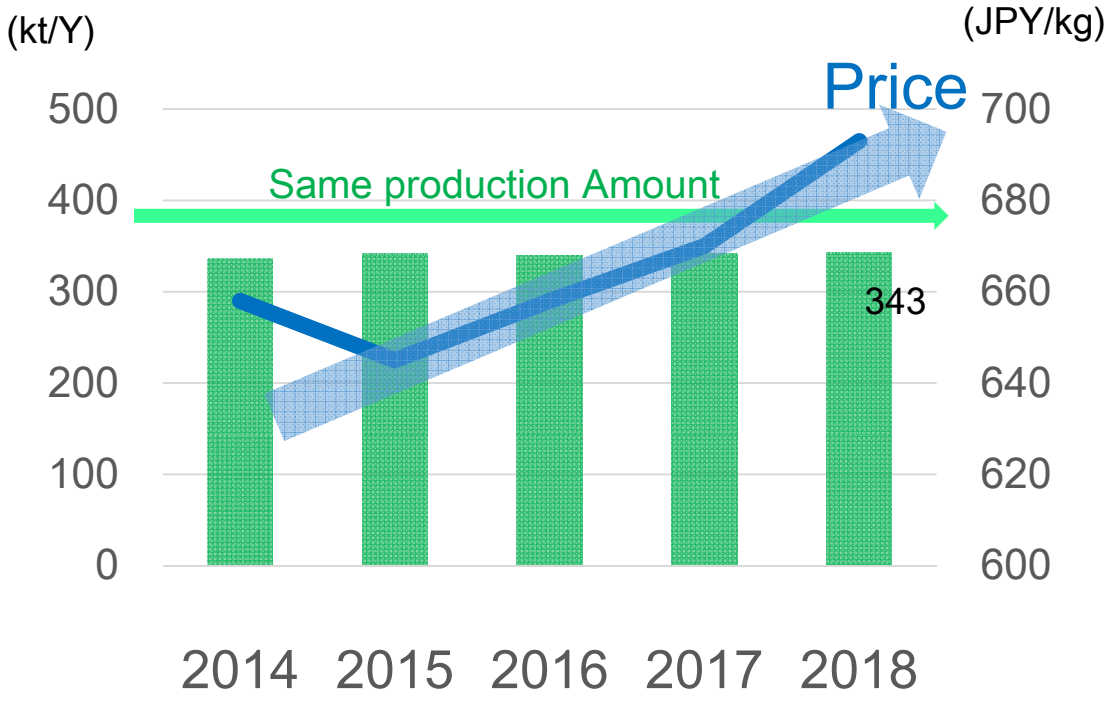
Melt Blown Nonwovens
TAPYRUS Co., Ltd.

The Wide Spectrum of Melt-Blown Nonwovens and Filtration Applications

T.Saito
Tapyrus Co., Ltd.

