



The Cleaning Pie

Webinar Notes

The Cleaning Pie

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Hello and thank you for joining us.

The reason why you're here this morning is because you are looking for cleaning efficiencies in your operation, you're looking for ways of doing things in a more cost-effective way, and you're looking to provide better value for your clients. This presentation will show you exactly how you can do that without cutting corners and without compromising quality.

Before we discuss the cleaning pie, we need to first get a clear understanding of the job description or the job on hand. Just picture for a moment that you're a pest exterminator. You'll need to have a good understanding of the pests that you are eradicating. Is the difference between a cockroach and a rat, and a snake and an Indian minor bird. You'll also need to have a good understanding of the tools that you have available, such as your traps, sprays, sleeping darts, etc. And lastly you need to have a good understanding of the different locations in which pests are found. It will require a different approach when removing an Indian minor bird from a residential bathroom, compared to the attic, for instance. Without having an understanding of these three factors you could run the risk of killing a cockroach with a shotgun on Mrs Jones' bathroom mirror.

The Job Description



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In the cleaning world these three factors are a lot less clearly defined. As seen in the diagram, the three factors are substrates, cleaning supplies and soiling. So, the soiling is the pests, the tools to eradicate the pests are the cleaning supplies and lastly the substrates, is the location from where the pests are removed from.

Substrates – It is very important to have a clear understanding of the surfaces and their characteristics in any cleaning application. Carpets, fabrics, natural stone, tiles, metals, plastics, etc all react differently to the soiling present, to the cleaning chemistries and also the cleaning process. Firstly, you need to know, how to accurately identify each substrate. Does your team know how to distinguish between a wool carpet and a synthetic carpet for instance, or a natural stone and a man-made tile. The difference between the various forms of plastics can also be important. Then you need to know the strengths and weaknesses of the substrates and how chemicals, temperatures and agitation can affect them. Furthermore, it's valuable to have an understanding of the inherent characteristics of the substrate. For instance, polypropylene carpets have an affinity for oily soils, wool carpets retains high levels of moisture when cleaning, limestone is calcite based and will be quickly damaged by acids whilst porcelain tiles are very resilient to chemical attack, and the list goes on. Understanding these substrate factors is very important to ensure successful soil removal without surface damage.

Soiling – Gaining an understanding of soiling and it's characteristics, goes back to our previous webinar on "Understanding pH and acids & alkalis". It's critical to know the differences between organic soils, inorganic soils, oil-based soils and staining agents. This knowledge will enable you to predict the soiling type based on the location or circumstance. For instance, where there is water activity (eg showers, pool surrounds), the dominant soiling is normally inorganic. Where there is human or animal activity the soiling will typically be organic. This enables you to choose the correct chemical solution to

remove the soil? Listen to this webinar video or/and the whitepaper for more information on this topic.

Cleaning Supplies – This includes all the tools, equipment and chemicals used in the cleaning process. It's important have a basic understanding of the pH profile of the chemical products. Ie what chemical solution is acidic, alkaline, neutral or solvent based. This will enable you to intelligently identify which chemical solution will be most effective on any particular soil. This is also discussed in more detail in the webinar on pH and acids & alkalis. And then understanding the strengths and limitations of the cleaning machinery and the cleaning accessories available.

The Job Description

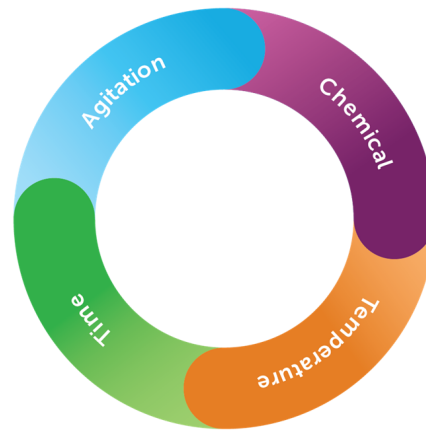


Unlock your peak
cleaning efficiency



The Process

- Maximize all four components for effective cleaning
- If one or more components are less, then the other components must increase to compensate.

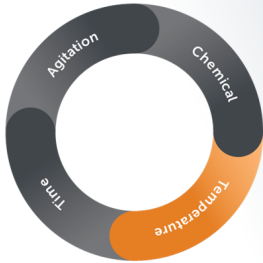


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Once a clear understanding is acquired of the job on hand, the cleaning process can be discussed. There are many factors which are involved in the cleaning process, however it's important to segment these out to the four components in the cleaning process and then determine how to maximise each component.

