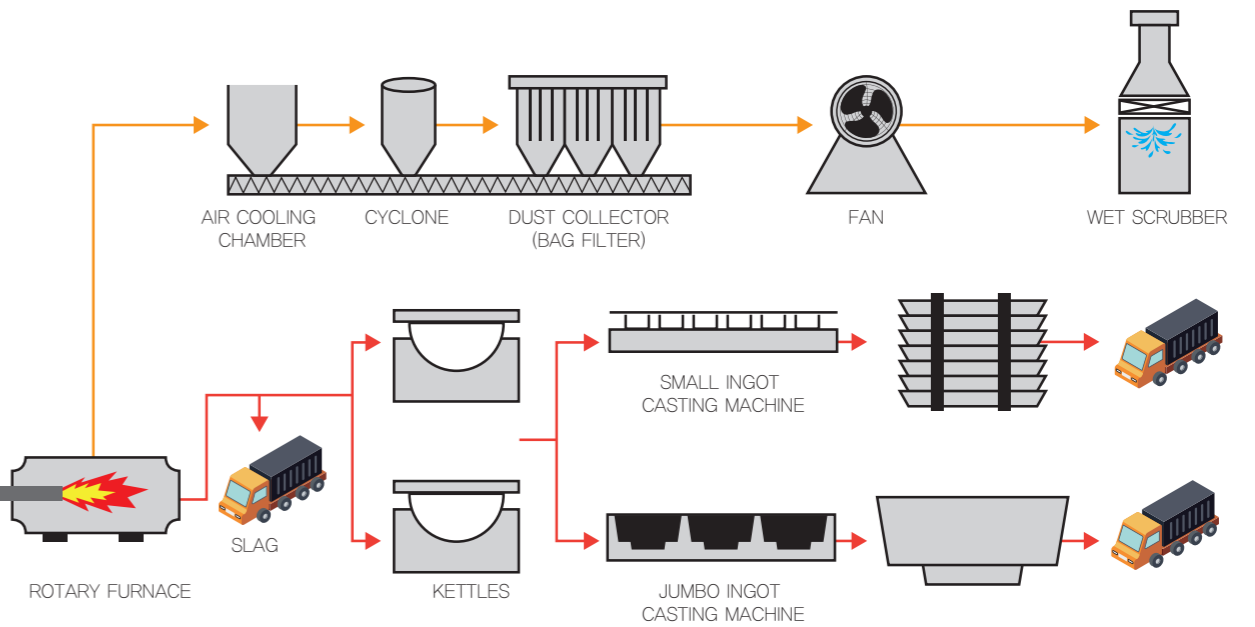
- Full compliance with national and international laws and regulations
- Providing the employee with a safe and healthy workplace by providing a safe and healthy environment and by performing its duties as a responsible company, providing the neighborhood with a clean environment

Process Flow at JOONG-IL



Status of the Main Equipment

Pretreatment: 2 / Rotary Furnace: 3 / Kettle: 11 /
Casting Machine (small-scale): 2 / Casting Machine (large-scale):1



