

Medium-Density Fibreboard (MDF)

Medium-density fibreboard (MDF or MDFB) is an engineered wood product formed by breaking down softwood into wood fibres, often in a defibrator, combining it with wax and resin, and forming panels by applying high temperature and pressure. It is a building material similar in application to plywood but made up of separated fibres, not wood veneers. It is denser than normal particle board.

Large-scale production of MDF began in the 1980s. Its name derives from the distinction in densities of fibreboard. MDF typically has a density of 600-800 kg/m³, in contrast to particle board (160-450 kg/m³) and to high-density fibreboard (500-1450 kg/m³). Similar manufacturing processes are used in making all types of fibreboard.

MDF is also known as Custom Wood or Craft Wood.



A Sample of MDF

MDF has been controversial in regard to its use of formaldehyde resins and the associated health risks. Thus, other resins are being considered and used instead of formaldehyde.

A. Manufacturing

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MDF is a wood product created by breaking down softwood into a powder, which is then mixed with wax and resin. The final finish is created by submitting the boards to high pressure and temperatures.

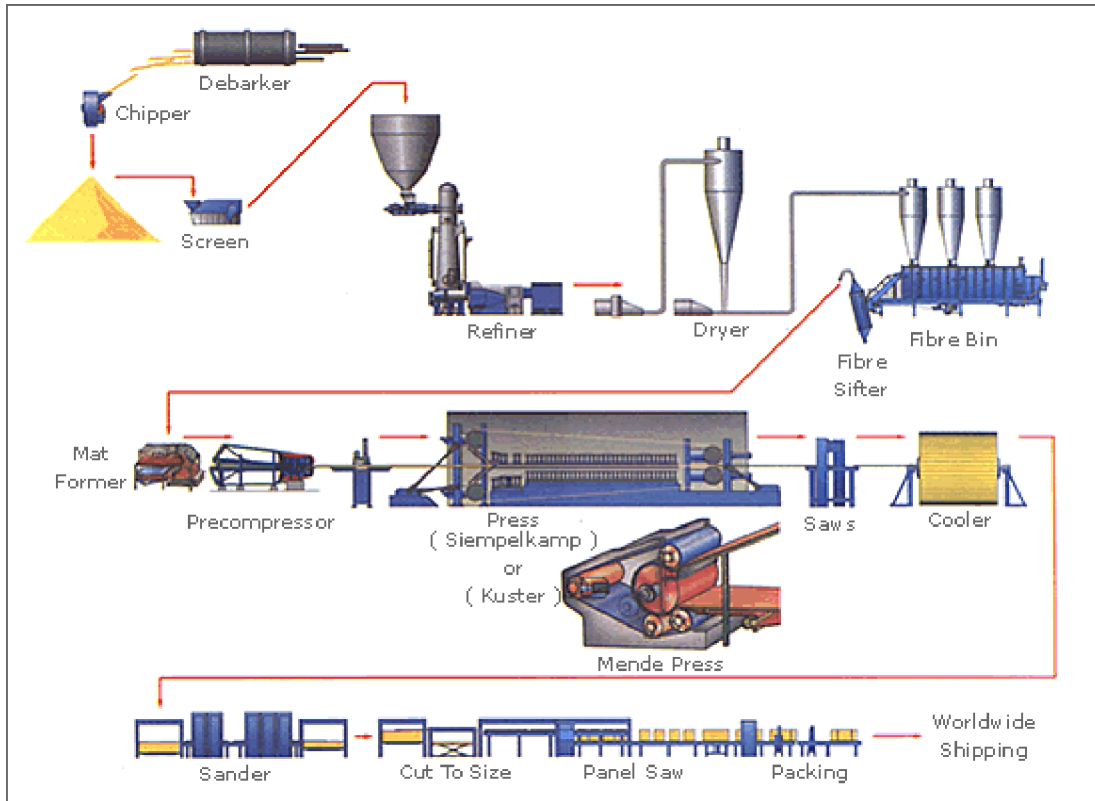
In Australia the main species of tree used for MDF is plantation-grown radiata pine. However a variety of other products have also been used including other woods, waste paper and fibres.



Hollow extruded MDF decking boards, which appear to have the coloring/preservative in the manufacture

The trees are debarked after being cut. The bark can be sold for use in landscaping, or burned in on-site furnaces. The debarked logs are sent to the MDF plant where they go through the chipping process. A typical disk chipper contains 4-16 blades. Any resulting chips that are too large may be re-chipped; undersized chips may be used as fuel. All chips are then washed and checked for defects.

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Manufacturing process flowchart

The chips are then compacted using a screw-feeder, and will be heated for 30-120 seconds to soften the wood; they are then fed into a defibrator which maintains high pressure and temperature. The pulp that exits from the defibrator is fine, fluffy, and light in weight and in color.

From the defibrator the pulp enters a blow line where it is joined with wax (to improve moisture resistance) and resin (to stop the pulp from forming bundles). The material expands in size and is then heated by heating coils. When it comes out it may be stored in bins for an indefinite length of time.

After this drying period the board goes through a "Pendistor" process which creates 230-610 mm thick boards. Then it is cut and continues to the press. Here it is pressed for a few minutes, to make a stronger and denser board.

After pressing MDF is cooled in a star dryer, trimmed and sanded. In certain applications boards are also laminated for extra strength.

The Environmental Impact of MDF has greatly improved over the years. Today many MDF boards are made from a variety of materials. These include other

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woods, scrap, recycled paper, bamboo, carbon fibres and polymers, steel, glass, forest thinning and sawmill off-cuts.

B. Comparison to natural woods

Benefits of MDF:

1. Some varieties are less expensive than many natural woods
2. Isotropic (no grain), so no tendency to split
3. Consistent in strength and size

Drawbacks of MDF:

1. Heavier (the resins are heavy)
2. Swells and breaks when waterlogged
3. Warps or expands if not sealed
4. Contains urea-formaldehyde which may cause eye and lung irritation when cutting and sanding
5. Dulls blades more quickly than many woods

C. Different kinds of MDF

There are different kinds of MDF, which are sometimes labeled by color:

1. Moisture-resistant is typically green
2. Fire-retardant MDF is typically red
3. High finition for powder lacking

Lighter densities of fiberboard are commonly marketed as ultralight or LDF boards.