

*Progressive Farmer*

# Gear Up For Safety

*Taken a look at  
protective clothing  
lately? You may be  
surprised at how  
comfortable and  
good looking it is.*



PHOTO: VANN CLEVELAND

**I** know this sounds terrible to be telling you," a grower says to *Progressive Farmer*. "And it depends on what we're mixing, but usually we only wear gloves and goggles. We don't get into a full body suit."

Another admits, "We never have even talked about buying a suit."

Yet another spurns all chemical-resistant protection except a face shield—even though he has had tell-tale tingling lips, which is a symptom of overexposure to some pesticides.

Of course, chemical hazards are only part of the danger. "There are 140,000 disabling injuries on the farm each year," says Sam Steel of the National Safety Council. Falls and slips cause a majority of them and could be avoided with proper footwear.

How about you? Are you still not wearing safety gear because you think it's uncomfortable? New fabrics like Durafab's Comfort Gard 150 not only prevent permeation by liquid chemicals but also "breathe."

Do you still believe that the equip-

ment is difficult to find? Not so, with the increased awareness of farm safety.

Hate the "geeky" look? Peep at the new designer-looking eye protectors—the Buddy Holly look is gone.

## Protective Clothing

"I think there is more misuse of protective clothing in industry and agriculture than there is proper use," says Lynn Goldstein of Durafab, Inc.

For instance, plain spunbonded polypropylene is not a good barrier to either liquids or particulates, but it is still often worn for both.

In general, any fabric that is liquid-proof will also serve as a barrier against vapors, as long as entry areas, such as those around wrists, are properly elasticized.

Before choosing fabric for protection from a particular pesticide, always refer to the product label and the Material Safety Data Sheet (MSDS). If the information conflicts, comply with the label. Here are some protective clothing fabrics.

**Denim**—Pros: Protects from dirt, minor abrasions; is easily cleaned. Cons: Not a chemical barrier. Approximate cost: \$2.50 to \$3 (apron).

**Leather**—Pros: Protects from dirt, abrasions, sparks. Cons: Absorbs chemicals; is hard to clean. Approximate cost: \$14 to \$15 (apron).

**PVC**—Pros: Protects against acids, some insecticides, water. Cons: Is a limited chemical barrier. Approximate cost: \$3 (apron).

**Neoprene**—Pros: Protects against petroleum greases. Cons: Limited chemical barrier. Approximate cost: \$10 (apron).

**Urethane**—Pros: Protects against abrasions, some chemicals. Cons: Hot to wear. Approximate cost: \$5 (apron).

**Tyvek**—Pros: Protects against some chemical splashes, particulates. Cons: Hot. Approximate cost: \$3.50 to \$4 for Tyvek suit; \$7.50 to \$12 for Tyvek QC suit; \$19 to \$25 for Tyvek + or Saranex 23-P suit.

**Comfort Gard 150**—Pros: Protects against some chemical splashes and small particulates; cooler than other chemical-resistant fabrics. Cons: Does not protect against vapors. Approximate cost: \$4 to \$4.50 (suit).

## Safety Spectacles, Goggles, and Face Shields

Although face shields provide some protection from splashes and particulates, you must wear safety spectacles or goggles under them.

Safety spectacles are used for protection from dust, glare, and particulates, while goggles are made for protection from impact or splash or both. Some of these have antifogging features. Some are indirectly or directly ventilated.

You should always wear the appropriate welding hood. Often, the hood is paired with spectacles or goggles.

"A lot of people wear spectacles rather than a welding hood while arc welding," says Woodie Zachry, Jr., of Encon Safety Products. But you may damage your eyes and skin if you do.

Here are some materials used for protective lenses.

**Polycarbonate**—Pros: Safety spectacles and goggles protect against impact; goggles protect against chemical splash. Cons: Scratch easily if not professionally treated with silicon epoxy

silicon quartz, or some other hard-surfaced coating; untreated lenses and some coated lenses can become opaque if chemically contaminated. Approximate cost: \$5 to \$8.

**Propionate and CR-39**—Pros: Safety spectacles and goggles protect against impact; goggles protect against chemical splash. More difficult to scratch than polycarbonate. Cons: Less optical clarity and impact resistance than polycarbonate. Approximate cost: \$5 to \$8.

## Earplugs, Earmuffs, And Semi-Aurals

The formable plug conforms to the ear canal; premolded plugs come in one inflexible size. Both types can be worn incorrectly.

"We think our ear canal is a straight shot back to our eardrum, but it's actually S-shaped," explains Brian Myers of Cabot Safety Products. Pull back the top of the ear and insert the plug securely.