Pre-treatment



Waste Battery Sorting



Waste Battery Crushing



Waste Battery Separation



Desulfurization

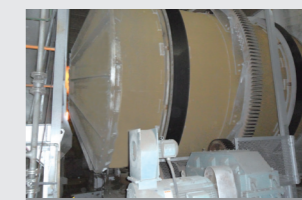
Smelting



Raw Material



Raw Material Charging



Rotary Furnace



Fanning

Refining & Casting



Refining and Alloying



Small Ingot Casting



Jumbo Ingot Casting



Product Transporting

Commercializing



Component Analysis



Small Ingot Loading



Jumbo Ingot Loading

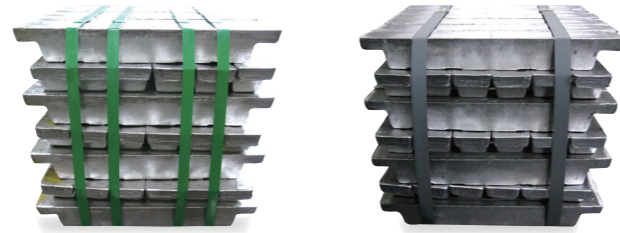


Transporting

Lead Alloy

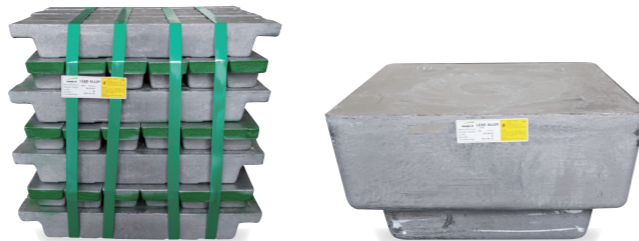
1. ANTIMONIAL LEAD ALLOY

Content: Antimony 2~6%
 Type: Small Ingot
 Weight: 25±1 kg/EA
 Packaging Specification: 1,050 ± 50kg / 1Bundle
 Quantity: 42EA / 1Bundle
 Uses: Batteries, various industrial Uses



2. LEAD CALCIUM ALLOY

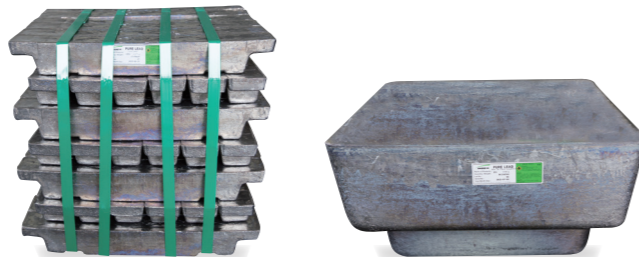
Content: Calcium 0.07 ~ 0.05%
 Type: Small Ingot, Jumbo Ingot
 Weight: 25±kg/EA, 900±50kg/EA
 Packaging Specification: 1,050 ± 50kg / 1Bundle, 900±50kg/EA
 Quantity: 42EA / 1Bundle
 Uses: Batteries, various industrial Uses



Pure Lead

PURE LEAD INGOT

Content: Pb 99.985% Min
 Type: Small Ingot, Jumbo Ingot
 Weight: 25±kg/EA, 900±50kg/EA
 Packaging Specification: 1,050 ± 50kg / 1Bundle, 900±50kg/EA
 Quantity: 42EA/1Bundle, 1EA
 Uses: Batteries, Various Industrial Uses



By-products

POLYPROPYLENE CHIPS



Raw Material Procurement

Joong-il procures the battery scraps, the main ingredient for the secondary smelting, domestically and from abroad and use them as the raw material.



Raw Materials

Battery Scraps

Automotive batteries and industrial batteries (UPS, Batteries for Forklifts), With Acid (RINK), Drained (RAINS)

Pure Lead Ingot

Pb 99.98%min & Dross 1% Max
 (Other impurities: Consultation)

Lead Bullion

Pb 99%min & Dross 3% Max
 (Other impurities: Consultation)

Lead Scraps

Lead Plate, Lead Cables and various Lead Scraps

Grid

Net-shaped Lead at the Plate Part of the Waste Batteries

Paste

Lead Compounds attached to the Grid of the Plate Part of the Waste Batteries

Environment Protection Equipment

Joong-il is the first company in Asia equipped with pre-treatment equipment for battery scraps (CX-System) and an various automated smelting facilities, allowing it to emit toxic gases that are below 50% of the standard values of the developed countries.



