SDS PPE Selection & Guidance

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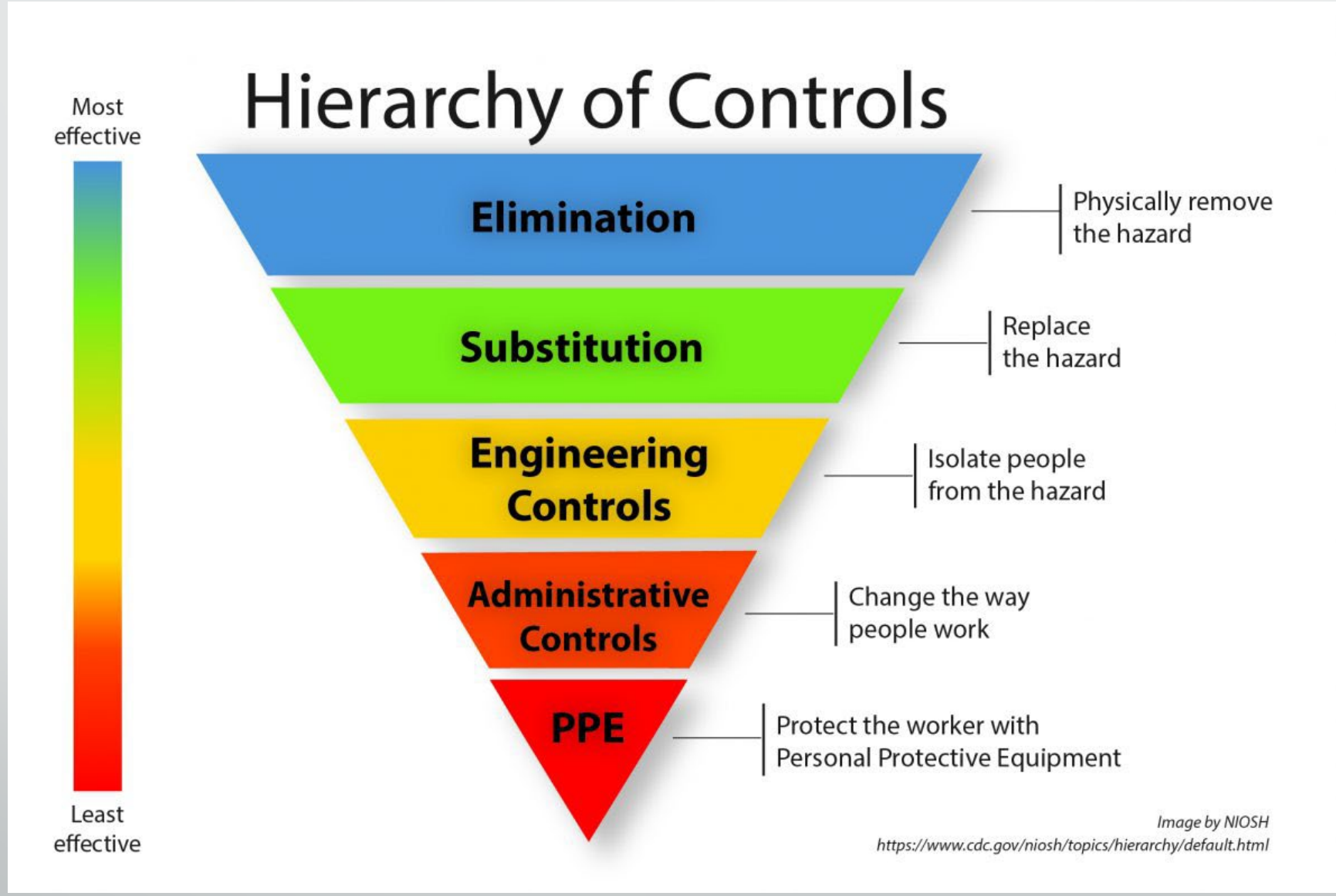
Hierarchy of Controls
Most effective
Least effective
Elimination
Physically remove the hazard
Substitution
Replace the hazard
Engineering Controls
Isolate people from the hazard
Administrative Controls
Change the way people work
PPE
Protect the worker with Personal Protective Equipment
Image by NIOSH
https://www.cdc.gov/niosh/topics/hierarchy/default.html

OSHA 1910.1200 App D - Safety Data Sheets

8. Exposure controls/personal protection	(a) OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available. (b) Appropriate engineering controls. (c) Individual protection measures, such as personal protective equipment.