Production and Price of Non-Wovens (NW) in Japan

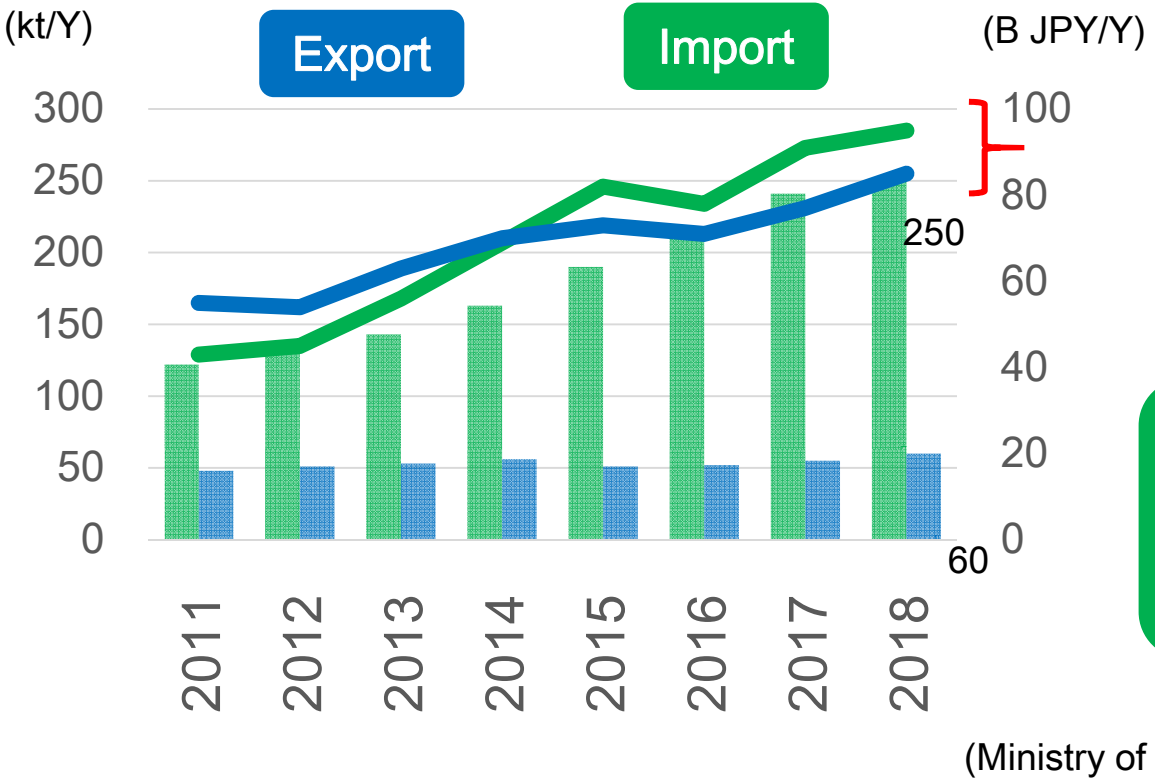


Domestic production levels off.

Price is increasing.

(Ministry of Economy, Trade and Industry)

Export and Import of NW in Japan



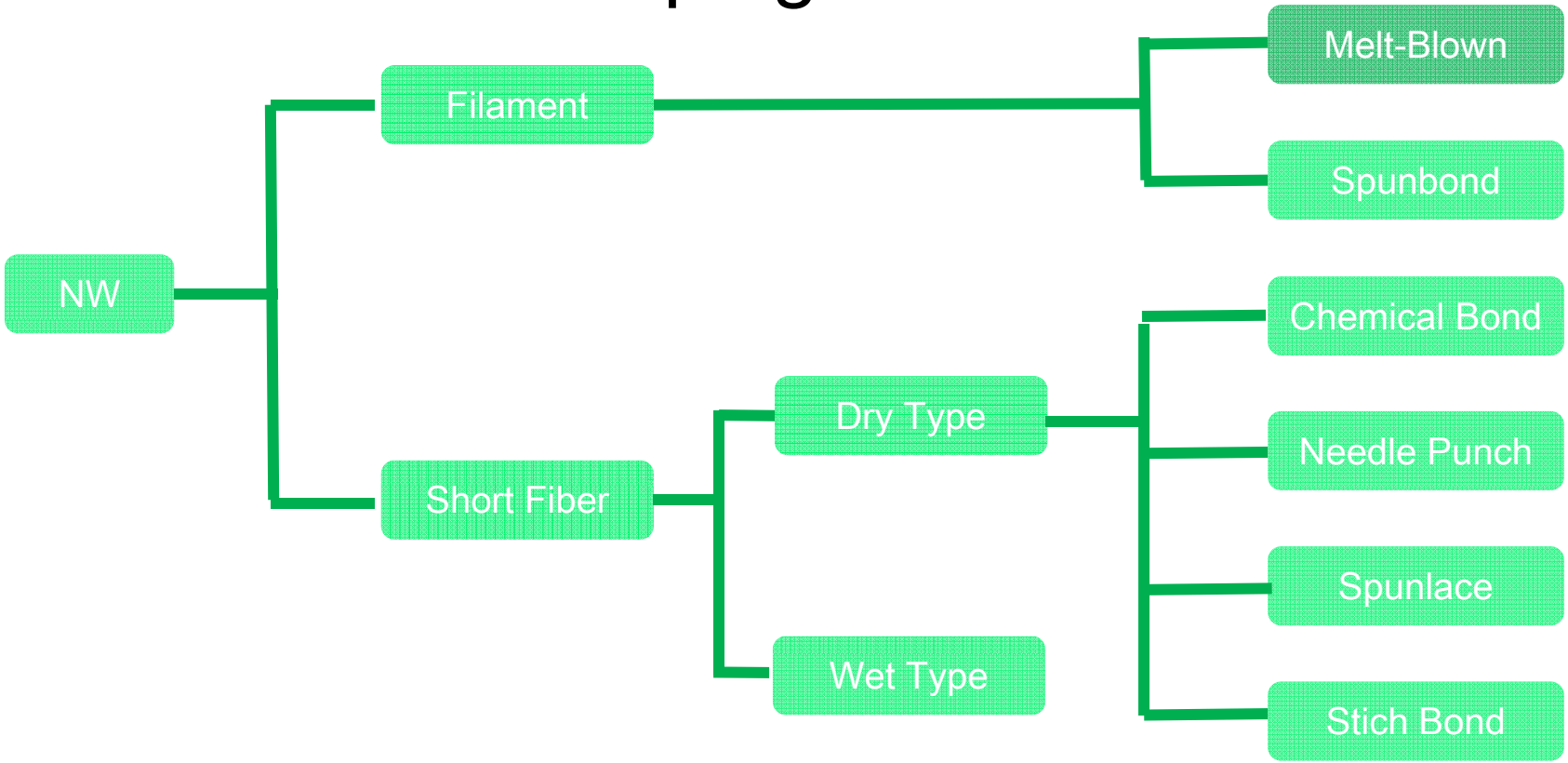
(Ministry of Finance)

