

T B M

**TBM Presentation**

# TBM CO.,Ltd.

Our company name, TBM, stands for “Times Bridge Management,” with a will to create businesses and technologies that last for centuries and become a company that bridges the times.

## Mission

Let us build a bridge to the future we want.

## Vision

Build on the past to create the future, with innovations to sustain a circular ecosystem lasting for centuries.



## Contribution to the SDGs

TBM aims to contribute to achieving the SDGs (Sustainable Development Goals) agreed by the world leaders in September 2015 at the UN Summit. Out of the 17 SDGs, TBM prioritizes eight areas: 6, 8, 9, 12, 13, 14, 15, and 17. LIMEX can contribute to developing a sustainable environment, society, and economy by contributing particularly on SDG #12, “Responsible Consumption and Production.”

By utilizing limestone, a natural resource abundant worldwide, we can reduce the consumption of precious natural resources such as water and oil. TBM contributes to developing a circular economy and improving resource efficiency, by establishing the collection and upcycling eco-system of LIMEX products.



## Company Information

<b>Chairman</b>	Dr. Yuichiro Sumi
<b>CEO</b>	Nobuyoshi Yamasaki
<b>Location</b>	2-7-17-6F, Ginza, Chuo-ku, Tokyo, Japan TEL +81-3-3538-6777 FAX +81-3-3538-6778
<b>Number of employees</b>	213 (As of April, 2021)
<b>Capital</b>	15,429 million yen (As of April, 2021)
<b>Group company</b>	Bioworks Corporation Times Bridge Management Global, Inc.

## Strategic Investors and Partnership

Capital raised from private sector: Over US\$154M

Subsidy by METI (Ministry of Economy, Trade and Industry) for 2 manufacturing plants: US\$ 40M

Subsidy by NEDO (New Energy and Industrial Technology Development Organization) for Research & Development: US\$ 5M

## Next Japanese Unicorn Company

Ranked as the #3 unlisted domestic company (c. \$1.2 billion) by the Nikkei 2020 “NEXT Unicorn Survey”.

# Our Product

# **LIMEX**

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**LIMEX is a new material made mainly from limestone, that can be used as an alternative to paper or plastic. It is economically and ecologically friendly as "limestone" is a highly sustainable material with abundant reserves all over the world.**

**Moreover, it is patented in over 40 countries worldwide by TBM Co., Ltd. LIMEX products has now been delivered to over 6000 companies across Japan and the number is still growing rapidly.**





## As an alternative to plastic

LIMEX can be molded into various plastic-alternative products with existing infrastructure for inflation or injection/vacuum molding.

### Environmental benefits

Compared with conventional petroleum-based plastic, production of LIMEX reduces oil consumption and CO<sub>2</sub> emissions.



Saves oil



less CO<sub>2</sub>



## As an alternative to paper

LIMEX can be made into sheets that can be used as an alternative to paper.

### Environmental benefits

While conventional paper requires massive amounts of water and trees, production of LIMEX Sheets uses less water and no fiber-based pulp.



Saves water



Saves trees

## Internationally recognized

LIMEX is registered in the sustainable technology dissemination platform "STePP" by UNIDO (United Nations Industrial Development Organization).

It was introduced at COP (United Nations Framework Convention on Climate Change) and also at G20 Innovation Exhibition in 2019.



## Production of LIMEX



### Pilot plant (R&D and production)

Location: Shiroishi Zao City, Japan

Operation start: 2015

Annual production: 6,000 t

Subsidized by Japanese government



### Mass production plant

Location: Tagajo City, Japan

Operation start: 2021

Annual production: 23,000 t

Subsidized by Japanese government



## LIMEX PRODUCTS

# Plastic Alternative

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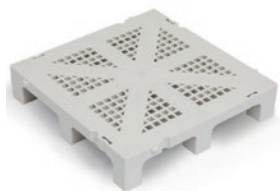
**Attention given to marine pollution caused by microplastics has catalyzed regulations against single-use plastics to take place globally.**

**Furthermore, companies are expected to be responsible and to take actions against environmental issues such as saving oil and climate change, and to realize a carbon-free society.**

### **Characteristics**

1. LIMEX can reduce use of petroleum-derived plastic and the impact on climate change.
2. LIMEX can contribute to preventing further marine pollution by reducing plastic content.
3. LIMEX can contribute to the transition into a circular economy by recycling LIMEX products.

