The Counter-Current Prewash System

Products and Procedures

Fabritec research has pioneered and constantly perfected the application of cationic injection detergents to the drycleaning industry. The advent of the new, modern drycleaning machinery, combined with this chemistry, has made the counter-current prewash system practical for drycleaning retail garments. It has evolved as the premier method in terms of cleaning performance, solvent condition and ease of operation. This slant discusses the process in detail and outlines the compromises that must be made if it is to be run with one of the older anionic charge detergents.

One of the principal advantages of these new machines is that, due to large integral stills and flexible control circuits, most are capable of running a two-bath prewash cycle. When properly run, using the counter-current method, the prewash system will consistently produce excellent cleaning results, double or triple the cartridge filter life, and eliminate the need to use activated carbon or clay cored filters. The latter two factors result in a significant reduction in hazardous waste materials. Not only are the number of cartridges to be disposed of reduced, but the residual solvent can be almost fully recovered from the all-paper cartridges, since there are no adsorbents in the core.

A typical Fabritec counter-current prewash cycle is as follows:

Time (Min.)	Operation
1	Fill from working tank
3	Clean with solvent circulating from wheel to button trap to pump to wheel (this is called milling)
1	Drain to still
1	Extract to still
1	Fill from clean solvent tank (same level)
4	Milling — add detergent
6	Clean with filtration
1 1/2	Extract
1	Tumble dry and deodorize

As can be seen, a batch of solvent is moved from the working tank to the wheel to the still and an equal batch from the clean solvent tank to the wheel to the working tank each load; hence, the term counter-current. On most machines, the still is capable of returning the batch to the clean solvent tank by the end of the cycle. Thus, the tanks remain in balance and solvent turnover in the working system results in consistent solvent color of 80% or above and the nonvolatile residue (NVR) levels of 0.5% or less. Solvent of such high quality will virtually eliminate streaks, swales and spotting rings and will result in brilliant whites and colors. In addition, since the first bath is taken from the working tank, some residual detergent is present to suspend the large amount of soil released in the non-filtered bath, thus eliminating the possibility of redeposition or greying.

What about the use of detergent in the prewash system? Let's begin with the traditional charge detergent. All of the many charge detergents are anionic in nature and are not attracted to the garments. They remain in the solvent in a fixed concentration and are added in a certain percentage whenever new or distilled solvent is added to the working

system. These detergents are chemically designed to work at concentrations of from 1% to 2% and are not effective at lower levels. A review of the counter-current system previously described reveals some problems in applying the traditional charged system.

For example, let's say our machine capacity is 35 Ibs., our solvent level is 15 gal., and we are going to use a charge detergent designed to run at a 11/2% charge. Since we are removing 15 gal. from the working system and replacing it with 15 gal. of distilled solvent each load, we will have to add 1 1/2% of 15 gal. or 28.8 ounces of detergent to each load to maintain the proper charge. Obviously, this is not economically feasible plus it is also time-consuming. As a result, compromises are made to accommodate the charge detergent. The most common compromise is to reverse the tanks; i.e., the first bath is taken from the clean tank, dumped to the still which returns it to the clean tank. The second bath is taken from the working tank and dumped back to the working tank. Such a system solves the economics of using a charge detergent. What has been lost in this compromise is, first, a raw solvent first bath with no detergent present is inviting redeposition. Secondly, very little solvent turnover in the working tank results in higher nonvolatile residue levels and poor solvent color which makes the use of carbon core filters necessary. Another compromise used retains the counter- current prewash system as described, but a token amount of charge detergent is added to the second bath, usually 4 to 8 oz. Thus, a product designed to work at 1 to 2% is being used in concentrations of around 1/4%, resulting in a proportionate loss of cleaning performance.

The Fabritec injection type detergent, on the other hand, is added to the wheel each load in relation to the number of pounds being cleaned and is independent of the distillation rate. Fabritec's true cationic injection detergent is highly substantive to the fabrics and is chemically designed to work at low concentrations. It may be applied to the counter-current prewash system with no compromises. In our example, 7-9 oz. of detergent would be added to our 35 Ib. machine at the beginning of the second bath. Fabritec detergent would be present in the concentration for which it was designed. Since the detergent is properly formulated, most of it would be attracted to the garments during the filter run, but enough residual would remain behind in the solvent, which is dumped to the working tank, to suspend the soil and prevent redeposition in the first bath of the next load. The Fabritec injection equipment is signaled by the machine control system and automatically injects the proper amount at the proper time in the cycle. Operator attention, calculations, and test kits are eliminated.

Thus, it is evident that the properly formulated, truly cationic Fabritec injection detergent is ideally suited to the counter-current prewash system and its application to a modern drycleaning machine will allow that machine to produce at its fullest potential without making compromises.