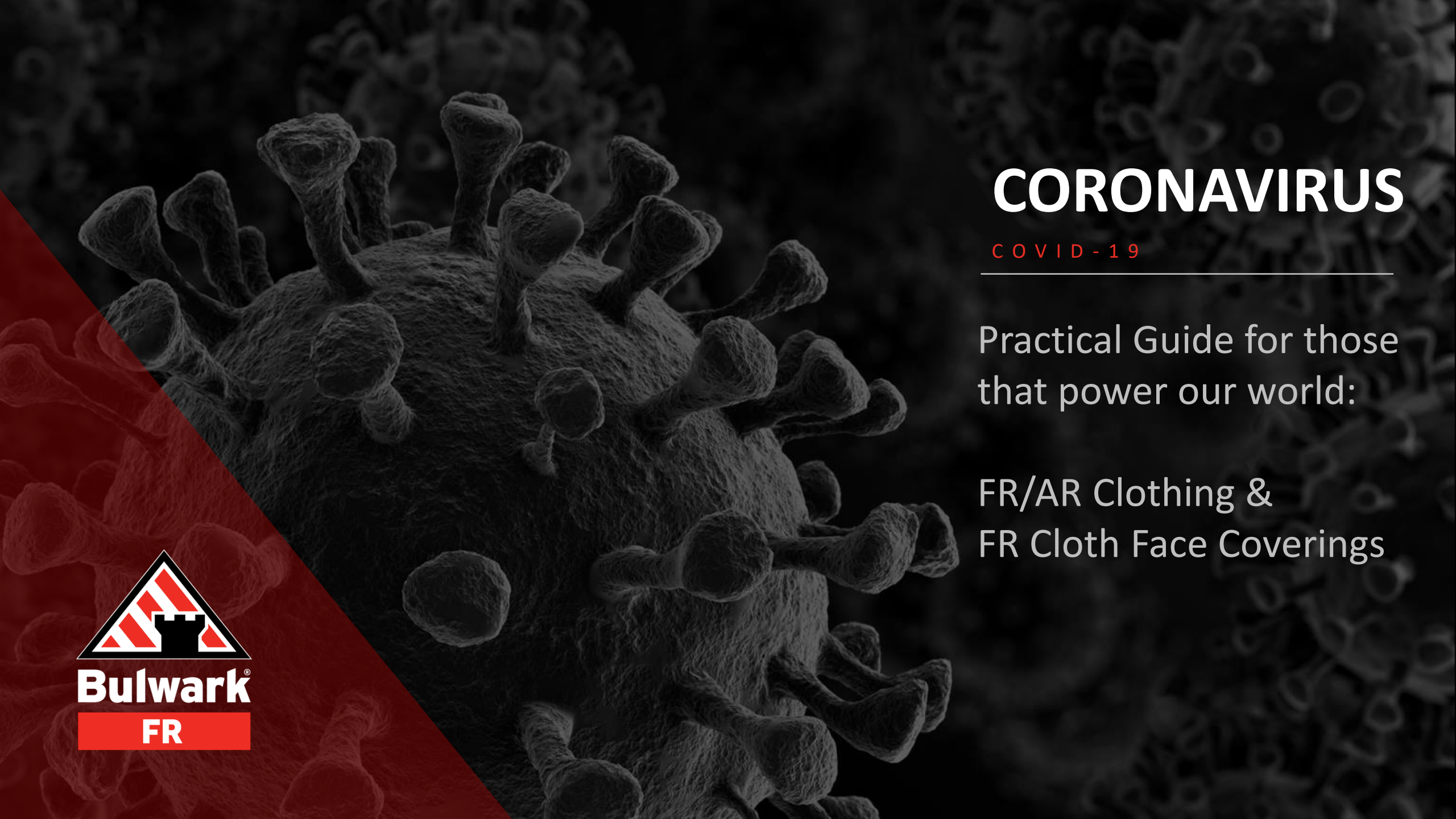


CORONAVIRUS

COVID-19

Practical Guide for those that power our world:

FR/AR Clothing &
FR Cloth Face Coverings

Bulwark®
FR

PRESENTATION IS FOR INFORMATIONAL PURPOSES ONLY

Customers of Bulwark Protective Brands are solely responsible for conducting their own Hazard Risk Assessment to identify safety hazards in their work environment.

Customers of Bulwark Protective Brands are solely responsible for selecting appropriate garments and protective gear for their employees and ensuring wearers use the garments and protective gear properly and in conjunction with appropriate gloves and footwear. Because working conditions and other factors may vary, Bulwark Protective Brands does not make any representation that these garments and protective gear will protect wearers from injury.

CORONAVIRUS | What you need to know

Premise:

We have and are receiving a lot of questions around FR/AR clothing and what to do concerning COVID-19

What you will take away:

- What is SARS-CoV-2, the basics
- How to neutralize the Coronavirus
- What are some best practices regarding your FR/AR clothing during COVID-19
- What should you look for when selecting a FRCFC aka an FR mask

A few definitions…

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) – Is the virus

COVID-19 – Is the disease

Flame-Resistant – self extinguishes does not support combustion, does not melt, drip or add to the injury

FR/AR – Flame-Resistant / Arc-Rated garments

FRCFC – Is the flame-resistant version of a cloth face covering (not a mask and/or face protection)

Cleaning refers to the removal of germs, dirt, and impurities from surfaces. It does not kill germs,

Disinfecting refers to use of a method such as chemicals or ultraviolet light to kill germs on surfaces. This process does not necessarily clean dirty surfaces.

