Toray’s Strategy of Films Business

Yusuke Orito, Films Division Manager
Toray Industries, Inc.
Contents
1. Films Business Overview
2. PET Film Business Operation
3. Mid-term Policies (Mar/04-Mar/06)
Films Business Overview
Organization of Plastics and Films Division

- Plastics and Films Div.
  - Plastics Div.
    - Films Div.
      - Industrial 1st Dept.
      - Industrial 2nd Dept.
      - Recording Media Films Dept.
      - Films Trading Dept.
        - Domestic and Overseas Subsidiaries and Affiliated Companies
      - Advanced Film Technical Dept.
        - Film Technical Dept.
          - Advanced Film Technical Dept.
            - Film Products Development Center
              - Films and Films Products Research Laboratories
    - Manufacturing Div.
      - Shiga Plant
      - Gifu Plant
      - Mishima Plant
      - Tsuchiura Plant
      - Film Technical Dept.
  - Films Products Development Center
    - Films and Films Products Research Laboratories

‘TORAY’
## Toray’s Film Products

<table>
<thead>
<tr>
<th>Brand</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUMIRROR*</td>
<td>Polyester Film (PET)</td>
</tr>
<tr>
<td>TORAYFAN*</td>
<td>Polypropylene Film (PP)</td>
</tr>
<tr>
<td>TORELINA*</td>
<td>Polyphenylene Sulfide Film (PPS)</td>
</tr>
<tr>
<td>MICTRON*</td>
<td>Para-Aramid Film</td>
</tr>
<tr>
<td>TUFTOP*</td>
<td>Scratch-resistant Film</td>
</tr>
<tr>
<td>HIGHBEAM*</td>
<td>Spattered Film</td>
</tr>
<tr>
<td>AC/MC LUMIRROR*</td>
<td>Metallized Film for Capacitor</td>
</tr>
<tr>
<td>AC/MC TORAYFAN*</td>
<td></td>
</tr>
</tbody>
</table>

< * stands for brand names of the Toray group.>
## Features and Applications

<table>
<thead>
<tr>
<th>Brand</th>
<th>Features</th>
<th>Major Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUMIROR</td>
<td>High Strength, Transparency, Chemical Resistance</td>
<td>General Industrial, Packaging, Magnetic, Capacitors</td>
</tr>
<tr>
<td>TORAYFAN</td>
<td>Lightness, High Tensile Strength, Electrical Properties, Mechanical Properties, Chemical Resistance, Moisture Resistance</td>
<td>General Industrial, Print Lamination, Packaging, Capacitors</td>
</tr>
<tr>
<td>MICTRON</td>
<td>High Rigidity, Heat Resistance, Excellent Moisture-proof Property, Gas Barrier Property, Surface Smoothness</td>
<td>Magnetic Recording Media</td>
</tr>
</tbody>
</table>
Film Manufacturing Sites in Japan

- Toray
  - Mishima, Shiga, Gifu, Tsuchiura Plants

- Toyo Metallizing Co., Ltd.
  - Mishima, Fukushima Plants

- Toray Plastic Films Co., Ltd.
  - Takatsuki, Nakatsugawa Plants
Lumirror* Business Operations, a mainstay PET Film
**Lumirror* Applications**

### Magnetic Applications
- Home Video
- Magnetic Tape
- Digital Linear Tape (DLT)
- Linear Tape Open (LTO)

### Packing Applications

### Industrial Applications
- Electronic Components
- Casting / Release
- Label, Cards
- Graphic Art Base, IC Card
- Optical (LCD, PDP)

**TORAY**
Lumirror*, the Top PET Film Brand

Expansion of Overseas Capacity

Expansion of Capacity in Japan

High Growth

1963 66 69 72 75 78 81 84 87 90 93 96

Trend of Lumirror* Sales (Toray Only)

High Growth mainly by Home Video Application

1985~1990

Expansion of Industrial Applications (Capacitor, TTR, etc.)

1990~2000

Strong Yen

Customers’ Transfer of Production To Overseas

Built up Global Operations and 6 Global Production Sites to become the No.1 PET Film Manufacturer in the World
Current Lumirror* Production Capacity

1 million t / Year

TPEU FRANCE 5.0
TSI KOREA TSI 1.5
YTP CHINA 0.6
Toray JAPAN 9.0
PFR MALAYSIA 3.0
TPA U.S.A. 3.0

Existing Capacity

Future Expansion Capacity

<Will start up the 2nd Machine in YTP during the 1st half of 2004.>
Base Film Demand Trend for Home Video Applications

Worldwide Demand is decreasing.
Korea becomes main supplier.

