

SAFETY BULLETIN

THE HAZARDS OF COLD BURNS: PRECAUTIONS AND FIRST AID TREATMENT

In this bulletin we cover the hazards which can arise when handling cryogenic liquids, very cold gas or equipment at very low temperatures. The hazards arise when using any cryogenic product and thus apply to this document, which addresses the handling of liquid nitrogen.

1. Cryogenic burns and frostbite

Exposure of the skin to low temperature can produce effects on the skin similar to a burn. These will vary in severity with temperature and the time of exposure.

Naked, or insufficiently protected, parts of the body coming into contact with very cold, un-insulated pipes or vessels may stick fast by virtue of the freezing of available moisture and the flesh may be torn on removal. Special care is needed when wearing wet gloves.

Prolonged exposure to cold can result in frostbite. There may well be insufficient warning through localised pain while the freezing action is taking place. All cold burns should be checked by a first-aider or, in extreme circumstances, by a medical expert to confirm the extent of the damage.

Prolonged inhalation of cold vapour or gas can damage the lungs. Cryogenic liquids and vapour can damage the eyes.

The low viscosity of cryogenic liquids means that they will penetrate woven or other porous clothing materials much faster than, for example, water.

2. Precautions

Protective clothing for handling low-temperature, liquefied gases serves mainly to protect against cold burns.

Non-absorbent gloves (PVC or leather) should always be worn when handling anything that is, or may have been, in contact with cold liquids or vapours. Gloves should be a loose fit so that they may be readily removed should liquid splash on to them or into them.

If severe spraying or splashing is likely to occur, eyes should be protected with a face shield or goggles.

Trousers should be worn outside boots and have no pockets or turn-ups.

3. First aid (cryogenic burns)

Flush the affected areas of skin with copious quantities of **tepid*** water, but do not apply any form of direct heat, e.g. hot water, room heaters, etc. Move the casualty to a warm place which should be at approximately 22°C. If medical attention is not immediately available, arrange for the casualty to be transported to hospital without delay.

While waiting for transport:

- (a) loosen any restrictive clothing.
 - (b) place the affected part in **tepid** water, or run **tepid** water over, until the skin changes from pale yellow through blue to pink or red.
 - (c) Protect frozen parts with bulky, dry, sterile dressings. Do not apply too tightly so as to cause restriction of blood circulation.
 - (d) Keep the patient warm and at rest.
 - (e) Ensure that the ambulance crew or the hospital is advised of details of the accident and first aid treatment already administered.
 - (f) Smoking and alcoholic beverages reduce the blood supply to the affected part and should be avoided.
- **Definition: tepid** Water at a temperature of between 35°C and 40°C.

DISCLAIMER

The information contained in this document was obtained from sources believed to be reliable and is based on technical information and experience currently available from members of the Southern Africa Compressed Gases Association and others.

However, the Association or its members, jointly or severally, make no guarantee of the results and assume no liability or responsibility in connection with the information or suggestions herein contained.

Moreover, it should not be assumed that every acceptable commodity grade, test or safety procedure or method, precaution, equipment or device is contained within, or that abnormal or unusual circumstances may not warrant or suggest further requirements or additional procedure.

25th November 2008