Ingredient Listing

- *If a chemical ingredient is listed in section 3 of the SDS, it only needs to be listed in section 8 if there is a PEL, TLV or other occupational exposure limit (OEL).*
- *However, if a chemical ingredient is listed in SDS section 8, then OSHA would expect to see the same ingredient listed in SDS section 3.*
- *OSHA does not require that all chemical ingredients be listed in SDS section 8–just those that are identified in section 3 and that have PELs, TLVs, and/or OELs.*

https://www.osha.gov/laws-regs/standardinterpretations/2020-10-28

ANSI Z400.1/Z129.1

Scope:

- Recommend PPE for each route of exposure that presents a potential hazard – inhalation, skin and eye/face.
- Note specific regulatory requirements for PPE (e.g., Toxic Substances Control Act (TSCA) 5(e) consent orders or significant new-use rules; OSHA chemical-specific standards).
- List the preferred PPE material of construction (including eye protection, gloves, boots, etc.) as well as the recommended type of respirator, including the cartridge type. If known, also list the materials of construction and type of respirator that are NOT suitable for the product. Emphasize the importance of minimizing or preventing contact or exposure to the product.

Recommendations

Skin and body protection	Wear protective gloves and protective clothing.

VS

Hand Protection: Wear appropriate chemical resistant gloves. Consult a glove manufacturer for assistance in selecting an appropriate chemical resistant glove.
Protective Material Types: Butyl rubber, Natural rubber, Neoprene, Nitrite, Polyvinyl chloride (PVC), Tyvek®.

ANNEX 4

GUIDANCE ON THE PREPARATION OF SAFETY DATA SHEETS (SDS)-United Nations

A4.3.8.3.2

Identify the PPE needed to minimize the potential for illness or injury due to exposure from the substance or mixture, including:

(a) Eye/face protection:

-specify the type of eye protection and/or face shield required, based on the hazard of the substance or mixture and potential for contact;

(b) Skin protection:

-specify the protective equipment to be worn (e.g. type of gloves, boots, bodysuit) based on the hazards associated with the substance or mixture

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A4.3.8.3.2

Continued:

(c) Respiratory protection:

-specify appropriate types of respiratory protection based on the hazard and potential for exposure, including air-purifying respirators and the proper purifying element (cartridge or canister) or breathing apparatus

(d) Thermal hazards:

-when specifying protective equipment to be worn for materials that represent a thermal hazard, special consideration should be given to the construction of the PPE.

Types of PPE

- Eye/face protection:
  - safety glasses vs shield vs googles

Goggles Comply with ANSI Z87.1	Direct vented 	Allows the flow of air into the goggle. Protection from impact	Working with particulates [Tends to fog less, but should not be used with liquid or fine dust hazards]
	Indirect vented 	Provides protection from splash entry by a hooded or covered vent	Protection from particulates and from chemical splash
	Non-vented 	Provides protection against the passage of dust, mist, liquid and vapors	Protection from particulates, chemical splash, and mist, liquid and vapors

Types of PPE

- Skin protection:
  - Aprons
  - Smock
  - Arm covers
  - Boot/ covers
  - Gloves

Permeation/Degradation Resistance Guide for Ansell Gloves

The first square in each column for each glove type is color coded. This is an easy-to-read indication of how we rate this type of glove in relation to its applicability for each chemical listed. The color represents an overall rating for both degradation and permeation. The letter in each square is for Degradation alone…

- GREEN: The glove is very well suited for application with that chemical.
- YELLOW: The glove is suitable for that application under careful control of its use.
- RED: Avoid use of the glove with this chemical.

