SAFETY BULLETIN
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Comfort for Cold Weather: Using Battery-Heated PPE or Clothing

HEATED CLOTHING SAFETY IN HAZARDOUS AREAS

Heated personal protective equipment (PPE) or clothing is not always safe by default, especially in hazardous environments where flammable gases, vapours or dust are present. Equipment designed to operate safely in an explosive atmosphere, limiting the electrical thermal energy and lowering the potential for combustion, is known as **intrinsically safe (IS) equipment.**

While heated PPE or clothing (e.g., jackets, hats, gloves, socks) provide warmth in cold conditions, its built-in batteries and electrical components introduce certain risks, like sparking, overheating and igniting flammable substances. Standard heated clothing may not meet the requirements for IS equipment unless specifically designed and certified.

What Does Intrinsically Safe Mean?

IS equipment is specifically designed to limit the energy that can ignite an explosive atmosphere, even in the event of a fault. For electrical equipment to be considered IS equipment, it must:

- Operate at low voltage and current levels to avoid sparks.
- Have limited thermal energy so that it cannot reach ignition temperatures.
- Include safety barriers or design elements that prevent overcharging, short circuits or excessive heating.

HEATED PPE IN HAZARDOUS ZONES

Are Heated PPE or Clothing Intrinsically Safe?

Most heated PPE or clothing products available today are not IS equipment. These devices' heating elements and batteries typically operate at power levels that could generate enough energy to ignite a hazardous atmosphere. They may pose a risk in environments where flammable or explosive materials are present unless they are explicitly designed and certified for IS.

Battery-operated heated PPE or clothing are not considered IS unless specifically certified for hazardous environments. Using non-certified heated PPE or clothing can be dangerous when explosive atmospheres are at risk. To ensure safety, use IS equipment where available, follow industry standards and best practices, and manage the risks by using heated PPE or clothing in non-hazardous areas or providing safe warming zones. Always prioritize certification and regular inspection to maintain a safe working environment.

Guidance for Using Heated PPE or Clothing in Hazardous Environments

Special precautions and guidelines must be followed if IS-certified heated PPE or clothing is unavailable or if you are unsure if your heated PPE is considered IS. Here's an overview of the best practices for using heated PPE in hazardous environments safely:

A. Use Intrinsically Safe or Certified Heated PPE/Clothing

- **Purchase PPE or clothing designed for hazardous environments:** Look for heated PPE or clothing specifically designed and certified to meet intrinsic safety standards (e.g., UL).
- **Verify certifications:** Ensure the PPE or clothing carries recognized certification marks (e.g., UL for North America). These certifications ensure that the equipment has passed stringent safety tests.

B. Use Heated PPE or Clothing in Non-Hazardous Zones

- **Limit use to safe zones:** If intrinsically safe heated PPE or clothing is unavailable, limit battery-operated heated PPE or clothing to non-hazardous zones (zones with no risk of flammable gases or vapours).
- **Create safe areas for warming:** In environments where explosive atmospheres may exist, e.g. oil rigs or chemical plants, provide workers with designated warming areas where they can safely use heated PPE or clothing. These areas should be free from any flammable or combustible materials.

C. Implement Safe Work Practices

- **Inspect PPE or clothing regularly:** Inspect heated PPE or clothing for signs of wear or damage, particularly to electrical components such as wires, batteries and connectors. Damaged equipment should be removed from service immediately.
- **Battery management:**
  - Use batteries that are properly rated for cold environments and have built-in safety features (e.g., overcharge protection).
  - Never charge batteries in hazardous environments. All charging should be done in safe, non-hazardous locations away from flammable substances.
  - Avoid using aftermarket or non-approved batteries or chargers that may not meet safety standards.
- **Monitor for overheating:** Train workers to be aware of overheating or malfunctioning PPE or clothing and immediately stop use if any issues arise.

D. Implement Safe Work Practices

- **Flame-resistant clothing:** In industries where cold exposure is an issue, consider using flame-resistant thermal clothing that provides insulation without electrical heating. These garments are typically non-electrical and are made of materials that retain heat.
- **External heat sources:** In hazardous environments, workers can warm up using external heat sources, such as heated shelters or portable heaters, instead of battery-operated PPE or clothing.

Resources

- ESC: Fire & Explosion Hazard Management Guideline
- ESC: Bonding and Grounding
- OH&S Online: Understanding Intrinsically Safe Technology in Hazardous Work Environments
- TSI: What makes equipment intrinsically safe?