

CHEM -SOP- 05	Revision #: 03	Implementation Date: June-2020	Last Reviewed/ Update: June 8th-2020	Page #: 1 of 4
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SURFACE DISINFECTION

1. Purpose: to provide step by step guidance on best practices to clean and disinfect hard surfaces to reduce the community spread and risk of exposure to SARS-CoV-2 which causes COVID-19.

2. Scope: applies to all faculty, staff and students within the Department of Chemistry who are working on-site in an office, laboratory or common area setting.

3. Prerequisites: WHMIS training as provided by the Office of Environmental Health and Safety.

4. Responsibilities: It is the responsibility of all faculty, staff and students to follow the procedures described in the SOP to disinfect their respective work areas and frequently touched surfaces. Everybody plays an important role in reducing the community spread of COVID19 and risk of exposure to SARS-CoV-2.

5.

Personal Protective Equipment for Preparing and Applying Disinfectants																		
Lab Coat 	Safety Goggles / Glasses / Face Shields 	Face Masks  <table border="0"> <tr> <td>SIZE</td> <td>WIDTH</td> <td>CURVE*</td> </tr> <tr> <td>XS:</td> <td>8"</td> <td>5"</td> </tr> <tr> <td>S:</td> <td>9"</td> <td>5.5"</td> </tr> <tr> <td>M:</td> <td>9.5"</td> <td>6"</td> </tr> <tr> <td>L:</td> <td>10"</td> <td>6.5"</td> </tr> </table> <small>*CURVE REFERS TO THE DISTANCE BETWEEN THE BRIDGE OF THE NOSE TO UNDER THE CHIN.</small>	SIZE	WIDTH	CURVE*	XS:	8"	5"	S:	9"	5.5"	M:	9.5"	6"	L:	10"	6.5"	Gloves 
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6. General Instructions on Cleaning and Disinfecting Surfaces

1. Surfaces that are frequently touched by faculty, staff and students should be routinely cleaned and disinfected.
 - i. These surfaces include doorknobs, light switches, cabinet handles, faucet handles, tables, countertops and electronics.
 - ii. It is not known how long SARS-CoV-2 can live on surfaces, however, early evidence suggests that it can live on objects and surfaces from a few hours to days.¹
2. Ensure the surface is cleaned prior to applying a disinfectant.
 - i. Cleaning products (i.e. detergents such as soap) remove germs, dirt, and impurities from surfaces. Cleaning does not kill germs, but by removing them, it lowers their numbers (infective dose) and the risk of spreading infection.
 - ii. Disinfectants are formulated with chemicals that kill most germs and should be applied to surfaces after they have been cleaned.
3. If available, use a hard-surface disinfectant that has been recommended by [Health Canada to likely be effective against SARS-CoV-2](#). Read and follow the manufacturer's instructions for safe and effective use with regards to:
 - i. Wearing personal protective equipment and using in well ventilated areas;
 - ii. Contact time (* a disinfectant's effectiveness is dependent on the contact time);
 - iii. Expiration date.
4. If a Health Canada recommended hard-surface disinfectant is unavailable, alternative disinfectants which have been recommended by the Centers for Disease Control and Prevention (CDC) can be purchased from Chemistry Stores. These include bleach, isopropanol, and hydrogen peroxide. **Refer to section 7 of this SOP for further information on dilution preparation and application.**
5. Surfaces in shared spaces or heavily trafficked areas (e.g. technical facilities) should be cleaned and **disinfected after every use**.
6. NEVER use surface disinfectants on your skin or internally as it can cause serious harm.

7. Preparation and Use of Bleach, Isopropanol, and Hydrogen Peroxide Disinfectants

1. Chemistry Stores has bleach, isopropanol, and hydrogen peroxide available for purchase, which are recommended disinfectants for SARS-CoV-2 (* 70% ethanol is not a recommended viricidal). Below is a comparison of the characteristics of these disinfectants:

	Bleach ²	Isopropanol ³	Hydrogen Peroxide ^{4, 5}
Recommended Concentration	0.1% ²	70% ³	0.5% ⁴
Recommended Contact Time	1 minute ⁶	N/A (until evaporated)	10 minutes ⁴
Shelf Life	24 hours ⁶	N/A (store in tightly sealed bottle)	21 days ⁷
Cost per Litre (subject to change)	\$0.02	\$3.68	\$0.44
Recommended Surfaces	Countertops, tables, tile, non-metal sinks	Electronic surfaces, light switches, metal surfaces (doorknobs, faucets, fumehoods)	Countertops, tables, tile, non-metal sinks, glass
Advantages	Inexpensive; fast-acting ⁸	Fast-acting; leaves no residue ⁸	Inexpensive; environmentally friendly; non-toxic; ⁸
Disadvantages	Corrodes metal; may destroy adhesives with prolonged soaking; solution is to be made daily; inactivated by organic material ⁸	Can damage rubber and plastics; flammable; evaporates quickly ⁸	Light sensitive; may be destructive to some equipment (copper, brass, carbon-tipped devices, anodized aluminum) ⁸

Table 1: Comparison of recommended disinfectants

2. In Chemistry Stores: bleach, isopropanol, and hydrogen peroxide are available for purchase in ready-to-use wash bottles at the recommended disinfection concentrations, as well as, in concentrated forms that will require dilution.
3. Prior to handling and diluting these disinfectants, ensure that you read their respective Safety Data Sheets to understand the hazards and safety precautions. Always use caution and care when working with these chemicals.
4. If preparing a dilution of a concentrated disinfectant:
 - i. Wear a lab coat, safety glasses/goggles, and gloves.
 - ii. Ensure your wash bottle is labelled with a GHS compliant label, which are available in Chemistry Stores for purchase. Opaque wash bottles must be used for hydrogen peroxide, as it is light sensitive.
 - iii. Follow the instructions below in Table 2 to prepare the recommended dilutions in 500mL and 1L wash bottles.

Disinfectant	Starting Material available in Stores	Preparation Instructions for 500mL Wash Bottle	Preparation Instructions for 1L Wash Bottle
0.1% Sodium Hypochlorite	6% Bleach	8.5mL bleach 491.5mL water	17mL bleach 983mL water
70% Isopropanol	≥99.5% Isopropanol	352mL isopropanol 148mL water	704mL isopropanol 296mL water
0.5% Hydrogen Peroxide	30% Hydrogen Peroxide	8.5mL hydrogen peroxide 491.5mL water	17mL hydrogen peroxide 983mL water
Ensure you record the date and time of the solution preparation on the wash bottle to monitor the shelf life and disinfection-activity			

Table 2: Preparation instructions for recommended disinfectants

5. Using gloves and paper towel, apply the disinfectant from the spout of the wash bottle to a hard surface, **following the recommended contact time in Table 1**. When applying a disinfectant, ensure the following:
 - i. **Never use a spray bottle** as the disinfectant may aerosolize;
 - ii. **Never apply concentrated bleach to a metal surface**, as it may result in corrosion of the surface;
 - iii. **Never mix incompatible disinfectants**, as this can cause adverse chemical reactions;
 - iv. **Never use a disinfectant past its expiration date**, as found in Table 1.
6. As per the CDC's recommendations, 70% isopropanol can be used to disinfect electronics.⁶
7. Residual disinfectant remaining on surfaces after the recommended contact time should be removed using paper towel.

References:

1. Government of Canada. (2020). Cleaning and Disinfecting Public Spaces During COVID-19. Retrieved 05/04, 2020 from <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/cleaning-disinfecting-public-spaces.html>
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3. Centers for Disease Control and Prevention. (2020). Reopening Guidance for Cleaning and Disinfecting Public Spaces, Workplaces, Businesses, Schools, and Homes. Retrieved 05/04, 2020 from <https://www.cdc.gov/coronavirus/2019-ncov/community/reopen-guidance.html>
4. <https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/applications-submissions/guidance-documents/disinfectants/hard-surface-disinfectants-monograph-revised.html>
5. Kampf, G. (2020). Potential Role of Inanimate Surfaces for the Spread of Coronavirus and their Inactivation with Disinfectant Agents. *Infection Prevention in Practice*, 2(2), 100044.doi:10.1016/j.inpip.2020.100044
6. Centers for Disease Control and Prevention. (2020). Cleaning and Disinfecting Your Facility. Retrieved 05/04, 2020 from <https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html>
7. Centers for Disease Control and Prevention. (2008). Chemical Disinfectants. Retrieved 05/04, 2020 from <https://www.cdc.gov/infectioncontrol/guidelines/disinfection/disinfection-methods/chemical.html#Hydrogen>
8. Public Health Ontario. (2018). At a Glance Disinfectant Tables. Retrieved 05/04,2020 from <https://www.publichealthontario.ca/-/media/documents/A/2018/at-a-glance-ipac-pss-disinfectant-tables.pdf?la=en>