WHEA LUNCH & LEARN SERIES WEBINAR

GRAINGER
FOR THE ONES WHO GET IT DONE

Personal Protective Equipment (PPE) Head to Toe and All Points Between

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Agenda

- OSHA Top 10 Violations for Healthcare
- Applying the Hierarchy of Hazard Controls
- PPE Categories Head, Eye/Face, Body, Hand, and Foot
- Resources and Tools
- Q&A

Are Hospitals Safe?

Occupational Injury/Illness Rates*, 2015 U.S. Bureau of Labor Statistics

- Nursing and residential care facilities (private industry) = 12.0
- Hospitals (state gov't) = 8.1
- Psychiatric and substance abuse hospitals (private industry)= 8.1
- All industries including state and local gov't = 3.3
- Construction = 3.6
- Manufacturing = 4.0

*injuries per 100 full-time workers; Source: Bureau of Labor Statistics

The Cost of Healthcare Injuries

$15,860

Average workers' compensation claim for a hospital injury between 2006 and 2011 (OSHA)

OSHA in Healthcare FY'2017

- **189 Federal inspections** of Ambulatory Healthcare, Hospitals and Nursing/Residential Care Facilities
  - (5,564 hospitals in U.S., AHA Fast Facts on US Hospitals 2017)

OSHA Top 10 List for Healthcare (Federal OSHA Inspections, FY2017)

1. Bloodborne Pathogens
2. Hazard Communication
3. General Requirements (PPE)
4. Reporting fatalities, hospitalizations, amputations and losses of an eye to OSHA
5. Formaldehyde
6. Respiratory Protection
7. Electrical general requirements
8. Wiring methods, components and equipment for general use
9. Asbestos
10. The Control of Hazardous Energy (Lockout / Tagout)

Frequently-Cited Standards in Healthcare FY'2017

The Top 10 OSHA standards represent:

- 75% of all Federal OSHA healthcare citations
- 74% of all Federal OSHA penalties issued with citations

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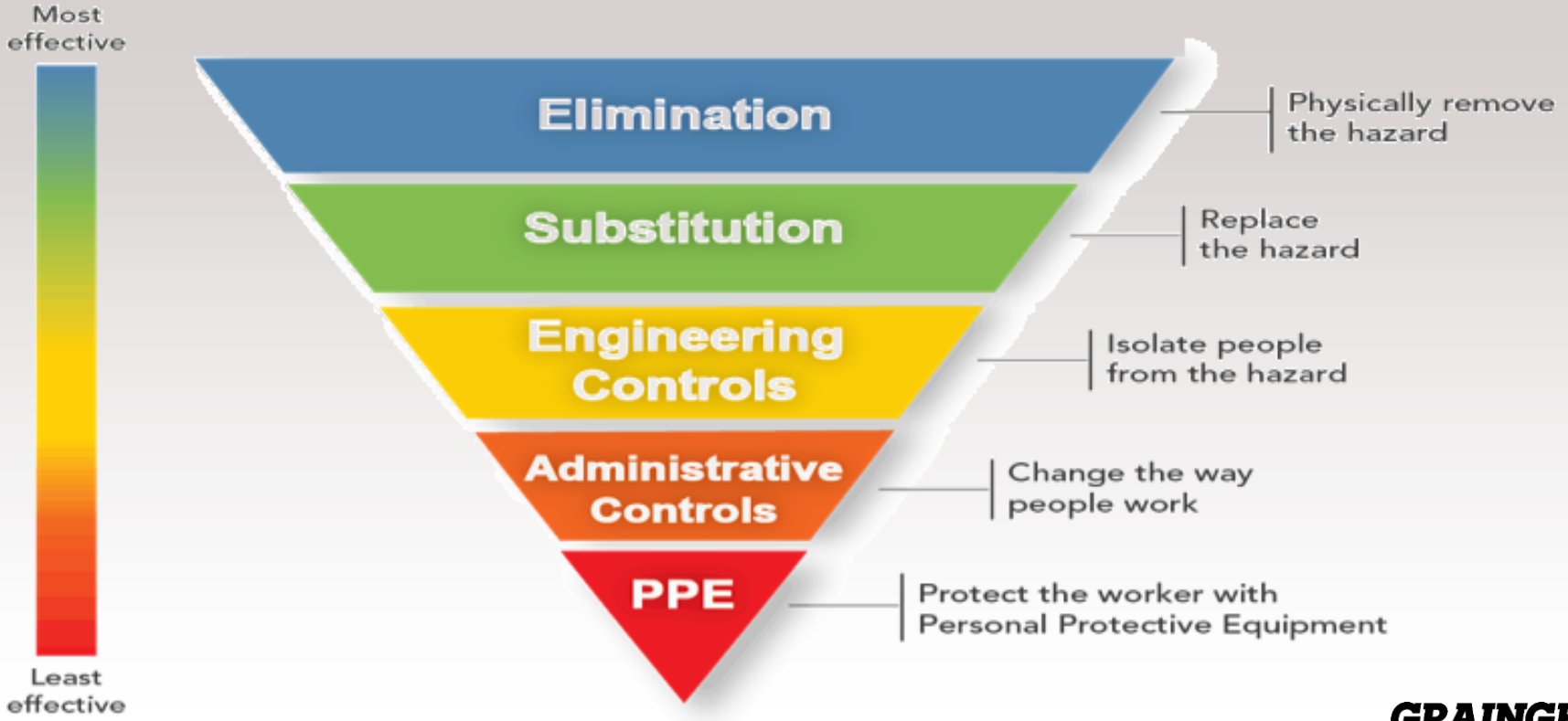
Hierarchy of Controls



General OSHA Regulation

- 29 CFR 1910.132
  - "Protective equipment, including personal protective equipment for *eyes, face*, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, …."

- Employers must:
  - Assess the workplace
- If such hazards are present, or likely to be present, employers must:
  - Select, and have each affected employee use proper PPE;
  - Communicate selection decisions; and,
  - Select PPE that properly fits

Hazard Assessment

- Hazard assessment review
  - Knowledge and experience in similar industries
  - Survey the workplace
    - Past history and accident analysis
    - Changes in processes, machines and materials
    - Observe the environment – operations, process, materials
    - Ask employees
    - Look for sources of injury

Required Training

- Each employee trained to know at least the following:
  - When necessary;
  - What is necessary;
  - How to properly put on/off, adjust, and wear;
  - Limitations and;
  - Care, maintenance, useful life and disposal

Did You Know?