Import NW is growing continuously.

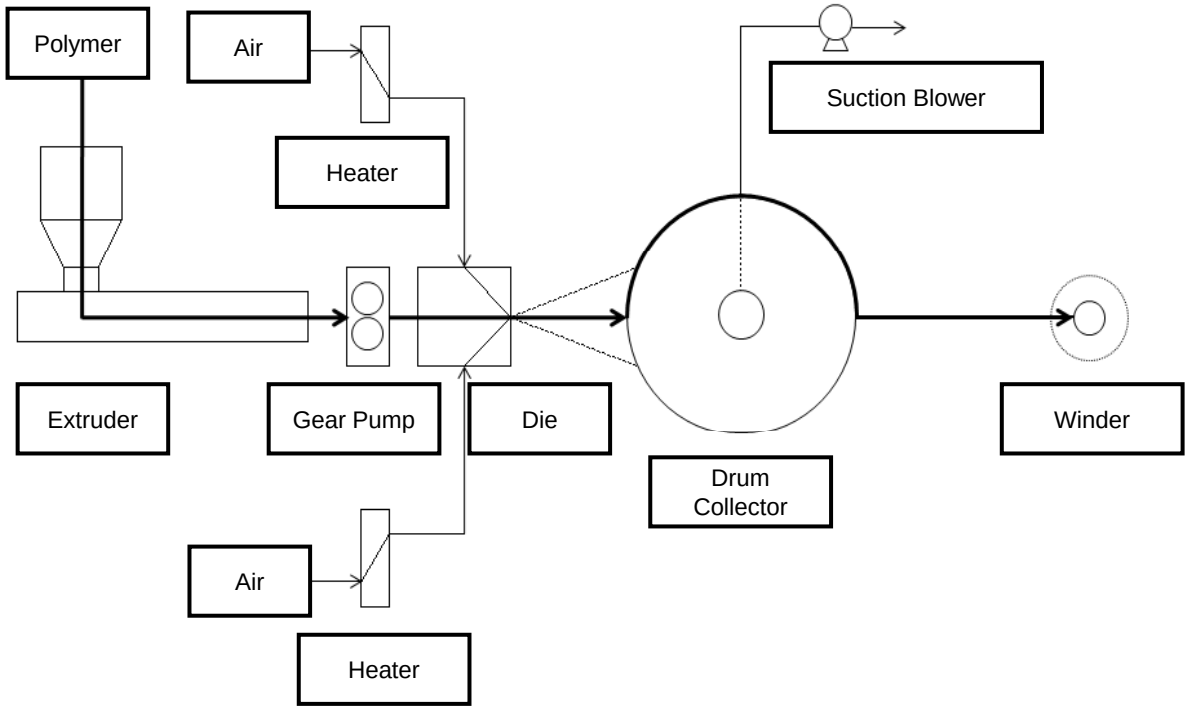
Unit Price (@2018)
Export : 1,402 JPY/kg
Import : 379 JPY/kg

NW supplier in Japan is strongly requested to provide NWMB showing higher performance and better quality