# Product Lineup



9.

10.

1. Food container
2. Mask case
3. Folder + Pen
4. Household items (Comb and Toothbrush)
5. Honeycomb board for industrial use
6. Backlit-poster
7. Shopping bag
8. Urushi products
9. Film package
10. Construction material

L I M E X   P R O D U C T S

# Paper Alternative

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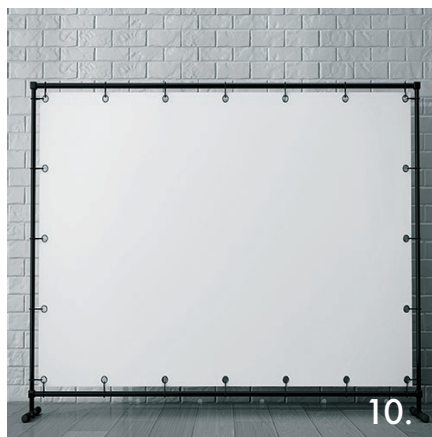
**Producing conventional paper requires massive amounts of water and trees. Therefore, there is a large impact on consumption of natural resources.**

**Furthermore, it is critical for companies to address water and forest resource issues in order to achieve the SDGs.**

## **Characteristics**

1. LIMEX requires almost no water and no trees, and therefore is able to contribute to saving precious natural.
2. LIMEX has high water resistance and tear resistance, enabling comfortable use in outdoor conditions.
3. LIMEX products can be upcycled into plastic alternatives with high efficiency.

# Product Lineup



1. Booklet
2. Map
3. Tag
4. Folded box
5. Menu
6. POP Display
7. Name card
8. Sticker / Label
9. Poster
10. Banner





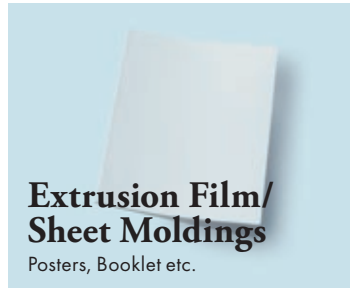
 **LIMEX**

CATALOGUE

# LIMEX

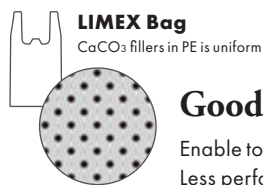
## Molding Method

LIMEX products can be manufactured with existing molding machinery and do not require special facilities.



# Technical advantages of LIMEX

TBM's own technology in high performance masterbatches. TBM's technology is not only in keeping high filling rate of  $\text{CaCO}_3$  in the applications, but in multiple directions as "Biomass LIMEX" and "weight control" etc. Biodegradable/marine degradable LIMEX is also under development. It is patented in over 40 countries world-wide by TBM Co., Ltd.



### Good filler dispersion uniformity

Enable to keep molding products even  $\text{CaCO}_3$  is over 50%  
Less performance drop as film strength etc.



Enable to make bag mainly from  $\text{CaCO}_3$   
**50%~55%**



### Filler dispersion is not uniform

Problem happens at molding process when  $\text{CaCO}_3$  increased.  
Performance drop as film strength etc.



$\text{CaCO}_3$  is generally limited to  
**5~25%**

■  $\text{CaCO}_3$  + Inorganic materials

□ PE



# HPM

(High Performance Masterbatch)

## Applicable Users

Pellet Manufacturers which use Calcium Carbonate ( $\text{CaCO}_3$ ) within Masterbatch for Pellet production in Blown Film Molding. HPM could be cost & quality effective replacement to the conventional Masterbatch.

## What is HPM

HPM is a High Performance Masterbatch for Manufacturing Applications with High Filling Rate  $\text{CaCO}_3$ , even over 50%.

## Why HPM

For example, for the blown film production, it may realize the following benefit.