- “Unscheduled” re-training requirement

1910.132(f)(3) - When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by paragraph (f)(2) of this section, the employer shall retrain each such employee . . .

Head Protection

Personal Protective Equipment

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Specific OSHA Head Regulation

- 29 CFR 1910.135(a)
  - Ensure use of appropriate head PPE where potential for head injury of falling objects exist
  - Ensure use of appropriate head protection electrical shock hazard is present

- 29 CFR 1910.135(b)
  - Using providing head ppe that are constructed in accordance with any of the last three American National Standards Institute (ANSI) national consensus standards
    - ANSI Z89-1997
    - ANSI Z89-2003
    - ANSI Z89-2009
    - ANSI Z89-2014
  - Anything deemed equivalent to Z89

Guiding Head Regulations

- ANSI/ISEA Z89.1-1997, American National Standard/International Safety Equipment Association for Industrial Head Protection
- ANSI/ISEA Z89.1-2003, American National Standard/International Safety Equipment Association for Industrial Head Protection
- ANSI/ISEA Z89.1-2009, American National Standard/International Safety Equipment Association for Industrial Head Protection
- ANSI/ISEA Z89.1-2014, American National Standard/International Safety Equipment Association for Industrial Head Protection

Types and Classes of Head Protection

Type/Class	Use/Description
Bump	Intended for low obstructions where head can “bump” into the obstruction. Not rated for falling object impact.
Type I	Intended to reduce the force of impact resulting from a blow to the top of the head.
Type II	Designed to provide protection against both side impact (lateral) and blows to the top of the head.
Class G	General use, rated to 2,200 volts.
Class E	General and electrical use, rated to 20, 000 volts.
Class C	General use but no electrical rating.

Markings of Head Protection

- Manufacturer’s name or identifying mark
- Date of manufacture
- Z89.1-2014
- Type and Class Designation
- Size range
- Optional markings

Optional Marking	Description/Use
 -	Hard hats marked with a "reverse donning arrow" can be worn frontward or backward in accordance with the manufacturer’s wearing instructions. They pass all hard hat testing requirements, whether worn frontward or backward.
LT	Hard hats marked with an "LT" indicate that the hard hat meets all testing requirements of the standard when preconditioned at a temperature of -30°C (-22°F).
HV	Hard hats marked with an "HV" indicate that the hard hat meets all testing requirements of the standard for high visibility colors. This includes tests for chromaticity and luminescence.
HT	Hard hats marked with an “HT” indicate the hard hat meets the performance criteria after being preconditioned to a temperatures of 140º F.

Sizing of Head Protection

Size	Small	Med	Large	XL
Hat	6 ¾- 7	7 1/8 – 7 ¼	7 3/8 – 7½	7 5/8 – 7 ¾
Head Circumference (inches)	21 ½ - 21 7/8	22 ¼ - 22 5/8	23 – 23 ½	23 7/8 24 ¼

Hearing Protection

Personal Protective Equipment

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Specific Hearing OSHA Regulation

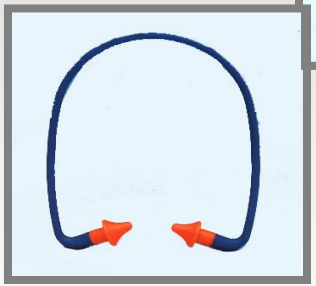
- 29 CFR 1910.95(a)
  - Protection against the effects of noise exposures above ***8-Hour 90 dBA** TWA must be provided
- 29 CFR 1910.95(b)
  - Feasible engineering and administrative controls must be used first if exposure above ***8-Hour 90 dBA** TWA
- 29 CFR 1910.95(c)
  - Included in hearing conservation program if exposure above 8-hour 85 dBA TWA

***Table G-16 Permissible Noise Exposures**

Duration per day, hours	Allowable Sound Level dBA
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
< 0.25	115

Hearing Conservation Program

- At 85dB as an eight-hour TWA
  - Train employees
  - Make hearing protection available
  - Sample for noise levels
  - Do hearing tests (audiograms)
  - Notify employees of results
- At 90dB or more as an eight-hour TWA
  - Employer must keep levels at or below 90dB



Noise Reduction Rating (NRR)

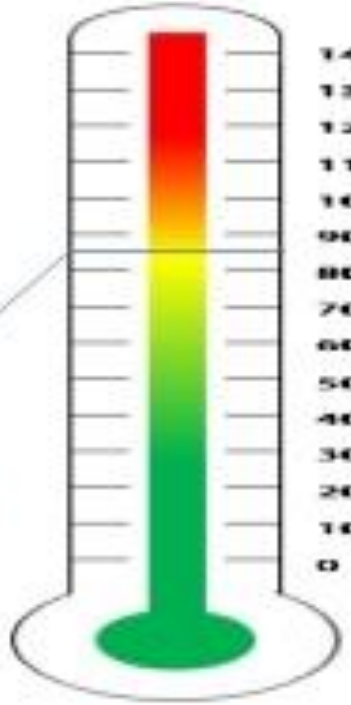
- Required formula: NRR-7
- OSHA says that hearing protection is designed to reduce the noise by the NRR, but that is unlikely to happen due to:
  - Leaks in the seal
  - Vibration
  - Improper insertion
- Recommended formula: (NRR-7) / 2
- If both plugs and muffs are used:
  - Calculate NRR using formulas above
  - Add 5dB to higher NRR of two

How Loud is Too Loud?

How loud is too loud?

Volume levels are measured in decibels (db).

The maximum safe exposure limit is 85 db. Excessive exposure to levels above that can cause headaches, nausea, and hearing damage.



140	Jackhammer
130	Fireworks
120	Rock Concert
110	Chainsaw
100	Maximum iPod Volume
90	Hair Dryer
80	Police Car Siren
70	Medium iPod Volume
60	Normal Conversation
50	Heavy Rainfall
40	Moderate Rainfall
30	Running Dishwasher
20	Leaves Rustling
10	Whisper
0	Silence

When to Monitor

- Use rule of thumb:
  - If employees are having difficulty communicating at a distance of about three feet, noise levels are very likely to be above 85dB
- Next Step?