What is a Coronavirus - https://www.cdc.gov/coronavirus/2019-ncov/faq.html

Viruses are not alive; viruses are infectious agents not living organisms and can multiply **ONLY** in a living cell.

Novel Coronavirus – we have no immunity

- **Not** a bacteria
- **Not** a single cell organism
- Hijack living/host cell to replicate and infect

How does the novel coronavirus infect a cell?

Due to its unique features, the virus is particularly good at infecting new cells, both in the upper respiratory tract, as well as deeper down in the lungs.

- The virus enters through the nose or mouth, where it begins its infection.
- The outer spike protein of the coronavirus latches onto specific receptors on the surface of cells in the respiratory tract.
- This binding triggers the process by which the virus fuses into human cells.

[How does the novel coronavirus infect a cell? | Scripps Research]

What we know about transmission

Respiratory viruses are transmitted in multiple ways:

Contact transmission is infection spread through direct contact with an infectious person (e.g., touching during a handshake) or with an article or surface that has become contaminated. The latter is sometimes referred to as “fomite transmission.”

Droplet transmission is infection spread through exposure to virus-containing respiratory droplets (i.e., larger and smaller droplets and particles) exhaled by an infectious person. Transmission is most likely to occur when someone is close to the infectious person, generally within about 6 feet.

Airborne transmission is infection spread through exposure to those virus-containing respiratory droplets comprised of smaller droplets and particles that can remain suspended in the air over long distances (usually greater than 6 feet) and time (typically hours).

Scientific Brief: SARS-CoV-2 and Potential Airborne Transmission | CDC

What we know about transmission

The principal mode by which people are infected with SARS-CoV-2 (the virus that causes COVID-19) is through exposure to respiratory droplets carrying infectious virus.

The epidemiology of SARS-CoV-2 indicates that most infections are spread through close contact, not airborne transmission

Scientific Brief: SARS-CoV-2 and Potential Airborne Transmission | CDC

How to destroy the Coronavirus

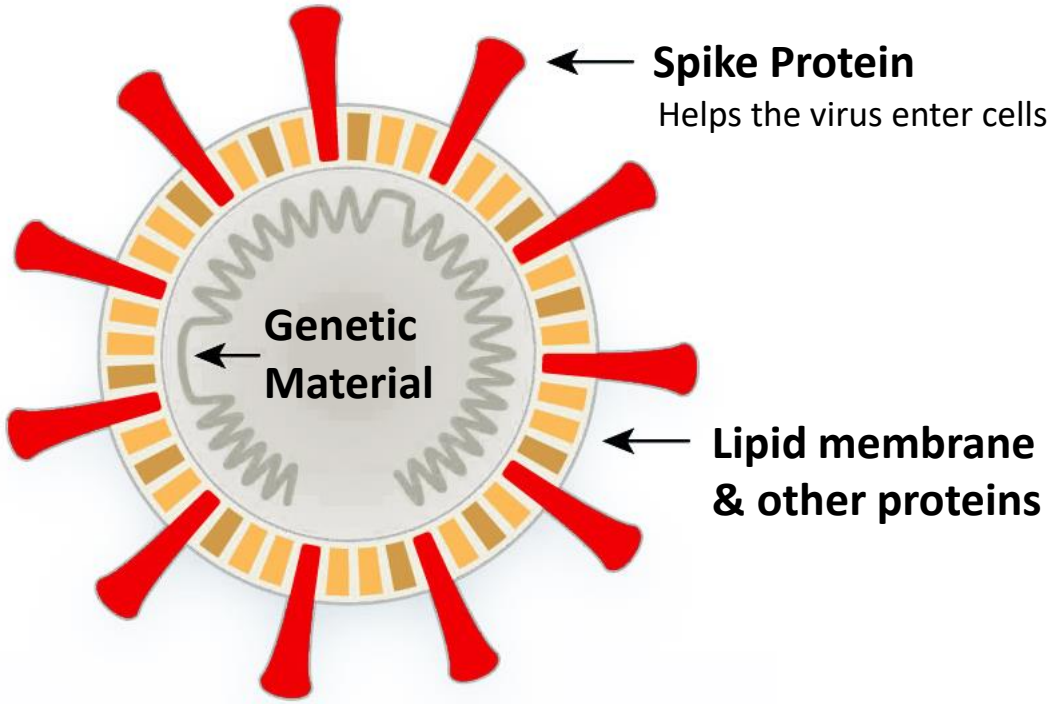
As Dr. Price from Weill Cornell Medical Center in New York said on his viral YouTube video – COVID is a wimp

https://www.youtube.com/watch?v=kcKTzefEJFM

- **Time** - dry's out the virus and it becomes inactive
- **Disinfectants** – bleach, alcohol, etc. destroy the virus but not appropriate for all surfaces/applications and don’t remove the virus
- **Soap and water** – as effective or more effective than sanitizers and can be used on all surfaces, destroys and removes the virus

