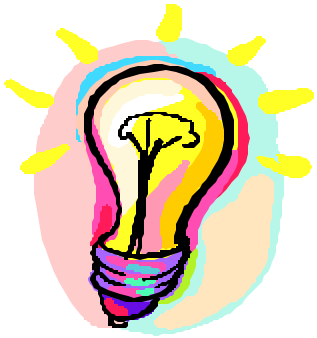

Technically Speaking

NOVEMBER 2004 VOLUME 3 NUMBER 4

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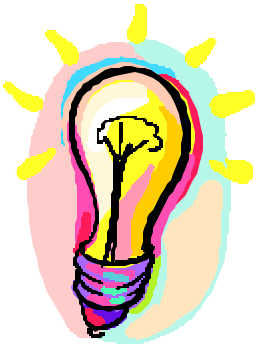
Choosing the Best Swab for A Critical Application

To make the best choice of a swab for a particular application the user must consider a number of different criteria. What is the job to be done- precision application, general cleaning, removal of contaminates from critical or sensitive surfaces, or cleaning validation? What kind of work pieces will be treated- printed circuit boards, disk drives, coated optics, and machined parts? Will any solvents be employed as cleaning aids? What conditions of cleanliness must be maintained while the work is being performed? Is cost a constraining factor when choosing a swab for the application? All these factors need to be considered before the choice of a cleaning swab is made.

Many different industries use swabs in their production and repair operation, and each industry generally operates production areas that require a certain degree of cleanliness, as related to particulate contaminants in the air. Pharmaceutical manufacturers, food processors and research laboratories usually operate Controlled Environments, where procedures are in place to minimize the introduction of particulate contamination into the area. These industries also operate cleanrooms that require more stringent measures and testing to insure that air-borne particulate levels are kept within specified operating parameters, usually between 100K to 10K particles 0.5 microns in size or larger, per cubic foot of air, or Class 100K to 10K. Printed circuit board, electronic assembly, medical device and floppy disks manufactures normally operate cleanrooms rated at Class 10K to 1K. Optics producers, disk drive manufacturers, and semiconductor fabricators normally operate cleanrooms rated between Class 1 K to as low as Class 1. At each cleanliness level the swabs used must be constructed of materials that will not release particles that will compromise the cleanroom standards established by the user.

Along with looking at the various types of swabs available in terms of particulate levels, you must also consider how the swab will be used in the specific application. Will there be considerable abrasion during use? Will solvents be used with the swab? Is the swab being used to apply lubricants? What extractable residues are of concern when using the swab for cleaning validation?

When using a foam swab in an application, wrapped foam swabs will generate more particulates than sealed foam swabs, due to the abrasion of exposed edges. Chemtronics® and Coventry™ sealed foam swabs have no edges to abrade. Wrapped and sealed foam swabs have the lowest chemical resistance, and the foam head can be rapidly dissolved in chlorinated solvents like methylene chloride. Foam



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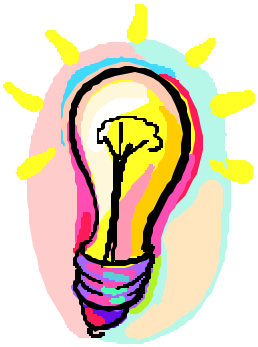
swabs show some resistance in exposure to ketones, like acetone or MEK, provided the exposure time is very short and there is little abrasive action during use. When using foam swabs with solvents it is best to minimize exposure to the solvent using a simple dip-rub-discard technique. If longer solvent exposure is required, or more rubbing action is necessary, then the user should consider using a polyester swab.

As with foam swabs, wrapped polyester swabs can have edges that can snag or tear when rubbing over an uneven surface. The wrapped polyester Pillow-Tip™ Swab eliminates any exposed edges by using a tubular knit polyester material that is bonded to the stick using a PTFE (Teflon®) shrink band. The patented, wrapped Diamond™ Swabs also eliminate edge abrasion and particle release by employing a uniquely designed polyester material. Both wrapped and sealed polyester swabs have much better chemical resistance to solvents than foam swabs, and can withstand exposure to chlorinated solvents and ketones for much longer times. The woven polyester material is virtually lint-free and does not crumble after long solvent exposure, as with foam swabs.

The shape and construction of the swab is also important. In many applications dirt and other residues must be removed from extremely small spaces encountered with fine pitch component placement. Sharply tipped swab heads, like the Coventry™ 44070 and the pointed end of the 20050, 20080 and 21050 wrapped foam swab sticks, make for handy tools for removing residues from these tight spaces. These swabs are also good for microscopic work, as the pointed head obscures less of the vision field. The sealing process used in bonding the swab head to the stick in the Chemtronics® and Coventry™ sealed foam and polyester swabs, insures that these swabs are the most robust swabs on the market. The heavy seams of the Coventry™ sealed polyester swabs guarantee high head strength and chemical resistance. As glues are not employed to attach the swab head to the stick, there are no adhesive residues to be dissolved by cleaning solvents and deposited on the work piece. Employment of six inch handles in some Chemtronics® and Coventry™ swabs facilitates the cleaning of "buried" surfaces, as the longer handle provides extended reach. Chemtronics® Chamois Tips™ have a flat, soft synthetic chamois head, ideal for cleaning sensitive surfaces, such as magnetic and optical audio and video heads.

If the swab is to be used in pharmaceutical manufacture or food industry applications for validating equipment cleaning methods, then the chosen swab must demonstrate low extractable organic and ionic residues. Only wrapped and sealed polyester swabs are recommended for such applications. Coventry™ also offers the Aqua Prime™ post-manufacture cleaning process, which produces polyester swabs with exceptionally low organic and ionic extractable residue, making them perfect for



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cleaning validation testing. In cleaning validation testing polyester is the best material for construction of the swab head, as it picks up contamination the best, and will readily release it into the analytical solution. In many cases polyester is the only material that can withstand the aggressive solvents that are sometimes employed in such testing.

If circuit boards which contain static sensitive components are being cleaned, you would want to use a swab that will dissipate any static electricity charge that may be generated while rubbing the surface of the board with the swab. Very sensitive components can be damaged by even the small amount of triboelectric charging that can occur due to rubbing the board surface with a swab. The Coventry™ ESD swabs employ static dissipative or conductive plastic handles, which will very rapidly dissipate a heavy static charge in much less than one second. The static dissipative handles are also very solvent resistant, so they will not leave behind any chemical residues when exposed to strong cleaning solvents.

The cost of the chosen swab may also be a consideration in the application. Cotton swabs are the least expensive and have good resistance to chemical solvents, but they also have the poorest abrasion resistance, especially when rubbing over an uneven surface. Cotton swabs can leave behind a great deal of cotton fiber lint on the work piece, necessitating time consuming and expensive cleaning. Cotton swabs should only be used in non-critical applications and on smooth surfaces to minimize abrasion and resulting fiber contamination. Cotton swabs should never be specified for clean room applications operating at Class 10,000 or lower. This rule can be relaxed if one chooses a “foam-over-cotton head” swab, such as the Coventry™ 43170 sealed foam swab or the 23110 wrapped foam swab. The foam covering prevents the cotton head from depositing lint on the work piece, while the cotton bud provides a soft cushion under the foam for applications where a more delicate touch is required..

Taking all of these factors into account, one can be confident of choosing the right swab for any application. There is normally more than one possible swab product for any given application, so the customer should be sampled with all the best choices, so that they can determine the best swab for their needs. This may require some time for trial and error testing on the part of the user, but will result in low failure rates and less product rejection.

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