

The 411 on Staying Warm

There is a Norwegian proverb; "There is no such thing as bad weather... only bad clothing". Following this line of logic, our employees should never be cold, no matter what the weather if they are properly clothed for the weather at hand. There really is quite a bit of truth to this proverb especially when using some of the more modern fabrics and technology available these days. The new buzz word among those using Extreme Cold Weather (ECW) clothing is- Ensemble. In reality, the idea of the ECW ensemble mimics good, old-fashioned layering with the use of the latest insulating and wicking materials that have been in use for winter sports.

When choosing cold weather clothing there are three main principles that should be followed to keep warm.

First the clothing should be chosen to work together as a unit. The choice should be made to meet the conditions that will be encountered while wearing the clothes. The amount and duration of physical work that will be done and the weather conditions that will be encountered will influence the types of clothing that are needed. For example, if an employee working in freezing rain will have different clothing requirements than an employee working in a dry, cold environment.

Second, it is helpful to understand the role of each layer of the ensemble.

- Inner Layer- Dry skin tends to be more comfortable and feel warmer than damp or wet skin. This explains why it is so important that the inner layer be permeable to sweat or allow sweat to move through the fabric. In order to keep warm and comfortable it is necessary that sweat be "wicked" away or transferred from the skin to the next layers of clothing. Moisture that remains in the material of the inner layer can decrease the layer's ability to insulate by as much as 30-50%. This is because wet clothing transfers more heat than dry. Materials that are commonly used as the inner layer include a thin layer of polyester or silk.
- Middle Layer- This layer is mainly for insulation, to trap warm air close the body. Materials that lend themselves well to being used in the middle layer include fleece, pile, wool or thick polyester. A good way to increase the insulating ability of the middle layer is to use multiple thin layers of material instead of a single thick layer.
- Outer Layer- The main function of the outer layer is to provide wind protection as well as moisture protection. By keeping the deeper layers of clothing dry the outer layer allows the ensemble to keep the employee warmer and more comfortable. Some materials that are good choices for the outer layer include Gortex, 60/40 cloth, PTFE laminate and nylon.

The third and perhaps most important factor of staying warm is to minimize the accumulation of moisture in the clothing. There are two main ways to accomplish this; first have several layers of clothing so the moisture can be "wicked" away from the skin. Next, the appropriate layers need to be designed with plenty of ventilation. The outer layer of the ensemble should have a way to ventilate and allow sweat to be released. Ventilation is typically accomplished through "pit zips" (zippers placed in the armpit area), opening sleeve ends and front zippers. This allows the moisture to be released from the clothing to the environment, thus helping to dry the clothes.

The strategy used to layer an ensemble can be the key to employees staying comfortable, warm and dry throughout the workday. Typically an employee will start the workday straight from home and will have piled on the layers. Once physical work begins, the employee will begin to heat up and sweat and moisture will accumulate in the clothing. At some point the employee gets too hot and removes layers to cool down. The remaining layers are wet with sweat and will cause a rapid and uncomfortable heat loss. The discarded layers will then be put back on, the employee heats back up, starts to sweat and the process is repeated. The way to avoid this cycle is to be proactive in layering clothing. When starting the day, don't put on all the layers or remove a few knowing that once work begins the body will naturally heat up and a comfortable temperature will be reached with a minimum of moisture accumulation. As the day unfolds, the number of layers can be adjusted to match weather changes as well as changes in employee activity level.

The key to keeping the layers of the ECW in good repair for the long haul is maintenance of the clothing. All layers of the ensemble should be dried or allowed to dry thoroughly before they are worn again. Dry clothing is much more effective at insulating the body than is even slightly damp clothes. It is unreasonable to think that the components of the ECW will work properly if the physical aspects of the materials are compromised. Any physical problem or damage to the material of a garment will decrease its effectiveness in keeping the body warm and dry. If possible the damage should be repaired or the piece of clothing should be removed from service. It is also important to consult manufacturer's recommendations for special care instructions. Many materials used for the outer layer, Gortex for example, need to be periodically washed to remove dirt from the pores in the material so it can work properly.

By following these simple ideas on layering, our employees can be kept warm, comfortable and safe throughout the coldest of winters.

For additional help with safety and OSHA compliance, take advantage of the resources available through NCMA. These resources include the NCMA Block Plant Safety Software. The software is available from NCMA at (703) 713-1900 at a cost of \$150 for up to 3 plants/year (nonmember \$450).