CHEMICAL	LAMINATE FILM BARRIER			NITRILE SOL-VEX			UNSUPPORTED NEOPRENE 29-865			SUPPORTED POLYVINYL ALCOHOL PVA			POLYVINYL CHLORIDE (Vinyl) SNORKEL			NATURAL RUBBER CANNERS AND HANDLERS*			NEOPRENE/ NATURAL RUBBER BLEND CHEMI-PRO*		
	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate
1. Acetaldehyde	■	380	E	NR	—	—	E	10	F	NR	—	—	NR	—	—	E	7	F	E	10	F
2. Acetic Acid	■	150	—	G	270	—	E	60	—	NR	—	—	F	180	—	E	110	—	E	260	—
3. Acetone	▲	>480	E	NR	—	—	E	10	F	P	—	—	NR	—	—	E	10	F	G	10	G
4. Acetonitrile	▲	>480	E	F	30	F	E	20	G	■	150	G	NR	—	—	E	4	VG	E	10	VG
5. Acrylic Acid	—	—	—	G	120	—	E	390	—	NR	—	—	NR	—	—	E	80	—	E	65	—
6. Acrylonitrile	E	>480	E	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table guide of Ansell gloves.

Respiratory Protection

CONTAMINATE		COLOR CODING ON CARTRIDGE/CANISTER
Acid gases		White
Hydrocyanic acid gas		White with 1/2 inch green stripe completely around the canister near the bottom
Chlorine gas		White with 1/2 inch yellow stripe completely around the canister near the bottom
Organic vapors		Black
Ammonia gas		Green
Acid gases and ammonia gas		Green with 1/2 inch white stripe completely around the canister near the bottom
Carbon monoxide		Blue
Acid gases and organic vapors		Yellow
Hydrocyanic acid gas and chloropicrin vapor		Yellow with 1/2 inch blue stripe completely around the canister near the bottom
Acid gases, organic vapors, and ammonia gases		Brown
Radioactive materials, except tritium and noble gases		Purple (magenta)
Pesticides		Organic vapor canister plus a particulate filter
Multi-Contaminant and CBRN agent		Olive
Any particulates – P100		Purple
Any particulates – P95, P99, R95, R99, R100		Orange
Any particulates free of oil – N95, N99, or N100		Teal

Respiratory Protection

- Respirators are classified as N (Not Oil Resistant), R (Oil Resistant), or P (Oil Proof), and the associated number (95, 99, 100) represents the percentage of airborne particles that mask is able to remove from the air.
  - N Ratings = Not Oil Resistant: For protection against dust, mists and fumes that do not contain oil aerosols.
  - N95 filters at least 95 percent of airborne particles
  - N99 filters at least 99 percent of airborne particles
  - N100 filters at least 99.7 percent of airborne particles
- R Ratings = Oil Resistant: For protection against dust, mists, fumes and occasional oil particle exposure. When using R-rated filters in oil-filled environments, you should only use the respirator for 8 hours at a time. Examples of oil particles include lubricants, cutting fluids, glycerine, some pesticides and some solvents.
  - R95 filters at least 95 percent of airborne particles
- P Ratings = Oil Proof: For protection against oil-based and non-oil based particles. Examples of oil particles include lubricants, cutting fluids, glycerine, some pesticides, and some solvents.
  - P95 filters at least 95 percent of airborne particles
  - P99 filters at least 99 percent of airborne particles
  - P100 filters at least 99.7 percent of airborne particles