- Japan
- North America
- Europe
- Korea
PET Films Price Trend (Commodities)

(1996=100)
Strategy for Business Environmental Change

Change of Business Circumstance

Severe Competition in Packing and Industrial Commodity Market

Our Strategy

Establishment of PFR (Malaysia), 1998 as Cost-Competitive Production Base

Demand Shift of Home Video Application to Korean Market

Establishment of TSI (Korea), 1999 Product Mix Change from Magnetic to Industrial Applications in Japan and U.S.A. (TPA)

Demand Decrease Worldwide

Expanding Demand in China

Establishment of YTP (China), 2001
Lumirror* Business Policies
Mid-Term Plan 2003-2005
Basic Policies of Film Business
Mid-term Plan

Business Circumstance

- Slowdown of Market Growth (+4.4%)
- Imbalance of Demand and Supply
  - Capacity: 150 million tons/year
  - Demand: 120 million tons/year
- Price Bottoming Out
- Change of Market Structure in Japan, America, and Europe
- Increase of Specialty Application Demand
- Severe Competition for Packaging Applications
- Expansion of China Market

Basic Policies

- Profitability Improvement and Business Expansion by Evolution of Global Operations
- Expansion of Processed Film Products Business

“New Value Creator”
Profitability Improvement and Business Expansion by Evolution of Global Operations

- Expansion of (High) Value-Added Packaging and Industrial Applications for European Market
- Start-Up of 2nd Machine; Expanding Supply to Expanding Demand In China
- Supplier for Packing and Industrial Commodities Product Mix Improvement from Standard Types to Semi-standard
- Expansion of (High) Value-Added and Strategic Applications
- Worldwide Supplier for Home Video Applications
- Share Expansion of Packing and Industrial Applications in Korean Market
- Expansion of (High) Value-Added Applications for North American Market
Current Global Operation

Complement of different types
Supply of Commodities
TSI ➔ TPEu
Packaging Films
Industrial Thick Films

TSI ➔ TORAY
Packaging Films

TORAY ➔ TPA
Packaging Films
Industrial Thick Films

PFR ➔ TPEu
Industrial Films

PFR ➔ TORAY
Packaging Films
Industrial Thick and Thin Films

TPA ➔ TPEu
TTR DFR

Chinese Market
Supply of Commodities
TSI ➔ TPEu
Packaging Films
Home Video Films

TSI ➔ TPA
Home Video Films
Packaging Films

PFR ➔ TPA
Industrial Thick Films

Supply of Commodities
Packaging Films
Home Video Films

Toray

Supply of Commodities
Packaging Films
Industrial Thick Films

Supply of Commodities
Packaging Films

Packaging Films
Industrial Thick Films
Expansion of High Value-added and Strategic Applications in Japan (Toray)

- **Magnetic Applications**
  - Computer Data Storage (SDLT, LTO)
  - Digital Video Cassette
- **Industrial Applications**
  - IT-related Applications
    - (LCD, DFR, Release)
    - Expansion of Thin and Ultra-thin Films for Capacitors
- **Packaging Applications**
  - Expansion of High Value-Added New Products (APT, NOA)
- **New Applications**
  - New Type Films

Japan (Toray) as Development Center of the Toray Group → Establishment of Advanced Film Technical Dept.
IT-related Films Applications

Information Processing Applications
- Electronic Components, Release Films for Ceramic Capacitors,
- DFR (Dry Film Photoresist),
- Film Capacitor, Circuit Materials, OA Equipment

Information Display Applications
- Optical Applications (LCD, PDP)

Information Recording Applications
- Digital Video, Data Recording Tape, TTR, Mimeograph Printing, Graphic Arts Base, Home Video, IC Cards
Expanding Strategic Businesses