Grouping of NW



Melt-Blown (MB) Technology



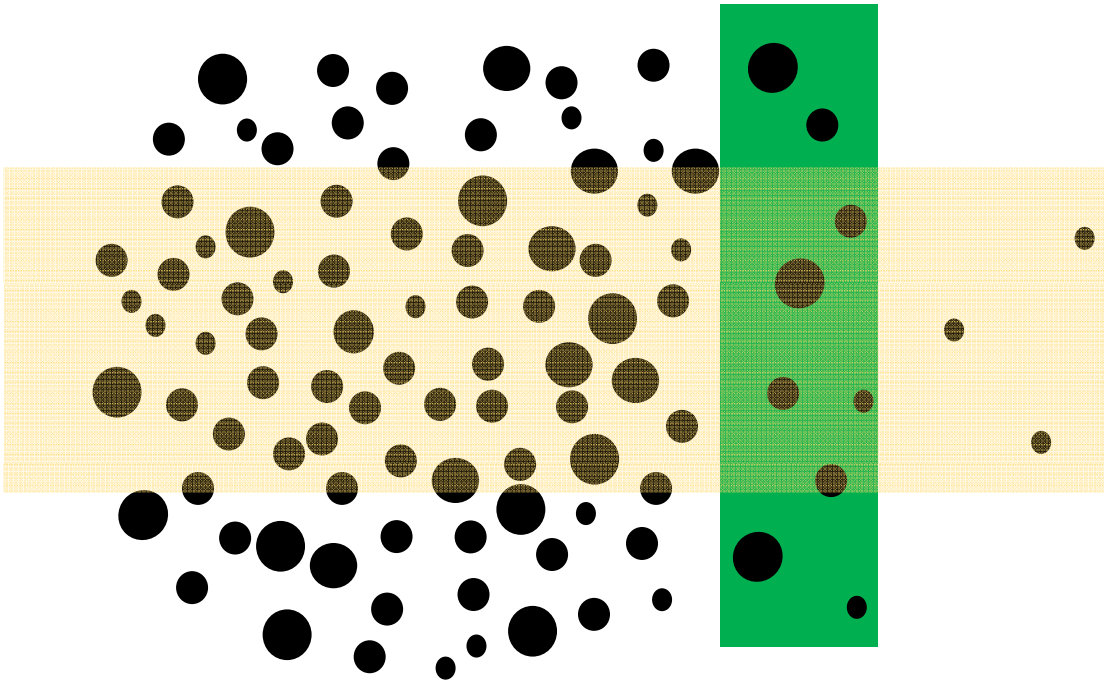
Process Step

1. Resin is melted and extruded.
2. Resin is blown with hot air
3. Resin fiber is formed
4. Fiber is collected and winded.

Unique Characteristics of MBNW

- Widely controllable of fiber diameters and basis weight
- Various raw material (thermoplastics)
- No binder for web forming
- Soft texture
- Simple production machine
- Lower dynamic strength (less orientation)

Image of Filtration

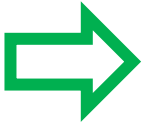


NW Filter Media

Requirements for Filter Media
+High Collection Efficiency
+High Flow Capability
+Longer Life
+Less Elution (liquid filtration)
+Durability

Good Matching of MBNW Features and Filtration Material

- Widely controllable of fiber diameters and basis weight
- Various raw material (thermoplastics)
- No binder for web forming
- Soft texture
- Simple production machine
- Lower dynamic strength (less orientation)



+High Collection Efficiency
+High Flow Capability
+Longer Life
+Less Elution (liquid filtration)
+Durability

Appropriate Material for Filtration Application

Brief Introduction of Tapyrus Co., Ltd.

Tapyrus Co., Ltd.