How Soap destroys the Coronavirus

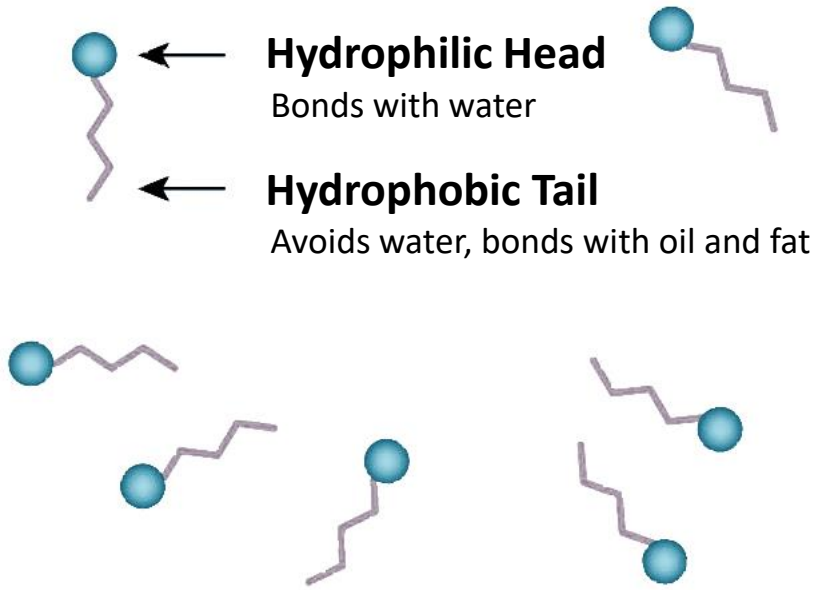
THE CORONAVIRUS has a membrane of oily lipid molecules, which is studded with proteins that help the virus infect cells.



SOURCE: https://www.nytimes.com/2020/03/13/health/soap-coronavirus-handwashing-germs.html

How Soap destroys the Coronavirus

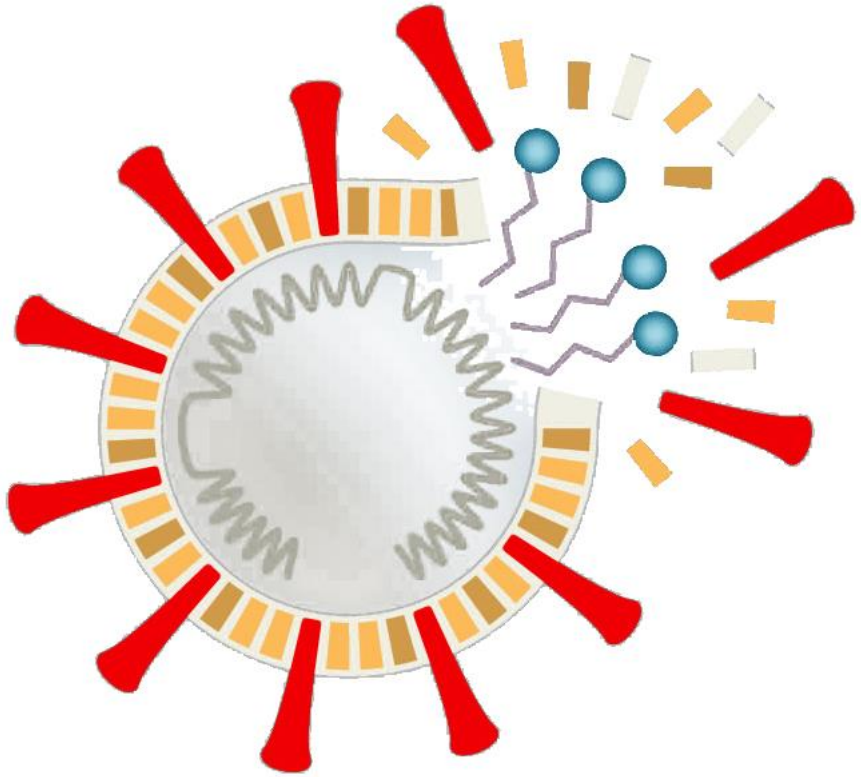
SOAP MOLECULES have a hybrid structure, with a head that bonds with water and a tail that avoids it.



