

## TECHNICALLY SPEAKING

### Choosing the Best Wipe for an Application

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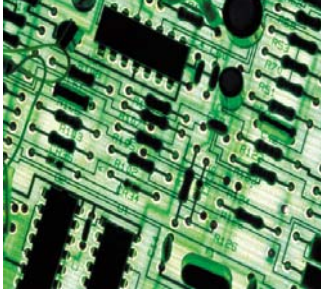
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In an earlier edition of Technically Speaking we considered how to choose the best swab for a given application. Now we will turn our attention to choosing the best wipe. In choosing the best wipe for a particular application we need to “match the wipe to the job”. Wipes are used for cleaning large surface areas, larger than those that could be conveniently cleaned using a swab. Wipes also offer advantages in solvent retention and solvent resistance that are not available with a swab. When choosing a wipe for a particular application we need to consider such factors as cleanliness, abrasion resistance, solvent compatibility, and absorbency.

Wipe cleanliness is usually determined based on three different parameters. First, a particle count is determined, which measures the size distribution of extractable particles in a wipe sample. Second, cleanroom grade wipes must also be low in extractable non-volatile organic residues. The amount of such residues is determined by extracting the residues from the wipe using ultra-pure DI water, ultra-pure IPA, or the solvent being used in the particular cleaning application. Third, the wipe is analyzed for the amount of extractable ionic contaminants present, such as salts and minerals. Since wipes are used in the manufacture of critical electronic assemblies, corrosion due to ionic salt contamination is of concern.

ITW Chemtronics offers two types of wipes, cleanroom grade wipes and general purpose wipes. Cleanroom grade wipes are designed and processed to reduce the generation of particulate contamination when used in a critical environment. All cutting, laundering and packaging operations are performed in a manner that eliminates or greatly reduces the introduction of particulates into the product and their subsequent introduction into the critical environment. All Coventry™ Cleanroom grade wipes are laundered and packaged in a Class 10 or Class 100 cleanroom and are therefore considered to be “Cleanroom” grade. Coventry™ Cleanroom wipes can be used for general cleaning, but are best for use in critical environments, where the amount of particulate contamination is of greatest concern.

Wipes made with synthetic fibers are the cleanest due to three manufacturing steps that determine **consistency** and **control** in the processing of the wipes. First, the composition and contamination level of the wipe fabric is controlled by using pure materials and controlled chemical reactions. Second, the fabric fibers are extruded to very long, consistent lengths. A single fiber can stretch continuously from one side of a wipe to the other, minimizing its chance to be lost from the wipe. Third, the fabric composition and its processing are designed to achieve the best balance of properties for the finished product,



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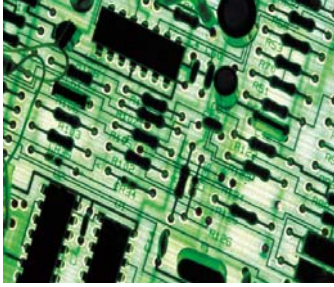
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Cleanroom wipes used for critical applications are almost always knitted synthetic fibers. Knitted polyester fabric is the most popular wipe material. Knitted polyester wipes like the Coventry™ Poly-Wipes are chosen for their initial cleanliness, their ease in cleaning, and their economy. Knitted polyester is made clean, contaminants can easily be removed from knitted polyester in a cleanroom laundry, and polyester is relatively inexpensive. Non-woven wipes do not offer the advantage of ease in cleaning as their composition causes them to disintegrate in a cleanroom washing machine or cleanroom drier.

Any wipe will produce particulates depending on the amount of abrasion it receives in use, so abrasion resistance should be considered. Wipes usually release the most particulates from their edges, so using a sealed-edge wipe will greatly reduce the particulate burden. There are two typical methods used for sealing the edge of a synthetic wipe. The first is heat cutting, where a hot knife cuts the edge and simultaneously fuses all the loose ends on the wipe, as in the Coventry™ Heat Cut Sealed Edge Poly-Wipes. The second method is to use a laser beam to accomplish the same task as the hot knife, as in the Sealed Edge Cleanroom Chamois wipe. Particulate counts are determined by a number of different methods, most of which involve agitating a sample wipe in ultra-pure water or another suitable solvent and measuring the distribution of different sized particles using a particle counting instrument. Particle counting instruments determine the size and distribution of particles using a technique that relies on light scattering. Particles are reported as the particle size distribution from 0.5 microns to 20 microns.

General purpose Chemtronics wipes are usually produced and packaged in a controlled environment to minimize the introduction of dust, particulates, or other contamination onto the wipes or the wipe packaging. Chemtronics general purpose wipes are meant to be used for general wiping and cleaning purposes in non-critical or controlled environments. Due to the product assortment and types of wipes offered, Chemtronics wipes are not considered to be cleanroom grade. By cleanroom standards Chemtronics general purpose wipes would only be acceptable in Class 10,000 cleanrooms or in "controlled environments". By general standards Chemtronics wipes are very clean and non-linting. Opticwipes™, Twillwipes™, and Controlwipes™ all contain natural cellulose fibers. Natural fibers like cellulose are usually irregular in size and short in length and consequently these fibers are more easily released from the wipe. However, these wipes work very well in the applications for which they were intended. All Chemtronics wipes are highly absorbent and low-linting. In the polyester/cellulose blend Controlwipes™ the polyester helps bind the cellulose fibers in the wipe, giving this wipe the best properties of each material: the wet strength and cleanliness of polyester and the absorbency of cellulose. In the case of the cotton Twillwipes™ the cotton offers excellent heat resistance to temperatures over 300 °F and resistance to strongly caustic chemicals.



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Solvent compatibility is another factor to consider when choosing a wipe. Foam wipes have the least compatibility with chemical solvents because they swell and weaken. If the wipe is to be used with a solvent in the cleaning application, then the wipe must be selected with the solvent in mind. Solvent retention and absorbency are also required. The wipe must be able to absorb a given solvent and retain the solvent within the fabric of the wipe for a sufficient amount of time, without premature release of the solvent. The texture of the wipe should also be considered when critical or sensitive surfaces are involved in the application. Some wipes can abrade some critical coated optical surfaces and should therefore be avoided in such applications.

Knitted polyester and nylon wipes have the highest compatibility with a wide range of organic solvents and weak acids. Coventry™ Poly-Wipes have good absorbency, excellent durability when cleaning rough surfaces, and low ionic and organic residue contamination. The Coventry™ Sealed Edge Cleanroom Chamois microfiber wipes have superior surface contact capabilities due to the unique wedge shape of their fibers, which act like tiny squeegees in scraping and lifting residues from surfaces. The Sealed Edge Cleanroom Chamois wipes have high solvent absorbency and excellent particle entrapment. Their high strength allows them to be laundered a number of times and re-used. Their extreme softness and texture make them the wiper of choice when cleaning sensitive optical surfaces.

The polyester/cellulose blended Econowipes™ have excellent resistance to solvents and weak acids, good durability when cleaning rough, abrasive surfaces, high particle entrapment and low particle and ionic contamination. Econowipes™ are an economical choice for general cleanroom cleaning and spill clean-up. Economical cotton wipes are soft, have excellent solvent absorbency and retention and are perfect for general cleaning of relatively smooth surfaces. Cotton wipes also provide good resistance to high temperatures without charring or melting. Foam wipes have good particle entrapment capabilities and a soft texture which makes them perfect for wiping sensitive surfaces.

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