

**A TECHNICAL  
AND PRACTICAL  
STUDY  
OF  
TONSIL®  
FILTER AID**

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## **A TECHNICAL AND PRACTICAL STUDY OF TONSIL® FILTER AID**

An independent observation was done on a filter powder with special properties that reportedly can eliminate distillation of hydrocarbon solvent while preventing odors and dye build up in a hydrocarbon solvent cleaning system.

The testing and observation of the solvent and equipment was done by Everett Childers of E Childers & Assoc., a nationally known and recognized consultant for the Drycleaners of North America.

Experienced drycleaners using the Tonsil® filter powder included plants that have used the product and method for five months to five years.

The equipment observed for the use of the Tonsil® filter aid and procedures of using the powder were hydrocarbon dry-to-dry, high-speed extract drycleaning machines. It is necessary to use a spin disk filter or a more uncommon flexible or rigid tube filter. This method cannot use conventional cartridge filters as it will plug them up very rapidly due to its unusual properties of being able to filter much finer than is commonly known in the industry.

There are cartridge filters available that will also enable operators to get the same, or similar, results as this study produced.

The drycleaning machines used were 35 to 75 pound hydrocarbon, dry-to-dry units and all were configured to use the Tonsil® filter powder without a still and also without machine installed refrigeration systems. All of the drycleaning machines using the new process were sold and serviced by John Kelleher Equipment Supply, Inc.

The environmental impact of the process and product was investigated and some interesting findings were made. The environmental impact was determined under current United States rules and regulations.

Included parameters were the process's ability to:

- Safely clean textile garments to acceptable standards
- Not retain any residual solvent odor
- Not abnormally increase filter pressure
- Permit no carryover of odors or contaminants to garments cleaned
- Produce a completely odor-free and clean garment
- Maintain normal flow rate through filters
- Produce no still residue problems nor mechanical operation of the still
- Reduce hazardous waste produced by process
- Maintain garment color to an acceptable degree
- Provide a nice hand to the garments cleaned
- Produce wrinkle free garments
- Reduce growth of bacteria in hydrocarbon solvents

- Not impart odors in the cleaned garments

## **BACKGROUND OF TONSIL® FILTER AID**

Tonsil® filter powder is produced from bentonite then enhanced by an acid process. This process produces a very fine clay that has highly adsorbent properties for not only odors but dyestuffs and water. The use of the processed bentonite can effectively reduce, or completely eliminate the need to vacuum distill hydrocarbon solvent that has been used during the cleaning process. Bentonite has been used for over 100 years for the clarification of olive and other edible oils and has also been known as Fullers Earth.

The MSDS information does not show any undue hazards for humans working with the powder. It has no effect on the flashpoint of the solvent with which it is used. It has a neutral pH and when viewed under a microscope shows a highly porous inner structure and a multitude of acid sites upon its surface. Tonsil® filter aid will remove traces of acids and polar impurities from solvents. The filtration time shows excellent performance (according to the standard method BE 0013) and averages between 60 and 90 seconds.

## **COMPARISON OF MACHINE OPERATION WITH AND WITHOUT TONSIL® FILTER AID**

The normal drycleaning machine operation includes installing cartridge filters then removing them when they become ineffective in removing insoluble soils. Cartridges with a carbon core are limited in the amount of dyestuffs they can remove from the solvent system. The solvent needs to be distilled on a regular basis to remove soluble impurities. All of this produces an excess amount of hazardous waste that must be legally handled. The conventional method of filtering and distilling solvent is very labor intensive and expensive, with less than desirable results.

With the method of operation that Kelleher Equipment Supply, Inc. recommends for solvent maintenance, there is the use of a combination of diatomaceous earth and Tonsil® filter additive placed upon a typical nylon spin disk filter. The Tonsil® filter additive will effectively adsorb dyes, water and solvent soluble soil, moisture and fatty acids from the solvent. It also has inhibiting properties for reducing or eliminating corrosion and bacteriological growth while maintaining a low filter pressure. This process can eliminate the need for distillation.

Since there is no need for distillation, a hydrocarbon cleaning machine may be purchased with out a still. With a high-speed extract motor the garments will not be heavily laden with solvent therefore will produce a reduced drying time of the garments. Cycle times are running between 50 and 55 minutes with some loads as low as 47 minutes.

Without a still approximately 3 boiler horse power or more can be saved depending upon distillation practices and size of the machine. With the high-speed extract machine, utilities will be saved due to faster drying times, lack of distillation and eliminating the refrigeration system common to drycleaning machines with a still installed. The drycleaning machine cost can be several thousand dollars less than a machine with a still and refrigeration unit.

## **TONSIL® FILTER AID SPIN-DISK CLEANING MACHINE OPERATION**

The nylon spin disk filter needs to be precoated with a combination of diatomaceous earth and Tonsil® filter additive. This is accomplished by adding a 1.5 dry quart measure of diatomaceous earth and the same amount of Tonsil® filter aid for a 35 pound capacity drycleaning machine's spin disk filter. These powders may be placed on, or in, a cloth bag in the wash wheel. Solvent is brought into the wash wheel and the basket is rotated while sending the wash wheel solvent to the nylon spin disk filter then back to the wash wheel for approximately ten minutes. This coats the disks with diatomaceous earth and Tonsil® filter aid. After this coating of the filter the machine is then ready to clean clothes.

Loads are classified as usual with like fabrics cleaned with like fabrics, mainly by how long it will take to dry the garments. For instance light-weight garments should be cleaned with other light-weight garments and heavy garments with other heavy garments. Heavily soiled garments may be prespotted and flushed as usual.