SOURCE: https://www.nytimes.com/2020/03/13/health/soap-coronavirus-handwashing-germs.html

How Soap destroys the Coronavirus

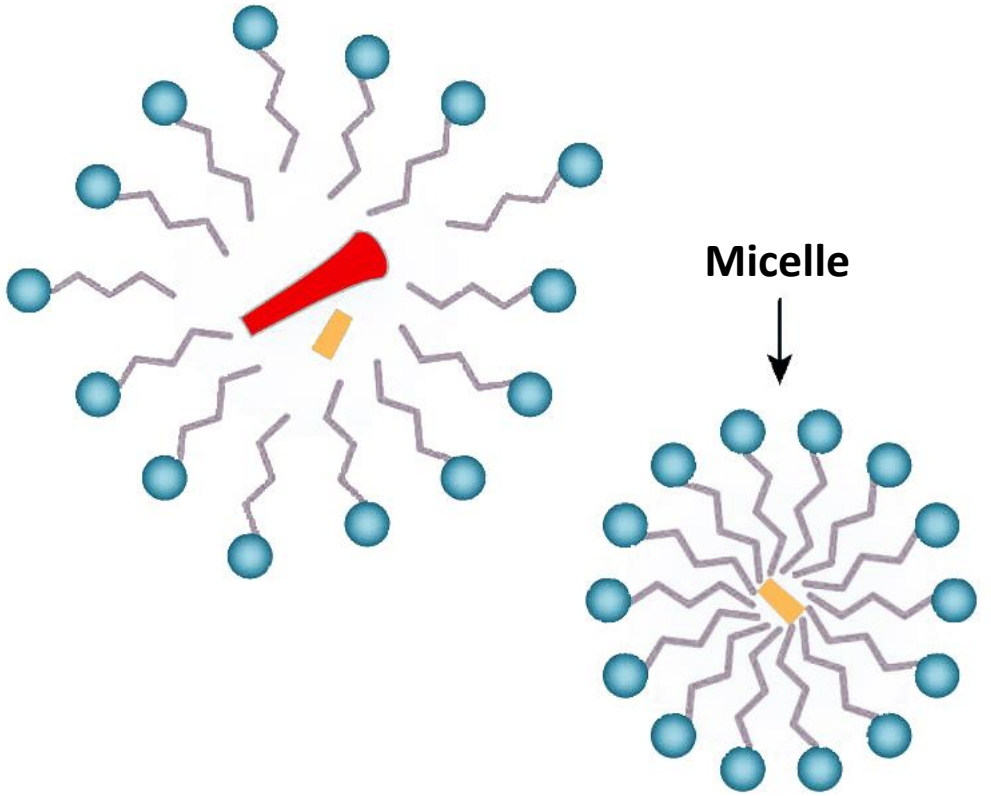
SOAP DESTROYS THE VIRUS when the water shunning tails of the soap molecules wedge themselves into the lipid membrane and pry it apart.



SOURCE: https://www.nytimes.com/2020/03/13/health/soap-coronavirus-handwashing-germs.html

How Soap destroys the Coronavirus

SOAP TRAPS DIRT and fragments of the destroyed virus in tiny bubbles called micelles, which wash away in water.



SOURCE: https://www.nytimes.com/2020/03/13/health/soap-coronavirus-handwashing-germs.html

How to Render the Coronavirus Inactive for FR/AR clothing

As more and more people are being impacted by the Coronavirus, the question of how to properly home wash FR garments potentially exposed to the virus, has been raised. Adhering to the manufacturer's laundry instructions is generally enough to render the virus inactive. There is **no need to use disinfectants** as they could negatively affect the flame-resistant properties of the clothing. The following instructions are in concert with the CDC directions for anyone handling potentially exposed clothing.

https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cleaning-disinfection.html

Even though it is never recommended to have FR/AR clothing encounter chlorine bleach

