

Introduction

With the ongoing SARS-CoV-2 situation across the world we have assembled here some guidance notes specifically focussed on the role that cleaning and disinfection regimes can play in the management of this issue in a food, dairy or beverage operation.

Chemicals and Viruses

When considering viruses, we face a challenge and a mind-set change as these infective agents do not behaviour or respond in the same way that bacteria do – fundamentally this is because they are not strictly "alive" in the sense that we consider life. Let's start with understanding what a virus is as this informs us about management strategies.

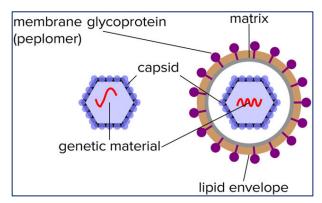
A virus is a microscopic parasite which can infect living organisms and cause disease. It can make copies of itself inside another organism's cells. Viruses consist of nucleic acid + a protein coat, usually the nucleic acid is RNA; sometimes it is DNA. Viruses are much smaller than bacteria and indeed can infect bacteria (commonly called a bacteriophage).

On that basis, we cannot rely on the traditional disinfection method of getting a chemical into a cell and either breaking apart the cell membrane (bacteria dies) or interfering with the reproduction process (bacterial population reduces and eventually dies out) as viruses do not respire or consume nutrients. It is for this reason that this class has their own Euro Norm (BS EN 14476) and isn't included in bacterial tests such as BS EN 1276 or 13697.

Even within the virus class we have two types: - Non-enveloped viruses are composed of capsid protein and

nucleic acid (DNA or RNA), termed the nucleocapsid, which constitute an infectious unit, the virion, whereas <u>enveloped viruses</u> are composed of an envelope along with the nucleocapsid.

In this respect we are seeking to inactivate the virus by disrupting the genetic material. It may seem counter-intuitive, however enveloped (or encapsulated viruses) are easier to inactivate than non-enveloped simply because the former rely heavily on the matrix of the envelope as the primary "defence" whereas the non-enveloped have to be



made of sterner stuff to survive without the benefit of this lipid-protein layer.

So, what is the practical value of this knowledge? Well, if we know that disrupting the envelope matrix layer leads to more rapid infective material inactivation then the actions of a good detergent will assist us through emulsification of said layer (neutral detergents) or saponification (alkaline detergents).

As for bacterial issues; cleaning remains the most effective method of contaminant control.

This is also true for hand hygiene where a good quality soap and water will serve to disrupt the same layer, remove the viral particles and achieve a reduction in cross-contact, however focus is often on hand <u>disinfection</u> rather than the more important hand-washing.



Hard Surface / Common Contact Point Identification

Identification and risk assessing of common contact points such as door handles, touch-screens, hand-rails and the like is crucial to avoid cross-contamination of employees hands.

Of course, each operation will have their own intricacies and we suggest assembling a cross-functional team (virtually if necessary) to brain-storm ideas, suggestions and locations of those items of equipment, fabrication or utilities that personnel regularly and



routinely touch and interact with. From this a schedule to allow for at least daily cleaning and disinfection can be created and implemented.



This is especially important given the reported lag between an individual being infective and shedding viral particles and displaying symptoms. As an example, if a food handler reports testing positive for COVID-19 then a preventative programme will have reduced the risk of common contact points having transferred the virus to other employees. Suggestions such as colour coding contact points as "red, amber, green" in terms of cross-transfer capability are worth factoring into your risk assessment.

In terms of routine cleaning and disinfection regimes for food contact and processing equipment, the message is to carry on as normal with an overlay of a product capable of inactivating viral contaminants for those common contact points – specifically a product tested against BS EN 14476.

Whilst this standard does not include this newly identified novel Coronavirus, it does contain Rotavirus which is also an encapsulated virus. The WHO have reported that products based on hydrogen peroxide, peracetic acid or sodium hypochlorite are all effective against the coronavirus "family" as are solutions containing greater than 60% alcohol. Generic products are: -

- **Alcohol Based** available as a ready to use solution or a pre-impregnated wipe based on 70% Propyl alcohols. The product should have verified viricidal efficacy under BS EN 14476
- Peracetic Acid Based (foaming) an OPC Peracetic Acid disinfectant containing at least 250 ppm PAA at 1% v/v
- **Peracetic Acid** 5 and 15% w/w respectively Peracetic Acid disinfectant concentrates suitable for CIP. The products have verified viricidal efficacy under BS EN 14476
- Sodium Hypochlorite solutions of Sodium Hypochlorite, typically 14 15% delivering 1,000 PPM free Chlorine
- **Hydrogen Peroxide** Only really useable as a stabilised solution often in a ready to use trigger spray based on Hydrogen Peroxide, stabilised with ionic silver (other methods may leave a residue) and a suitable shelf-life at ambient temperatures. The product should have verified viricidal efficacy under BS EN 14476.
- In-Situ Generation examples include hypochlorous acid (electrolysis of a brine solution), chlorine dioxide and Ozone. Each of these can demonstrate viricidal efficacy, however they require the introduction of suitable generation equipment and monitoring systems to effectively control them.



