got PPE?

your safety is nothing to experiment with
Ken Smith, CHP CIH RRPT
University of California Office of the President
UC Systemwide Laboratory Safety Manager

Ellie Wulliman
DuPont Protection Technologies
Business Development Manager

OH&S Webinar
Big Picture Timeline

- **Q2 2013**: Planning Ordering
- **Q4 2013**: LHAT Event Reg.
- **Q1 2014**: Fitting & Bulk Distribution
- **Q2 2014**: Steady

~40,000 Researchers
Why PPE?

- Elimination
- Substitution
- Isolation
- Engineering
- Administrative
- PPE
Cal/OSHA 8 CCR 3320 **Hazard Assessment.**

- Employers are required to **assess** the workplace for hazards that will require PPE.
- This assessment **documented**
- **Select** PPE that will protect the worker from the hazards identified.
- **Communicate** assessment and selection decisions.
- **Train** researches on the PPE.
- Select PPE that properly **fits** each lab worker.
- **Use** the PPE.
- **Maintain** the PPE.
Systemwide Policy on PPE

• Systemwide Training Policy: PPE Policy
• Submitted for OP review June 2012. – under adoption review
• Applies to
  – all laboratory areas and
  – all faculty, staff, volunteer, or visitor/visiting scholars.

http://policy.ucop.edu/
Campus Visioning Sessions can help...
PPE Documentation

• Volume 1: *System-Wide Program Requirements & Technical Resources*
• Volume 2: Campus-Specific Bulk Distribution Event Guide
• Volume 3: Campus-Specific Steady State Program
Laboratory Hazard Assessment Tool (LHAT)

PPE Distribution
1. **Principal Investigators (PI)**
   - Use the Laboratory Hazard Assessment Tool (LHAT) to:
     - Create lab groups
     - Assess workplace hazards to determine PPE to be used
     - Invite lab staff and approve lab worker association
     - Assign a delegate or designee to perform these actions (optional)
   - Documented in LHAT

2. **Lab Worker**
   - Use LHAT to:
     - Identify with a lab group
     - Review hazard assessment
     - Complete the Outfit for Safety Training and quiz
     - Print a PPE voucher
   - Watch Video, Read, Take Quiz
   - Documented in LHAT

3. **Schedule Fitting Time**
   - Schedule fitting time with EventBrite.
   - Documented in EventBrite

4. **Fitting and Distribution**
   - Fitting and distribution of the PPE.
   - Documented by Mission Linen

5. **PPE Maintenance**
   - Researcher uses program in place to maintain and replace PPE.
   - Dirty coats go into a specially marked hamper
   - Clean coats returned on hangers
   - Partial Mail-Style
   - Dirty coats go into the mail (in a sealed envelope)
   - Clean coats return on hangers
   - Complete Mail-Style
   - Dirty coats go into the mail (in a sealed envelope)
   - Clean coats return in the mail or delivery service
Principal Investigators (PI)

Use the Laboratory Hazard Assessment Tool (LHAT) to:

- Create lab groups
- Assess workplace hazards to determine PPE to be used
- Invite lab staff and approve lab worker association
- Assign a delegate or designee to perform these actions (optional)