With the process described above the cleaners observed are running cycle times, for normally soiled garments, between 8 and 20 minutes. Observations of the garments for spots, cleanliness, brightness, freshness, hand, and lack of wrinkling were all at or above average for the industry.

## **PRACTICAL CLEANING OF TEXTILES AND THE RESULTS**

All of the plants observed were completely free of solvent, bacteria or soil odors. The operators of the systems were pleased with the results they were receiving and noted that spotting was normal, or less, than for a conventionally operated system. They all mentioned the reduced total cycle times and all had reduced their wash times to as low as 8 minutes while still maintaining reduced spotting. Garments spotted did not leave rings due to redeposition.

Classification of garments is primarily by the weight of the garment rather than the color of the garment. All operators mentioned the lack of dye bleed that would redeposit on other garments. On the occasion when a garment would pick-up a stray dye a simple re-cleaning would clear the affected garment without additional work.

After examining fifteen loads that had been removed from the machines after drying, the garments were free of wrinkles, free of any odor, had bright colors and whites. Darker garments had a depth of color that was apparent. Examination of fifty garments after cleaning, at random produced a total of three stains and two crusty surfaces that were blown off with the steam gun. Including the stains this would produce a 90% pass-up rate for garments cleaned, with no pre-treatment of stains.

One of the cleaners visited had a noticeably darkened sight glass and was asked about it. He reported that the clothes cleaned in the solvent did not show any discoloration from the darkness of the solvent. I examined the garments from the last load he had cleaned and they were all bright with no evidence of redeposition. I asked him to clean it up and he said it would simply take a quart of diatomaceous and a quart of Tonsil® filter aid. After adding the powders it was timed as to how long it would take. After three minutes there was a remarkable difference in the appearance of the solvent. In two more minutes the solvent was completely free of color.

## **WHAT THE USERS SAY**

One of the cleaners visited for information regarding the above described process was Crown Cleaners in Huntington Beach, CA. Mr. Matt Borgerson has used the process for fourteen months with no distillation and reports that he does a regular amount of prespotting. He originally had two perc drycleaning machines and replaced them with new dry-to-dry hydrocarbon machines. The machines have never had the stills turned on due to the effectiveness of the Tonsil® filter additive being able to adsorb dyes, odors and fatty acids from the system. He notes that he has a natural gas reduction of 8%, electricity usage reduction of 23%, and 100% reduction in cartridge costs and disposal costs for cartridges. These cost reductions were calculated after installing two water chillers, a large capacity laundry washer and two drycleaning machines.

Mr. John Marifian of Crown Cleaners (no connection to the company above) in Downey, CA has been in the cleaning business for over 40 years and installed a hydrocarbon dry-to-dry machine using a spin disk filter and Tonsil® filter additive reports that he wouldn't consider going back to petroleum solvent distillation. He reports clarity of solvent, lack of bleeding, excellent cleaning, no odors and excellent hand to the cleaned garments. With the high speed extract machine he said he has not purchased any solvent since installation of the machine over one year ago, which is yielding over 60,000 pounds of cleaning per drum of solvent.

Mr. John Lee of Valencia, CA was a perc cleaner for over 20 years and installed his 2 hydrocarbon machines five months ago and has not used either still in that time, nor does he see a need to, he says. His cleaning cycle is between 10 and 20 minutes with excellent solvent clarity and zippers that actually work on the trousers he cleans. He is reporting utility savings, hazardous waste savings and a boiler HP reduction of 3 HP.

Mr. Gary Futterman of Flair Cleaners in Studio City, CA has cleaned in excess of a million pounds of garments in his high profile cleaners without distillation and with greatly simplified

operating procedures. He is doing a load in a total of 57 minutes with exceptional brightness and lack of odors. Spotting is the same as from his perc machine that he uses as a back-up and for heavily soiled garments. When asked his opinion of the Tonsil®/spin disk procedure he made two statements, “Fantastic” and “Miracle powder”.

## **ENVIRONMENTAL AND ECONOMIC BENEFITS OF TONSIL® FILTER AID**

As mentioned by all the cleaners interviewed there was consensus that the hydrocarbon dry-to-dry, high-extract speed machines using diatomaceous filter powder with the additive, Tonsil® filter aid, were above average for cleanliness, brightness and lack of odors for the garments cleaned. None of the cleaners were distilling solvent which results in lower energy costs, elimination of still maintenance and replacement, reduced workload for the operator, no cartridge costs, greatly reduced solvent and filter wastes and a completely odorless working environment. All of their hydrocarbon machines were operating without a costly built-in refrigeration system or still and relied upon the chilled water system to provide the proper temperatures for drying the garments.

The pressers and finishers interviewed also showed a high regard for the clothes cleaned with the process and all stated they pressed easier and faster due to no wrinkling and pleats not being removed during cleaning, and the complete lack of odors of the cleaned garments.

Machine costs can be reduced approximately \$10,000.00 by the elimination of a still and refrigerated cooling unit from the price of a new machine. With higher solvent mileage due to a high speed extract and reduced energy and hazardous waste hauling costs this process could pay for a new machine especially if the various states are offering an incentive to switch to a more environmentally correct solvent as does California and some of the eastern states.

In Summary, the filter additive Tonsil® reduces costs by elimination of vacuum distillation equipment, related distillation costs, hazardous or filter waste, labor, and utilities while producing superior cleaning with brighter colors and completely odor free. The process is less costly by eliminating cartridge filters and their ultimate disposal. The drycleaning machine is less complicated, by the elimination of distillation and refrigeration equipment, which will also reduce maintenance costs.

*This technical and practical report was prepared by Everett Childers in April, 2004.  
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