If you put earmuffs on over a hat, their effectiveness will be reduced, and wearing the muffs may be uncomfortable.

Semi-aurals are nonadjustable headbands fitted with plastic pods on each end. They are appropriate for short-duration, intermittent noises but not for sustained noise.

A decibel level above 85 for eight hours can cause hearing loss. For example, a chain saw typically runs at a decibel level of 100. You'd need a device with a noise reduction ratio number of at least 15 to lower the noise to an acceptable 85 decibels.

"If you're standing 3 feet away from somebody and you feel the need to shout to be heard, then you're in an area that's probably in excess of 85 to 90 decibels," Myers says. Tinnitus (ringing, buzzing, or whistling in your head) is a signal that you need hearing protection.

**Formable earplugs** (PVC or polyurethane)—Pros: Easily fitted; provide excellent protection if used properly; compatible with other attire. Cons: Can be worn improperly; have shorter life than premolded. Approximate cost: 20 cents a set.

**Premolded earplugs** (injected molded silicone)—Pros: Long lasting; can provide excellent protection if

used properly; compatible with other attire. Cons: Limited sizing; can be worn incorrectly. Approximate cost: \$2 a set.

**Earmuffs**—Pros: Easily fitted; long lasting. Cons: Hot; not compatible with other attire. Approximate cost: \$15 and up.

## Respirators

Respirators protect from gases, fumes, particulates such as dust, and vapors such as those from paint.

Now, according to EPA's 1992 Federal Worker Protection Standards for Agricultural Pesticides (40 CFR Parts 156 and 170), when a label requires a respirator, the label will indicate a specific prefix number.

"If a farmer is out spraying his fields with a pesticide, many times he will just wear a disposable dust respirator," says Tracy MacMillan of North Safety Equipment. Often called a dust mask, this cup-shaped piece of material can be used inappropriately. MacMillan advises using a pesticide respirator with organic vapor cartridges and pesticide prefilters.

"Somebody suffering from asthma or 'farmer's lung' may want to use a dual-cartridge respirator with high-efficiency particulate air (HEPA) cartridges when operating machinery and grinding feed," MacMillan explains. A farmer free of these ailments may be satisfied with a dust respirator.

A face piece becomes a respirator when cartridges or filters are added. Brands are not interchangeable, but

## Information and Equipment

### Industrial Safety Equipment Association

1901 North Moore St., Suite 808  
Arlington, VA 22209  
703-525-1695

Ask for the *ISEA Buyers' Guide*.

### Gempler's

Box 270

211 Blue Mounds Rd.

Mt. Horeb, WI 53572

1-800-382-8473 (phone)

1-800-551-1128 (fax)

Ask for latest catalog and a free

*How To Comply* manual.

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### Lab Safety Supply, Inc.

Box 1368

Janesville, WI 53547-1368

1-800-356-0783 (phone)

1-800-543-9910 (fax)

Ask for latest catalog.

### Direct Safety Co.

7815 South 46th St.

Phoenix, AZ 85044

1-800-528-7405 (phone)

1-800-366-9662 (fax)

Ask for latest catalog.

### American Conference of Governmental Industrial Hygienists

Kemper Woods Center

1330 Kemper Meadow Dr.

Cincinnati, OH 45240

(address as of Dec. 1, 1993)

Ask for information on the Confined Space regulation.

## The Worker Protection Standards

A major portion of EPA's 1992 Federal Worker Protection Standards for Agricultural Pesticides (40 CFR Parts 156 and 170) deals with ag employees and the requirements for personal protective equipment.

Currently, when you use a pesticide whose label refers to the standard, you must comply with worker protection requirements on the pesticide label. By April 15, 1994, compliance will be mandatory.

The federal penalties for non-compliance are the same as those for using a pesticide in a manner

that's inconsistent with its labeling.

The fines can be up to \$1,000 per offense for private applicators and up to \$5,000 per offense for commercial applicators.

If the rules are "knowingly violated," the punishment for private applicators can be \$1,000 and 30 days in jail. Commercial applicators may be fined up to \$25,000 and sentenced to one year in jail.

A *How To Comply* manual from EPA should be available soon from county agents and ag-related sources. Gempler's already offers free copies (see resource box).

all manufacturers use the same color-coding system for matching the cartridges to an application.

**Air-purifying dust respirator**—Pros: Protects from dirt and dust; inexpensive; disposable. Cons: Does not offer a tight seal. Approximate cost: 7 to 25 cents each.

