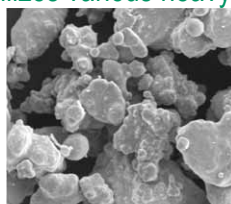


Removes heavy-metal contaminated soil and ground-water through a highly efficient absorption reaction

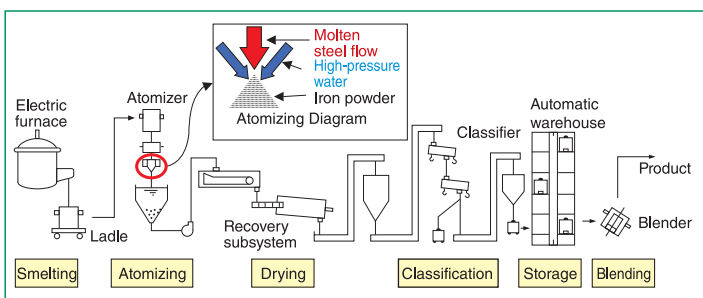
# Iron Powder 'Ecomel' for Purification of Heavy Metal-contaminated Soil and Groundwater

## Features

- Ecomel contains none-hazardous chemical substances. It is an environmentally-friendly absorbent/insolubilizer.
- Ecomel efficiently absorbs and insolubilizes various heavy metals
- Atomization manufacturing method enables mass-production and supply of Ecomel at stable quality.



50µm  
Macrophotograph of Ecomel



Manufacturing Process of Ecomel-Water Atomization Method

## Overview

(Technical principles, actions, etc.)

### Background

Since the enforcement of the Soil Contamination Countermeasures Act, countermeasures against heavy metal contamination have become an area of social concern. Most of the countermeasures at present depend on soil excavation, a method not always desirable from points of view such as the spread of contamination, etc. To cope with this situation, the Act was revised in 2010 to enforce notification of changes of the land character when changing lands with an area 3000 m<sup>2</sup> or larger regardless of the nature of the contamination (whether the contamination is caused by a natural process or not). This background has led to demands for remediation materials that can absorb and insolubilize contaminants on site.

### Outline of Product

By alloying components that accelerate the reaction with heavy metals, we have developed and commercialized "ECOMEL" 53NJ, a unique high-performance atomized iron powder that absorbs and insolubilizes contaminants. "ECOMEL" 53NJ is the second product released in the "ECOMEL" series since the previously commercialized environmental iron powder that breaks down and detoxifies volatile organic compounds (VOC). Current export and sales activities include distribution in Korea, which started in 2011. ECOMEL 53NJ is also registered in the New Technology Information System (NETIS) administered by the Ministry of Land, Infrastructure, Transport and Tourism. Registration No.: No KK-120063-A

### Performance and Feature

#### ① Great absorption performance

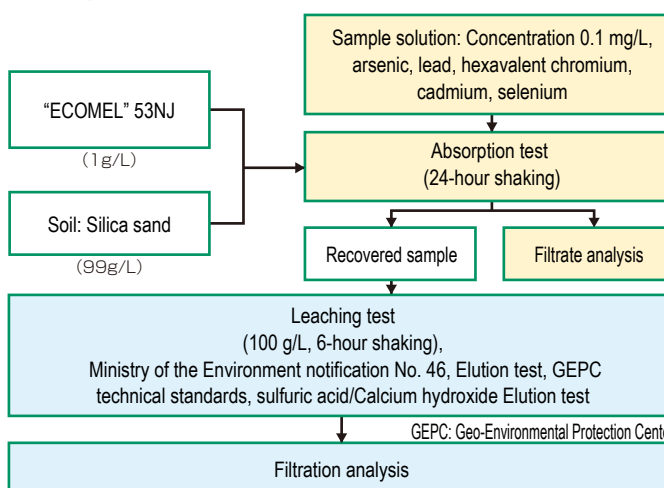
It quickly purifies (absorbs) various heavy metals, bringing them below environmental limits.

#### ② Superiour stability (elution prevention)

Once a heavy metal is absorbed, it remains stable under any aquatic environment with no risk of re-elution.

This performance has made possible by quickly generating stable compounds using the reducing power of iron, maximized by Ecomel.

## Absorption/Elution test flow



## Outcomes of absorption and elution test (unit: mg/L)

Target substance	Arsenic	Lead	Hexavalent chromium	Cadmium	Selenium
Environmental standard	0.01	0.01	0.05	0.01	0.01
Initial concentration	0.1				
↓ Absorption test					
Concentration after absorption	0.002	<0.005	<0.02	<0.001	0.002
↓ Elution test					
Ministry of the Environment Notification No. 46 (pH=5.9)	<0.002	<0.005	<0.02	<0.001	<0.002
GEPC elution of sulfuric acid (pH=2.9)	<0.002	<0.005	<0.02	<0.001	<0.002
GEPC elution of calcium hydroxide (pH=12.1)	<0.002	<0.005	<0.02	<0.001	0.006

## Introductory Track Record

- VOC breakdown application (2002 - )  
Domestic: Cumulative total, approx. 8000 tons – Exports: None
- Heavy metal absorption application (2009 - )  
Domestic: Cumulative total, approx. 800 tons – Exports: None

## Effects

- ◎ **ECOMEL 53NJ complies with the requirements of the Soil Contamination Countermeasures Act.**  
It is an effective countermeasure against artificial contamination caused by hexavalent chromium discharged from metal plating factories or other human activities, or complex contamination caused by natural processes. The soil is easily remediated by applying ECOMEL 53NJ using the "absorption layer method," a method wherein an absorption layer is formed under the contaminated soil. This method has been receiving attention due to the Soil Contamination Countermeasures Act. Alternately, the soil is also remediated by mixing with ECOMEL 53NJ with the contaminated soil.
- ◎ **ECOMEL 53NJ can also be applied to water treatment.**  
The water is easily treated by adding the ECOMEL 53NJ into a vessel and agitating the water to induce a reaction with the iron powder.

## Kobe Steel, Ltd.

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※Note: This publication introduces examples of technologies and products believed useful towards solving environmental and energy issues. In no way does it constitute guarantees concerning their transfer or sale.

Applicable field  
Purification of contaminated soil and  
underground water

Water

Energy saving/Energy recovery

ENERGY  
Energy storage/Energy creation

New energy

Waste disposal/  
Recycling/  
Resource saving

Air

Soil

Other