It's also known as the Sinner's Circle, which relates to the scientist that developed the theory that these four aspects are involved in every single cleaning operation. Namely **agitation, chemical, temperature and time**.

The most effective, cost-efficient cleaning is performed where each of these four components are maximized. If one or more of these components are limited then the other components must increase to compensate for it. For example, if there is limited agitation action in a cleaning activity, then there must be increased focus on the performance of the chemical or/and the temperature of the cleaning solution or/and the dwell time. For instance warm solution could be used with extended dwell time.



What it takes to clean.



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Temperature

Elevated temperature.

- Significantly increases the molecular chemical activity making the cleaning solution more effective.
- Softens fats, greases and organic soils

Some key points;

1. Warm/hot solutions may dry too quickly
2. High heat can damage some substrates
3. Hot solutions will damage most auto scrubbers
4. Enzymes solutions work best at warm (not hot)
5. Powdered oxidizers work best using hot solutions
6. Hot solutions may set blood, egg & other protein stains.
7. Chlorine works best in cool water.
8. Hydrogen Peroxide works best in hot water.

Let's have a look at each of these four components individually.

Temperature – temperature is a key component, particularly when it is combined with chemicals. A significant increase in molecular chemical activity of the cleaning solution is experienced with an increase in the solution temperature. Even if the chemical solution temperature is increased by only 10°C the chemical efficacy is significantly improved. This temperature increase is normally achieved by diluting the cleaning chemical using hot tap water or by on-board heating capabilities of cleaning equipment. Elevated solution temperature also softens fats, oils, greases and organic soils, promoting their release from the substrate.

However, elevated (hot) temperatures isn't the whole story. The key is to understand how solution temperature effects cleaning – both hot and cold. Key examples are given below

- Warm or hot solutions may dry too quickly, leaving a dry chemical residue on the surface, which can itself be tough to remove.
- High heat can damage some substrates, such as delicate fabrics, some plastics, etc. Hot solutions can also damage auto scrubber components.
- Enzyme solutions work best when warm, not hot. A temperature of approx 55°C is ideal. Ideally not over 65°C.
- Powdered oxidizers (oxy bleach) work best in hot solutions.
- Liquid hydrogen peroxide also works best in a hot solution.
- Sodium hypochlorite (chlorine bleach) works best in cool water.
- Protein stains such as blood and egg may be set by hot solutions

So it's not just a matter of the hotter the better. It's a matter of having an understanding of how temperature affects the cleaning process.



What it takes to clean.



Time

Dwell time, allows chemical solution reaction time.

- Typically, the longer the dwell time, the better
- However, do not allow solution to dry on the surface
- Correct dwell time for disinfectants critical

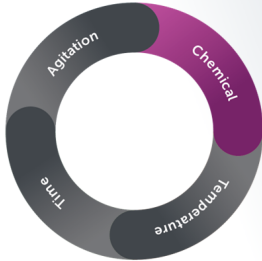
Many cleaning machine processes use very low dwell time.

Focusing more on agitation, temperature and chemical action more.

Time – dwell time allows chemical solution reaction time. Typically, the longer the dwell time, the better. However, do not allow the solution to dry on the surface. Many people ask, what is the ideal dwell time? Ten minutes is a good time frame to work on. In most applications this provides sufficient time for the chemicals to react but is also not too long that the surface dries. Of course, in some circumstances items can have extended dwell times such as a laundry or kitchen soak solution. In many carpet and hard surface cleaning processes 10 minutes allows the operator to apply chemical solution to two or three areas and then circle back with a cleaning tool to agitate and rinse extract.

Dwell time is very critical when disinfectants are used because the biocidal efficacy depends on this reaction time. If the disinfectant instructions says that the dwell time must be two minutes, well, it mustn't be less than two minutes. Otherwise, it's very possible that not all the germs have been destroyed leaving the area vulnerable and with a false sense of security.

Cleaning machine's processes often facilitate very little dwell time. So, it puts the focus more on agitation, temperature, and chemical action.



What it takes to clean.



Chemical

Use the correct chemistry for the job.

- Match the chemistry to the soiling
- Prevent substrate damage
- Match the chemistry to the equipment type
- Match the chemistry to the cleaning process

Use correct dilutions and method.