The Technical Account Management team from your hygiene support provider will be able to advise on the safe deployment and use of these disinfectant products as they may differ from those in routine use and, in the particular case of sodium hypochlorite solutions, they may require a rinse step to be included to avoid product taint or contamination.

Many of the UK hygiene support suppliers have produced a range of generic CIC's (Cleaning Instruction Cards) (example in appendix 1) which deal specifically with the issues of equipment disinfection as well as environmental decontamination which are readily available from your Technical Account Manager and can be deployed as part of your Food Safety Management System.

What about fogging?

Fogging of disinfectants may prove of benefit as an additional control measure following a successful cleaning and disinfection regime.

As this accompany graphic illustrates; fogging should be regarded as the top level of the pyramid and never as a replacement for disinfection regimes in the hygiene regime.

Fogging is, that said, effective at reducing air-borne contaminants as well as reaching high levels and other difficult to access ledges and equipment tops. However, a key limitation is the inability of fog to



sufficiently penetrate closed sections (such as control panels, box sections, etc) nor to impact on the loading on downward facing vertical surfaces. One must also bear in mind that vertical surfaces will receive limited contact with the disinfectant fog as gravity will intervene and cause run off. Attempts have been made, with limited success, to impart an electrical charge to the fog droplets (electrostatic fogging) which can help to overcome this limitation by causing fog to "cling" to surfaces of an opposing charge. It is this last statement that is pertinent here as if the surface has no discernible charge, plastic for example, or an opposing charge then cling will **not** take place.

Suitable chemicals for application by fog include: -

Product Name	Typical Recommended	Microbial Efficacy				Material Compatibility	Operator Safety	
		В	S	Υ	M	٧		
Triamine	0.5 - 2.0%	+++	0	++	+	0	+++	++
QAC (BAC/DDAC)	2.0 - 5.0%	+++	0	++	+	0	+++	++
Sodium Hypochlorite	0.25 - 1.00% 292.5 - 1,170ppm Cl ₂	+++	+++	+++	+++	+++		+
Peracetic Acid	1.10 – 2.20% 280.0 – 560ppm PAA	+++	+++	+++	+++	+++		+
Silver- stabilised Hydrogen Peroxide	3 - 6% H ₂ O ₂	+++	+++	+++	+++	+++	+++	+



Anticipated Reductions in Micro-flora Populations.

Extensive research has been conducted into the pros and *cons* of fogging, the following details some of the main points identified: -

- Fogging is found to have a good disinfecting effect on upwardly facing horizontal surfaces reported as up to 6 log reductions after 60 minutes.
- Fogging is not an effective method for disinfection of vertical surfaces, the undersides of equipment or dismantled components because of the lack of chemical coverage on such surfaces.
- Airborne microbiological contamination can be reduced by fogging 2 log reductions after 30 minutes; 3 log reductions after 60 minutes.
- Fogging is most effective with particle sizes in the range 10 20 microns (μ m) with an air velocity at the nozzle of 100m/s. for larger particle sizes, i.e. above 35 μ m (microns) then the droplets may need to be fan assisted for dispersal and enhanced distribution. For smaller particle droplets below 10 μ m (microns), then the settling time will need to be increased.
- Under typical factory conditions, fogging needs to be carried out for a minimum 15 30 minutes to
 enable the fog to disperse and the chemical action to occur. After fogging an additional period of 45 60 minutes is required to allow the droplets to settle and reduce the risk of operators inhaling the
 chemical droplets.
- Compressed air driven fogging nozzles are recommended, either plumbed in systems or mobile units.
 Portable electric fogging machines do not operate at sufficient volume flow rate for most applications and are therefore not recommended.

Where possible, nozzles should not be placed near the floor or be pointed at surfaces within the range of the plume generated by the nozzle.









Future Developments

Information and search results pertaining to SARS-CoV-2 is continuing to evolve and both the NHS and WHO have commented that the situation, at least in the UK and Ireland, is unlikely to have peaked. SOFHT will continue to monitor developments and will issue further guidance should the situation change, or new technologies become available.

