

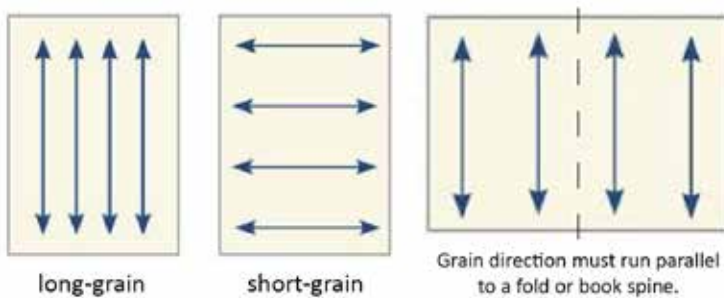


# Understanding Paper Properties

## Grain Direction

Grain direction is the direction in which the paper fibers line up on the paper machine when the paper is manufactured. Grain direction is relevant when folding and binding is required, or if the paper has to run through other equipment for imprinting after initially printed on press.

- Long grain paper refers to the fiber alignment parallel to the longer dimension of the sheet.
- Short grain paper refers to the fiber alignment parallel to the shorter dimension of the sheet.



## Folding

Folding puts stress on both paper and ink film. Too much stress can result in unsightly cracking or bursting at the fold edge.

Successful folding and scoring starts with considering:

- Type of paper used
- Basis weight/caliper
- Grain direction
- Felt or wire side
- Number and direction of the folds
- Type of score to be used
- Depth and width of the score
- Condition of the paper, i.e., strength and moisture content

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### Folding Guidelines

- Folding with the grain (same direction as most of the fibers) offers the least resistance to folding. Pages tend to lie flatter when folds are made with the grain.
- The strongest folds result when folding across the grain since paper has greater resistance to tearing in that direction.
- When folding at right angles, make the primary fold with the grain.

Communication your folding and binding requests clearly when requesting your estimate will help to ensure that the right paper specification (and grain direction) is used for your estimate.

### Scoring

Scoring generates a crease to assist the folding of paper to provide a more sharply defined fold without cracking. A rounded rule is used to create or emboss a narrow ridge that serves as a hinge or a joint.

### Scoring Guidelines

- Heavier papers are more likely to crack on the fold. Fibers on the outside of the fold have to travel too far and can be bent beyond the breaking point.
- Scoring should be used when the fold is made across the grain.
- Coated papers are more likely to crack than uncoated papers. Scoring all cover weights is recommended.
- Heavy ink coverage at the fold increases the risk of cracking.
- The thicker the paper, the wider the score should be. The score width should never be less than the caliper of the paper.
- The score should be made with the ridge inside the fold to ensure maximum strength and flat folding.