Respirator Pocket Guide

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INTRODUCTION

His skin is an almost translucent shade of blue. He sits hunched over, arms on his knees. His head bobs up and down as he takes in each sharp, short breath. His cough seems constant. His heart rate is rapid, yet faint.

Hi, I'm Annie Bates, although some of my patients call me "Iron Lung" Annie or "Nurse Hacker" (must have been those 20 years in the army). I'm not only a tough ol' lady, I'm a nurse and a certified respiratory therapist (CRT). And that's no Grade B movie monster I was just describing – it's Mr. Smith, one of my patients.

Mr. Smith has emphysema. Now I could give you all the medical jargon about the pathologic enlargement/overdistention of the alveoli or bronchiole, etc., but let's just say that Mr. Smith's lungs are, well, shot. And that's the good news, 'cause our Mr. Smith is also just a wheeze or two away from congestive heart failure.

Hey, I tell it like it is. Maybe that's why my patients think I'm more like a drill sergeant than a Florence Nightingale. It's not that I don't care, I really do, but I'm also angry because I know that Mr. Smith (and many

I. REVIEW OF THE LAW

The Federal government estimates that well over 60,000 employees each year become ill due to acute exposure to airborne hazardous substances. Wow! That's more coughing and wheezing than I hope to see in a lifetime.

Just imagine how many more workers would become ill if there weren't some written rules for your employer to follow. These "rules" were spelled out back in 1970 by the then "new" Occupational Safety and Health Act (OSHA) in a little ditty entitled "Respiratory Protection"(OSHA part 1910.134). And you thought the only good thing to come out of the seventies was disco!

Anyway, this was the first time specific legal requirements were issued for the selection, use, and maintenance of respirators. Much of this OSHA standard was taken from a 1969 "Consensus Study" issued by the American National Standards Institute (ANSI), entitled "ANSI 288.2-1969, Practices for Respiratory Protection." This ANSI standard has been updated several times, and even as you read this, the OSHA standard is currently under extensive revision.

First let's take a look at the law as it affects you today. Remember, whether it's current or proposed, the idea is the same – to provide your employer with a blueprint to protect your health and safety on the job. So if you don't want to find yourself coughing up a lung, you'll give a serious listen...

The Law Today

The first section of the law requires three basic things:

1. Prevent atmospheric contaminants. This certainly makes a lot of sense. Whenever possible, engineer the problem out of the

II. ATMOSPHERIC HAZARDS

It's your employer's responsibility to assess the hazards particular to your job, and it's also his or her responsibility to communicate these hazards to you. But since all of this information is used to select the proper respiratory protection to guard *your* health and safety, you best be a good little soldier and pay attention.

There are basically two respiratory hazards to be concerned with – oxygen deficiency and atmospheric contaminants.

Oxygen Deficiency

The normal percentage of oxygen at sea level is 20.9%. An oxygen-deficient atmosphere contains less than 19.5% oxygen by volume. As oxygen content continues to fall, things go from bad to worse, and you go from dizzy to dead. Take a look at the following chart:

Percent Oxygen	Physiological Effects
16% – 12%	Loss of peripheral vision, increased breathing effort, quickened pulse, impaired coordination, poor attention span
12% – 10%	Very poor judgment, poor muscular coordination, continued physical exertion may cause permanent heart damage
10% – 6%	Nausea, vomiting, immobility, staggering, spastic movement, unconsciousness followed by death
less than 6%	Convulsions, sporadic breathing, death

III. TYPES OF RESPIRATORS

A Brief History Lesson

Even though OSHA has been around for over twenty years, the need for respiratory protection goes back almost two thousand years. Now you may wonder what the heck they were doing back then that would require a respirator. Well, just like our Mr. Smith, there were people involved in metal ore mining, which was needed to make swords, plows, etc.

These miners wore loose-fitting animal bladders with sack cloth filters to protect against dusts, such as red oxide found in lead mining operations. Pretty impressive, yet here we are, two thousand years later, and ol' Mr. Smith is wheezing his life away because he didn't wear his respirator. And I'll bet the respirator he was issued was a good deal better than the internal organs of an ancient cow!