In the meantime, if you have any questions or queries then please do not hesitate to contact your local Technical Account Manager Hygiene Support company's Central Technical Team.

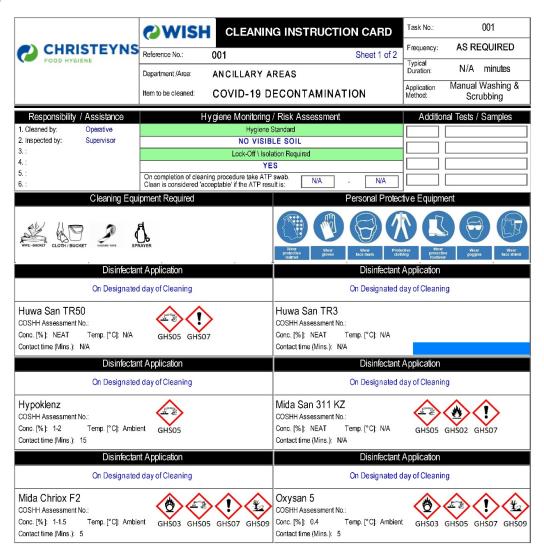
Peter Littleton

Vice-Chair and Training Service Director The Society of Food Hygiene & Technology

5th April 2020

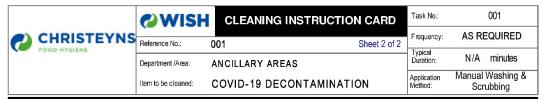


Appendix 1 - Generic CIC's



Other Information	Key Inspection Points			
	All Contaminated Areas 5.			
	2. 6.			
	3. 7.			
CONTROLLED DOCUMENT	4. 8.			
Emergency Telephone No.	Documentation Control			
In the event of a chemical incident, accident or personal injury and urgent medical	Prepared By: Kelly Roslyn	Date Created: 19/03/2020		
information is required, please use one of these 24 hour emergency Tel. Nos.:	Authorised by: Kelly Roslyn	Issue Date: 19/03/2020		
01925 234696	Review / Audit Frequency: As Necessary	Next Review Due: As Required		
CHRISTEYNS (File Ref No.: 001 COVID-19 DECONTAMINATION -	Issue No.: 1 Amendment Date:		
FOOD HYGIENE	© Christeyns Food Hygiene Ltd 2016	Last Review:		





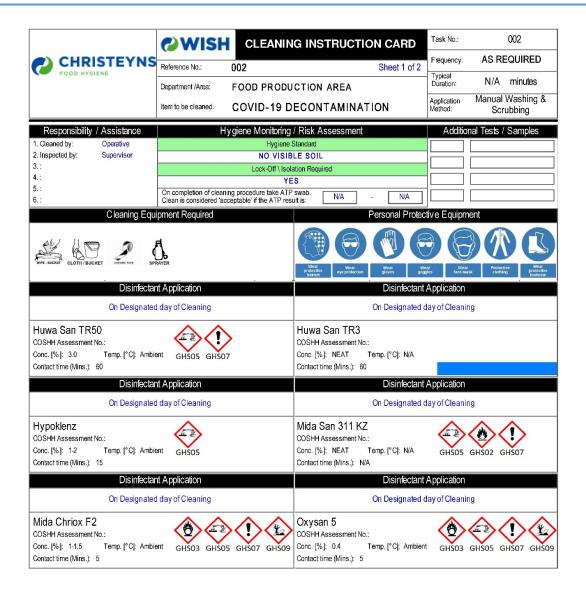
- This decontamination procedure refers to hard and soft surfaces that may have been contaminated by SARS-CoV-2, the virus responsible for COVID-19, and that are relatively clean.
- This procedure applies only to those surfaces that may have come into contact with an operative subsequently diagnosed as COVID-19 positive.
- 3. Risk assess the likely level of Coronavirus likely to be present on surfaces how long ago was the operative subsequently diagnosed as COVID-19 positive known to be working in the area? Coronavirus will have an initial rapid decline over 72 hours and is thought to have a low risk after this time, therefore consider the viability of isolating the area for a minimum of 72 hours before decontamination is undertaken. There may be an extended survival (at a low level) of Coronavirus over several more days, so decontamination of surfaces is still required.
- Risk assess the necessity to wear appropriate PPE including a respirator and close-fitting goggles if high levels of Coronavirus titre are expected, and/or if the decontaminating technique adopted is likely to create a high level of aerosols.
- Risk assess whether or not air ventilation units, evaporators, etc. need to be turned off during the decontamination
- Wear the appropriate, selected PPE e.g. disposable overall (body, arm and leg coverage).
- Isolate the areas where the operative has worked, particularly surfaces that could be frequently touched by staff.
- Consider any occupational health and safety requirements before decontamination, e.g. electrical equipment in the area.
- For surfaces which are not likely to be affected by chlorine, spray or sluice all areas with a 1000 ppm available chlorine solution of Hypoklenz to achieve thorough disinfection, allowing a minimum 15 minutes contact time prior to rinsing with fresh clean water. Do not use Hypoklenz on soft furnishings.
- 10. For other surfaces, spray and/or wipe surfaces with an alcohol product Midasan 311 KZ solution and a clean cloths or Huwa San TR3 / Huwa San TR50 / Mida Chriox F2 which containing >70% isopropyl
- 11. (please refer to relevant PI / SDS for recommend product) allowing a minimum 5 minutes contact time prior to rinsing with fresh clean water. For More information please see the Christeyns Food Hygiene Covid-19 Policy.
- 12. Following a risk assessment, primarily based on the time since the confirmed COVID-19 operative was in the area and the degree of forced or natural air movement, fogging of the area may be appropriate. If indicated, follow the Room Fogging CIC if you have one. If not, please contact Christeyns Food Hygiene for guidance.
- 13. All cleaning utensils used e.g. cloths or scourers, and all PPE, should be bagged, sealed and safely disposed of correctly.14. In the initial phase of COVID-19, it might be appropriate to place bags in a segregated area and follow any instructions from the relevant health authority as to how contaminated waste should be disposed of.
- Non-disposable items such as respirators, goggles, waterproof footwear should be decontaminated as appropriate.
 Try not to touch your face during the decontamination process until your hands have been washed at the end.
- 17. A double normal handwash and disinfection procedure should be applied as a minimum.
- 18. In the initial phase of COVID-19, it may be appropriate to record the names and contact details of the cleaners so that they could be contacted as part of the tracing process for a confirmed COVID-19 case.