- Inaccurate dosage leads to residue, foam, waste, substrate damage.

Quality chemicals provide quality cleaning

- Chemicals are a small proportion of a job's cost, but it effects the success of the entire job.



Chemical – this is a very critical topic and where we find a lot of errors and costly mistakes. There is three key factors with this chemical component;

1. Using the correct chemical in respect of the soil type, substrate type and cleaning equipment type. As mentioned before, the webinar on “Understanding ph, acids and alkalis” provides additional information on this point. Where organic soiling is encountered, then alkaline solutions are required. Where inorganic solutions are encountered, then acidic solutions are required. Where oil-based solutions are encountered then solvent solutions are required. Furthermore the chemical solution pH must be matched to the substrate. For instance, acidic cleaning solutions will damage natural stone. As will alkaline solutions damage wool and natural fibre carpets. You also need to ensure that the proposed cleaning solution will be suitable for the cleaning equipment being used. For example, the vacuum components of an extraction machine may be damaged by using a foaming chemical solution.
2. Using the chemical solution correctly. Ie diluting accurately and applying it correctly. Even the best chemical solution can leave unwanted residues, or create foam or damage substrates, etc when used at incorrect dilutions or in a manner contrary to directions.
3. Using quality cleaning chemical solutions. Remember that the cleaning chemicals are the lowest cost portion of your cleaning operation and yet the performance of them impacts the success of the entire job.

The picture shown, is from a job outside a restaurant that we went to in 2021. The contract cleaner had experienced persistent soiling issues with a painted concrete area in the outdoor eating area. We enquired what cleaning suggestion had been used. They had used several cleaners in conjunction with a high-pressure washer but the cleaning efficacy was low. All three products which had been used were

acidic cleaners. Being a restaurant and eating environment we knew that these must be organic soils and therefore acidic. We therefore trialled the alkaline T&G cleaner LF cleaner diluted 1:10. We obtained an immediate result with minimal scrubbing. The cleaning success was simply because the chemistry was matched to the soiling type.



What it takes to clean.



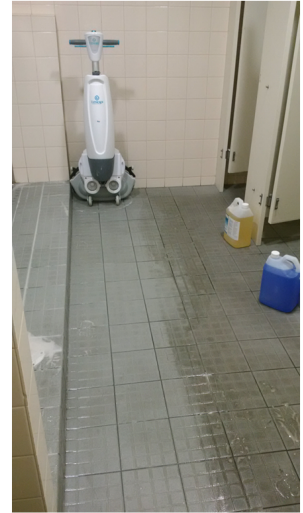
Agitation

Loosens embedded & non-soluble soiling

- Often up to 80% of soiling is non-soluble
- Dislodges dried stubborn soils off the substrate
- Dislodges emulsified or “reacted with” soiling
- Spreads cleaning solution, ensuring substrate contact
- Brings fresh cleaning solution in contact with soil in build-up/compacted soiling scenarios

Use the correct agitation type

- Cloth/sponge – smooth surfaces, light soiling
- Pad – smooth surfaces
- Scrubbing Brush – textured, undulating surfaces
- High Pressure water – outdoor textured surfaces, hard-to-reach places and fibers.



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Agitation – The two key factors about agitation is that it loosens embedded soils and it increases the contact between the cleaning solution and the soiling.

Remember that 80 percent of soiling in most applications is non-soluble in water nor solvents. Therefore, agitation is required to physically dislodge it and enable it to be flushed away during the cleaning process. The enhanced contact of the chemical solution with the soiling is especially important with soil build-ups, compacted soiling and efflorescence.

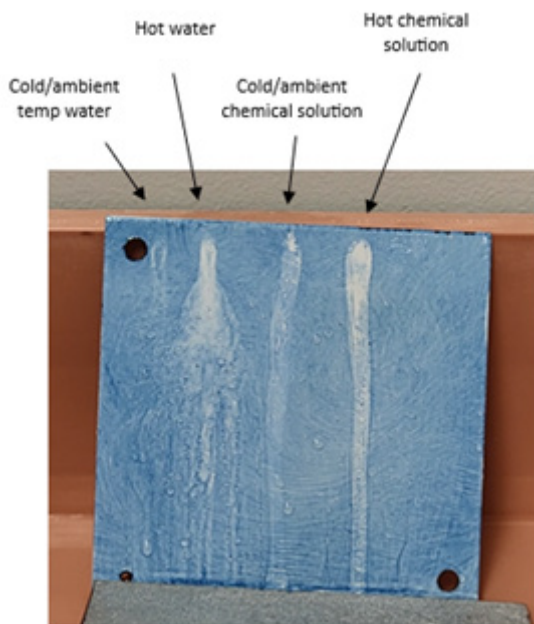
Choosing the correct agitation type is perhaps the most important factor. Cloths and sponges will, of course suffice for light soiling on smooth surfaces. However for heavier duty cleaning it is important that more consideration to the agitation type is given.