Monitoring Noise Levels

- Sound level meter
  - Amplifying device that converts sound pressure waves into measurable units of dB – up to 140dB
- Dosimeter
  - Sound level meter that integrates noise samples over time

Eye and Face Protection

Personal Protective Equipment

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Specific OSHA Regulation

- 29 CFR 1910.133(a)
  - Ensure use of appropriate eye/face PPE
  - Ensure use of eye protection with side protection
  - Prescription eyewear incorporated into the design of the eyewear
  - Ensure eye & face PPE is marked for identification
  - Ensure proper use of filter lens and color

- 29 CFR 1910.133(b)
  - Criteria for eye & face PPE
  - Using providing eye & face ppe that are constructed in accordance with any of the last three American National Standards Institute (ANSI) national consensus standards
    - ANSI Z87-2003
    - ANSI Z87-2010
    - ANSI Z87-2015

Guiding Eye & Face Regulations

- ANSI Z87.1-2003, American National Standard for Occupational and Educational Personal Eye and Face Protection Devices
- ANSI Z87.1-2010, American National Standard for Occupational and Educational Personal Eye and Face Protection Devices
- ANSI Z87.1-2015, American National Standard for Occupational and Educational Personal Eye and Face Protection Devices

ANSI
American National Standards Institute

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Types of Protection Needed

- Ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards:

Potential Hazard	Type of Protection Needed-Based on ANSI Z87.1-2015
Impact	Safety Glasses with sideshield protection, goggles with direct or indirect ventilation, faceshields worn over safety glasses or direct or indirect vented goggles, loose-fitting respirators worn over safety glasses or direct or indirect vented goggles, full-facepiece respirators
Dust	Goggles with direct or indirect ventilation, full-facepiece respirators
Chemicals	Goggles with indirect or non-vented ventilation, faceshields worn over indirect vent or non-vented goggles, loose-fitting respirators worn over safty glasses or indirect vent or non-vented goggles, full-facepiece respirators.
Optical Radiation	Welding Helmets, shaded (2-14) safety glasses , faceshields, direct or indirect vented goggles, or correct filter laser safety glasses
Heat	Heat reflective faceshields worn over safety glasses or direct or indirect vented goggles.

Side Shield Protection

- Ensure that each affected employee uses eye protection that provides side protection when there is a hazard from flying objects
- Detachable clip-on or slide-on side shields must meet Z87 specifications
- Eyewear tested **as a whole unit** is required

Prescription Eyewear

- Prescription safety eyewear
  - Must be filled by eye doctor
  - Meets ANSI specifications
- Reader eyewear
  - 1.0 to 3.0 diopter strengths
  - Meets ANSI specifications
- Over-the-glass (OTG)
  - Fits over prescription eyewear
  - Meets ANSI specifications

Five Eye & Face Markings

1. Impact markings
    1. Impact
    2. Non-impact
2. Manufacturer monogram (varies by manufacturer)
3. Z87 marking (Z87)
4. Lens type
5. Use

Type of Mark	Description	Marking
Impact	Impact Rated Plano	Z87+
	Impact Rated Prescription	Z87-2+
Non-Impact	Plano	Z87
	Prescription	Z87-2

Lens Type & Use Markings

Lens Type	Marking
Clear	None
Welding	W and Shade Number (Shades range from 1.3 to 14-the higher the number the darker the lens)
UV Filter	U and Scale Number (Scale ranges from 2 to 6 – the higher the number the highest protection from far and near UV)
Visible Light Filter	L and Scale Number (Scale ranges from 1.3 to 10 – lower numbers providing greater light transmittance)
IR Filter	R and Scale Number (Scale ranges from 1.3 to 10)
Variable Tint	V
Special Purpose	S

Type of Use	Marking
Splash/Droplet	D3
Dust	D4
Fine Dust	D5

Eye and Face Shades

- Provides Ultraviolet and Infrared protection
- Shade 2 (lightest) – 14 (darkest)

Color	Shade Number	Use
	1.5-3	Torch soldering
	3-4	Torch brazing
	3-6	Cutting
	4-8	Gas welding
	10-14	Electric arc welding

Eye and Face Lens Color

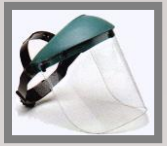
Color	Description	Use
	Clear	For general indoor applications where impact protection is required.
	Gray	For outdoor applications where light and glare can cause eye strain and fatigue. Provides good color recognition.
	Indoor/ Outdoor	Same use as gray lens yet allows more visible light through the lens for indoor/outdoor use. Reduces glare from artificial light.
	Gold/Blue/Silver Mirror	For outdoor applications where sunlight and glare cause strain and fatigue. Mirror coating reflects light, reducing the amount of light that passes through the lens.
	Dark Green	General-purpose protection from glare and UV radiation.
	Brown/Espresso	For outdoor applications where sunlight and glare cause eye strain and fatigue. Meets color traffic signal recognition requirements.
	Vermillion	Enhances contrast while reducing all color equally for optimum color recognition. Ideal for indoor inspection.
	Amber	Blocks the blue portion of the visible light spectrum, creating maximum contrast enhancement, particularly in low light.

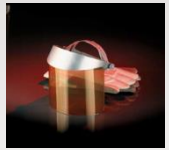
Safety Goggles Types and Uses

- Protect eyes, eye sockets, and the facial area immediately surrounding the eyes from impact, dust, and splashes
- Some goggles fit over corrective lenses
- Direct vent
- Indirect vent
- Non vented

Faceshield Types

Type	Use
Standard	Offers protection from hazards such as flying particles and impact protection.
Arc-Flash	These faceshields are used for protection against an arc flash.
Heat and Radiation	There are faceshields that provide protection against heat and radiation.
Welding	Shaded welding faceshields provide protection from UV and IR radiation generated when working with molten metal.
Respiratory	Incorporated into the design of full-face respirators. Offer compliant





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Faceshield Lens Materials

Lens Material	Use
Polycarbonate	Provides the best impact and heat resistance of all visor materials. Polycarbonate also provides chemical splash protection and holds up well in extremely cold temperatures. Polycarbonate is generally more expensive than other visor materials.
Acetate	Provides the best clarity of all the visor materials and tends to be more scratch resistant. It also offers chemical splash protection and may be rated for impact protection.
Propionate	Material provides better impact protection than acetate while also offering chemical splash protection. Propionate material tends to be a lower price point than both acetate and polycarbonate.
Polyethylene terephthalate glycol (PETG)	Offers chemical splash protection and may provide impact protection. PETG tends to be the most economical option for faceshield choices.
Steel or Nylon Mesh	Provide good airflow for worker comfort and are typically used in the logging and landscaping industry to help protect the face from flying debris when cutting wood or shrubbery.

