

Paper Grain

During papermaking, fibers become aligned in one direction. The result is grain. When fibers run parallel to the length of a sheet, the stock is grain long; when fibers run crosswise, the sheet is grain short.

Mills have several ways of indicating grain direction on labels and in swatch books and price books: They print Grain Long or Grain Short. They sometimes underline the dimension parallel to the grain; for example, 11" x 17" means grain short. They sometimes indicate by putting the dimension in the front; for instance, 17" x 11". They write "M" for machine direction after the dimension parallel to the grain; for example, 23" x 35" (M) means grain long.

If you have a sheet with unknown grain direction, you can determine the grain by moistening one side of the sheet. It curls parallel to the grain. You can moisten a piece of newsletter enough by placing it on a surface that has been wiped with a damp cloth.

Grain direction affects printing because moisture in the air and in dampening solutions causes the fibers in paper to expand slightly. Fibers then become wide, but not longer; a sheet expands against the grain, but not with the grain. Printing that requires tight register is done on grain long paper so that fibers lie parallel to the length of the cylinder, giving press operators maximum control over register as sheets expand.

In copying or digital imaging, if the copier does not have straight paper path, the static force may not be strong enough for holding paper around the cylinder. Wrong grain direction may cause frequent paper jams.

Knowing grain direction helps design for folding and strength. Heavy stock folds most smoothly with the grain. Folds against the grain may need scoring first. Grain long book pages turn more easily than grain short; grain long letterheads are more rigid than grain short. Business cards printed on the same 10pt cover stock will give you different feel if it is printed grain long instead of grain short.

Recycled paper has relatively short fibers, so it scores, folds and embosses more easily than virgin stock.