**Air-purifying cartridge respirator** (half- or full-face piece, cartridges, pre-filters)—Pros: Purifies air in a contaminated environment by means of cartridge or cartridges appropriate for the contaminant; provides a better seal and protection than does a dust respirator. Cons: May be inappropriate at higher levels of exposure to contaminants. Approximate cost: face piece, \$10 to \$35; box of 6 cartridges, \$20 to \$30; box of 10 prefilters, \$5 to \$10.

**Supplied-air respirator** (half- or full-face piece, hose, coupler, and air source)—Pros: Provides clean air through a hose that runs from face piece to a stationary air source containing Grade D breathing air, or a portable air compressor equipped with particulate filters; provides better protection than does a dust respirator or a air-purifying respirator. Cons: Expensive; has limited application and mobility. Approximate cost: face piece, \$200 to \$300; air source, \$400 to \$700; hose, \$30 to \$40; coupler, \$20 to \$30.

**Self-contained breathing apparatus**—Pros: Provides Grade D breathing air from an attached portable cylinder worn on back; provides highest level of protection from hazardous contamination; required at higher levels of exposure when contamination concentration is unknown or is immediately dangerous to life and health. Cons: Expensive. Approximate cost: \$2,000 to \$3,000.

## Gloves

Hand and foot materials call for the same selection process as protective clothing. Here are some glove fabrics.

**Leather**—Pros: Protects against abrasions, heat, sparks, dirt. Cons: Absorbs chemicals; difficult to clean. Approximate cost: \$1.60 to \$20, depending on thickness and type of leather.

**Cotton canvas or cotton knit**—Pros: Cool, offers good dexterity, especially cotton knit gloves with vinyl dots. Cons: No chemical barrier. Approximate cost: \$10 per dozen.

**Rubber** (varying degrees of thickness)—Pros: Thin latex protects

|                                                   | Tractor and Equipment Operation (no spraying)                                                       | Building Construction, Maintenance and Repair (no lead exposure)    | Sanding and Sawing                                                                                 | Farmstead Cleanup and Routine Maintenance                  |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Protective Coveralls, Suits, and Aprons           | None required                                                                                       | Tyvek coverall; denim apron                                         | Urethane apron                                                                                     | Tyvek coverall; PVC apron                                  |
| Spectacles, Goggles and Face Shields <sup>3</sup> | Open cab, combining: dust goggles<br>Plowing: none required<br>Enclosed cab: spectacles recommended | Safety spectacles, impact goggles, or both; face shield with either | Spectacles with side shields or indirectly or directly ventilated goggles; face shield with either | Safety spectacles or dust goggles; face shield with either |
| Earplugs and Earmuffs                             | Open cab: earplugs or earmuffs<br>Enclosed cab: none required                                       | None required                                                       | Earplugs                                                                                           | None required                                              |
| Respirators                                       | None required                                                                                       | Dust respirator                                                     | Dust respirator or HEPA <sup>†</sup> respirator                                                    | Dust respirator                                            |
| Gloves                                            | Leather for cold weather; cotton canvas for hot weather                                             | Leather, cotton canvas, cotton knit                                 | Leather                                                                                            | Rubber-coated, leather                                     |
| Boots                                             | Steel-toed leather boots with lug sole                                                              | Steel-toed leather boots with lug sole                              | No special footwear                                                                                | Steel-toed 16-inch PVC knee boots with lug sole            |

*Personal protective equipment is suggested by Progressive Farmer and the Industrial Safety Equipment Association with input from PPE manufacturers and distributors and the National Safety Council. Consult all product instructions and warnings before using any safety equipment. If in doubt, contact your county agent and refer to the appropriate label, MSDS, the EPA How To Comply manual, and/or Occupational Safety and Health Administration, National Institute of Occupational Safety and Health, and American National Standards Institute regulations.*

\* Material Safety Data Sheet

† High-efficiency particulate air

from mild caustics, water; provides good dexterity. Thick rubber provides a broad-spectrum barrier. Cons: Thin latex offers little resistance to chemicals; thick rubber limits dexterity. All rubber degrades quickly when exposed to concentrated chemicals. Approximate cost: \$7.25 for box of 50 pairs of thin latex; \$10 for one pair of thick rubber.

**PVC with thermal lining**—Pros: Protects from thermal burns; gives a broad-spectrum barrier. Cons: Limits dexterity. Approximate cost: \$6 to \$7 per dozen.

**Nitrile**—Pros: Broad-spectrum barrier with better dexterity than rubber or PVC. Cons: Shorter life than neoprene. Approximate cost: \$1.65 per pair, unlined.