What we have learned: Bleach – Spills, Mist, Dried Residue

Many are sanitizing with diluted bleach in spray bottles

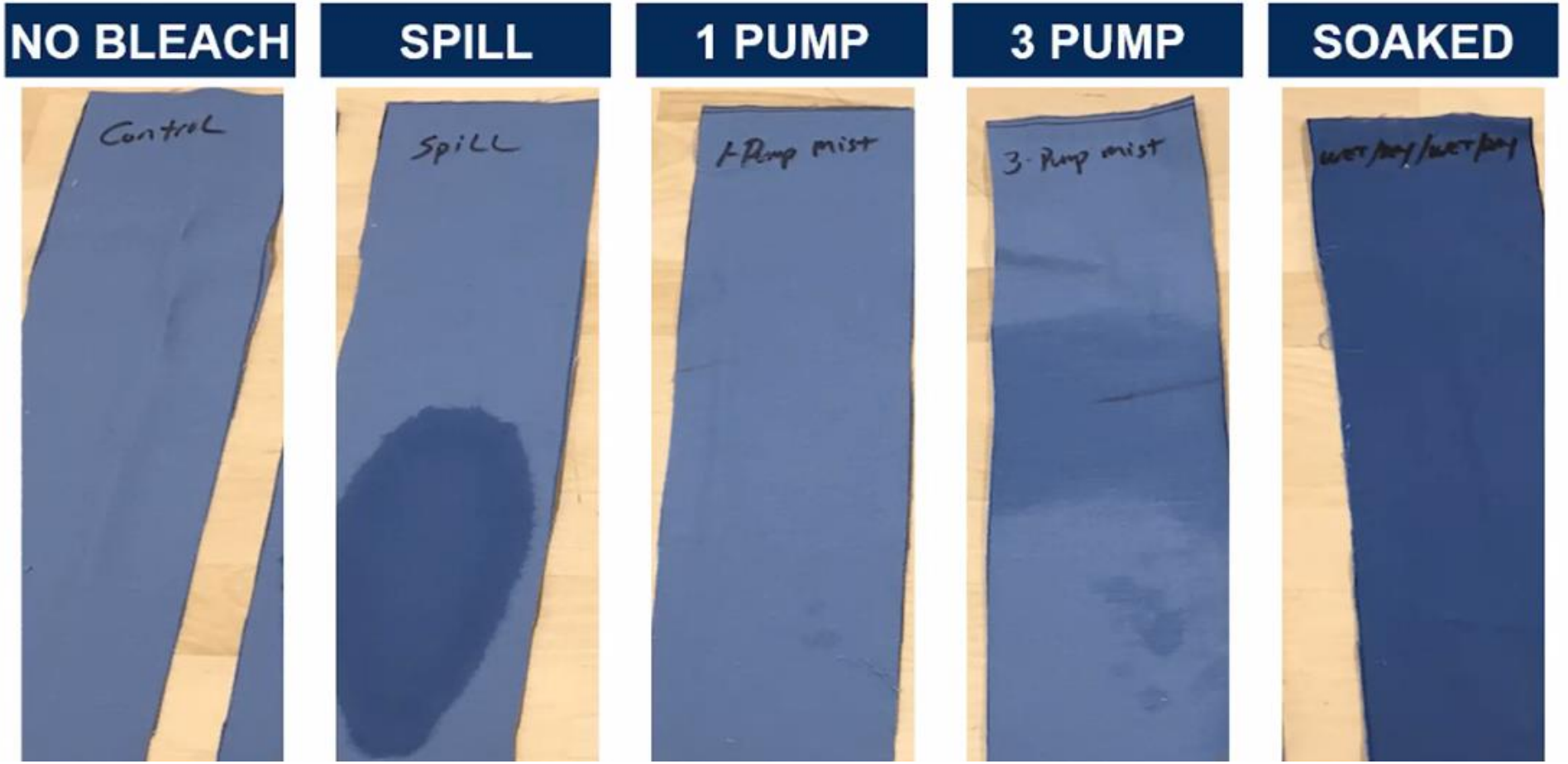
Tyndale used an ATSM D 6413 chamber to study the effects of bleach on fabric by using a spray bottle to apply a bleach/water solution that is greater than what the CDC recommends.

CDC: 1/3 cup of chlorine bleach per gallon of water

Tyndale: 2/3 cup of chlorine bleach per gallon of water

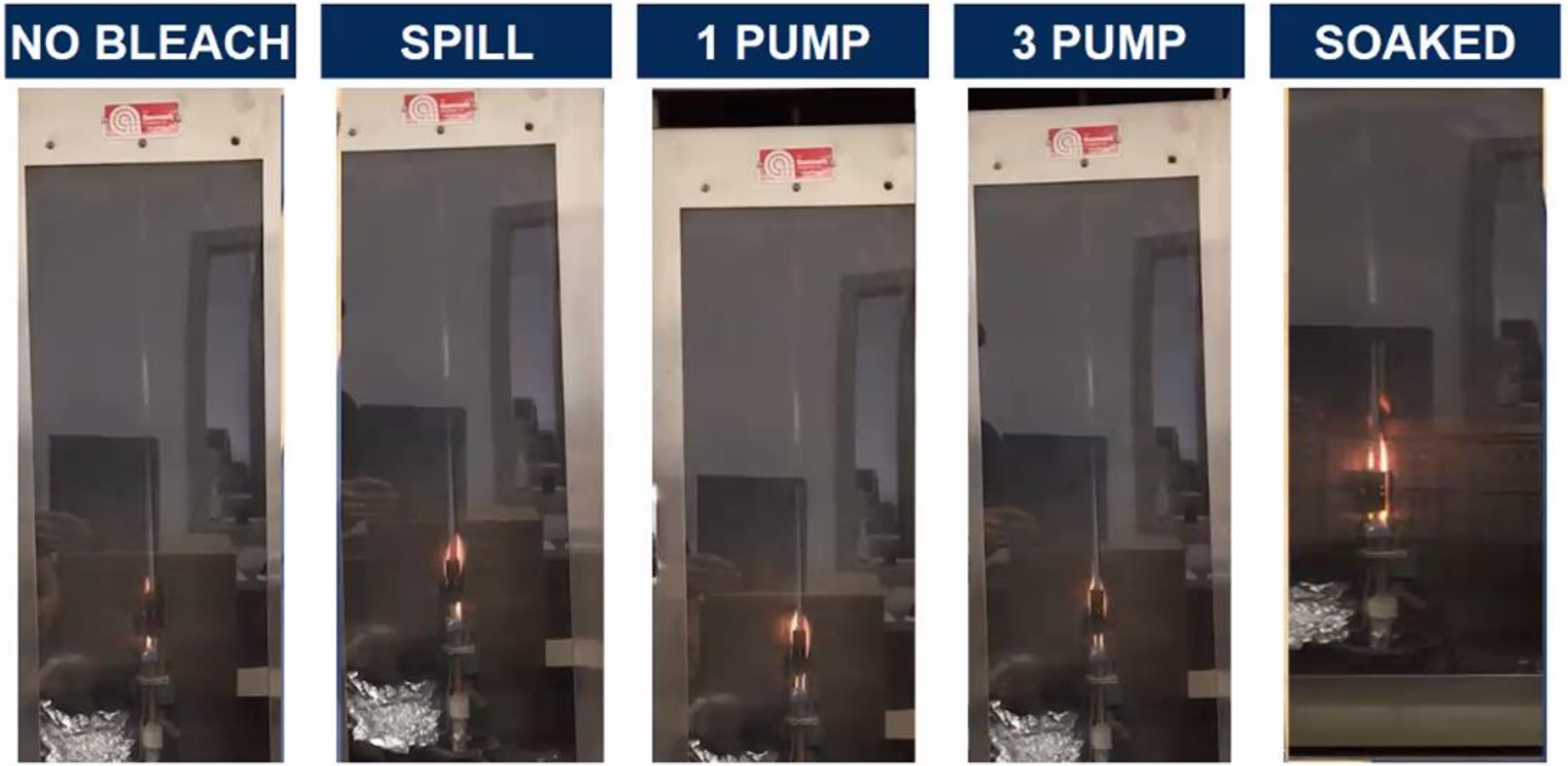
https://tyndaleusa.com/blog/2020/03/25/frc-safety-during-covid-19-dried-bleach-residue-and-frc/