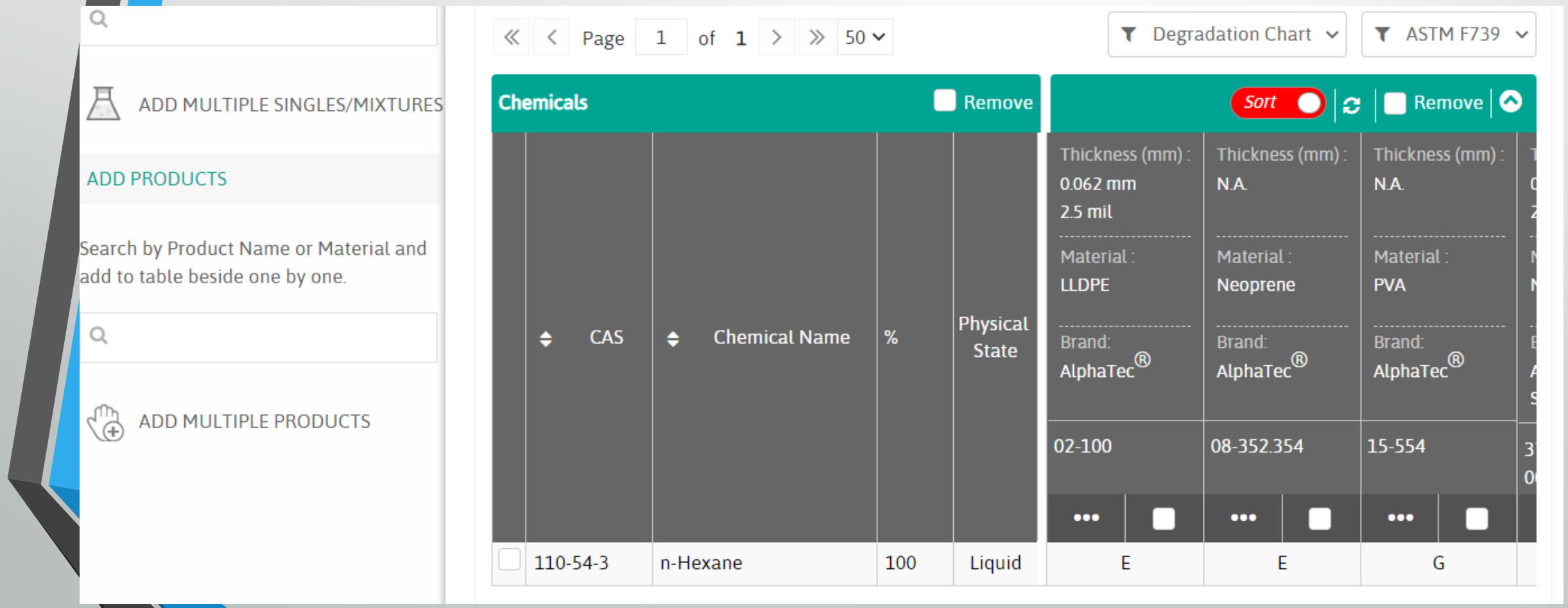
Types of PPE

- Thermal hazards: when specifying protective equipment to be worn for materials that represent a thermal hazard, special consideration should be given to the construction of the PPE. A4.3.8.3.3

- **Permeation rate:** Permeation rate is a measurement of how quickly a chemical passes through a material at the molecular level.
- **Degradation:** Degradation is the physical changes to the material caused by the chemical, which can include swelling, stiffening, wrinkling, changes in color, and other physical deterioration.
  - The slower the degradation occurs in the presence of a chemical, the more protective the material is for that specific chemical.
- There are no standardized tests for degradation; each manufacturer generally has its own test.

- **Breakthrough time:** Breakthrough time is how much time it takes from the initial contact of the chemical with the material until it is detected on the opposite side of the material (essentially, when it begins to soak through). Obviously, the greater the breakthrough time, the more protective the material is for that particular chemical.
- Breakthrough is measured using a standardized test (ASTM F739).

- **Ansell Guardian**
- Ansell Guardian is an interactive program that asks application questions and matches the many styles of Ansell gloves that meet specified chemical compatibility and application needs.
- **MCR Safety**
- MCR Safety offers a glove permeation guide for several of their supported and unsupported gloves. The chemical permeation is measured in accordance to European Standard EN374.
- **Showa**
- View detailed chemical compatibility information by using this comprehensive chemical-resistant glove guide –ChemRest®. This guide contains thousands of chemicals and suggests matches to more than 60 styles of Showa gloves.
- **MAPA Professional**
- MAPA Professional's website has an easy-to-use chemical resistance guide that allows you to search by chemical, CAS number, glove name or glove material.
- **Kimberly-Clark Professional**
- Kimberly-Clark Professional provides a product selector guide for all safety products they produce that includes hand protection.