# Common Farm Activities

| Welding                                                                                   | Painting, Wood-Stripping, and Surface Preparation                                    | Chemical Handling (including pesticides)           | Operating Power Mowers                                       | Tree Trimming, Chain Saws, Splitting and Chipping                                       | Operating Machinery (grinding feed)                            | Farm Shop Work, Hand and Power Tools, Equipment Repair       | Entering Confined Spaces (grain bins, silos, manure pits)                                     | Electrical Work                                                    | Livestock Handling                                   |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------|
| Leather apron                                                                             | Tyvek coverall; PVC apron                                                            | Refer to label, MSDS*, and EPA manual <sup>1</sup> | None required                                                | Kevlar or leather chain saw chaps                                                       | None required                                                  | Denim apron                                                  | Tyvek or Tyvek QC suit <sup>2</sup>                                                           | None required                                                      | None required                                        |
| Welding helmet and/or goggles suitable for electrical or oxyfuel-welding <sup>4</sup>     | Safety spectacles or chemical splash goggles; face shield with either                | Refer to label, MSDS*, and EPA manual              | Safety spectacles or impact goggles; face shield with either | Safety spectacles or indirectly or directly ventilated goggles; face shield with either | Safety spectacles or impact goggles; face shield with either   | Safety spectacles or impact goggles; face shield with either | None required                                                                                 | Safety spectacles with UV-absorbing face shield for electrical arc | None required                                        |
| Varies with decibel level                                                                 | None required                                                                        | Refer to label, MSDS*, and EPA manual              | Earplugs                                                     | Dual protection: earplugs and earmuffs                                                  | Earplugs or earmuffs                                           | Earplugs                                                     | None required                                                                                 | None required                                                      | None required                                        |
| Half mask respirator with HEPA <sup>5</sup> cartridges <sup>5</sup> ; provide ventilation | Half mask or full-face mask with organic vapor cartridges and paint-spray prefilters | Refer to label, MSDS*, and EPA manual              | None required                                                | None required                                                                           | Dust respirator or face mask with HEPA <sup>†</sup> cartridges | Dust respirator                                              | Refer to EPA manual, OSHA's respirator regulation, and confined space regulation <sup>6</sup> | None required                                                      | None required                                        |
| Two-layer leather                                                                         | Nitrile, neoprene                                                                    | Refer to label, MSDS*, and EPA manual              | Leather, cotton canvas, cotton knit                          | Two-layer leather or chain saw gloves                                                   | Cotton canvas, cotton knit                                     | Leather, cotton canvas, cotton knit                          | Leather for periodic hydraulic work                                                           | Electrical gloves covered with leather gloves                      | Cotton canvas, chemical-resistant fabric, or leather |
| Leather boots                                                                             | No special footwear                                                                  | Refer to label, MSDS*, and EPA manual              | Steel-toed leather boots with lug sole                       | Steel-toed leather logging boots with lug sole                                          | No special footwear                                            | Leather boots with lug sole                                  | No special footwear                                                                           | Rubber-soled footwear or specialty boots for electrical work       | Steel-toed PVC knee boots                            |

<sup>1</sup> Decision must be made for each chemical for correct style, construction, and fabric.

<sup>2</sup> Static electricity could be a problem. Not to be worn in potentially flammable or explosive environments.

<sup>3</sup> Eye protection is recommended for all farm activities because of potentially damaging ultraviolet radiation.

<sup>4</sup> Use correct filter plate shade.

<sup>5</sup> There are more than 80 welding procedures. Half mask with HEPA cartridges cannot be used with stainless, brass, galvanized, tainted, coated, or plated surfaces; or when flame-cutting or flame-welding.

<sup>6</sup> Take proper measurements before entering or consult an industrial hygienist.

**Neoprene**—Pros: Broad-spectrum barrier. Cons: Limited dexterity. Approximate cost: \$8 to \$15.

## Footwear

The crucial characteristics of safe footwear include slip resistance, chemical resistance, waterproofing, and protective reinforcement.

Lug and crepe soles offer different

degrees of slip resistance. "A lug sole has cleats similar to those of a hiking boot," says John Morton of Gempler's. "A crepe sole is less aggressive and is best suited for stationary work."

Here are some footwear materials.

**Leather**—Pros: Protection for many farm chores. Cons: Unsuitable for chemical work because of absorption. Approximate cost: \$65 to \$85.

**Chemical-resistant or waterproof PVC, latex, vulcanized rubber, or Tyvek**—Pros: Provide broad-spectrum protection and waterproofing; available as boots or disposable over-the-shoe booties. Cons: Shorter life than leather. Approximate cost: \$8 to \$30 (boots); \$7 per pair (booties).

BY NANCY DORMAN-HICKSON