What we have learned: Bleach – Spills, Mist, Dried Residue



* Images and information courtesy of Tyndale

What we have learned: Bleach – Spills, Mist, Dried Residue



Vertical Flame Test

* Images and information courtesy of Tyndale

What we have learned: Bleach – Spills, Mist, Dried Residue

NO BLEACH	SPILL	1 PUMP	3 PUMP	SOAKED
				
Passed	Passed	Passed	Passed	Passed

* Images and information courtesy of Tyndale

What we have learned: Bleach – Spills, Mist, Dried Residue

Dried residue was also tested for the effects of bleach on FR fabric:

Method	Pass/Fail
Spills	Passed
Light Mist (1 Squeeze)	Passed
Heavy Mist (3 Squeezes)	Passed
Soaked	Passed
Dried Residue	Passed
Dried Residue, Rewetted	Passed

* Images and information courtesy of Tyndale

NEW: Flame Resistant Cloth Face Cover (FRCFC)

Because of the additional hazard of a short duration thermal event, your cloth face coverings need to:

- Self extinguish, not melt and/or drip
- Your CFC more than likely will have an arc rating, this is nonvital other than it further demonstrates that the fabric will meet the previous criteria of self extinguishing.
- In addition, NFPA 2112 and ASTM F1506 committees have fast tracked revisions, updates and TIA's to get end-users the information they need.

Traditional Masks and FR/AR Cloth Face Coverings

RESPIRATOR
(N95)

MASK

CLOTH FACE COVERING

Cloth face coverings are not designed to be respirators; respirators form a seal resulting in negative pressure when inhaling and filter the inhaled air.

- When it comes to fabric, the tightness of the weave is crucial. At a bare minimum, you want the weave to be tight enough that you don't see the outline of the individual fibers when you hold the material up to light.
- NonFR and/or FR cloth face coverings are not designed as face protection or to be PPE, they are designed to reduce transmission of the Coronavirus by limiting the ability to touch one's face and impede the contribution of expired droplets and aerosols to the environment.

https://medical.mit.edu/covid-19-updates/2020/08/how-do-i-choose-cloth-face-mask

So why Cloth Face Covering's

Fluid droplets are continuously being exhaled, inhaled deposited and transferred CFC's mitigate – transmission of the virus by:

- Minimizing the ability to touch your face
- Reduce droplets inhaled
- Reduce droplets exhaled into the environment
- Reduce droplet travel distance
- Reduce droplets deposited on surfaces

https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover-guidance.htm

Flame Resistant Cloth Face Cover (FRCFC)

Must attempt to balance:

- Protection
- Filtration
- Breathability
- Comfort
- Structural integrity

FR/AR cloth face coverings Safety and Proper Use

Is it safe to breath through? WASH ALL CLOTH FACE COVERINGS FR or Not

Why? Dyes, finishes, sizing, etc.

Confidence in your supplier, do they already go beyond the standards…. OKEO-Tex 100, ISO, experience in cutting and sewing, experience with fabrics already being used on face and/or near face such as – balaclavas on face, shrouds, liners near face.

Bulwark FR

Is it Safe to breath through… Bulwark's initial offering of an FR face covering will be made of one of the most common fabrics used in the FR clothing we sell, 88/12 FR cotton/nylon.