In order to meet the national as well as the global proposition to reduce the air pollution and water pollution that are becoming ever so severe and to perpetuate the recycling business that is efficient and pollution-free, Joong-il has installed a fully automated facility that is most efficient in the world and is capable of carrying out the complete pre-treatment processes in one-stop multi form, the pre-treatment processes consisting of 'storing-inputting-pulverizing-separating-desulfurization-dehydration' This will make it possible to minimize the secondary wastes by separating the constituent materials of the battery scraps according to the type and Joong-il is currently preparing to set up a production system for sodium sulfate (Glauber's Salt) which is the by-products of desulfurization of the sulfur, constituting 5~10% of the sulfur contents in the battery scraps. In addition, Joong-il has converted to the use of clean fuel from the use of various fossil fuels, such as coal, used in tradition smelting processes, thereby reducing the emission of hazardous gases, such as SOx and NOx, by more than 90% and also minimized the generation of hazardous materials by automating the storing, transporting, inputting and outing processes of the raw and auxiliary materials.

It is predicted that the future competitiveness in lead recycling and smelting industries will be environmental competitiveness. When the Kyoto Protocol comes into effect and trading of the gas emission becomes active, those companies equipped with equipment not suitable for environmental competing will lose their competitiveness as a company.

Joong-il, while, proactively coping with continuing environment changes, will do its utmost to maximize the efficiency of resources use through establishment of the system for recycling of the resources, through making contributions in advancement of lead recycling industry and though continuous research and development.

Plant Export

Plant export by a company can only be realized if the company has advanced experience and accumulated know-how and this is another competitive edge of Joong-il



Joong-il has the necessary know-how to manufacture the equipment/facilities for the secondary smelting and refining of lead, based on 40 years of accumulated experience and technology, it is currently exporting the related equipment/facilities on a TURN-KEY basis. Plant specifications and purchase conditions are available for further consultations.

Certification
and
Qualification



ISO 9001



ISO 9001 CERTIFIED

ISO 14001



ISO 14001 CERTIFIED

- KSA/ISO 9001 Certification
- KSA/ISO 14001 Certification
- Registered Patent No. 0199665 – Method for chemically treating lead dust, the main component thereof being lead sulfide
- Registered Utility Model No. 0322424 – Mechanism for controlling molten metal transfer pump

JOONG-IL METAL OXIDES INC.