ADD MULTIPLE SINGLES/MIXTURES
ADD PRODUCTS
Search by Product Name or Material and add to table beside one by one.
ADD MULTIPLE PRODUCTS
Page 1 of 1 50
Degradation Chart
ASTM F739
Chemicals
Remove
Sort
Remove
CAS
Chemical Name
%
Physical State
Thickness (mm) : 0.062 mm 2.5 mil
Material : LLDPE
Brand: AlphaTec®
02-100
Thickness (mm) : N.A.
Material : Neoprene
Brand: AlphaTec®
08-352.354
Thickness (mm) : N.A.
Material : PVA
Brand: AlphaTec®
15-554
110-54-3
n-Hexane
100
Liquid
E
E
G

CHEMICAL TO MATERIAL | CHEMICAL TO CHEMICAL

Use dropdowns below to select a Chemical, and compare against ALL MATERIALS or any specific material.

1. CHEMICAL: Aluminum Hydroxide

2. MATERIAL: Natural rubber

VIEW COMPATIBILITY | Clear Search

CHEMICAL SELECTED : Aluminum Hydroxide

SHARE | PRINT

MATERIAL	COMPATIBILITY
Natural rubber	D - Poor

Ratings - Chemical Effect

A - Excellent

B - Good: Minor Effect, slight corrosion, or discoloration.

C - Fair: Moderate Effect, not recommended for continuous use. Softening or loss of strength, and swelling may occur.

D - Severe Effect: Not recommended for any use.

E - Information not available.

Explanation of Footnotes

1-Satisfactory to 72°F (22°C)

2-Satisfactory to 120°F (48°C)

- https://www.coleparmer.com/Chemical-Resistance

- **Degradation:** how the chemical will affect the physical properties of the glove material upon contact. Degradation can lead to softening, drying, swelling, shrinkage, increased brittleness, or other undesirable side effects that could allow permeation or breakthrough inside the glove.
    - The ability of the chemical to penetrate through the glove must be determined.
    - **Latex or natural rubber** does not hold up well to organic solvents, oils, greases, or fuels such as kerosene or gasoline.
    - **Nitrile** is ideal for stripping and degreasing, chemical washing, and is resistant to animal fats and vegetable oils. Nitrile does not contain latex that causes skin allergies.
    - **Polyvinyl chloride** (PVC) provides excellent resistance to most acids, fats, and petroleum hydrocarbons.
    - **Neoprene** is strong and durable and provides excellent chemical resistance. Note: Check “Chemical Compatibility Guides” for specific chemical and glove materials recommended.

- **Degradation-continued**
  - **Polyvinyl alcohol** (PVA) has an extremely high resistance to aliphatics, aromatics, chlorinated solvents, esters, and ketones. PVA quickly breaks down when exposed to water and light alcohols.
  - **Butyl** provides excellent chemical resistance to gases and ketones. It is ideal for handling hazardous materials. Butyl is severely affected by fuels and aliphatic and aromatic hydrocarbon solvents.
  - **Viton** is the most resistant of all, and provides high-temperature, fuel-resistance. Recommended for working with extremely hazardous chemicals, such as carcinogenic or highly toxic chemicals.
  - **Silver-shield** provides excellent chemical resistance and is commonly used for hazardous materials work, or work involving multiple chemical hazards.
  - **Mixtures and formulated products** (unless specific test data is available) require that gloves should be selected based on the chemical component with the shortest breakthrough time since it’s possible for solvents to carry active ingredients through some glove materials.