1) Expansion of IT-related Applications Market

Sales of IT-related Applications

2002

Non IT-related: 41%
IT-related: 59%

2005

Non IT-related: 34%
IT-related: 66%

2) Expansion of Environmental Protection Products Market

PET Films for LCD

Liquid Crystal Display Panel Composition

- Glass
- Liquid Crystal Layer
- Glass
- Polarizer
- Adhesive Layer
- Release Film for Polarizer
- Viewing Angle Expanding Film
- Prism Film
- Diffusing Plate
-Reflective Polarizer
- Cold Cathode Fluorescent Tube
- Light Guide Plate
- Reflector

(Good Adhesion to Hard Coat)

Anti-reflection Film

Touch Panel

(Polarizer)

(Low Alignment Angle)

(Super Transparent, No Scratch)

(White Film, High Luminance)

Liquid Crystal Display

Touch Panel

Panel Composition

Touch Panel
Production of Ultra High Quality Grade Lumirror* with Innovative Equipment

<table>
<thead>
<tr>
<th>Plant:</th>
<th>Mishima Plant (Mishima-shi, Shizuoka Pref.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity:</td>
<td>2,500 Tons/year (4 micron conversion)</td>
</tr>
<tr>
<td>Start:</td>
<td>End of 2002〜</td>
</tr>
<tr>
<td>Feature:</td>
<td>Enable to Produce Ultra High Quality Films</td>
</tr>
<tr>
<td></td>
<td>(Excellent Tensile Strength, Great Dimensional Stability, Ultra Smoothness and No Scratches on Surface)</td>
</tr>
<tr>
<td>Applications:</td>
<td>Advanced Digital Data Storage Applications</td>
</tr>
<tr>
<td></td>
<td>Ultra-Thin Industrial Applications (Capacitors)</td>
</tr>
</tbody>
</table>
Value-Added New Products for Packaging Applications - NOA, APT

NOA  Nano-Order Alloy Controlled PET film

High Strength of Nylon + Stable Processing of PET

APT  Amorphous-controlled PET film

Heat and Freezing Resistance
+ Environmental Stability

Easy Forming
+ High Lubricity
Expansion of Processed Film Products

1) Expansion of Packaging Metallizing Business

Business Expansion and High Profit from Global Operations
Toray Plastic Films Co., Ltd. / Toyo Metallizing Co., Ltd.,
3TM Plastics Co., Ltd. (Thailand), Toyo Saehan, Inc. (Korea)

Expansion of High-Barrier Flexible Packing Application Demand (Ex. Retort, Pouch)
Progress of Substitution for Aluminum Foil (Environmental Request)

Demand Exploitation of Processed New Type Films (NOA, PBT, etc.)

2) Expansion of Processed Film Products Business for Industrial Applications

Expansion of IT-related, Environmental, and Medical Application Businesses
by Full Use of Sputtering and Coating Technologies (Toyo Metallizing, others)

Evolution and Expansion of IT-related and Display-related Demands

Capacity Expansion in TSI and Development of Korean Market

3) Reorganization of Capacitor Metallizing Business

Demand Shift of Commodities from Japan and U.S.A.
to other areas, especially China
New Demands Expansion in Japan and U.S.A.

Business Expansion of TFZ (China)
Development of New Advanced Films in Japan (IT-related and Automotive-related Applications)
Toyo Metallizing Co., Ltd.

Main Businesses
1. Manufacture and Marketing of Vacuum Metallized Products
2. Manufacture and Marketing of Processed Film Products

Head Office: Nihonbashi, Chuo-ku, Tokyo
Plants: Mishima and Fukushima

Industrial Materials: Label, Lumiace*, Cerapeel*
Packaging Materials: Packaging Commodities, Barrialox*, Capacitor, Anti Reflection Film, Metaloyal*

Metaloyal* is a Two-layer Adhesiveless FPC Material (a Copper Layer is plated directly on Polyimide Film).
Main Businesses: Manufacturing, Processing and Marketing of Plastic Films

Head Office: Takatsuki-shi, Osaka

Plants: Takatsuki and Nakatsugawa

<table>
<thead>
<tr>
<th>Brand</th>
<th>Material/Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torayfan* NO</td>
<td>Non-Oriented Film (CPP)</td>
</tr>
<tr>
<td>CF Film</td>
<td>Peelable Film</td>
</tr>
<tr>
<td>Toretec*</td>
<td>Surface Protection Film</td>
</tr>
<tr>
<td>Rayfan* NO</td>
<td>Nylon Film</td>
</tr>
<tr>
<td>Toyoflon*</td>
<td>Fluorine Film</td>
</tr>
<tr>
<td>LL Film</td>
<td>Linear Low Density Polyethylene</td>
</tr>
<tr>
<td>Torepalloy*</td>
<td>Polycarbonate-Copolyester Composite Film</td>
</tr>
</tbody>
</table>
Film Capacitor Market and Our Position