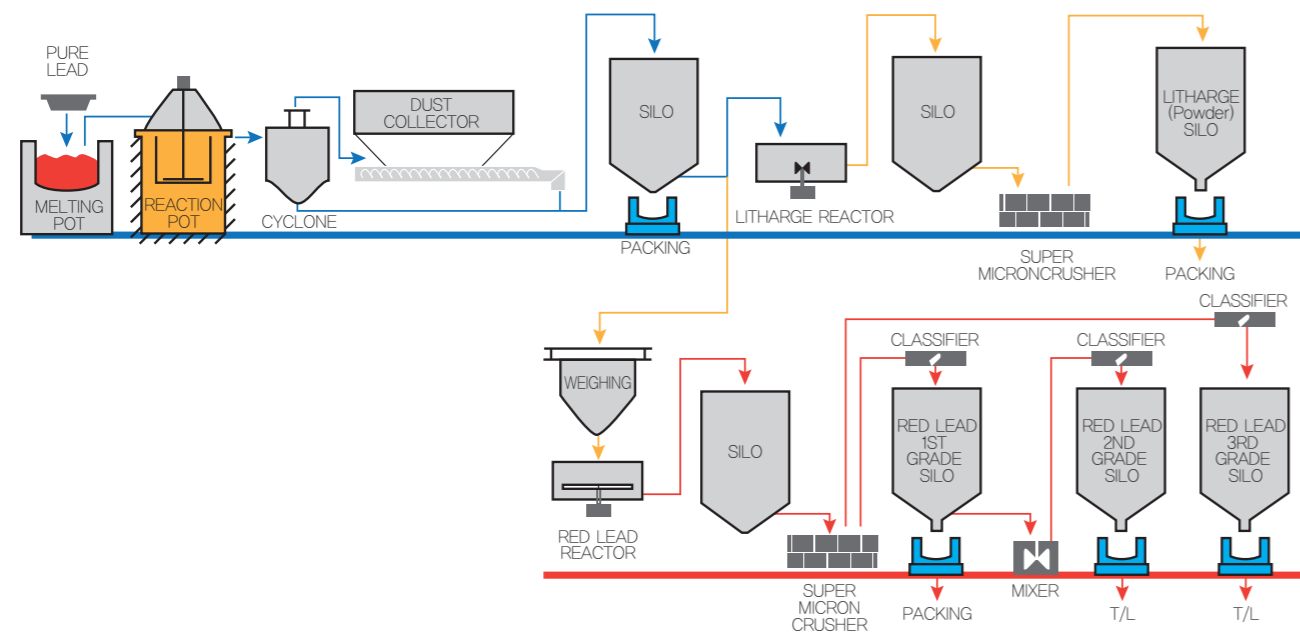
Company Introduction

JOONG-IL METAL OXIDES INC. located in Gimhae, Gyeongnam, produces lead oxides (red lead, litharge to be used as the raw material in batteries, paint pigments, PVC stabilizers and various other industrial goods.



Company History

- 76. 06 ● Incorporation of Joong-il
- 98. 11 ● Establishment of Gimhae Plant (Start of the Operation of Lead Compound Plant)
- 99. 10 ● Expansion of Gimhae Plant Site and Facilities, including Equipment
- 12. 07 ● Spin-off of Joong-il Metal Oxides Inc. from Joong-il Metals Inc.



Lead Powder Process
Ingot Melting → Primary Oxidation



Litharge Process
Primary Oxidation (Lead Powder) → Secondary Oxidation



Red Lead Process
Primary Oxidation (Lead Powder) → Secondary Oxidation

Main Products

Joong-il Oxide is equipped with manufacturing facilities that are optimized for product manufacturing and is capable of producing, using only the high quality materials, high quality products provided with physical properties expected by the customers.

RED LEAD

Use: Battery, Glass, Paint Pigment, other Industrial Goods

Packaging: 1,000kg, 500kg, 25kg / Bag

Main Properties:

Test Items	Test Standards	Units	Test Methods
Content(Pb ₃ O ₄)	97 Max	%	KS M ISO 510 :2013
Fe	10 Max	ppm	
Cu	15 Max	ppm	
Tamped density	3.0~4.0	g/ml	
Appearance density	1.2~2.2	g/cc	
Particle size	5.0 Max	μm	



(Note: Depending on the processing conditions and customers' requirements, the physical properties may slightly vary)

LITHARGE

Use: PVC Stabilizer, Paint Pigment, Pottery Glaze, Radiation Shielding

Packaging: 1,000kg, 500kg, 25kg / Bag

Main Properties:

Test Items	Test Standards	Units	Test Methods
Content(PbO)	99.5 Min	%	KS M 6608
CH ₃ COOH Insoluble Matter	0.1 Max	%	
Fe	10 Max	ppm	
Cu	15 Max	ppm	
Tamped density	4.0 Min	g/ml	
Appearance density	2.0~4.0	g/cc	
Particle size	6~8	μm	



(Note: Depending on the processing conditions and customers' requirements, the physical properties may slightly vary)



25kg bag



25kg pallet



500kg packing



1,000kg packing

Certification and Qualification KS Q ISO 9001 : 2009/ISO 9001:2008, KS I ISO 14001 : 2009/ISO 14001:2004

JM INTERNATIONAL INC.

Company Introduction

Incheon Branch Office of JM International Inc. is located in Incheon Namdong Industrial Complex, and recycles poly-propylene plastic wastes to produce eco-friendly plastics to be used as the raw material for various plastic products.