- Increasing of  $\text{CaCO}_3$  content (likely low-cost) with less film performances degradation.
- Reducing  $\text{CO}_2$  emission and Petroleum-based resin usage by high filling rate of  $\text{CaCO}_3$ .



## What can be made

Wide applications as flexible packaging, shopping bag, rigid tray, injection molded products etc.



## Masterbatch Physical Properties

	Unit	Measurement Method	LHPE 78-02M
<b>Ash</b> (CaCO <sub>3</sub> + inorganic materials)	%	ISO 3451-1	78
<b>Binder resin</b>			PE
<b>MFR</b>	g/10ming (190°C-2.16 kg)	JIS K 7210	0.6
<b>Specific Gravity</b>	g/cm <sup>3</sup>	ISO 1183	1.9

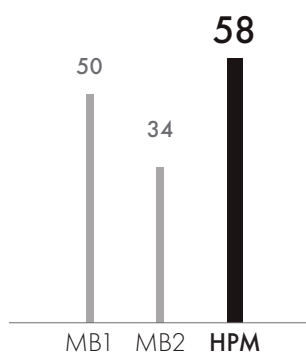
\*Above is representative value, NOT guaranteed value.

## Value Proposition of HPM

\*MB1 & MB2 are representative products from two major manufacturers of calcium carbonate MB

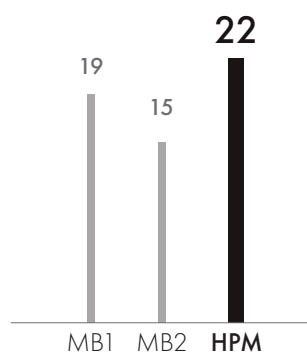
### Physical Properties at CaCO<sub>3</sub>% = 20%

**Tensile Strength**  
(Mpa, Machine Direction)



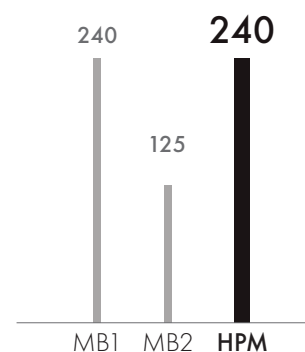
Film using LIMEX HPM has **higher resistance when stretched**

**Heat Seal Strength**  
(N, Gusset)



**The sealed part** of the film using LIMEX HPM is **stronger and does not stick**

**Tensile Elongation**  
(%, Machine Direction)

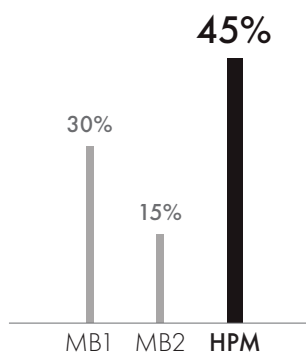


The film using LIMEX HPM has **stronger resistance when sticked**

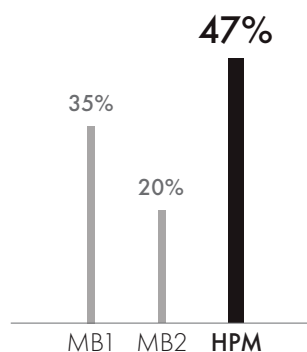
**LIMEX HPM has better quality at the same CaCO<sub>3</sub> content**

### CaCO<sub>3</sub>% at same performance

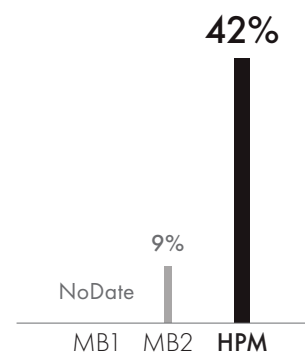
**Tensile Strength = 40MPa**  
(Machine Direction)



**Heat Seal Strength = 15N**  
(Gusset)



**Tensile Elongation = 200%**  
(Machine Direction)



**With same performance, more CaCO<sub>3</sub>% is possible with LIMEX HPM in order to reduce cost and reduce plastic consumption.**

## **TBM Co., Ltd.**

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