

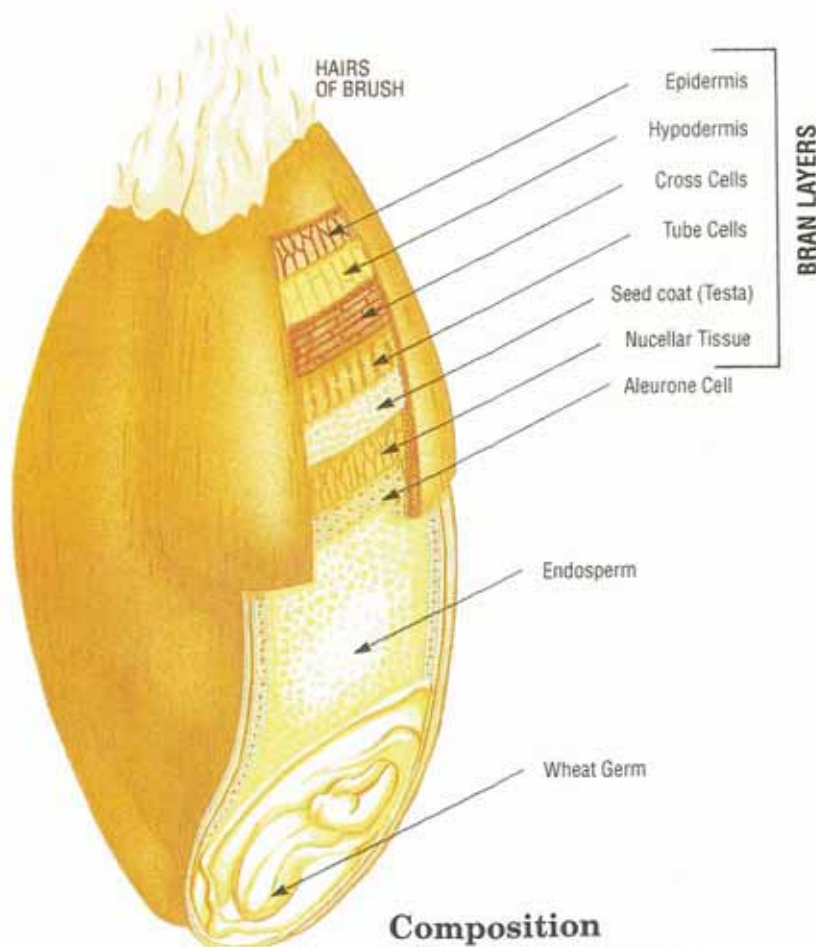
FROM WHEAT TO FLOUR

The purpose of milling is to separate the bran coating and the germ (embryo or sprouting section of the grain) from the endosperm as efficiently as possible and then to grind the endosperm into flour. This simple chart illustrates the various stages of the modern flour milling process. A crease which is found down the middle of the wheat grain makes the clean removal of the bran layers difficult, requiring a complex series of grinding, sifting and separating operations to produce the flour (endosperm).



DELIVERY & STORAGE

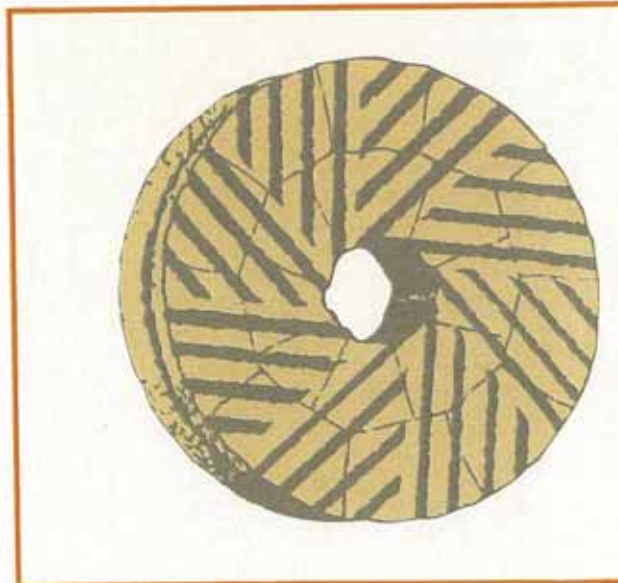
Wheat is transported to the mill from country silos by truck or rail. At the mill it is again stored in silos until required for milling into flour. Quality checks are carried out during storage to ensure the grain remains in first class condition.



Composition of the wheat grain

Reproduced courtesy of The Australian Wheat Board.

- Semolina:** Coarse chunks of endosperm.
- Middlings:** Finer chunks of endosperm than semolina.
- Stocks:** Any product being milled, usually referred to by the name of the processing stage, e.g. 3rd break stock.
- Overtailings:** Any product that will not pass through the desired sieve cover.





