

The **Moist Heat Decontamination Unit (MHDU)** uses controlled temperature and humidity to deactivate the SARS-CoV-2 virus from potentially contaminated filtering facepiece respirators (N95 masks), surgical masks, and other non-wipeable surfaces. Masks can be placed into the provided stainless steel decontamination baskets after wearing. Once loaded with masks, the baskets are placed in the MHDU where the temperature is brought to 68°C and moisture is injected to bring the relative humidity to 75%.

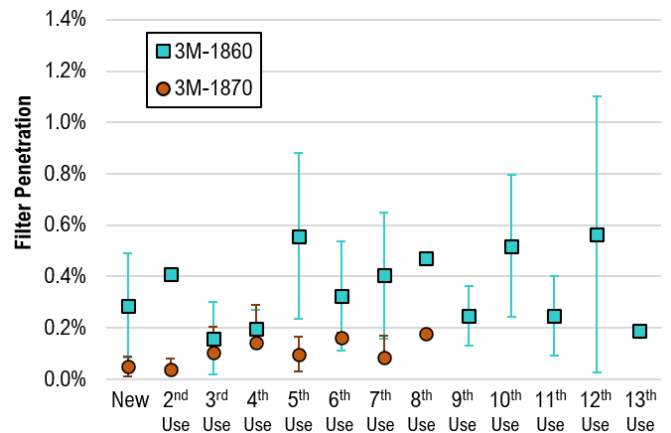


- Deactivates SARS-CoV-2 from PPE with heat and moisture
- Decontaminate 18 masks each cycle
- Total cycle time of 30 minutes
- Process >400 masks per day per unit\*
- Does not degrade fit or filtration of mask†
- Modular design appropriate for bench-top usage
- Wipe-down enclosure makes for clean and safe operation
- Automated self-checks ensure decontamination with every cycle

Heat and moisture denature critical proteins of the virus, rendering it entirely deactivated. Moist heat decontamination is extensively validated by scientific literature (some results provided in *Table 1* for H1N1 on N95 masks and *Table 2* for SARS-CoV-2).



The MHDU constantly monitors the humidity and temperature for each individual decontamination cycle and alerts the user of any deviation from the prescribed conditions.



The carefully controlled heat and moisture preserve the filtration capabilities of the mask material. After twelve cycles, the filter material remains well within the NIOSH limits set for N95 respirators (<5% penetration). Additionally, the fit of the respirator is preserved after multiple donning, doffing, and decontamination cycles with *PortaCount™* fit testing results (shown in *Table 3*) indicating passing fit tests after at least the tenth use of all tested masks.

Specifically designed for offices, operatories, and clinics, the MHDU has a small footprint and is suitable for countertop use. The MHDU requires a standard North American 60Hz 120VAC wall power outlet and consumes about as much average power as a TV. An

\* Assuming 18 masks per load and a 12 hour shift  
† Fit and filtration tested explicitly for 3M 8210, 3M1860, 3M1870 N95, 3M2091 P100 at present

on-board reservoir contains sufficient water for about a week of typical operation before requiring refilling.

The MHDU is clad entirely in 304 stainless steel making it extremely easy to clean and prevent cross contamination. The buttons, screen, and handle are waterproof and can be sprayed and wiped with any Health Canada recommended antimicrobial cleaner. The unit is sealed to prevent spreading of any contaminants. Any air that vents from the MHDU passes through a HEPA filter to remove any viral particles. Most HVAC systems are able to handle the additional moisture released from the oven which equates to approximately one tablespoon per hour during average operation (significantly less than boiling a kettle of water).

Decontamination and reuse of masks provides additional freedom to maintain safe operation during supply-chain challenges when PPE cannot be consistently sourced. SARS-CoV-2 has been shown to have survivability over several days on various surfaces, and several hours when aerosolized (van Doremale *et al.* 2020); this necessitates reliable decontamination to maintain safe operations in spaces where social distancing cannot be maintained.



**Table 1** – Data from Heimbuch *et al.* 2011 showing effectiveness of moist heat decontamination of H1N1 virus on various popular N95 masks. BDL = Below Detectable Limits

	Droplet Application		Aerosol Application	
	Untreated	Moist Heat	Untreated	Moist Heat
N95-A	4.10 ± 0.14	BDL	4.85 ± 0.14	BDL
N95-B	6.10 ± 0.38	BDL	4.76 ± 0.14	BDL
N95-C	5.18 ± 0.25	BDL	5.60 ± 0.14	BDL
SN95-D	5.77 ± 0.14	BDL	5.35 ± 0.14	BDL
SN95-E	6.85 ± 0.14	BDL	4.93 ± 0.25	BDL
SN95-F	5.18 ± 0.25	BDL	4.93 ± 0.5	BDL

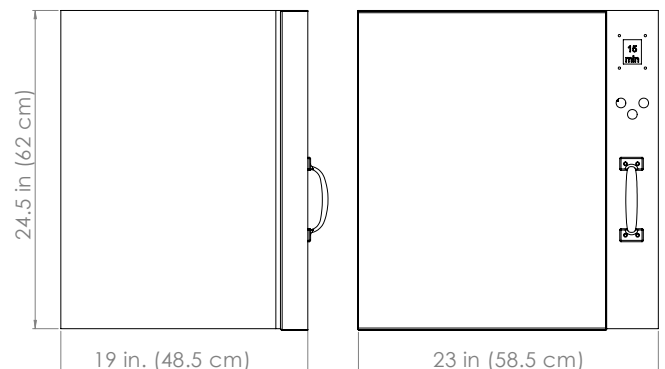
**Table 2** – Data from Chin *et al.* 2020 showing survivability of SARS-CoV-2 at room temperature and elevated temperature. BDL = Below Detectable Limits

Time	22°C	56°C	70°C
1 min	6.51	6.65	5.34
5 mins	6.7	4.62	BDL
10 mins	6.63	3.84	BDL
30 mins	6.52	BDL	BDL
1 hour	6.33	BDL	BDL
3 hours	6.68	BDL	BDL

**Table 3** – Fit testing results using PortaCount™ Pro with fit panel of four individuals using 3M-1860, 3M-1870, and 3M-8210. Masks were doffed, decontaminated in the MHDU, and re-donned between each fit test (Note: 200 is maximum possible score, 100 is a passing score, blank indicates quantitative fit test was not performed for this point but cycles were still completed.)

	Number of Reuses:	Fit Test Results:														
		New	2	3	7	8	9	10	15							
F. Subj. 1	3M1870	200+	176	200+	200+	200+	200+	200+	200+							
F. Subj. 2	3M1860S	200+	190	200+	200+	200+	200+	200+	200+							
M. Subj. 1	3M1860	200+	112	200+	200+	200+	200+	200+	200+							
M. Subj. 1	3M1870	200+	187	110	200+	200+	200+	200+	200+							
M. Subj. 2	3M1860	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+					
M. Subj. 2	3M1870	177	200+	200+	200+	197	145	118	199							
M. Subj. 2	3M8210	200+	198	200+	200+	200+	200+	200+	200+	200+	200+					
M. Subj. 3	3M1860	200+	200+	178	200+	200+	200+	200+	200+							
M. Subj. 3	3M1870	200+	200+	200+	200+	200+	200+	200+	200+							

**Physical Dimensions:**



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