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Body Protection

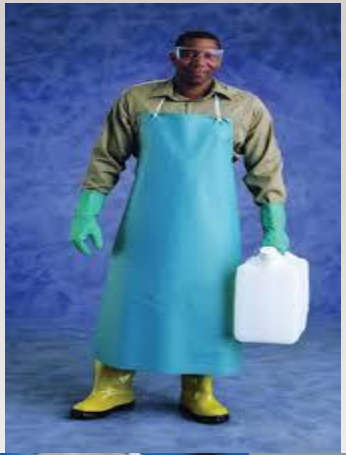
Chemical Protective Clothing

Guiding OSHA Regulations

- General Duty Clause
  - OSH Act Section 5 Duties (a)(1)
- 29 Code of Federal Regulations (CFR) 1910.132
  - Personal Protective Equipment General requirements
    - "Protective equipment, including …*protective clothing*, …"
- 29 CFR 1910.120 – Hazardous Waste Operations and Emergency Response (HAZWOPER)

Chemical Protective Clothing

- Purpose
  - Shield or isolate from chemical, physical and biological hazards
  - Should provide resistance to permeation, penetration and degradation
- No single combination of protective equipment and clothing is capable of protecting against all hazards



Levels of Chemical Risk

Material Chemical Resistance

- **Permeation rate**
  - Movement of chemicals through a material on a molecular level
  - The higher the rate, the faster the chemical moves through the material
- **Breakthrough time**
  - Time it takes a chemical to permeate completely through the material
  - Gives an indication of how long a material can be used before permeation
- **Degradation**
  - Observable or measurable physical changes in a material

Suit Design

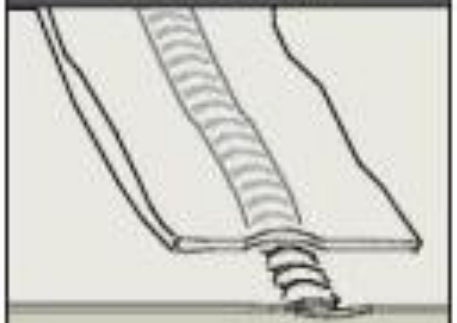
Serged Seam

A seam produced when three threads are interlocked around the raw edges of two pieces of material for a strong, stress-resistant seam.

Bound Seam

Tightly sewn with a reinforced outer binding to increase seam strength and barrier. For potential light splash of nonhazardous liquids or particle penetration through the seam.

Sealed Seam



A sealed seam is produced when materials are lapped and thermally welded. There are no filers, thread or needle holes.

Chemical Protective Clothing

- Thorough hazard assessment
- Methodical review of the wearers needs
- Thorough familiarity of the chemicals being handled
- Understanding of the clothing manufacturer's chemical databases
- Availability, reputation of the manufacturer, and of course the price

Hand Protection

Chemical Resistant Gloves

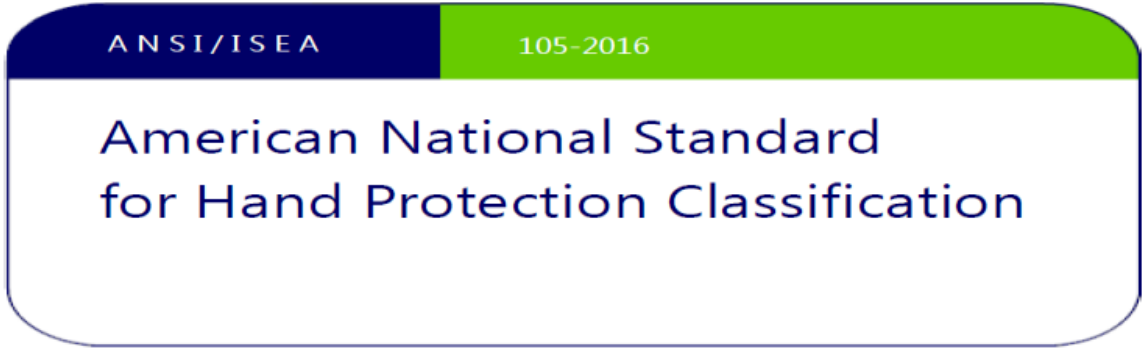
Guiding OSHA Regulations

- 29 CFR 1910.132
  - Employers must assess the workplace
  - Chemical hazards
  - PPE must be provided, used and maintained
- 29 CFR 1910.138 – Hand Protection
  - Skin absorption of harmful substances, chemicals burns, etc.
  - Selection based on performance characteristics

OSHA® Occupational Safety and Health Administration

ANSI/ISEA 105-2016

- American National Standard for Hand Protection Classification
- Chemical resistance effects:
  - Degradation
  - Penetration
  - Permeation

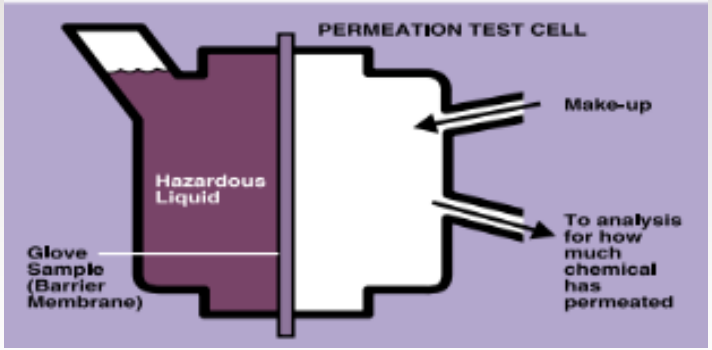


Chemical Resistance

- **Degradation**
  - Observable or measurable deleterious change in one or more properties due to contact with a chemical – swell, soften, shrink, melt, stiffen, crack, etc.
- **Penetration**
  - Flow of a chemical through a glove on a non-molecular level – through seams, pinholes or other imperfections
- **Permeation**
  - Movement of chemicals through a material on a molecular level
  - Involves absorption, diffusion and desorption

