

UV-C CABINET

! This cabinet is not certified by any regulatory body and use must be approved by national, regional or facility authorities, according to the local context. No warranties are implied and workflows are used at your own risk.



**N95DECON UV-C
TECHNICAL
REPORT**



**UV-C CABINET
DESIGN
PRINCIPLES**

UV-C BASICS

- 1 UV-C inactivates pathogens by altering DNA and RNA
- 2 Wavelength for antimicrobial activity (254nm)
- 3 Surface decontamination with UV-C common in healthcare settings - to kill C. Diff, MRSA, VRE and Ebola
- 4 At least 1J/cm² to inactivate SARS-CoV-2 & similar viruses on N95 & surgical mask material

HEALTH & SAFETY GUIDELINES



1 AVOID UV-C EXPOSURE

Exposure to UV-C can cause damage to skin & eyes. Confirm doors are closed and sealed. Utilize interlocks to prevent doors openings during cycle



2 AVOID OZONE

Avoid using bulbs intended to produce ozone. Keep cabinet doors closed to prevent escape of ozone (UV-C light will breakdown ozone within cabinet)



3 WEAR PPE

Avoid self-contamination and exposure of UV-C to eyes and skin by wearing the right PPE (gown, gloves, eye protection, surgical mask)

DECONTAMINATION PRINCIPLES

- 1 Preserve mask* fit & filtration
- 2 Reduce bioburden (3-log reduction in SARS-CoV-2 for decontamination)
- 3 Avoid harmful residues



~10 MINS
PER CYCLE**



~5,000
MASKS/ DAY

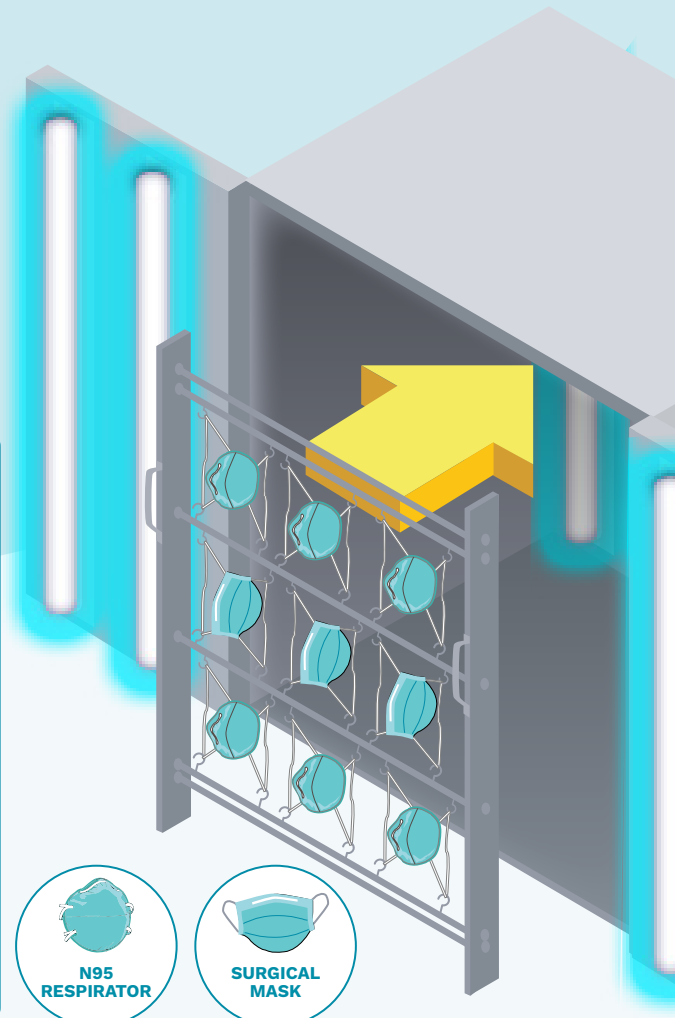
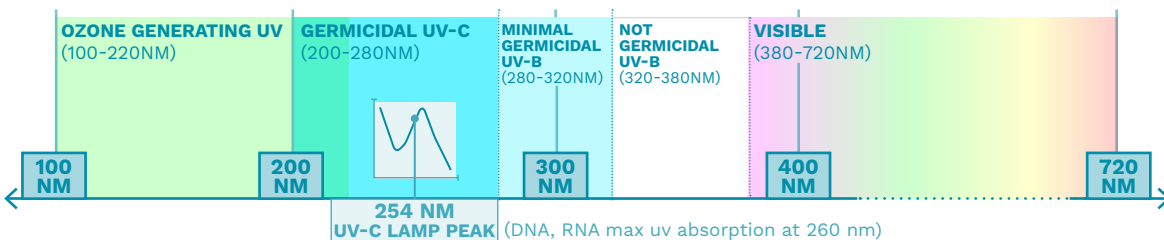


<\$1,500
PER CABINET

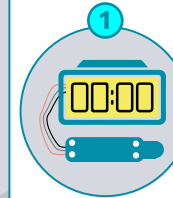
* Mask denotes an N95 respirator. Surgical masks may be substituted but supporting evidence is sparse or unpublished

** Cycle time = dependent on bulb irradiance to ensure ≥1J/cm² dose is applied to masks

DECONTAMINATION WAVELENGTHS

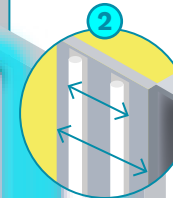


DESIGN PRINCIPLES FOR CORRECT DOSE APPLICATION



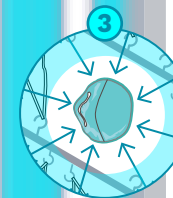
1 MEASURE DOSE ROUTINELY

With photodiode or photochromic strips that are specific to UV-C and can measure >1 J/cm²



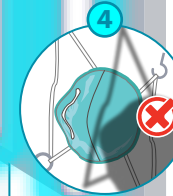
2 IRRADIATE BOTH SIDES

Bulb array facing front & back of masks. Inside of cabinet lined with reflective material



3 IRRADIATE UNIFORMLY

Distance between bulbs = distance from bulb to mask, to apply >1J/cm² to all surfaces



4 AVOID SHADOWING

Avoid shadowing from other masks, straps, or any objects between bulbs and mask



5 SECONDARY STRAP DECONTAMINATION

Straps are resistant to UV-C decontamination and must be wiped with compatible disinfectant solution. Do not wipe facepiece.

N95 respirators can be decontaminated in the UV-C cabinet and require at least 1J/cm² UV-C irradiation. This method may possibly be used for surgical masks, however data on surgical mask decontamination via UV-C and impact on surgical mask performance are sparse - results on bioburden reduction are preliminary, internal, and unpublished as of 12/1/20. Confirm surfaces are hydrophobic with water drop test prior to decontamination.



N95 RESPIRATOR



SURGICAL MASK

CITATIONS:

- <https://www.n95decon.org/uvc>
- <https://www.covidppeguide.com/uvc-decon>
- Image adapted from 'http://www.tecnowattsnc.com/eng/egermlamp.htm' Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule (2006)
- Kowalski, W. (2010). Ultraviolet germicidal irradiation handbook: UVGI for air and surface disinfection. Springer science & business media

lifebox

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