QUALITY CONTROL



BREAK SYSTEM



QUALITY CONTROL

Samples of all wheats delivered to the mill are analysed by laboratory chemists for milling and baking qualities.

CLEANING

A multi-stage process which removes foreign matter such as stones, sticks, stalks, leaves, dirt, seeds and other grains.

CONDITIONING

Water is added to cleaned wheat to toughen the outer bran coats for easier separation from the endosperm. Conditioning also softens or mellows the endosperm making it easier to mill.

BREAK SYSTEM

After conditioning, the wheat is passed through revolving fluted break rolls which coarsely break the grains into a mixture of endosperm and bran. This is then sieved and the branny material returned to a second break roll. Most mills have a sequence of four break roller mills – the last two are to remove the endosperm from the bran.

STONE GRINDING

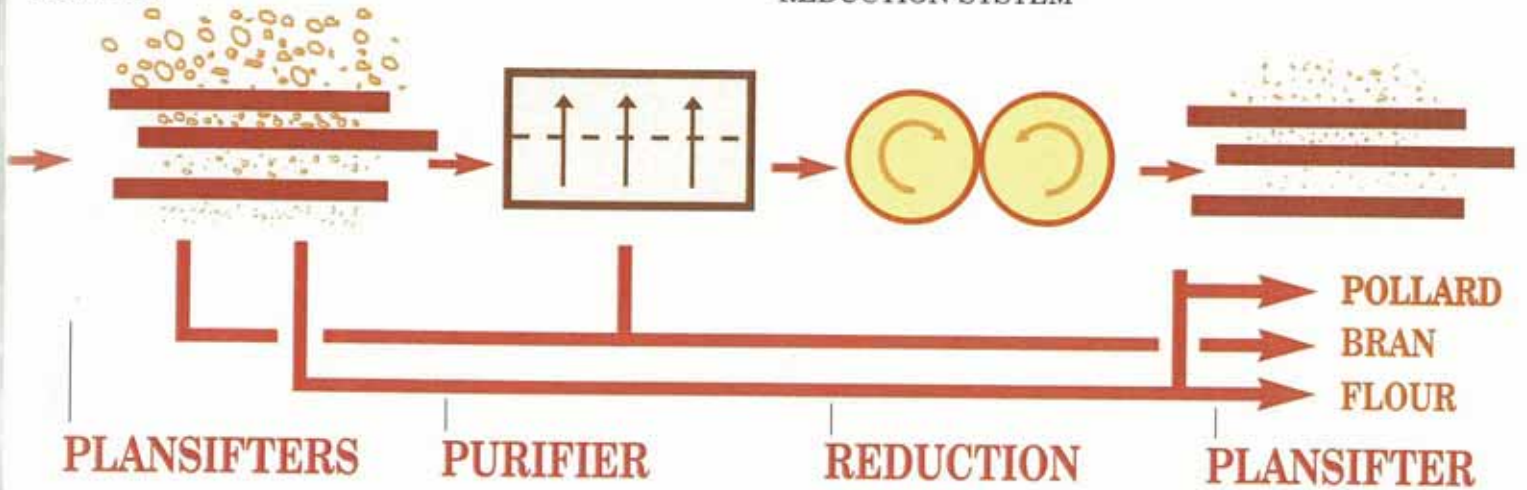
This ancient method of grinding flour, first carried out using animal or human power, then wind or water, now uses electricity. The original stones were each made from a single hard stone with curved grooves running from the centre towards the edge at regular intervals. Nowadays French Burr stones are preferred. The stones are set in pairs with the bedstone remaining stationary and the top stone revolving slowly. The grain, fed down through a channel at the centre of the top stone, is driven by centrifugal force towards the outer circumference along the grooves, producing a fine wholemeal flour.



PURIFIER



REDUCTION SYSTEM



PLANSIFTERS

The coarse endosperm chunks (semolina stocks) pass through the plansifters at two stages of the milling process. The first series takes place during the break system, followed by a second during the reduction system. After each break roller mill, the stock has to be sifted into various fractions for further processing so that flour is removed from the semolina, middlings and bran. Then, following each reduction roll, sifters again remove flour, overtilting stock to subsequent roller mills.

PURIFIER

Semolina stocks and finer endosperm particles (middlings) are separated in the purifier and sent to the reduction rolls. Any remaining fine bran particles may be removed by the purifier using a combination of sieves and air currents.

REDUCTION SYSTEM

This system consists of a series of pairs of rollers interspersed with plansifters so the semolina is rolled then sifted several times as it is progressively reduced to fine flour. The overtilts from the final plansifter after the flour has been sifted out is called pollard, which is used for stockfeed manufacture.

Roller milling is carried out at controlled temperatures which do not destroy nutrients or impair flavour.

PLANSIFTER



DISTRIBUTION

Flour mill products are either pumped into tankers or packed into sacks for export.