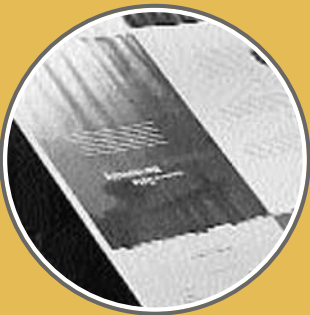


WAFFLING BY ANY OTHER NAME...

Whatever you call it (and there are many other terms for it), waffling, if excessive, can degrade the appearance of the finished printed piece.

Waffling — also known as “fluting” — can be defined as a virtually permanent, wavy wrinkling of the paper that appears in heatset web printing — most often with jobs involving heavy, two-sided ink coverage and light stock.

The waves or wrinkles — always parallel to the paper’s grain — can be very subtle and unobtrusive to the eye or they can be quite pronounced. They are usually spaced between one-third of an inch to an inch and a half apart.



TECHNOLOGY TODAY

Paper Waffling: Understanding and Managing the Problem

Quality printing is as much art as it is science, and minimizing waffling — the usually subtle waves or “wrinkles” that sometimes appear on the final printed page — involves a little of both. First a bit of nomenclature; waffling is known by many names. It’s also called fluting, corrugating, ridging, or rippling. Sometimes the resulting unevenness in the paper is called streaks or striations. Call it what you will, it becomes undesirable if it’s excessive.

A few fundamental facts: 1) Although GLS and other industry leaders are making progress on eliminating it completely, occasional subtle waffling is considered normal, particularly with some papers (usually coated) and paper weights. Also, waffling occurs only on heat-set web presses — it is virtually unheard of on sheetfed jobs. Finally, keeping a printed page smooth often requires delicately balancing a number of factors — it is indeed a mixture of science and the printer’s art.

A basic understanding of waffling will help you predict the outcome of your project. It will also give you a sense of industry standards and some appreciation for the various ways that waffling can be minimized.

It all depends

The good news is that while it can happen on any job, waffling is limited to pieces printed on a web press. In fact, it appears to be related specifically to in-line web drying ovens. But just because your job is on a web does not mean your paper will waffle. It depends on a number of other factors.

Studied widely by both the printing and paper industries, no single cause of waffling has been found, nor has any routine set of procedures been developed to eliminate it entirely. There is, however, consensus that it is mostly a matter of paper moisture content and the factors that control that content. Put another way, waffling has mainly to do with a paper’s ability (or inability) to absorb and dissipate moisture evenly. Complicating efforts to control it is the fact that things like paper weight, coating, and ink coverage all have an effect.

Principle culprits

Waffling occurs most often when printing coated stock with heavy ink coverage on both sides. It’s thought that the heavier the coating and the greater the ink coverage, the more difficult it becomes for moisture in the paper to migrate evenly. Our experience at GLS further suggests it is more likely to happen in page layouts where there are alternately heavy and light areas of ink coverage on two sides of a given position on a form. In other words, on both sides of a particular area of paper.

If waffling becomes heavy, one common corrective approach is to move to a heavier stock. This often reduces the rippling effect. But other remedial action may be taken as

well. Bearing in mind that the waffling is water-related, unexpected rippling may be mitigated by a number of press adjustments.

No single answer

Imagine for a moment the “life” your paper leads. Although covered in a protective wrapping, it’s often shipped as a roll from the mill through bone-dry cold or humid summer thunderstorms. Unwrapped at the press, it’s suddenly exposed to the ambient air only to be hurtled through a 160-foot press. It is stretched (two ways!), moisturized, coated with ink and/or varnish, then heated in ovens to flash solvents off the ink. Next, it’s chilled to set the ink, coated with a silicone lubricant, and chopped into pieces – all in less than 10 seconds.

We try to compensate for these stresses by adjusting any or all of several drying and heating zones, adjusting paper tension, moderating fountain solution, and increasing or reducing chilling temperature. One adjustment is seldom enough; the art comes in understanding how the multiple adjustments all affect each other. In an industry study presented by a major Japanese paper manufacturer, one author was blunt: “Correcting just one of the above factors does not lead to a satisfactory result. Comprehensive measures [are required].”

Thinking ahead

If carefully packed and allowed to sit, will waffled paper flatten out over time? Will the fluting eventually dissipate? The simple answer is no, severe waffling won’t go away. Another industry investigation found that the measure of waffling dropped only between 12 and 30 percent after 90 days. In other words, most of it remained.

What can be done? Neither science nor the printer’s craft can, as yet, offer a solution for the elimination of waffling. There are, however, several things the designer or print buyer should keep in mind. Some occasional subtle waffling on web runs is often unavoidable and should be considered normal. It is most likely to occur in layouts with heavy or alternatively heavy and light coverage.

Lighter paper weights are most prone to problems. Coated stock is also usually more susceptible. If waffling is a concern and you have a choice, remember that sheetfed printing virtually eliminates the possibility of waffling.

It is also useful to check with us in advance regarding potential waffling. Litho is particularly experienced with high quality color printing on web presses. Although waffling can be difficult to predict, we can evaluate your job specs and give you an experienced appraisal of how to minimize the likelihood of a problem, so your job – and your paper – can run as smoothly as the state of the art allows.