

Alkaline filler addition and retention

Jerome C. Pflieger

With the advent of alkaline papermaking, operators are finding that they can substantially increase the amount of filler in some grades, such as opaque offsets. Up to 30% total filler is possible in some cases, although the norm for most other grades is an increase of 5–10% filler.

Addition points and filler retention become much more important with higher filler levels. There are two schools of thought on the subject of addition points:

- Add the filler to the thick stock at the blend chest or the suction side of the machine chest pump. Adding the filler back at this location assures that it is well dispersed with the fiber.
- Add the filler to the thin stock at the silo or the suction of the primary fan pump. This addition point would be advantageous, especially if the machine has a closed loop ash gauge.

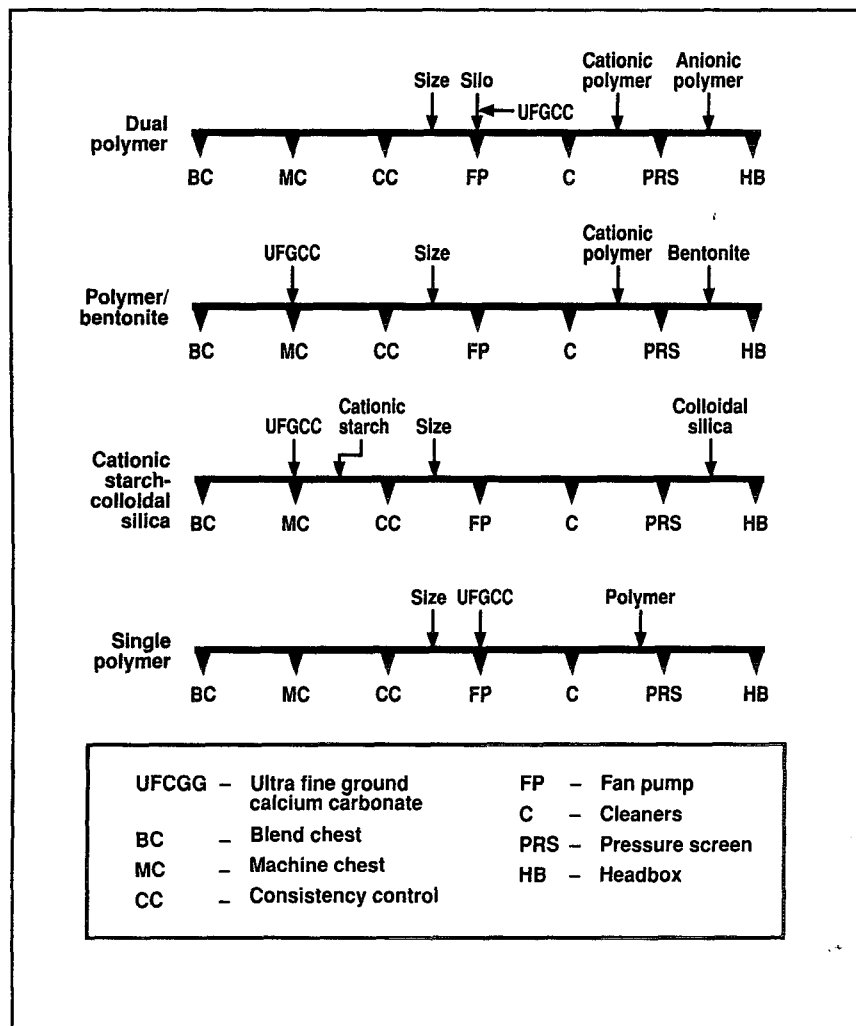
Probably the biggest advantage to adding the filler to the fan pump is the quick response time to filler adjustments. But excellent results can be achieved from either addition point. (See Table I.)

A word of caution is in order when adding wet ground calcium carbonate (CaCO_3) and titanium dioxide (TiO_2) together to the thick stock. In that situation they should be added to the suction of a stock pump so that they will be mixed and dispersed with the stock in the shortest time. If these two materials are allowed to intermingle for any length of time, then they will agglomerate and both products will become less efficient.

Probably the best approach would be to add the carbonate to the thick stock and the TiO_2 to the thin stock. TiO_2 is normally added for opacity and in this way there would be quick response to any upsets in opacity, plus a more conservative use of TiO_2 .

Pflieger provides technical service at OMYA, Inc., 61 Main St., Proctor, VT 05765-1196.

1. Suggested addition points for alkaline retention systems



Such a problem occurred in a mill producing coated woodfree grades. The mill was not meeting the opacity specification. A check of the addition points of the wet ground CaCO_3 and the TiO_2 revealed that the two products were being added to the top of the blend chest through pipes that were 12 in. apart. The two products were in contact with each other for about a minute before they were pulled down into the stock. The problem was resolved by having the machine superintendent turn off the TiO_2 to bring the opacity up. Within the hour the opacity was back in specification.

A discussion of filler would be incomplete without mentioning filler retention. The past few years have seen the introduc-

I. Filler addition point characteristics

<i>Grade</i>	<i>Machine speed</i>	<i>Filler addition point</i>	<i>% ash</i>	<i>% ash retention</i>
70# coated base stock	2185 ft/min	Mach. chest	12.3	65.5
60# coated base stock	750 ft/min	Silo	20.0 *	78.5
50# opaque offset	1700 ft/min	Fan pump	13.2	63.3

* Low temp. (500° C) ash

tion of dual polymer systems and microparticle systems. **Figure 1** illustrates the recommended points of addition for several of the most commonly used retention systems for woodfree grades.

With the advent of these new systems, high first pass (80–90%) retention can be achieved along with excellent (50–70%) ash retention. Although these systems are more expensive than the older single component systems, they give the papermaker much more flexibility. They usually incorporate shorter chain polymers, resulting in better drainage and improved formation. Good retention on both first pass and ash are paramount for a clean and trouble-free wet end. If the filler is not retained, then abrasion and felt filling can become a problem. Good filler retention is also very important for good sizing. If filler is not retained, then all the size is not retained. The result is hydrolyzed size buildup that causes press picking and possibly sheet holes.

As mills become more expert at alkaline papermaking the trend will be to higher filler levels, especially in commodity grades, and ultrafine ground calcium carbonate will take on a much more important role than it has today. □