1. Capacitor Supply Chain

- **Base Film Manufacturer**: Toray Group (PET, OPP, PPS)
  - Both Film Manufacturing & Metallizing
  - Total 3,590t/month (43,080t/year)

- **Metallizing Converter**: Toray Group
  - Both Metallizing and Capacitor Manufacturing
  - Total 2,500t/month (30,000t/year)

- **Capacitor Manufacturer**: Only Capacitor Manufacturing
  - Total 2,500t/month (30,000t/year)

- **Converting**: Only Metallizing Converting

- **Manufacturing**: Myler Capacitor 10,000t/year
**Film Capacitor Business Strategy by Product**

**Business Environmental Change of Film Capacitor Market**
1. Worldwide Recovery of Electronic Components Demand
2. Severe Competition with Other Types of Capacitors => Downward Price Pressure
3. Rapid Transfer of Production Sites (From Japan, U.S.A., and Europe to China and Other Asian Countries)

**Our Strategy**
1. Strengthen New Product Development in Japan
2. Global Production Reorganization based on Demand

<table>
<thead>
<tr>
<th>Material</th>
<th>Production Base</th>
<th>New Development (Japan)</th>
<th>Reorganization Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luminor* (PET)</td>
<td>Japan (Shiga, Mishima), Korea (TSI)</td>
<td>Development of Advanced Super Ultra Thin Film, Development of Heat-Resistance Improved Film</td>
<td>Production Transfer of Commodities to Korea (TSI) and China (YTP), Reorganization of Domestic Production Structure</td>
</tr>
<tr>
<td>Torayfan* (OPP)</td>
<td>Japan (Tsuchiura)</td>
<td>Development of Ultra-thin Film for Hybrid Car</td>
<td>Concentration on Advanced Applications</td>
</tr>
<tr>
<td>Torelina* (PPS)</td>
<td>Japan (Gifu)</td>
<td>Development of Super Ultra Thin Film (Sub-Micron)</td>
<td></td>
</tr>
<tr>
<td>Metallized Films</td>
<td>Japan (Toyo Metallizing Co., Ltd., Kakogawa)</td>
<td>Development of Special Metallized Film for Hybrid car</td>
<td>Early Start up of New Metallizer in China (TFZ) Reorganization of Metallizing Business</td>
</tr>
</tbody>
</table>
Development of Advanced Film Capacitor for Hybrid Car

Company X Hybrid Car Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>Type A</th>
<th>Type B</th>
<th>Type C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Film Capacitor is Superior for Hybrid Cars to The Other Type of Capacitors

Hybrid Car Market Size: 300,000 units/year in 2005
### Summary

<table>
<thead>
<tr>
<th>Product</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumirror*</td>
<td>Keep the No.1 Position in the Global Market</td>
</tr>
<tr>
<td></td>
<td>Improve Profitability through Evolution of Global Operations</td>
</tr>
<tr>
<td></td>
<td>Assign Roles and Functions to Each of Six Production Sites</td>
</tr>
<tr>
<td>Torayfan*</td>
<td>Pursue Specialty Market Demand</td>
</tr>
<tr>
<td></td>
<td>Keep the No.1 Market Position for Capacitor Application in the World</td>
</tr>
<tr>
<td>Torelina*</td>
<td>Expand Business as the Sole PPS Film Manufacturer in the World</td>
</tr>
<tr>
<td>Mictron*</td>
<td>Increase Sales of Advanced Films for Next-Generation Digital Storage</td>
</tr>
<tr>
<td></td>
<td>and Industrial Applications</td>
</tr>
<tr>
<td>Processed Film</td>
<td>Expand New Processed Film Products Business</td>
</tr>
<tr>
<td>Products</td>
<td></td>
</tr>
</tbody>
</table>

As a World-leading Total Film Supplier
Descriptions of predicted business results, projections and business plans contained in this material are based on predictive forecasts of the future business environment made at the present time.

The material in this presentation is not a guarantee of the Company’s future business performance.