✓ Documented in LHAT
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/No</th>
<th>Hazardous Materials</th>
<th>Eye or skin damage</th>
<th>Poisoning</th>
<th>Chemical-resistant apron</th>
<th>Face shield</th>
<th>Lab coat</th>
<th>Chemical-resistant gloves</th>
<th>Chemical splash goggles</th>
<th>Safety glasses</th>
<th>Lab coat</th>
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</thead>
<tbody>
<tr>
<td>C2.</td>
<td>Yes/No</td>
<td>Working with hazardous liquids or other materials which create a splash hazard</td>
<td>Eye or skin damage</td>
<td>Poisoning</td>
<td>Chemical-resistant apron</td>
<td>Face shield</td>
<td>Lab coat</td>
<td>Chemical-resistant gloves</td>
<td>Chemical splash goggles</td>
<td>Safety glasses</td>
<td>Lab coat</td>
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<tr>
<td>C3.</td>
<td>Yes/No</td>
<td>Working with small volumes ((\leq 4L)) of corrosive liquids or solids</td>
<td>Low probability for a splash hazard</td>
<td>Eye or skin damage</td>
<td>Safety glasses</td>
<td>Lab coat</td>
<td>Chemical-resistant gloves</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C4.</td>
<td>Yes/No</td>
<td>Working with large volumes ((&gt; 4L)) of corrosive liquids or solids</td>
<td>Low probability for a splash hazard</td>
<td>Eye or skin damage</td>
<td>Safety glasses</td>
<td>Lab coat</td>
<td>Chemical-resistant apron</td>
<td>Chemical-resistant gloves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C5.</td>
<td>Yes/No</td>
<td>Working with small volumes ((\leq 1L)) of flammable solvents/materials when no reasonable ignition sources are present</td>
<td>Eye or skin damage</td>
<td>Potential poisoning through skin contact</td>
<td>Safety glasses</td>
<td>Lab coat</td>
<td>Chemical-resistant gloves</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6.</td>
<td>Yes/No</td>
<td>Working with large volumes ((&gt; 1L)) of flammable solvents/materials</td>
<td>Major skin or eye damage</td>
<td>Major fire</td>
<td>Flame-resistant outer gloves should be considered</td>
<td>Safety glasses</td>
<td>Chemical-resistant gloves</td>
<td>Flame resistant lab coat (NFPA 2112)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C7.</td>
<td>Yes/No</td>
<td>Working with any quantity of flammable solvents/materials when there are reasonable ignition sources present; or working in areas where flammable concentrations of vapors or gas may be present</td>
<td>Major skin or eye damage</td>
<td>Major fire</td>
<td>Flame-resistant outer gloves highly recommended</td>
<td>Safety glasses</td>
<td>Chemical-resistant gloves</td>
<td>Flame resistant lab coat (NFPA 2112)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C8.</td>
<td>Yes/No</td>
<td>Working with Category 1 or 2 acutely toxic chemicals</td>
<td>Chemicals pose a high level of immediate danger</td>
<td></td>
<td>Safety glasses</td>
<td>Lab coat</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
So what type of Lab Coat Do you Need?

What’s the diff?
Dr. Charles Perrin – Professor of Chemistry
50 years of Teaching, Research and Service

What’s the diff?
PURPOSE OF FR FABRICS

Reduce Burn Injury and Increase Chance of Survival

- Does Not Ignite and Continue to Burn
- Does Not Melt and Drip
- Maintains a Barrier
- Insulates the Wearer from Heat
- Resists Breaking Open
- Provides Valuable Escape Time

Garment Purchasing Considerations:
- Durability / Value in Use
- Comfort / Design
- Reactivity to Oxidizers
- Particle Shedding
  - Predicted Burn Injury
WHAT’S THE DIFFERENCE?

Nomex® IIIA  Cotton/Poly  Cotton
WHAT’S THE DIFFERENCE?
WHAT’S THE DIFFERENCE?
WHAT’S THE DIFFERENCE?

Nomex® IIIA  Cotton/Poly  Cotton
WHAT’S THE DIFFERENCE?
WHAT’S THE DIFFERENCE?
SO WHAT’S RELEVANT?

DO A HAZARD ASSESSMENT!

**NFPA 2113**
- Hazard Assessment
- Garment selection, care, use and maintenance

**NFPA 2112**
- Standard for flame resistant garments
- 7 tests to pass including <50% body burn at 3 sec, 2 cal/cm²/sec

**Garment Manufacturer**
- Licensee
- ISO Certification
- Experience, Focus
- Design and Style

**Industrial Laundry**
- Experience with FR Garments
- Program Management
- Experience, Service

**PPE Distributor**
- Program Management
- Experience, Service
- Garment Maintenance/Repair?

**Fabric Technology**
...

NOT?

**Other NFPA Standards**

**NFPA 70E**
- Energized Equipment

**NFPA 701**
- Textiles

**UNIVERSITY OF CALIFORNIA**

**Nomex.**
# FABRIC PERFORMANCE

<table>
<thead>
<tr>
<th>Inherent</th>
<th>Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.e. Nomex®, Kevlar®</td>
<td>i.e. UltraSoft®, Proban®</td>
</tr>
<tr>
<td>Fiber molecular structure does not support combustion</td>
<td>Chemicals added to fabric produce char/gas to inhibit combustion</td>
</tr>
</tbody>
</table>

## PROS
- ✓ Permanent FR protection
- ✓ Lighter weight
- ✓ Durable
- ✓ Fiber resistant to chemical degradation
- ✓ Exceeds minimum FR standard

## CONS
- o Higher initial cost
- o FR can be compromised by bleach/chemical exposure
- o Shorter life span
- o “Activates” beyond minimum exposure
- o Higher particle shedding
What if FR PPE is NOT ENOUGH?
Chemical Protection should not compromise Fire Protection

- Most chemical protective garments are flammable and should not be worn when fire is a hazard.