Founded in 1987
Changed capital relationships in 2003

Production and Sales of MBNW and its related products

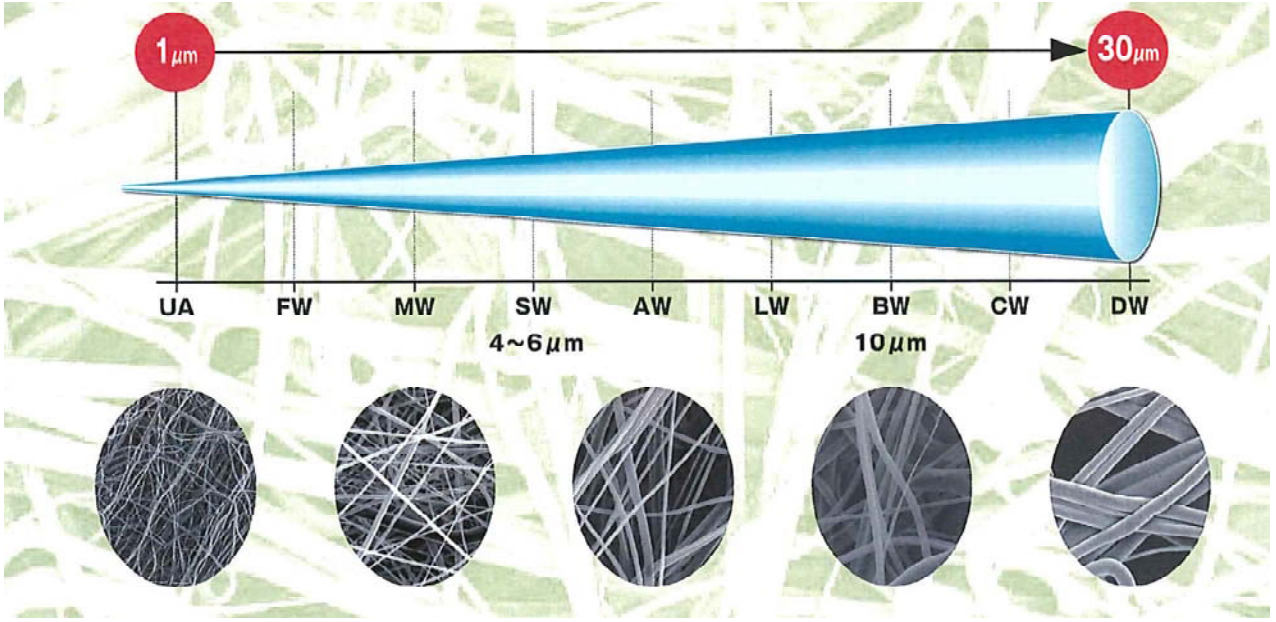
Tapyrus(Thailand) Co., Ltd.

Founded in 2011

Various Applications of TAPYRUS

TAPYRUS

Various Fiber Diameters

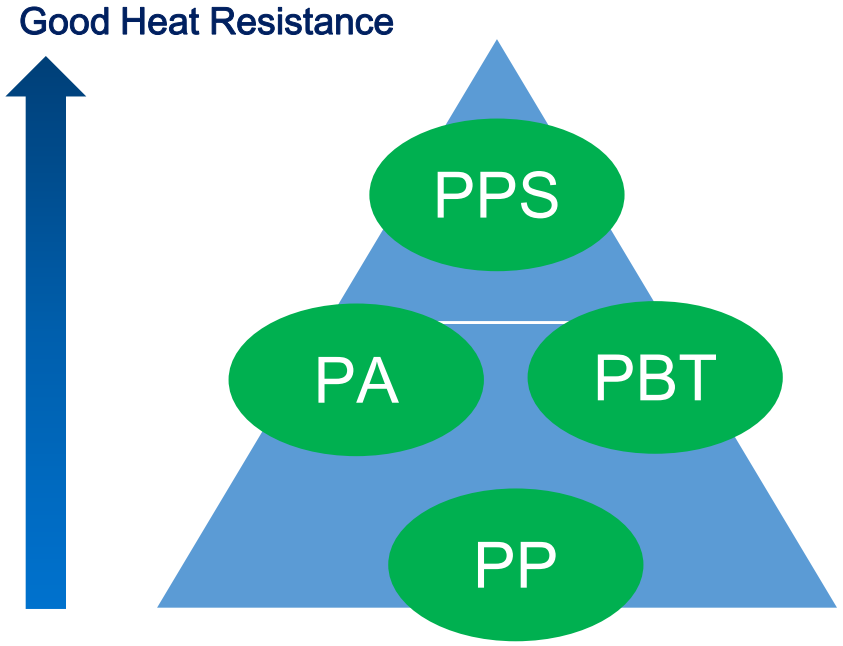


Process Optimization

Various Fiber Diameters

Variety of Raw Material

Theoretically, all thermoplastic raw material can be fabricated.