- Cleaning pads – floor maintenance pads and hand pads are ideal for agitation on smooth surfaces and provide significantly better results than brushes and high-pressure water cleaning.
- Scrubbing brushes – hand held brushes and scrubbers are designed for textured and undulating surfaces.
- High-pressure washers are used extensively in outdoor cleaning. They produce a result satisfactory for many exterior applications but seldom produce high-quality results on their own. It's also note-worthy that high-pressure cleaning can cause damage to masonry, concrete, grout lines and natural stone surfaces. Used in conjunction with chemical solutions, agitation and temperature ,high-pressure systems can perform a cleaning/rinse role with great success. This is well illustrated in the use of high pressure carpet and tile cleaning equipment following the application of prespray chemicals.

We recently had an application with stubborn tyre marks on a car showroom floor. The flooring was a shiny, smooth porcelain tile. Five different cleaning solutions had been tried with very little success.

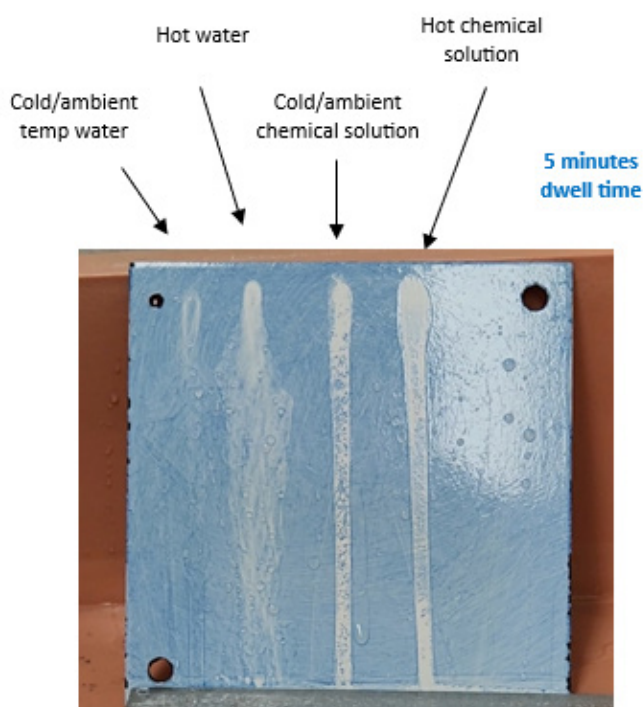
They were in fact correct solutions for this application. On making inquiry, we found out that they had only used a brush in their trials. We suggested the use of a blue scrubbing pad and the tyre marks came off immediately using those same solutions. This illustrates how much more effective pads are than brushes or high-pressure water on smooth surfaces. It also demonstrates how important it is to understand the difference an alternate agitation method can make.

A laboratory demonstration has been done to illustrate the cleaning pie components. The plate shown has been presoiled with a standard laboratory soil containing lard, cooking oils, sump oil (and a blue dye to provide definition). The soiled plate is stood up on a slight angle. The four solutions mentioned below are allowed to run down the plate and are dispensed using a syringe.



- Cold/ambient water – wetting propensity is very poor, with very little soil removed.
- Hot water (60C) - the wetting propensity is improved but still poor, with a slightly more soil removed.
- Cold/ambient chemical (T&G Cleaner LF) solution – the solution shows excellent wetting propensity with significantly more soil being removed. Comparing this to the cold/ambient trial with no chemical, it is notable the huge benefit which cleaning chemistry provides.
- Hot (60C) chemical (T&G Cleaner LF) solution – the solutions show very rapid wetting and soil emulsification. Demonstrating the significant increased chemical activity due to heat.

A second experiment was done, with exactly the same procedures as the above, except that instead of rinsing immediately a “dwell time” of 5 minutes was provided. The result shows a significant improvement in the cold/ambient T&G Cleaner LF solution as the dwell time facilitates more soil emulsification.