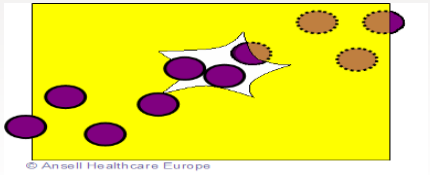
Chemical Resistance

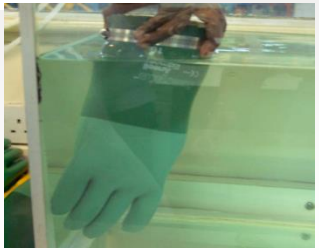
- Breakthrough time
  - Time it takes a chemical to permeate completely through the glove material
  - Gives an indication of how long the material can be used



ANSI/ISEA 105 Chemical Permeation

Level	Standard breakthrough time (minutes)
0	< 10
1	≥ 10
2	≥ 30
3	≥ 60
4	≥ 120
5	≥ 240
6	≥ 480





ANSI/ISEA 105 Chemical Degradation

Level	Percentage change (%)
0	> 80
1	≤ 80
2	≤ 60
3	≤ 40
4	≤ 20

Chemical Glove Materials General Guidance

Material	Strengths	Weakness
Natural Rubber Latex	• Aqueous solutions, acids, bases and alcohols • Sensitivity and dexterity • Good dry and wet grip, abrasion	• Organic chemicals, oils and greases • Risk of sensitisation / Type I allergy due to proteins
Polychloroprene (PVC)	• Aldehydes and ketones, acids, bases, alcohols, diverse solvents • Good abrasion resistance	• Aromatic and halogenated solvents • Environmentally unfriendly • Cuts and punctures easily
Neoprene	• Excellent resistance to acids and bases • More flexible than nitrile with ozone resistant properties	• Not recommended for most organic and hydrocarbon solvents • Expensive and denser then nitrile
Nitrile	• Many (organic) solvents, including aliphatic hydrocarbons, oils, fat • Excellent resistance to puncture and abrasion • Good dry grip	• Strong acids, halogenated hydrocarbons, aldehydes and ketones • Poor wet and oily grip

Chemical Glove Materials General Guidance

Material	Strengths	Weakness
LLDPE - Barrier	• Extensive protection: hydrocarbons, esters, aldehydes, ketones, acids, salts • Excellent chemical resistance to the broadest range of chemicals	• LMW halogenated hydrocarbons • Low mechanical resistance: abrasion, puncture and tear • Low wear comfort: stiff, poor fit and sweaty – "plastic bag feel"
Butyl	• Aldehydes and ketones, esters, polar organic solvents; also concentrated acids and alkalis • Comfort	• No resistance to aromatic and aliphatic solvents
Viton®	• Comprehensive protection: acids, bases, hydrocarbons (including aromatic and halogenated) • Comfort	• Some aldehydes, ketones and esters, and other polar solvents medium
Polyvinyl alcohol (PVA)	• Extensive protection: hydrocarbons (including halogenated.), aldehydes, ketones • Good physical properties: resistant to puncture and abrasion	• Not very flexible • Quickly breaks down when exposed to water solution or air

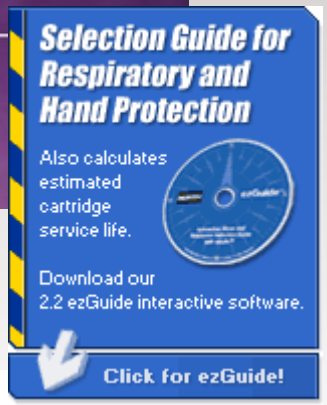
Questions to Ask

- What chemical (s) are being handled?
  - Concentration?
  - Temperature?
- What is the nature of contact?
  - Total immersion?
  - Splash protection?
- Duration of contact?
- Length to be protected – hand, forearm arm?
- Grip requirements?

Disposal

- Laundering not suggested
- Rinsing with water on the outside suggested
- Cleaning does not restore the integrity of deteriorated glove walls
- Before reuse inspect for possible sign of degradation and defects: pinholes, tears, discoloration, structural or dimensional changes
- Spent / used gloves should be disposed of per local regulations

Resources



Chemical Search

Please select the chemical used in your application. You may search by chemical name or CAS number.

SAFROTIN (50% IN ROH) CAS Number: 31218-83-4	SODIUM HYDROXIDE (10%) CAS Number: 1310-73-2	SODIUM HYDROXIDE (CAUSTIC SODA) 40% CAS Number:
SODIUM CARBONATE CAS Number: 497-19-8	SODIUM HYDROXIDE (20%) CAS Number: 1310-73-2	SODIUM HYPOCHLORIDE CAS Number: 7778-54-3
SODIUM HYDROXIDE CAS Number: 1310-73-2	SODIUM HYDROXIDE (50%) CAS Number: 1310-73-2	SODIUM HYPOCHLORITE (6%) CAS Number: 7681-52-9

MAPA PROFESSIONAL

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Resources

Measure around your dominant hand

GETTING THE RIGHT GLOVE SIZE:

MEN'S SIZES:

Size	Inch	CM
XS	7	18
S	7 ½ - 8	20
M	8 ½ - 9	23
L	9 ½ - 10	25
XL	10 ½ - 11	28

WOMEN'S SIZES:

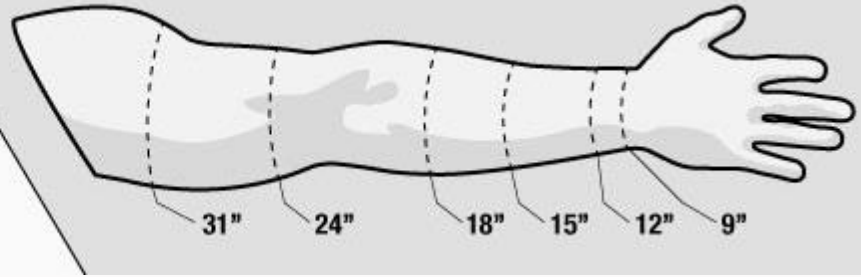
Size	Inch	CM
XS	6	15
S	6 ½	17
M	7	18
L	7 ½	19
XL	8	20

EXPAND ▾

ARM LENGTHS:

HOW TO GET THE PROPER FIT

To ensure the best protection of the hand, wrist and forearm, use this guide as a template for length measurement, and measure the length of the arm.