PEEK

PES

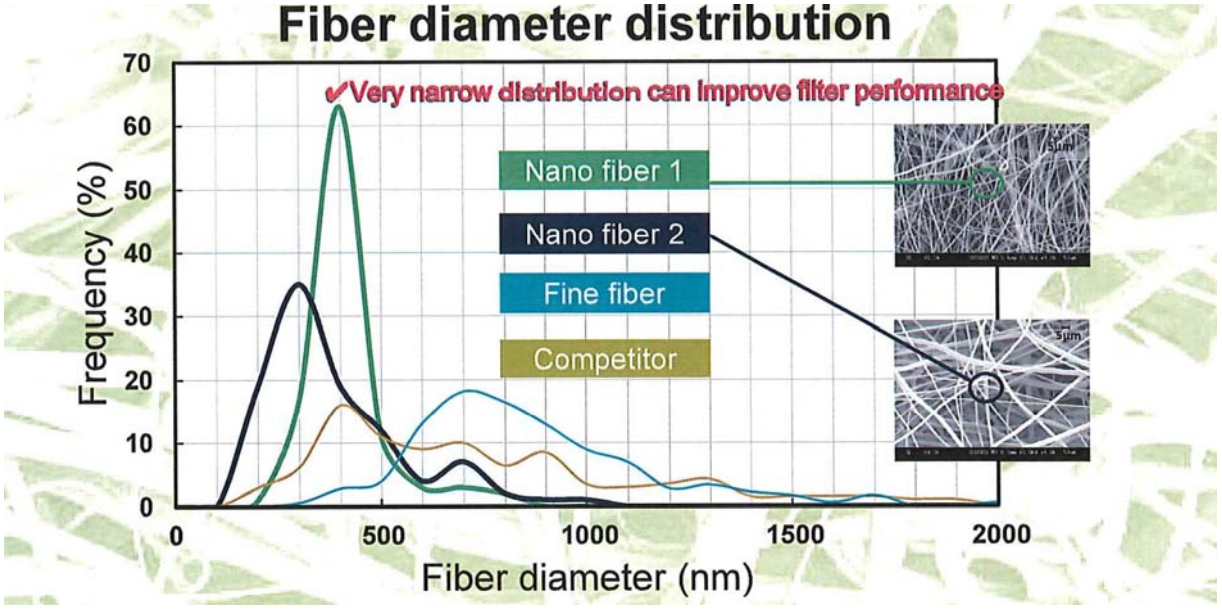
Appropriate Raw Material Selection

PMP

PE

PLA

Nano-MBNW

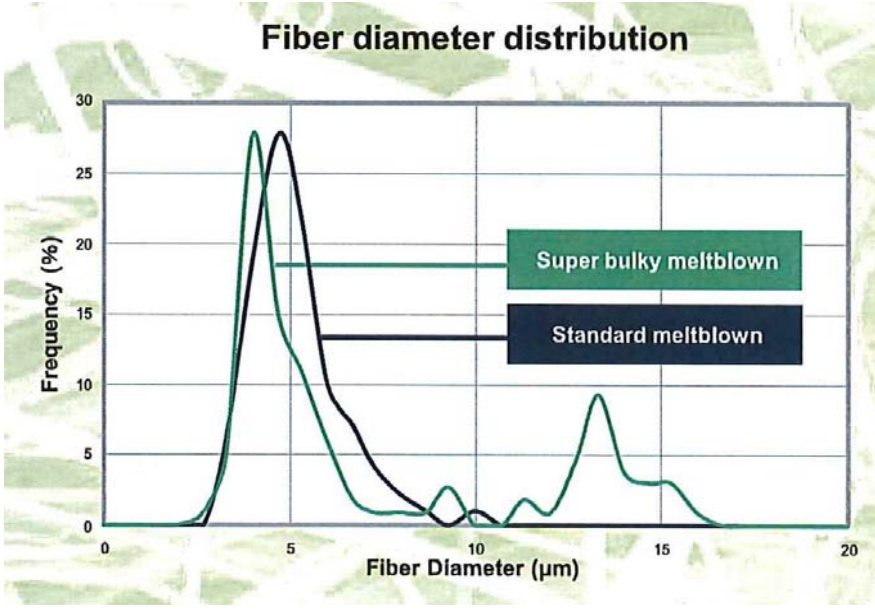


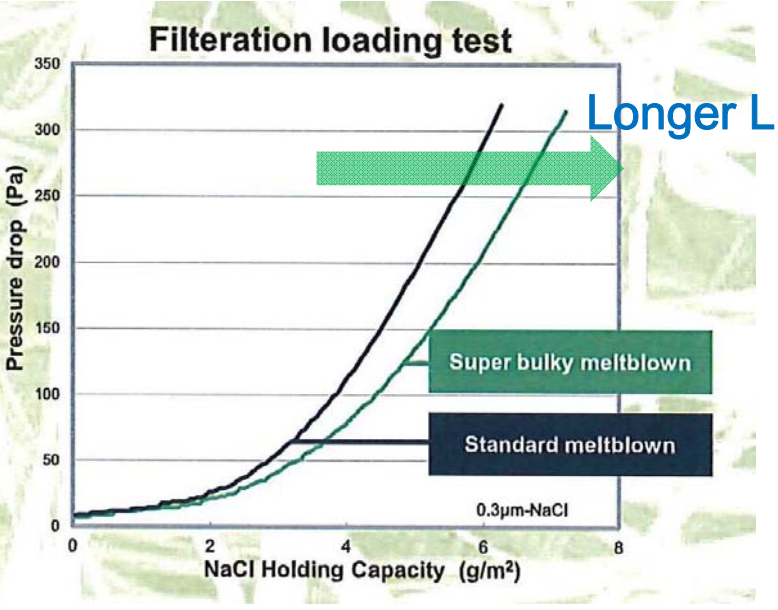
Improvement of the Specialized NW Machine

↓

Realization f Nano-MBNW

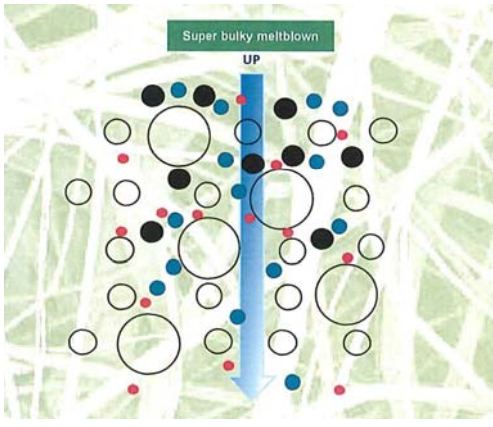
Design for Longer Life (1)
(Control of Fiber Diameter Distribution)

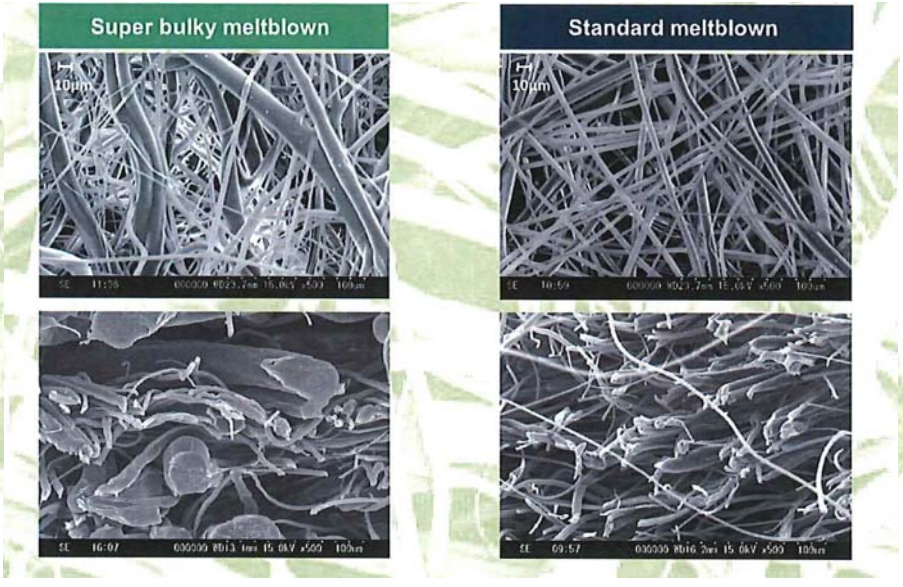




Bimodal Fiber Diameter Distribution

Design for Longer Life (2)
(Control of Fiber Diameter Distribution)





Particles are trapped at both surface and inside.

Particles are mainly trapped at surface.

Melt Blown Nonwovens
TAPYRUS Co., Ltd.

Summary

- MBNW is widely applied and has a large potential as the filter media.
- Fiber diameter and its distribution of MBNW strongly influence the filtration performances.
- The suitable selection of raw material is also key factor for filter design.
- From the view point of MBNW supplier, the followings are the key technology.
  - +The control of fiber diameter and its distribution
  - +MBNW forming of the various thermoplastic raw material
  - +Effective and durable electret method
- Tapyrus will continue the MBNW development for the filtration industry.