Raw Materials



Products



Shipping

Company History

- 11. 03 ● Incorporation of JM International Inc.
- 13. 08 ● Establishment of Branch Office of JM International Inc. (Namdong Industrial Complex)
- 14. 12 ● Relocation and Expansion of the Plant and Scale-up of the Production Capacity (Namdong Industrial Complex)



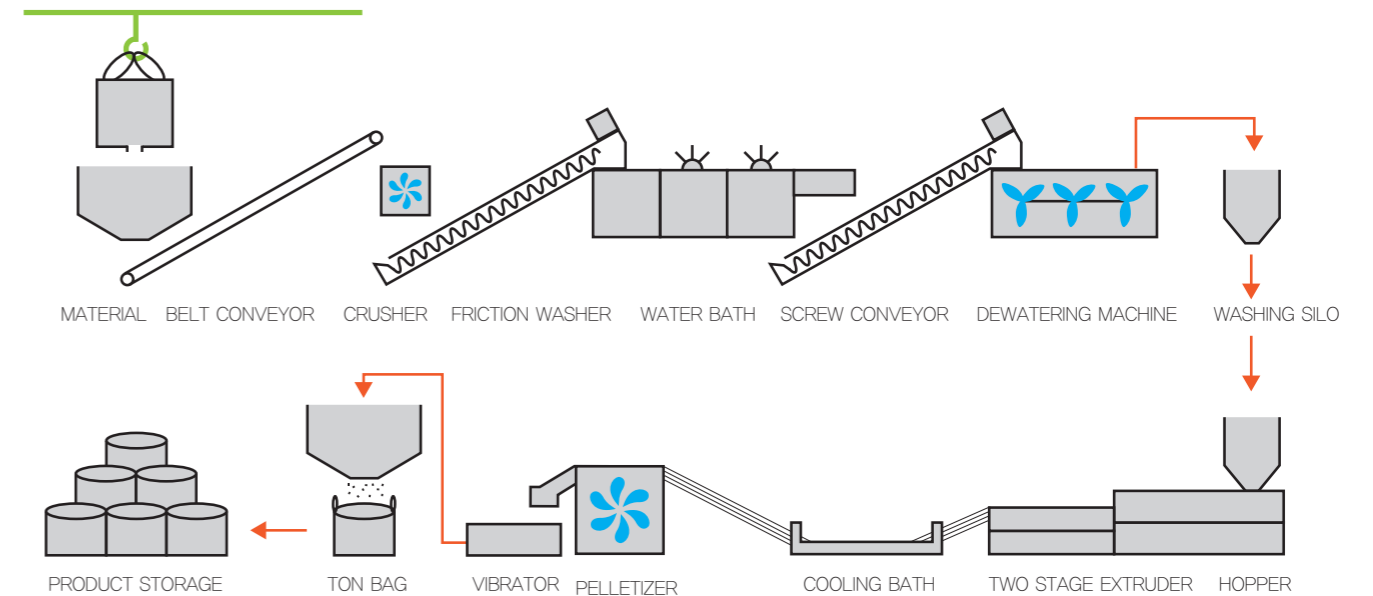
Plant View



Company Logo



Plant Interior



Current Status of the Equipment



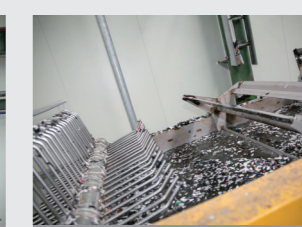
License Information



Raw Materials



Raw Materials Input Hopper



Cleansing



Drying and Transporting



Extrusion



Cutting



Product Storage Silo and Packaging



Product Storage Warehouse

Products

RECYCLED POLY-PROPYLENE

JM International Inc. is equipped with manufacturing facilities and is capable of producing, using only clean and high-purity material, a high quality product provided with excellent physical properties.



Main Properties

RECYCLED POLY-PROPYLENE

Test Items	Results	Units	Test Methods
Melting Index	9.5	g/10min	ASTM D1238
Tensile Strength	267	Kgf/cm2	ASTM D638
Percentage Elongation	96	%	ASTM D638
Weight/Mass	0.91	-	ASTM D792

(Note: Depending on the production conditions of the test samples, there may be a slight variation in the properties)



Ingredient : PP(Polypropylene)

Source of the Ingredients : Single item such as battery cases, supplying of materials of high purity

Final Product : PP Pellets

Usage : To be used as raw material, without requiring further processing, for injection molding in the production of automotive components, household goods, building materials and other industrial goods



JOONG-IL Family Companies

JOONG-IL METALS INC.

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