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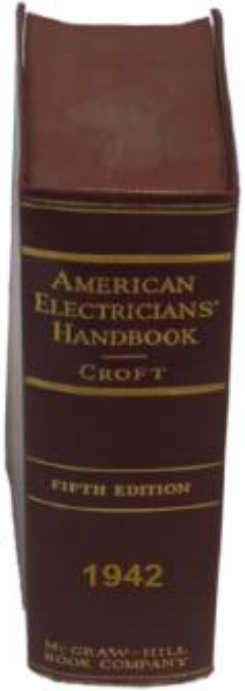
Hand Protection

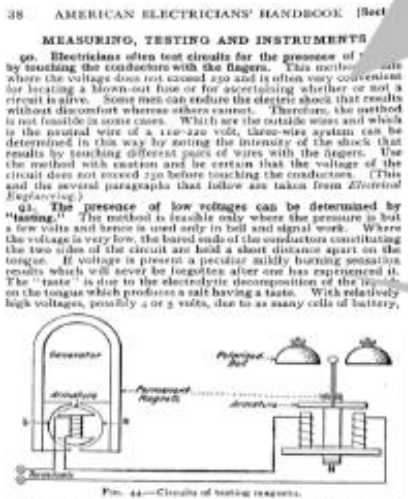
Electrical Gloves

OSHA Bottom Line

- Working live (>50 volts) only done under two special circumstances
- Circumstance #1:
  - De-energizing introduces additional or increased hazards
- Circumstance #2:
  - When it is infeasible due to equipment design or operational limitations

We Have Come a Long Way Baby





38 AMERICAN ELECTRICIANS' HANDBOOK [Sect

MEASURING, TESTING AND INSTRUMENTS

90. **Electricians often test circuits for the presence of voltage by touching the conductors with the fingers.** This method is safe where the voltage does not exceed 250 and is often very convenient for locating a blown-out fuse or for ascertaining whether or not a circuit is alive. Some men can endure the electric shock that results without discomfort whereas others cannot. Therefore, the method is not feasible in some cases. Which are the outside wires and which is the neutral wire of a 110–220 volt, three-wire system can be determined in this way by noting the intensity of the shock that results by touching different pairs of wires with the fingers. Use the method with caution and be certain that the voltage of the circuit does not exceed 250 before touching the conductors. (This and the several paragraphs that follow are taken from *Electrical Engineering.*)

91. **The presence of low voltages can be determined by "tasting."** The method is feasible only where the pressure is but a few volts and hence is used only in bell and signal work. Where the voltage is very low, the bared ends of the conductors constituting the two sides of the circuit are held a short distance apart on the tongue. If voltage is present a peculiar mildly burning sensation results which will never be forgotten after one has experienced it. The "taste" is due to the electrolytic decomposition of the liquids on the tongue which produces a salt having a taste. With relatively high voltages, possibly 4 or 5 volts, due to as many cells of battery,

FIG. 44.—Circuits of testing magnets.

it is best to first test for the presence of voltage by holding one of the bared conductors in the hand and touching the other to the tongue. Where a terminal of the battery is grounded, often a taste can be detected by standing on moist ground and touching a conductor from the other battery terminal to the tongue. Care should be exercised to prevent the two conductor ends from touching each other at the tongue, for if they do a spark can result that may burn.

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Guiding Regulations

U.S Department of Labor - Occupational Safety and Health Administration (OSHA)

- **OSHA** is the main federal agency charged with the enforcement of safety and health legislation. Electrical Glove protection regulations are contained in 29 Code of Federal Regulations (CFR) 1910.137.

ASTM International

- **ASTM** is an international organization that promotes and facilitates voluntary consensus standards such as ASTM D120-14a Standard for Specification for Rubber Insulating Gloves and ASTM F496-14a Standard Specification for In-Service Care of Insulating Gloves and Sleeves

National Fire Protection Association (NFPA)

- **NFPA** develops standards intended to minimize the possibility and effects of fire and other risks such as NFPA 70E-2018 Standard for Electrical Safety in the Workplace.

1910.137-Electrical Protective Equipment

- Design requirements (a)
  - Markings (Class 0-4 and Type 1 or 2)
  - Voltage proof-test classifications (Tables I-2 and I-3)
  - Ozone test
  - Finish
- In-service care and use (b)
  - Maximum use voltage (table I-5, Class 0-4)
  - Inspection
  - Protector gloves (2)(vii)
  - Test intervals (table I-6)
  - Air test

Glove Markings and Classifications

CLASS	TEST AC VOLTS	USE AC VOLTS	USE DC VOLTS	LABEL COLOR	LABEL IMAGE
00	2,500	500	750	Beige	10 NOVAX™ by G.B. INDUSTRIES ANSI / ASTM CLASS 00 MADE IN MALAYSIA D120 TYPE I MAX USE VOLT 500V AC
0	5,000	1,0		Red	10 NOVAX™ by G.B. INDUSTRIES ANSI / ASTM CLASS 0 MADE IN MALAYSIA D120 TYPE I MAX USE VOLT 1000V AC
1					10 NOVAX™ by G.B. INDUSTRIES ANSI / ASTM CLASS 1 MADE IN MALAYSIA D120 TYPE I MAX USE VOLT 7500V AC
					10 NOVAX™ by G.B. INDUSTRIES ANSI / ASTM CLASS 2 MADE IN MALAYSIA D120 TYPE I MAX USE VOLT 17000V AC
3					10 NOVAX™ by G.B. INDUSTRIES ANSI / ASTM CLASS 3 MADE IN MALAYSIA D120 TYPE I MAX USE VOLT 26500V AC
4			,000	Orange	10 NOVAX™ by G.B. INDUSTRIES ANSI / ASTM CLASS 4 MADE IN MALAYSIA D120 TYPE I MAX USE VOLT 36000V AC