THIS PROCEDURE WILL BE REVIEWED AND AMENDED AS ACCORDINGLY FOLLOWING THE GOVERNMENT **GUIDELINES.**

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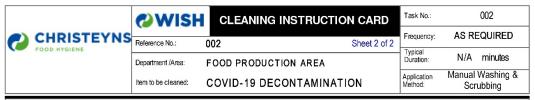
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- Risk assess the necessity to wear appropriate PPE including a respirator and close-fitting goggles if high levels of Coronavirus titre are expected, and/or if the decontaminating technique adopted is likely to create a high level of aerosols.
- Risk assess whether or not air ventilation units, evaporators, etc. need to be turned off during the decontamination
- Wear the appropriate, selected PPE e.g. disposable overall (body, arm and leg coverage).
- Isolate the areas where the operative has worked, particularly surfaces that could be frequently touched by staff.
- Stop the production line and remove any food products and packaging that could be cross-contaminated by cleaning fluids during decontamination.
- Consider any occupational health and safety requirements before decontamination. Refer to the relevant Cleaning Instruction Cards if such surfaces are part of an item of production equipment.
- 10. Spray or sluice all areas with a 1000 ppm available chlorine solution of Hypoklenz to achieve thorough disinfection, allowing a minimum 15 minutes contact time prior to rinsing with fresh clean water. It is essential to rinse steel surfaces to prevent corrosion.
- 11. If Hypoklenz is unavailable, one of the following can be used Midasan 311KZ, Mida Chriox F2, Huwa San TR3 Huwa San TR50 or Oxysan 5 (please refer to relevant PI / SDS for recommend product) allowing a minimum 5 minutes contact time prior to rinsing with fresh clean water. For More information please see the Christeyns Food Hygiene Covid-19 Policy.
- 12. Following a risk assessment, primarily based on the time since the confirmed COVID-19 case was in the area and the degree of forced or natural air movement, fogging of the area may be appropriate. If indicated, follow the Room Fogging CIC if you have one. If not, please contact Christeyns Food Hygiene for further guidance.
- 13. If fogging has not been undertaken, use the normal daily use terminal disinfectant to re-spray all surfaces post rinse following the normal equipment/area CIC.
- All cleaning utensils used e.g. cloths or scourers, and PPE should be bagged, sealed and safely disposed of.
 In the initial phase of COVID-19, it might be appropriate to place bags in a segregated area and follow any instructions from the local health authority as to how the contaminated waste should be disposed of.
- 16. Non-disposable items such as respirators, goggles, waterproof footwear should be decontaminated as appropriate.19. Try not to touch your face during the decontamination process until your hands have been washed at the end
- 17. A double normal handwash and disinfection procedure should be applied as a minimum
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