- Tychem® ThermoPro fabric provides TRIPLE HAZARD protection from liquid-chemical splash, flash fire and electric arc by combining DuPont™ Tychem® chemical barrier and DuPont™ Nomex® FR technology.
  - Meets FR requirements of NFPA 2112 standard.
  - Provides at least 30 minutes of protection against more than 180 chemical challenges.
## Selection Guide for FR was developed...

### Flame Resistant (FR) Lab Coat Selection Guide Matrix for University of California

**Prepared by EORM: Xavier Alcaraz, MSPH, CIH, CSP**  
**Reviewed by EORM: Glenn Fishier, MS, CIH**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>FR-Type</th>
<th>Manufacturer(s)</th>
<th>FR Rating/Test</th>
<th>Fabric Weight (oz/yd)</th>
<th>% Laundering Shrinkage</th>
<th>Laundering Colorfastness</th>
<th>% Moisture Regain</th>
<th>Tenacity (lbs)</th>
<th>200 x 150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nomex IIIA</td>
<td>Inherently FR Blend – 93% Nomex, 5% Kevlar, 2% antistatic fiber</td>
<td>Bulwark Dupont Workrite</td>
<td>NFPA 2112, NFPA 70E</td>
<td>4.5 - 7.3</td>
<td>&lt;2 - 3.5</td>
<td>Fair to Good</td>
<td>4.5 - 5.5 (moderate)</td>
<td>240 x 150</td>
<td></td>
</tr>
<tr>
<td>Tecsafe Plus</td>
<td>Inherently FR</td>
<td>TenCate Bulwark</td>
<td>NFPA 2112, NFPA 70E</td>
<td>5.8 - 8.5</td>
<td>&lt;3</td>
<td>Fair to Good</td>
<td>No data</td>
<td>135 X 85 lbs</td>
<td></td>
</tr>
<tr>
<td>Cool Touch 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Tegen</td>
<td>Inherently FR</td>
<td>Ashburn Hill Corp.</td>
<td>NFPA 2112</td>
<td>5.5</td>
<td>&lt;3</td>
<td>Fair to Good</td>
<td>6</td>
<td>110 X 80 lbs</td>
<td></td>
</tr>
<tr>
<td>Indurs Ultra Soft</td>
<td>Chemically Treated FR: Cotton Blend 88%/12% nylon -THPxs Treated</td>
<td>Westex Unknown Bulwark</td>
<td>NFPA 2112, NFPA 70E</td>
<td>7 - 9</td>
<td>3 - 5</td>
<td>Fair</td>
<td>8.5 - Arapaho</td>
<td>130 x 100</td>
<td>110 x 100 Arapaho</td>
</tr>
<tr>
<td>KL6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>129 x 60 - KL6</td>
<td></td>
</tr>
</tbody>
</table>

**Chemical & Other Incompatibilities / Limitations:**
- No chemical splash protection. Good resistance to alkalis. Unaffected by most acids, unless exposed for long periods to high concentration acids. No chlorine bleach laundering.

**Garment Life / Color Options:**
- Excellent, Reported to last 3-5 times longer than cotton or chemically treated garments / Many color options

**Standard Sizes / Comfort:**
- Semi-breathable – not as good as cotton. Can feel bulkier than cotton, “itchy”, stiff, or rough

**Hazard Level (HL) Recommendation:**
- $100/ea  
  - For use up to HL-4  
  - Highest FR protection rating, most durable, longest life, fewest chemical incompatibilities. Cost higher than most other FR.

- $80/ea  
  - For use up to HL-4  
  - Highest FR protection rating, most durable, longest life, fewest chemical incompatibilities. Cost lower than Nomex, but higher than most treated FR.

- TBD  
  - For use up to HL-4  
  - More info needed

**Other Matters:**
- Chemical properties degraded by petroleum and other flammable liquids. Not splash resistant. No chemical splash protection. Degraded by acids. No chlorine bleach laundering. Flame-resistant fabrics treated with a phosphorus containing flame retardant should not be used in chemical operations where contact with strong oxidizers (e.g., >10% sodium hypochlorite, NaOCl) or reducing agents (e.g., sodium hydrosulfite, Na2S2O4) is possible. Contact with these chemicals may result in chemical burns to the wearer. Not ideal for static control.

**Hazardous Material Recommendations:**
- Good / Many  
  - Cotton has poor resistance to mildew, aging, sunlight. Nylon content improves abrasion resistance. FR guaranteed for life of product. Reportedly 50% longer than 100% cotton.