Westex Ultrasoft® Fabrics

Safety Data Sheet

According to 29 CFR 1910.1200

Milliken

Carcinogenicity:	Does not meet the criteria for classification. This product (or components >0.1%) is not reported to have any carcinogenic effects. This product (or its components) is not listed in IARC Monographs, the current NTP Report on Carcinogens, or the current ACIH TLV's as a carcinogen or potential carcinogen.
Eye Damage/Irritation:	Does not meet the criteria for classification. However, exposure to fiber fly or nuisance dust may cause minor eye irritation.
Reproductive Toxicity:	Does not meet the criteria for classification.
Aspiration Hazard:	Does not meet the criteria for classification.
Specific Target Organ Toxicity (Single Exposure):	Does not meet the criteria for classification.
Specific Target Organ Toxicity (Repeated Exposure):	Does not meet the criteria for classification.
Symptoms/Injuries After Inhalation:	None under normal use.
Symptoms/Injuries After Skin Contact:	None under normal use.
Symptoms/Injuries After Eye Contact:	None under normal use. Prolonged exposure may cause slight irritation to eyes.

Formaldehyde levels are below the state of CA requirements for reporting.

In addition, there is no aspiration hazards or inhalation concerns.

, regional, national, and

TDG:	Not regulated for transport
EPCRA 302 Extremely Hazardous (>0.1%):	No components above 0.1% listed
EPCRA 313 Toxic Chemicals (>0.1%):	No components above 0.1% listed

US State Regulations:

California Proposition 65:	Warning! - This product contains chemicals known by the State of California to cause cancer – Formaldehyde (CAS No. 50-00-0). *This product contains trace quantities of formaldehyde. Under normal use conditions, the level of exposure will be below the Safe Harbor Level established by the State of California and will not require product warning labels.*
Massachusetts - Right To Know List:	Formaldehyde (CAS No. 50-00-0)
New Jersey - Right to Know Hazardous Substance List:	Formaldehyde (CAS No. 50-00-0)
Pennsylvania - RTK (Right to Know) List:	Formaldehyde (CAS No. 50-00-0)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Other Information:	This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.
Prepared by:	Andrew Child
Date prepared:	July 13, 2018
Version:	1.0

This information in this SDS was obtained from sources which we believe to be reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use, or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with the handling, storage, use, or disposal of this product. If the product is used as a component of another product, the SDS information may not be applicable.

FR/AR cloth face coverings: can you breathe through?

Context –

- Home gym; spin bike
- 103 degrees
- 20 minutes
- HR – approx. 120 bpm
- Respiration approx. 25 L/min

Context – Murph

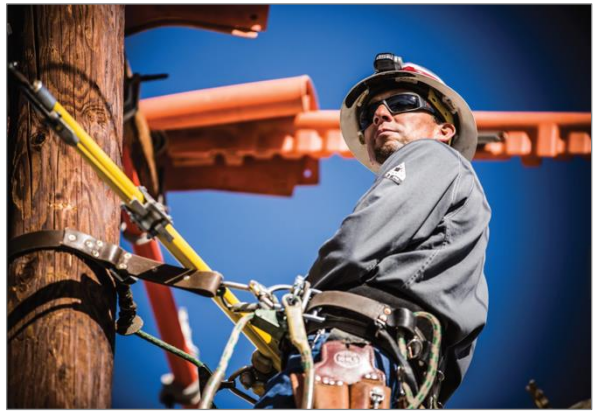
- 1-mile run
- 100 Pull-ups degrees
- 200 Push-ups
- 300 squats
- 1-mile run

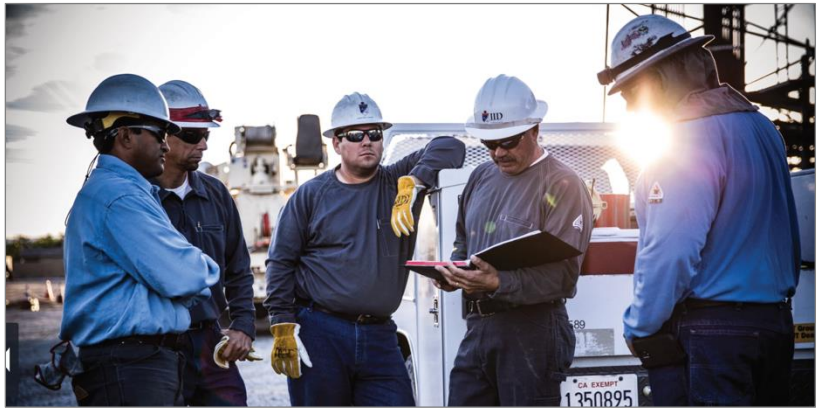
FR/AR During the Coronavirus Pandemic:

1 Big Don’t

3 Do’s

One Big DON'T – Don't Share your PPE





Virus can remain for days on different surfaces

- Different surfaces need to be disinfected/sanitized differently (you can have a lot of different surfaces – rubber, leather, poly carbonate, HD plastics etc.)
- Virtually impossible to disinfect in the field
- Arc Flash Kits are a huge concern

https://e-hazard.com/is-it-ok-to-share-arc-flash-and-electrical-ppe/

Handling your FR clothing in a COVID World

DO #1

If you have NO concern regarding possible contamination:

- Follow manufacturers laundering guidelines for FR/AR home laundering procedures
- Do **not** use chemical additives such as sanitizers, bleach, Lysol
- No need to isolate clothing beyond manufacturers guidelines
- No need for special handling

https://www.bicmagazine.com/departments/hse/disinfecting-fr-clothing-and-ppe/

Handling your FR clothing in a COVID World

DO #2 – IMPORTANT!