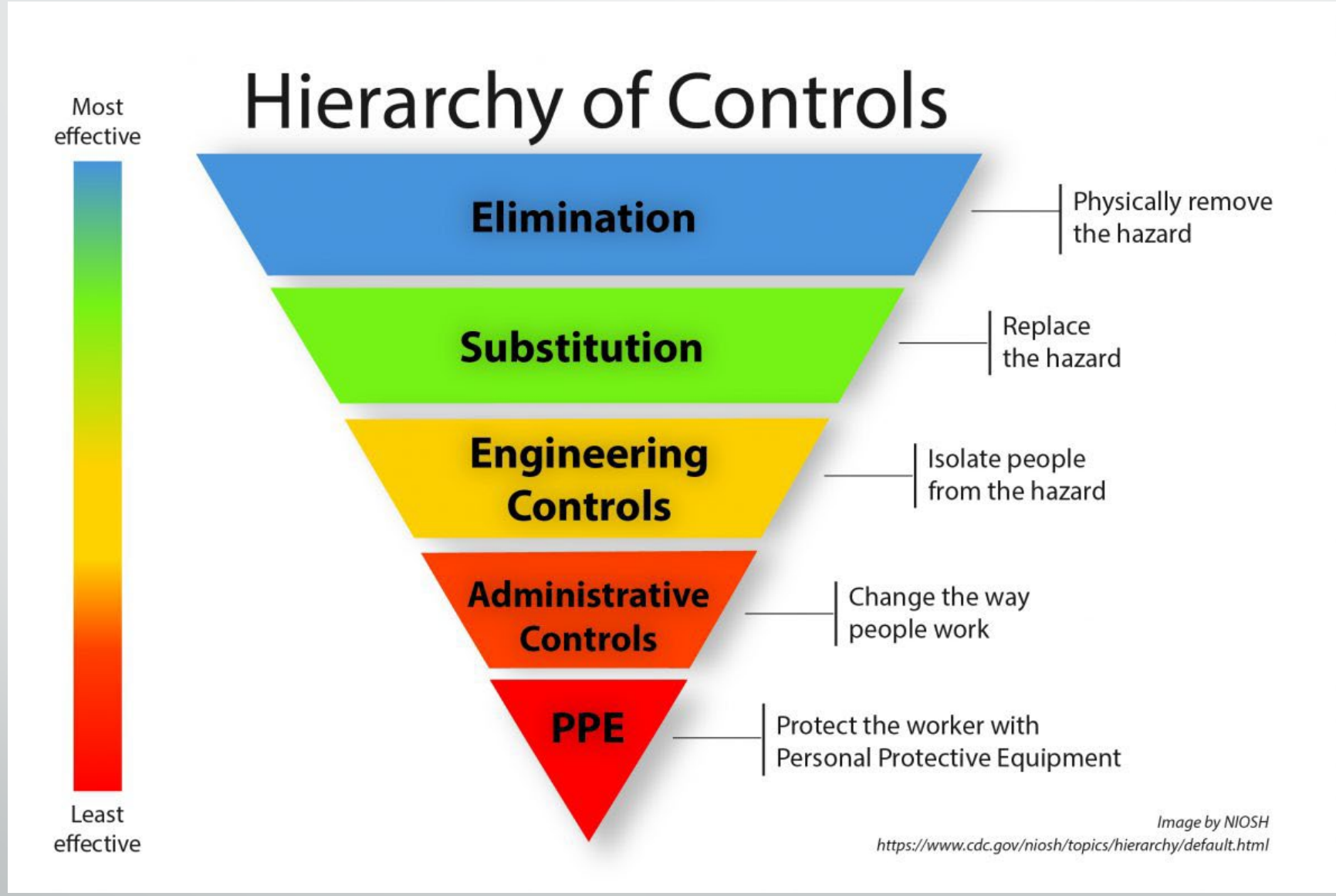

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Image by NIOSH
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Quick Links

https://www.ansellguardianpartner.com/chemical/home#hp

https://www.cdc.gov/niosh/docs/2005-149/pdfs/2005-149.pdf

https://www.osha.gov/sites/default/files/publications/osha3151.pdf

https://www.dir.ca.gov/title8/3380a.html

https://webstore.ansi.org/preview-pages/ACC/preview_ANSI+Z400.1+Z129.1-2010.pdf

https://multimedia.3m.com/mws/media/639110O/3m-respirator-selection-guide.pdf

https://www.ishn.com/articles/95751-permeation-degradation-and-breakthrough-how-they-affect-your-ppe