**Breathability:**
- Breathable, soft, more comfortable than synthetics

**Price:**
- $60/ea  
  - For use up to HL-3  
  - High FR protection rating, chemical incompatibilities with select oxidizers and reducing agents. Feels similar to standard cotton-blend lab coats. Cost lower than Nomex and other inherent FR.
## Type of Basic PPE

<table>
<thead>
<tr>
<th>Gender</th>
<th>FR NFPA 2112</th>
<th>Non-FR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>Traditional Open Cuff</td>
<td>Barrier ASTM F 1670</td>
</tr>
<tr>
<td>Male</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Female</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Male</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
Personal Protective Equipment (PPE) VOUCHER

Personal Information
Ryan Mosley
rcmosley@ucdavis.edu
Hazard Assessment Reviewed: 10/14/2013
PPE Training Completed: 10/14/2013

Lab Group Information
Pt: Ryan Mosley
Lab Group: Dr Mosley’s Chem Lab
Pt’s Department: ACADEMIC & STAFF ASST PROG
Hazard Assessment Certified by Pt: 10/14/2013

Recommended Personal Protective Equipment
The items below can be picked up at your campus Product Distribution Center:
Safety glasses
Flame resistant lab coat (NFPA 2112)
Barrier lab coat impervious to fluids
Chemical splash goggles
Success of an PPE program is dependent on three factors:

1. Fit
2. Fit
3. Fit
Why do you think that fit is the most important factor in selecting PPE?
OTG Glasses

[Images of various OTG glasses]
Eyewear – Systemwide
How much PPE?
Bulk Distribution Event
FREE PPE!

PPE Distribution Event

1. View your laboratory's hazard assessment
2. Watch Training video, take a quiz, and print a PPE voucher
3. Sign up on Eventbrite for a convenient time to attend the event
4. Bring PPE voucher and get FREE PPE

[Office Event Date]  [Office Event Time]  [Office Event Place]  [Office Event Campus]  [Eventbrite link]
<table>
<thead>
<tr>
<th>University of California</th>
<th>Personal Protective Equipment</th>
<th>Bulk Distribution Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC Merced</td>
<td></td>
<td>BDE EVENT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dec 16, 2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[1 day] <em>The California Room</em></td>
</tr>
<tr>
<td>UC Riverside</td>
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<td>BDE EVENT</td>
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<tr>
<td></td>
<td></td>
<td>Jan 14-15, 2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[2 days] <em>Highernder Union Building</em></td>
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<tr>
<td>UC Santa Cruz</td>
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<td>BDE EVENT</td>
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<td>Jan 22-23, 2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[2 days] <em>Physical Sciences Building</em></td>
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<tr>
<td>UC Santa Barbara</td>
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<td>BDE EVENT</td>
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<tr>
<td></td>
<td></td>
<td>Feb 11-13, 2014</td>
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<tr>
<td></td>
<td></td>
<td>[2.5 days] <em>Cowen Pavilion</em></td>
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<tr>
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<td>BDE EVENT</td>
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<tr>
<td></td>
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<td>Feb 19-14, 2014</td>
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<tr>
<td></td>
<td></td>
<td>[5 days] <em>Arc Pavilion</em></td>
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<td>Feb 18th &amp; 19th, 2014</td>
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<tr>
<td></td>
<td></td>
<td>[2 days] <em>Medical Center in Sacramento (TSG)</em></td>
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<tr>
<td>UC Berkeley</td>
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<tr>
<td></td>
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<td>Feb 24-18, 2014</td>
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<tr>
<td></td>
<td></td>
<td>[9 days] <em>Memorial Stadium</em></td>
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<td>March 4-7, 2014</td>
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<td>[9 days] <em>Pavely Pavilion Club Room</em></td>
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<td>N/A Self-distributing</td>
</tr>
</tbody>
</table>

- **UC Merced**: BDE EVENT on Dec 16, 2013 (1 day) at *The California Room*.
- **UC Riverside**: BDE EVENT on Jan 14-15, 2014 (2 days) at *Highernder Union Building*.
- **UC Santa Cruz**: BDE EVENT on Jan 22-23, 2014 (2 days) at *Physical Sciences Building*.
- **UC Santa Barbara**: BDE EVENT on Feb 11-13, 2014 (2.5 days) at *Cowen Pavilion*.
- **UC Davis**: BDE EVENT on Feb 19-14, 2014 (5 days) at *Arc Pavilion*.
- **UC Berkeley**: BDE EVENT on Feb 24-18, 2014 (9 days) at *Memorial Stadium*.
- **UC Los Angeles**: BDE EVENT on March 4-7, 2014 (9 days) at *Pavely Pavilion Club Room*.
- **UC San Diego**: BDE EVENT self-distributing.
- **UC San Francisco**: BDE EVENT self-distributing.
- **UC Irvine**: BDE EVENT self-distributing.
PPE Video