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This video is an excellent demonstration of the cleaning pie in action. The subject is a retaining wall with significant mould growth and soiling. A trial was conducted whereby the left-hand side was cleaned by applying Actichem Mould Exterminator solution followed by high pressure rinsing. The right-hand side was cleaned using no chemical, but the high-pressure washer only. The high-pressure washer used was rated at 3000psi. The trial was timed.

On the right-hand side the Mould Exterminator solution broke down the mould and organic soiling which enabled, the high-pressure washer to be used more as a rinsing tool. The cleaning lance was held at an approximate distance of 300mm from the wall which gave a wider cleaning path and prevented surface damage. This facilitated a remarkably faster cleaning time with a very satisfactory cleaning result. Furthermore, with the mould roots and spores being killed the wall will stay mould free for an extended period.

On the right-hand side, the high-pressure washer lance must be held at a much closer 100mm distance from the wall to effect mould & soil removal. This only allows for a narrow cleaning path and the possibility of surface damage. The result is a low-quality job, which not only took significantly longer, but the soiling and mould roots are not effectively removed from the substrate pores leaving a "dirty shadow" on the wall.

Q&As

How do the System 7 Pads relate to the cleaning operation and agitation?

The System 7 pads, you might say are a step up on the typical floor maintenance cleaning pads, both when used by hand or by machine. They work especially effectively on smooth surfaces such as porcelain tiles, painted surfaces, plastics, etc. Their innovative and unique composition enables them to remove soiling from surfaces which has previously not been possible. They are mainly used in conjunction with tile cleaning chemicals and spray n wipes solutions.

We've had great success in areas such as train stations where the train brake dust, and general soiling creates a formidable soil build-up. They have also transformed the way restorers tackle fire restoration clean-ups. Used with Actichem Fire Fix or Fire Restore solutions, the System 7 pads remove soot and fire smoke residues on from painted walls and ceilings, floors, tiles colourbond sheeting and more.

If you're ever faced with a situation where you're not getting results with a chemical solution and a cleaning pad, trial a System 7 pad. The chances are high that it's going to be a problem solver for you.

What would you use to remove yellow transfer from underside of gumboots on smooth concrete in a food processing facility, from gumboots themselves?

Well, that's an interesting question. This is the yellow dyes being transferred from the yellow boots themselves. For the agitation type I would recommend the System 7 pad. Initially I would use T&G Cleaner LF (dilute 1:4) to remove as much residue as possible. There may well be some dyes or colourants which have transferred into the concrete. To remove this, make the T&G Cleaner LF solution using hot water and add OxyBoost (Sodium Percarbonate) into the mixture at a rate of 30g/Lt. Stir until completely dissolved and use within 30 minutes

Can you give an example when you would use abrasive cleaner to help with agitation?

The most common type of abrasive cleaner is a cream cleanser. These are used on smooth surfaces, including in stone care. In natural stone care they are especially important for removing soiling which would normally be removed using an acid. This would include efflorescence, soap scum and lime scale. Another great application is removing stubborn greasy grime on smooth kitchen surfaces including stainless steel, laminex, glass, chrome and natural stone.

A good quality crème cleanser will not scratch even delicate surfaces.

What do you use on shower grout to kill and remove mould and mould staining?

Good question. Shower grout lines are typically a porous substrate which becomes a trap for organic growth, soap scum and oily soils. Two important factors are that the mould roots embedded in the grout pores must be killed and that the mould staining must be removed. The secret to killing mould roots is to use a powerful mouldicide (biocide) which also has super wetting capabilities. This ensures a complete mould structure kill. Secondly an oxidiser is needed to remove the mould staining. The Actichem Percide, RG Mould Remover and Mould Exterminator are powerful mouldicides which employ super-wetting agents and oxidisers to produce a complete mould eradication solution.

What is the best way to remove soot and smoke staining from external brick wall. Dry ice blast or acid wash?

Dry Ice blast is often used for soot removal. It's limitations include expense, substrate damage and it can be very messy. An alkaline cleaner will mostly work better on soot and smoke residue removal because these soils are acidic in nature. I would recommend the Actichem Fire Restore, which is a very powerful smoke residue cleaner, which also reverses the static charge on the smoke and the soot residue. Apply using a pump spray and agitate with a medium stiff brush and then using a high-pressure washer to rinse it down.



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