



## BLOG

### Choosing the Fluid: Solvent and Aqueous Parts Washing Chemistries

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Inevitably, parts will get dirty. Whether this is from handling, machining, or use, it's your job to get them clean again.

One of the first questions you need to ask yourself when looking for a new parts washer is what sort of cleaning chemistry you want to use. This is crucial to tackle early on, because the type of cleaning solution will determine what sort of equipment you need. And choosing the wrong one can slow down your cleaning process and lead to extra costs. If you change your mind after making the purchase, it is difficult and expensive - if not impossible - to retrofit the equipment to use the other type.

At the end of the day, you still need to get down to the surface of your parts and get rid of contaminants, from oils to greases to dirt to dust to rust. So how do you choose which is right for you? Let's look at the two major categories: solvents and aqueous (water-based).

#### Old School: Solvent

Solvents, and in this case we are referring to typical mineral spirits cleaning solvents, are the traditional answer. Made of light petroleum distillates, they are what many people think of when they think of parts washing.

Why have solvents been a popular choice? Quite simply, they work well. Mineral spirits cleaners dissolve petroleum-based oils and greases, cleaning very efficiently. They also do not require additional energy inputs, such as heat, spray, and ultrasonics (side note, NEVER heat mineral spirits and never use in a spray or ultrasonic application unless approved by the manufacturers of both the machines and the solvent) to get the job done. Usually, a soak

and light brushing is all that is needed, though larger or more complex parts might necessitate pump or platform agitation to fully flush holes and grooves.

Parts cleaned in solvent also dry fast and do not require a rinse. They typically come out rust-free.

Sounds perfect. So what's not to love? Well, solvents have a few drawbacks.

**First, they are not considered to be environmentally friendly.** They are made of oil and evaporate, creating VOC (volatile organic compounds) emissions. Even if being green isn't top of mind for you, it is for the government. Emissions standards are constantly being tightened, and some localities have banned solvent altogether.

**Second, solvents are combustible.** Traditional solvents have a flash point, or the point as which vapor can be ignited by a flame, of 105-141F. Some companies do not want to deal with having combustible fluids in their facility.

**Third, service for these units is frequent - and frequently expensive.** The unit has to be drained, cleaned, and refilled with fresh solvent, commonly on an 8-week service interval. These costs add up over time.

**Finally, there are not as many specialized solvents as there are aqueous solutions.** Solvents tend to be more of a "one size fits all" solution.

#### Constant Evolution: Aqueous

Water-based (or aqueous) solutions have grown in popularity in recent years. While early versions were slow and somewhat ineffective, newer water-based cleaners rival solvents. One difference is how they work. Where solvents dissolve oils and greases, water-based chemistries emulsify the oils, using polar



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surfactants to bond with both the water and the oil and lift the contaminants away from the surface of the part.

Why have companies made the move away from solvents? One explanation is that aqueous detergents are more environmentally friendly, especially in the more neutral pH range. They are non-combustible, though this needs the obvious clarification that dumping combustible or flammable (a flash point below 100F) products into an aqueous solution can change this.

Another advantage is the wide variety of both machines and chemistries available. This allows you to tweak both to fit your process closely, driving efficiencies in the system. Machines are available with heat, agitation, low- and high-pressure sprays, and ultrasonics. Chemistries have rapidly evolved and are formulated to handle everything from light dirt to honing oil to UV-curable printing ink - and beyond. Add to this the ability to mix additives from rust preventatives to brighteners into chemistry. This mix-and-match capability can benefit your cleaning process dramatically and help you get exactly what you want out of it.

#### Once more, all this sounds great. So what are the downsides?

Many aqueous systems require a post-cleaning rinse, a rust preventative dip, or drying. This means secondary steps and potentially extra equipment.

Aqueous machinery also usually costs more up-front. This is due to the need to use stainless steel on wetted surfaces to prevent rusting of the equipment. The machines also frequently have add-ons like heaters, spray manifolds, and ultrasonic systems.

Some chemistries rely on high pH to clean effectively. Non-ferrous metals can potentially be damaged or discolored by this, so it is important to test your choices out first before implementing. Most reputable manufacturers have the capability to offer this service.

Aqueous machines still need service. This is usually less frequent than with solvent machines, but you need to budget for the cost. One thing that will help, though, is that many water-based chemistries are sold as concentrates, so you are paying less for shipping.

#### So which is best for me?

There is no one best solution for everyone. This is where a trusted advisor comes in handy. Call Graymills, and we can help you make the decision that will work best for you. And we can prove it out in our testing lab, showing you what the real-world outcome of your cleaning process could be.

#### ABOUT TOM KUCKLICK

TOM KUCKLICK FROM GRAYMILLSTOM IS OUR "PROFESSIONAL PROBLEM SOLVER" AT GRAYMILLS - THE GO-TO PERSON FOR ANY AND ALL TECHNICAL ISSUES AND APPLICATION QUESTIONS. HE HAS EXTENSIVE MANAGEMENT, SALES ENGINEERING, INTERNATIONAL SALES AND TECHNICAL EXPERTISE IN THE FIELDS OF INDUSTRIAL CAPITAL EQUIPMENT AND OEM MASS PRODUCED PRODUCTS. TOM ALSO HAS SIGNIFICANT HANDS-ON EXPERIENCE IN THE SALES, DESIGN, MANUFACTURE, INSTALLATION, MAINTENANCE AND OPERATION OF INDUSTRIAL MANUFACTURING MACHINERY, INTEGRATED MANUFACTURING SYSTEMS, AND THE MANUFACTURE OF METAL PRODUCTS. CONTACT TOM AT TKUCKLICK@GRAYMILLS.COM.