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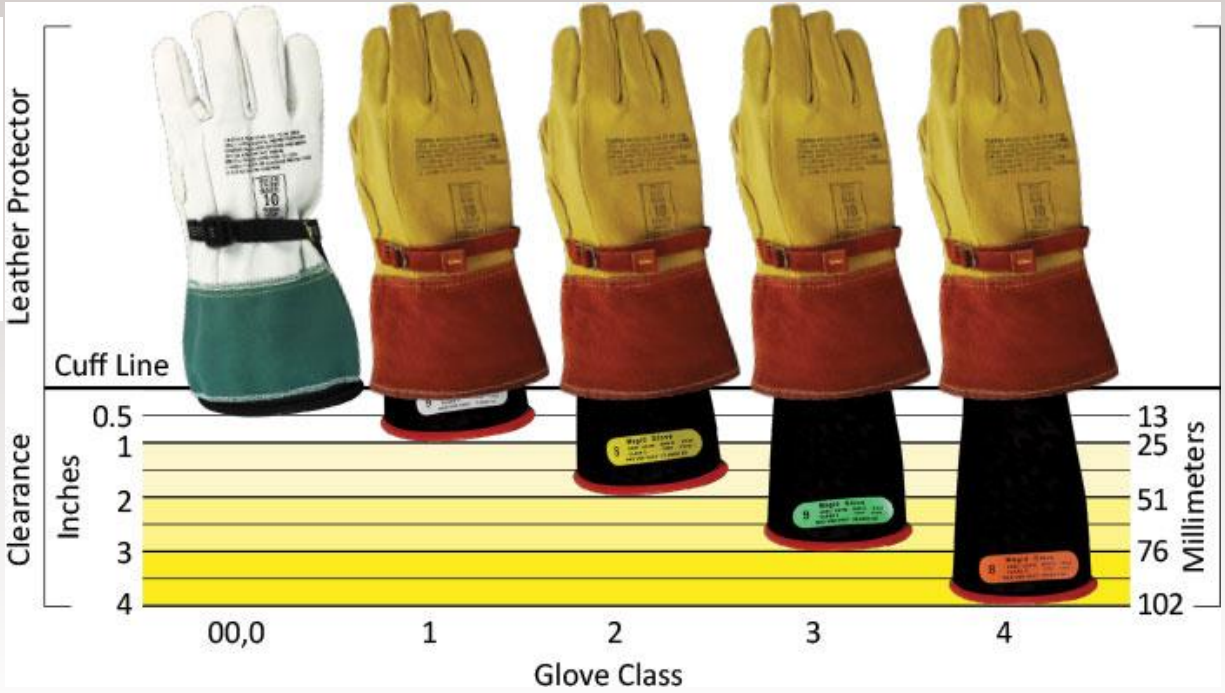
Leather Protectors

- Exceptions to use 1910.137(c)(2)(vii)(A)-(C)
- Leather specifications NFPA 70E-2018, Article 130.7(C)(10)(d)(1-2):
  - Must be worn over insulating gloves
  - Made entirely of leather
  - Minimum thickness of 0.03 in
  - Unlined or lined with non- flammable material
  - Minimum arc thermal protective value (ATPV) of 10 cal/cm^2

Clearance of Leather Protectors

CLEARANCE TABLE FOR LEATHER PROTECTORS PER ASTM F496 - Table 4

Glove Class	Min. Distance Between Protectors and Rubber Gloves	
	in.	mm
00, 0	1/2	13
1	1	25
2	2	51
3	3	76
4	4	102



In-Service Care and Use

- Care and use
  - Equipment must be inspected before each use
  - An air test must be performed along with the inspection –1910.137(c)(2)(ii)
- Equipment must not be used if:
  - There is a hole, tear, or cut
  - Embedded foreign object
  - Texture changes
- Storage:
  - Light
  - Ozone
  - Temperature Extremes
  - Excessive humidity

Repair of Gloves

1910.137(c)(2)(x)(D)

Glove Testing Intervals

- Rubber insulating gloves must be tested by an outside laboratory to ensure proper protection

Type of Equipment	When to Test
Rubber Insulating Gloves*	Before issue & every 6 months
Rubber Insulating Blankets	Before issue & every 12 months
Rubber Insulating Sleeves	Before issue & every 12 months

- *ASTM requires every glove must be electrically tested before it is shipped.
- The six month window starts from the date the gloves are **put into service** and NOT based on the manufacture date stamp.

Glove Date Stamping

- Some manufacturers will stamp the month and year of the test on the glove.
- Some manufacturers stamp them on request for a small charge.

Foot Protection

Personal Protective Equipment

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Specific OSHA Foot Regulation

- 29 CFR 1910.136(a)
  - Ensure use of appropriate foot PPE where potential for foot injury of:
    - falling objects exist
    - electrical shock hazard is present
    - objects piercing the sole

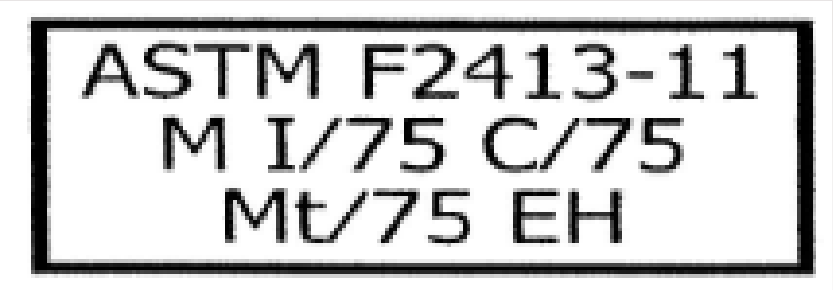
- 29 CFR 1910.136(b)
  - Using providing foot PPE that are constructed in accordance with any of national consensus standards:
    - ANSI Z41-1991(retired)
    - ANSI Z41-1999 (retired)
    - ASTM F-2412/2413-2005
  - Anything deemed equivalent to ASTM F-2412/2413-2005

Guiding Foot Regulations

- ASTM F2412-2011, ASTM International - Standard Test Methods for Foot Protection
- ASTM F2413-2017, ASTM International – Standard for Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear

