MANUFACTURING GUIDE
Molded Fiber Manufacturing Method Type 3

This manufacturing guide provides a general representation of the process. Details may vary by application.

Typical Products Manufactured Using This Method: Food service and disposable tableware: plates, bowls, clamshells, trays, cutlery, cups, and others. High quality electronics packaging: phone cases, earphones. High-end retail packaging: packaging for cosmetics, creams and lotions, perfumes. Coffee pods and powder containers

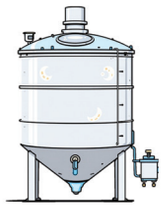
Raw Material: Cellulose Fiber

Typical Fiber Type: Virgin fiber for food contact & specialty applications, recycled Fiber for other applications

Common Machine Output: From 0.7 to 2 tons per day of finished goods

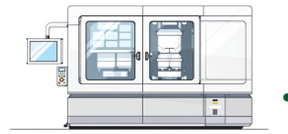
General Steps

Cellulose Fibers + **Water**



Pulper
Pulp Consistency: 6% fiber and 94% water

Pulp Tank
Pulp Consistency: 0.5% Fiber and 99.5% water



Thermo-former

Finished Molded Fiber Product
Moisture Content = 6-9%

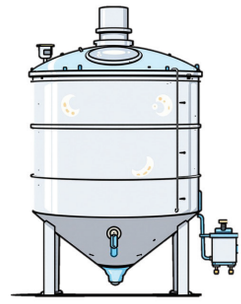
Pulping

Cellulose Fibers +  **Water**

Pulp Consistency:
6% fiber and 94% water

Raw Materials (Virgin Fiber):
Wood fibers:
Softwood
Hardwood
Recycled fibers

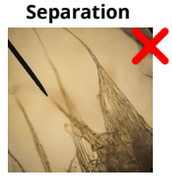
Non-wood fibers:
Bamboo
Baggase
Wheat straw
Miscanthus
And many others



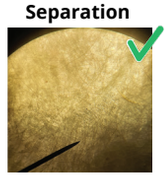
Additives (Optional)
Water repellent (AKD)
Oil/grease repellent
Drainage aids
and many others

Pulper
Common size of a pulper:
5 or 10 cubic meters

Poor Fiber Separation



Great Fiber Separation



Objectives of a Pulper:
Fiber separation with the agitation.
Mixing fibers with different characteristics
Adding additives (at the appropriate moment)

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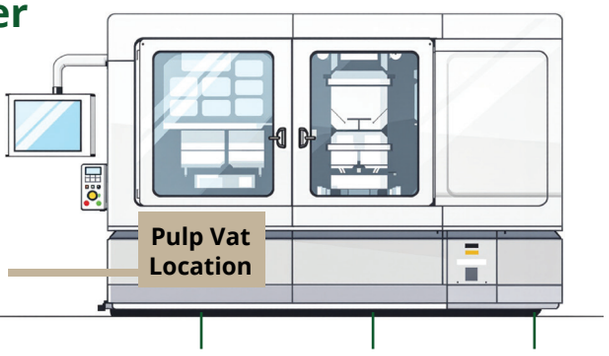
Thermo-former



Pulp In-Feed from the Pulp Tank

Pulp consistency:
0.5% Fiber and 99.5% water

Step 1
Forming

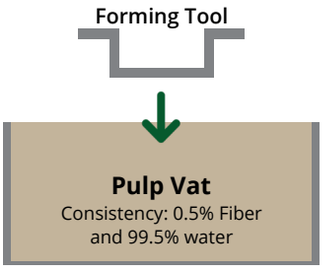
Step 2
Pressing & Drying

Exit Conveyor
Finish Products Stacking
Trimming (Optional)

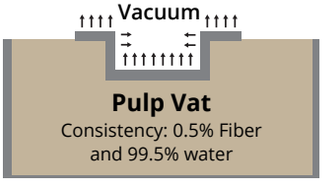
Finished Molded Fiber Product

Moisture Content = 6-9%

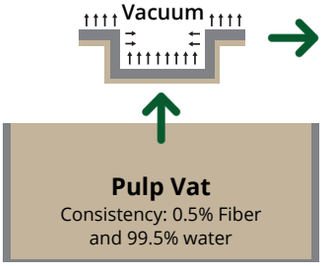
Step 1: Forming



Phase 1: Forming tool submerges into the pulp vat to take fiber.



Phase 2: Vacuum on the tool removes water from the fiber and takes an even layer of fiber into the tool.



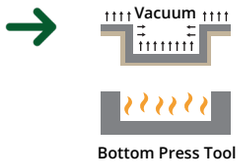
Transfer the wet product into the press tools

Moisture content around 70% equivalent to solid content of 30%

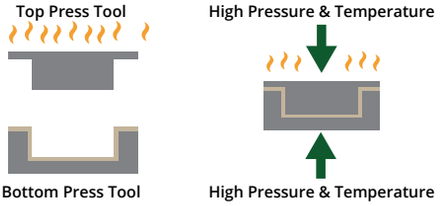
Phase 3: After a big quantity of water is remover from the fiber, the "wet" product transported to a press to change the moisture content from 60% to 6-9%.

Step 2: Pressing & Drying

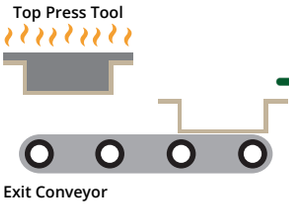
Transfer the wet product into the drying oven



Phase 1: The wet product is transfer from the forming station into the press tool for a final press and drying.



Phase 2: A top and bottom tool with a hot temperature (around 200°C-210 °C) will compress and dry the fibers. This compression takes out the remaining water from the fibers and also adds rigidity to the product.



Exit Product to:
stacking, trimming, lamination, or packing
Moisture Content = 6-9%

Phase 3: After the products reach a moisture content of 6-9%, the machine transfers them to an exit conveyor or platform for stacking or any additional steps, such as trimming, lamination, or printing.

Additional After Process

In some cases, the product may require an additional step to add extra properties or enhance its strength or functionality. Common processes are:

Trimming: Certain thermo-formers leave an additional edge on the product, which will require final trimming. Trimmings can add holes, hinges, or any other functionality.

Lamination or Coating: Adding a film or an additional layer of other material to enhance the barrier properties.

Printing: If the product requires logos, bar-codes, or any additional information, standard printing processes include screen printing, tampoprinting, and digital printing, for example.