

6. FIBERBOARD

6.0 Types of Fiberboard

There are various types of fiberboard¹, and unfortunately the terminology is not yet internationally standardized. Nevertheless, one fundamental definition generally is recognized (FAO, 1958/1959, p. 4): "Fiberboard is a board generic term encompassing sheet materials of widely varying densities manufactured from refined or partially refined wood fibres or other vegetable fibres. Bonding agents and other materials may be incorporated in the manufacture of the board to increase strength, resistance to moisture, fire or decay or to improve some other property." In the technical sense the ISO-definition is more precise:

"Sheet material generally exceeding 1.5 mm in thickness, manufactured from ligno-cellulosic fibers with the primary bond from the felting of the fibers and their inherent adhesive properties. Bonding materials and/or additives may be added".

FAO, OEEC and ISO used formally various definitions but the differences between them are without practical importance.

The classification of fiberboard into types is based on:

- a) Type of *raw material* and method of fiber production;
- b) Method of *sheet formation*;
- c) *Density* of product (kg/m³ or g/cm³ or lb./cu. ft.);
- d) Kind and place of *application*.

Perhaps, the best factor for classifying fiberboard is the density. This is internationally recognized. There is a rather simple difference between pressed and not pressed sheets but the range of qualities is wide and there is an overlapping. Another point which should be taken into consideration is the fact that wood fibers are blended occasionally with mineral fibers (such as asbestos), plastics and with other chemical additives. Some half-hard fiberboard contain no less than 20% of thermoplastic bonding agents.

The general term "fiberboard" is not only adopted for use in the publications of FAO and ECE, but is generally understood in the literature and in the industry. FAO (1958/1959) gives a survey on the nomenclature.

Fiberboard is manufactured from separated fibers or bundles of them. This is a fundamental difference between fiberboard and particleboard. Fiberboard is produced by interfelting of fibers in such a way as to produce a mat or sheet. The properties of the mat depend on the characteristic natural bonding of fibers between themselves. Chemicals may be added during manufacture with the aim to improve the cohesion and the water resistance. Typical of fiberboard is the wide range in densities between 0.02 and about 1.45 g/cm³ (~1.25 and 90 lb/cu. ft.).

¹ Literature: *Segring* (1947), Voith Maschinenfabrik, Heidenheim, W.-Germany (1948), Defibrator AB, Stockholm (1952), *Stamm and Harris* (1953), *Kollmann* (1955), *Neusser* (1957), *Kaila* (1958).

Fiberboard are used mainly as panels for insulation and as covering materials in buildings and constructions, where flat sheets are necessary and a moderate strength is needed. Fiberboard are also used as parts in doors, cabinets, cupboards, furniture, etc.

Fiberboards may be classified according to their density ranges into five types as shown in Table 6.1. The limits to reach are approximate. Classifications may vary from one country to another. These types and their ranges are, however, suitable for general understanding and discussion of the subject.

Table 6.1. Classification of Fiberboard According to Density

Fiberboard	Density	
	g/cm^3	lb./cu. ft.
Non-compressed		
Semi-rigid insulation board	0.02...0.15	1.25... 9.5
Rigid insulation board	0.15...0.40	9.5 ...25
Compressed		
Intermediate or medium density fiberboard (half-hard)	0.40...0.80	25...50
Hardboard	0.80...1.20	50...75
Special densified hardboard	1.20...1.45	75...90

In the ISO-recommendation 818 (Fiber building board, Sept. 1968; definition and classification, 1973) the following figures are agreed upon:

Type of board	soft	medium	hard
Density g/cm^3	≤ 0.35	$> 0.35 \leq 0.80$	> 0.80

6.1 History and Development

The origin of wood fiberboard goes back to Japan where as early as in the 6th century B. C. heavy papers were used for the construction of walls for small houses. In Europe a patent was granted to the British inventor *Clay* in 1772 for the application of "papier maché" (*Neusser, 1957*) not only for use in dwellings, furniture, doors, but also for carriages. The idea of using the new material for big stiff building elements was evident. Since the middle of the 19th century, the proposals for use of fiberboards have greatly increased. More than 200 patents were issued in this field between 1858 and 1928 (*Rossmann, 1928*), more than 600 patents until 1957 (*Neusser, 1957*).

In spite of these early developments the actual fiberboard industry started near the beginning of the 20th century in England and in the U.S.A. The development up to 1926 was rather sporadic and without a remarkable increase in capacity. The historical development of fiberboard industry is shown condensed in Tables 6.2 and 6.3. There may be some uncertainties or even some gaps in the summaries, but in general they show the sequence of the development.