ASTM Labeling

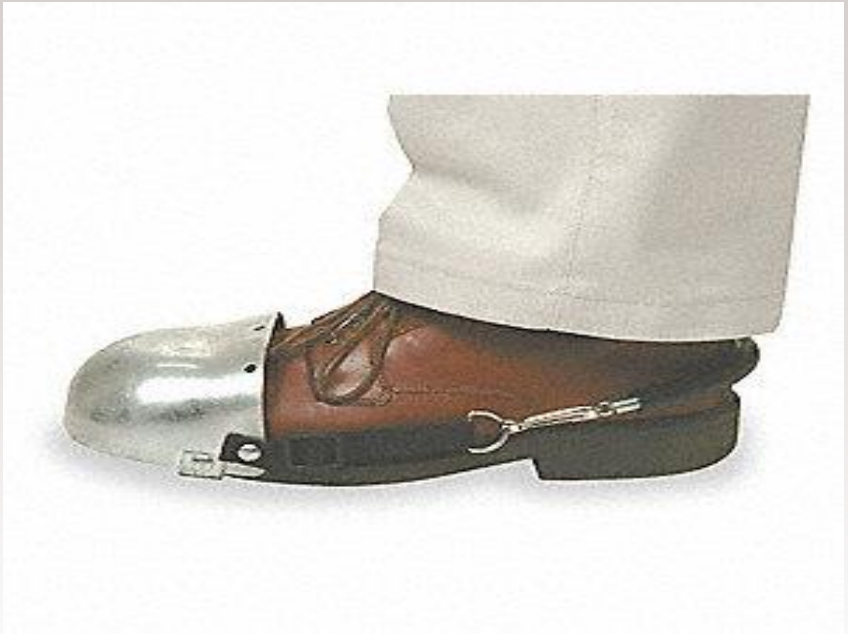
- Ensures the wearer that footwear meets the required minimum performance
- Must meet labeling requirements of ASTM F2413-17 paragraph 6
- QT252



F2413-17 Markings

Marking	Use/Description
M I/75 C/75 Mt75	Gender of user(M/F), impact resistance (I), compression resistance(C), metatarsal rating (Mt)
Cd	Conductive properties which reduce hazards that may result from static electricity buildup, and reduce the possibility of ignition.
EH	Electrical hazard rating. Outsole is intended to provide secondary source of electrical shock-resistance. 18,000 volts at 60Hz for 1 minute.
SD	Static dissipative properties to reduce hazards due to excessively low footwear electrical resistance that my exist. Resistance of 1 mega ohm to 100 mega ohms
PR	Provide puncture resistance between insole and outsole.

Add-On Devices



Who Pays?

- 1910.132(h)(2):
  - "Non-specialty safety-toe protective footwear (**including steel-toe shoes or boots**) and non-specialty prescription safety eyewear provided that the employer permits such items to be worn off the job site."

Foot Protection Products

- **Safety Toe**
  (Steel / Alloy / Composite)
- **Dielectric**
- **Chemical Resistant**
- **Winter Boots**
- **Water Repellent**
- **Slip Resistant**

Accessories

- Insoles
- Socks
- Boot Dryers
- Foot & Leg Guards
- Anti-Fatigue Soles
- PVC & Rubber Overboots & Shoes
- Boot Guards
- Footwear Traction Devices
- Shoe & Boot Covers
- Boot Brushes

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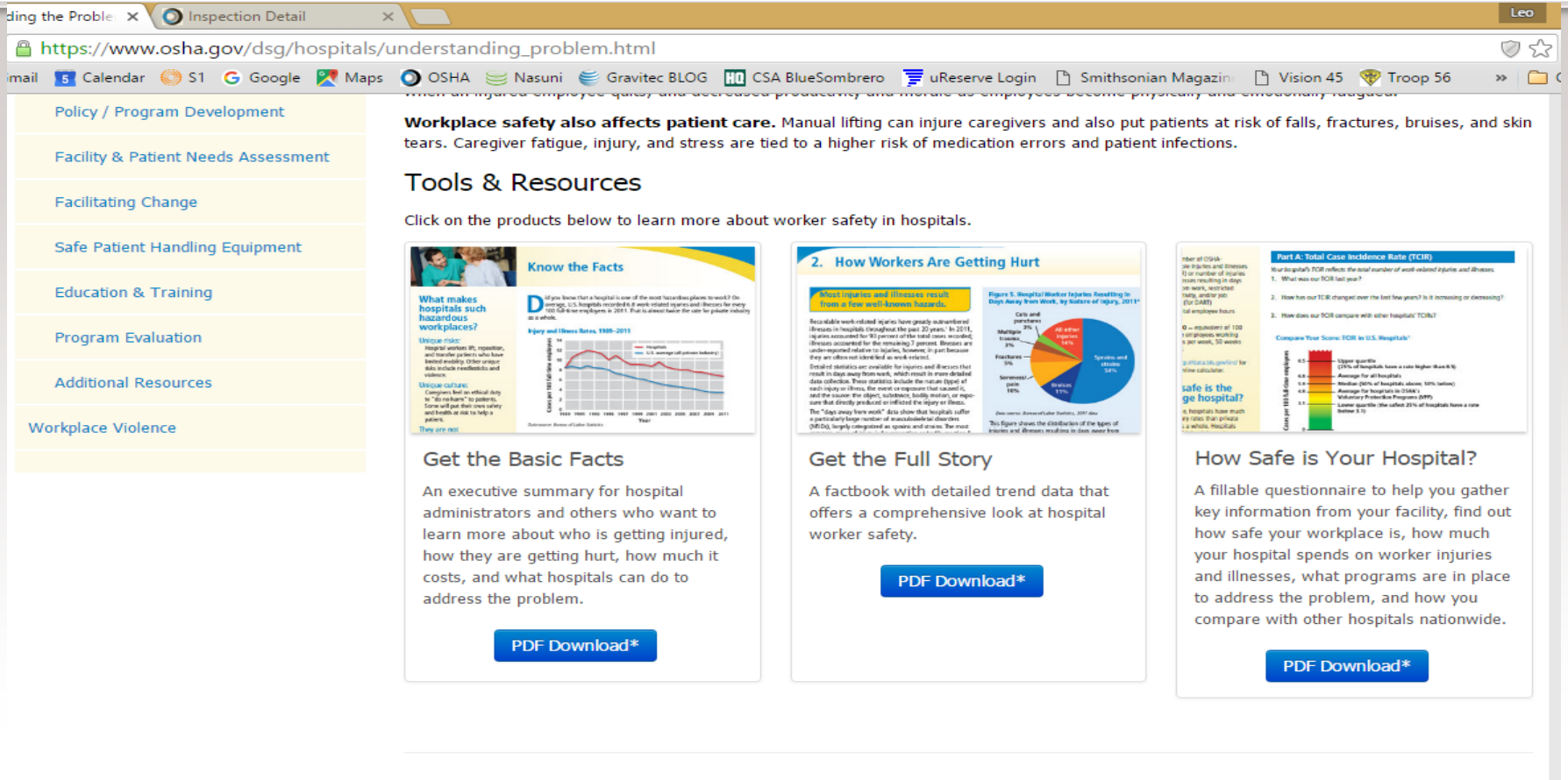
OSHA Resources



Grainger Safety Solutions – Align with OSHA Compliance

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