If you have a contamination concern, DO NOT shake the clothing:

The CDC recommends anyone handling potentially exposed FR clothing wear disposable gloves. If gloves are not available, be sure to wash your hands thoroughly with soap and water, for at least 20 seconds, after handling. If soap and water is not readily available, use an alcohol-based hand sanitizer that contains at least 60% alcohol.

- Isolate clothing, remove away from living areas and other clothing if possible
- Remove with gloves or wash hands prior and again after
- Follow manufacturers laundering guidelines for FR/AR home laundering procedures
- Do not use chemical additives such as sanitizers, bleach, Lysol
- Special handling – NOTE: The heat of the water, the agitation in the wash cycle, as well as the chemicals in the detergent work well to render the virus inactive

https://www.webmd.com/lung/news/20200401/coronavirus-on-fabric-what-you-should-know

Handling your equipment and tools in a COVID World

DO #3

Sanitize your tools and equipment.

- Wear disposable gloves to clean and disinfect.
- Clean surfaces using soap and water, then use disinfectant.
- Cleaning with soap and water reduces number of germs, dirt and impurities on the surface. Disinfecting kills germs on surfaces.
- Practice routine cleaning and disinfection of frequently touched surfaces.
  - More frequent cleaning and disinfection may be required based on level of use.

CDC
Centers for Disease Control and Prevention

CDC recommends a chlorine bleach/water disinfectant

- 1/3 cup for every gallon of water
- Do not use/wear your FR clothing when cleaning
- When cleaning, protect your FR clothing – Use a disposable coverall
- Wear an old coverall over your FR coverall

https://www.cdc.gov/disasters/bleach.html

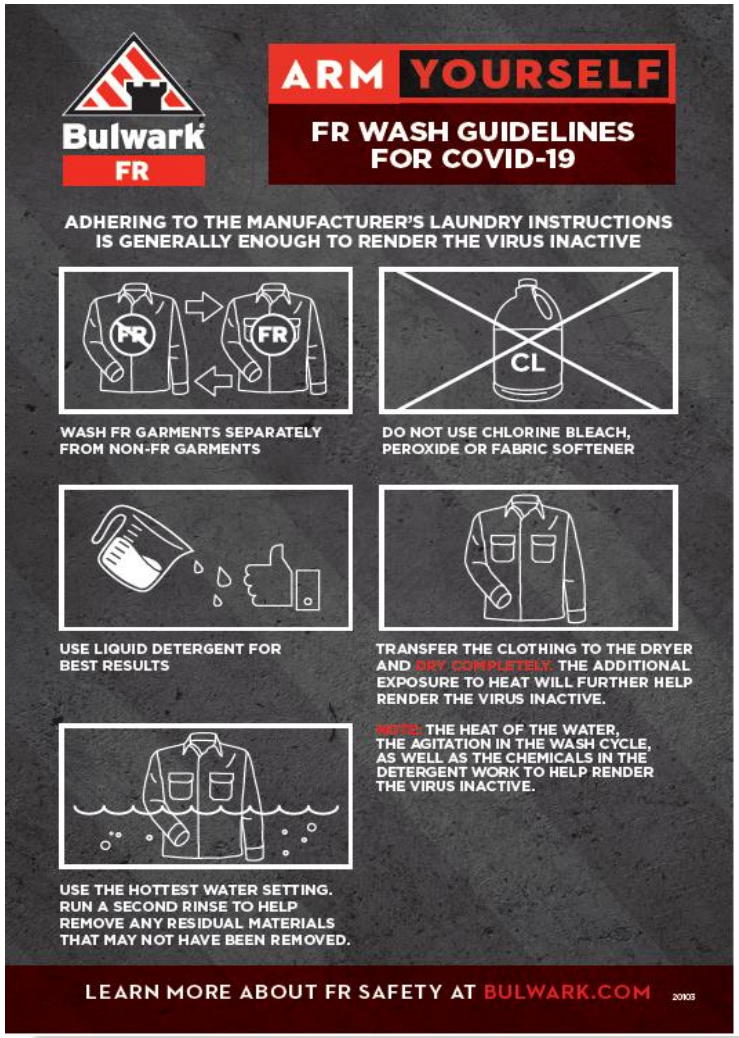
Proper Care of Your FRCFC

- ✓ Wash All cloth face coverings before use
- ✓ Wash hands/sanitize before donning
- ✓ Proper fit over nose, under chin snug on the sides
- ✓ Avoid touching face while wearing
- ✓ Remove from top down/ reverse when donning bottom up
- ✓ Wash hands/sanitize between each use

Best Practices

- ✓ Don’t share PPE – hard hats, face shields, arc flash suits, hoods etc.
- ✓ Sanitize PPE by laundering
- ✓ Wear your FR/AR cloth face covering (FRCFC’s do not replace or substitute for proper PPE)
- ✓ Take care of your PPE so it can take care of you

LAUNDRY GUIDE & COVID-19 FAQ'S



additional resources at https://www.bulwark.com/covid19safety

Questions / Comments

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Bulwark® FR