What's the message here? It's the fact that the need for respiratory protection has been around since humans learned the importance of their opposable thumbs, but there are still those who don't recognize or understand the need for this respiratory protection.

Anyway, during the big growth in industrialization in the 1700's and 1800's, the need for varied respiratory protection grew. Actually, there are now hundreds of respirator variations out there, but when you boil it all down, there are two main choices – you either purify the air before you breathe it, (air-purifying respirator) or you supply yourself with respirable air from an external source (supplied-air respirator).

Air-Purifying Respirator

Air-purifying respirators work as simply as the name implies – they filter, trap, and remove a given contaminant before you breathe it. Let's

IV. MAINTENANCE

You've reviewed the law, you understand the importance of hazardous assessment, you've learned about different types of respirators and how the hazard determines what type of respirator to use. That's an awful lot, but it's not enough. If your respirator isn't properly inspected, cleaned, and stored, you might as well put a bag over your head – the kind your mother warned you about – 'cause the only thing as bad as using a wrong respirator is using a correct respirator that doesn't work!

All the time and effort that goes into the design, manufacture, approval, and selection of respiratory protective equipment can be quickly ruined by poor maintenance of that equipment. A good maintenance program that includes inspection, cleaning, repair, and storage practices will keep your respirator working as well as the day it came out of the box.

Repair

We're not going to venture too deeply into repairs here. Repair instructions are unique to the specific piece of equipment and the manufacturer who produced it. This is especially true of self-contained breathing apparatus. Let's just say that repairs will be done by trained personnel (maybe you!) using special tools, test equipment, and parts designed by the manufacturer and supplied by your employer.

Inspection

Obviously, there is a world of difference between inspecting a simple dust mask and an SCBA. Depending on the size of your company, the person who inspects the respirator before use (you) may not be the same person who inspects the respirator during

CONCLUSION

Well troops, we've done it. You good little soldiers really stuck with it. Even though ol' Sergeant Annie dragged you through a pile of pages, I know you haven't lost sight of those original three golden rules:

1. Engineer the atmospheric hazard out.

OR

2. Your employer must provide you with the proper respiratory protection.

AND

3. You must use and maintain the respiratory protection provided in accordance with the written instructions and training given.

The third point listed above includes checking the respirator's fit every time you put it on. Use the respirator within it's limitations, and make sure it's properly cleaned, inspected, and stored according to the instructions provided by your employer.

Remember, it's your health and safety at stake every time you strap on that respirator. So promise me you'll follow the program. I don't want to see you being wheeled down this hall. And if Mr. Smith could manage to talk above a whisper, I'm sure you'd hear him say the same thing.

Take care. Be smart. Stay healthy. Dismissed.

GLOSSARY

Abrasive blasting respirator. A respirator designed to protect the wearer from inhalation, impact, and abrasion of materials used for, or generated in, abrasive blasting.

Aerosol. Particles, solid or liquid, suspended in air.

Airline respirator. An atmosphere-supplying respirator in which the respirable gas is not designed to be carried by the wearer. Also known as a supplied-air respirator.

Air-purifying respirator. A respirator designed to remove air contaminants (i.e., dust, fumes, mists, gases, vapors, or aerosols) from the ambient air or air surrounding the respirator user.

Approved. A respirator that has been evaluated and listed as permissible by the National Institute for Occupational Safety and Health (NIOSH), the Mine Safety and Health Administration (MSHA), or the Bureau of Mines (BM).

Assigned protection factor (APF). The number assigned by NIOSH to indicate the capability of a respirator to afford a certain degree of protection in terms of fit and filter/cartridge penetration.

Atmosphere-supplying respirator. A respirator that supplies the wearer with air or oxygen from a source independent of the immediate ambient atmosphere. This includes air-supplied respirators and self-contained breathing apparatus (SCBA).

Canister or cartridge. The element of a gas and vapor or particulate air-purifying respirator which contains the sorbent, filter, and/or catalyst that removes specific contaminants from the air drawn through it.

Ceiling concentration. The concentration of an airborne substance that shall not be