

# Personal hand and arm protection to $-160^{\circ}\text{C}$

Keep **CRYO GLOVES<sup>®</sup>** readily accessible for the secure handling of liquid nitrogen!

## HOLGER BRIAN FRITZSCHE

LABOplus  
Pasinger Heuweg 89  
80999 München, Germany  
Tel +49 (0)89 812 54 24  
Fax +49 (0)89 892 94 31  
www.laboplus.de

## THE FIGURES OF INDUSTRIAL CRYOGENIC APPLICATIONS INCREASE

Liquid nitrogen is used in many processes and applications within the chemical, biochemical, pharmaceutical as well as the life sciences industries, spreading from the lab bench through process optimization in the pilot plant and on to the full production line. Liquid nitrogen might be thought sterile in itself due to its ultra low temperature. However, it is even used to preserve living microorganisms. Cryogenic gases – such as liquid nitrogen, liquid carbon dioxide and dry ice – are used to cool various processes and equipment. Cryogenic cooling with gas offers an environment-friendly alternative when compared, for example, with mechanical cooling based and halogenated hydrocarbons. Many pharmaceutical processes can be enhanced through the use of cryogenic cooling, e.g. grinding, milling, mixing, granulation, freezing and several others. Temperature control can be integrated into existing processes or equipment to enhance both production and product quality. Some typical parameters are processing time, yield, selectivity, surface structure and particle size. Cooling may be obtained by either direct or indirect contact with an ultra-cold gas flow or with a liquid gas. Liquid nitrogen's main use is cryo-preservation. That allows storage at a temperature sufficiently below any critical temperature. This means that biological material can be stored almost indefinitely, since decomposition is extremely low. The gas industry and specialized companies offer a range of freezers and containers of all sizes, engineered to



Bio-Freezer and CRYO GLOVES, elbow length

maintain specific temperatures between  $-150^{\circ}\text{C}$  and  $-196^{\circ}\text{C}$  – depending on whether the sample is in liquid or in vapour phase.

When transporting frozen micro specimens, biological matter or medicines modern techniques and a high-level on engineering know-how and automated processes allow a maximum of product safety.

Unfortunately personal safety especially for those working in these ultra cold environments and handling ultra cold liquified media does not keep pace with the technological improvement!

## PERSONAL SAFETY EQUIPMENT – PSA – FOR ULTRA COLD ENVIRONMENTS

Ultra-cold liquid nitrogen reaches a temperature of  $-196^{\circ}\text{C}$  (77.36 K). It is mainly used for working in vapour phase – an ultra-low temperature range from  $-80^{\circ}\text{C}$  down to  $-180^{\circ}\text{C}$ . While filling

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Tel. 0039 02 83241119  
Fax 0039 02 8376457  
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*The technical gas industry announces an enormous increase of 30 times in the distribution of liquefied nitrogen, over the period of the last 10 years! The awareness for the appropriate safety equipment, especially in this field, does not equal.*

procedures and handling of liquid nitrogen safety regulations require the use of qualified ultra-low temperature aprons and gloves as well as a face shield – in order to protect effectively from the hazards of cryogenic splashes and cryogenic atmospheres.

Regrettably the daily practice mirrors another impression: in a high number of applications leather-work-gloves or even leather-welding-gloves are still used! The choice of leather-gloves and aprons for personal safety in ultra-cold working environments is grossly negligent! ...'cause the material leather is deliquescent; it has the characteristic to link moisture from the ambient air. This leads in ultra-cold environments to an increase of the cold conductivity.

BACKGROUND: Water molecules can, already at 'normal' humidity between 40 to 60%, position in every single pore of the leather material – the leather becomes damp. If one now dives with the moist leather gloves into a cryogenic environment, for example in the vapour phase of liquid nitrogen (from -80°C down to -180°C), each of the water-molecules freezes immediately into an ice crystal – the leather becomes cold conductor – the cold can burn the skin!

LABOplus is Tempshield's European General Agent, since 1986. We offer essential personal protection in a wide variety of applications, CRYO GLOVES® and CRYO APRON® are relied upon worldwide by leading firms in science, medicine and industry. These ultra-low temperature safety garments are especially developed for the secure handling of liquid nitrogen.

### EFFECTIVE PROTECTION FROM CRYOGENIC SPLASHES AND ATMOSPHERES

The outer material is semi-permeable nylon, the manufacturer states it is 100%



Wide-necked Dewar flask and CRYO GLOVES, mid arm length

water resistant and together breathable. The insulation of the gloves against the cold offers a polyolefin / polyester inner layer.

Micro-pores restrain the cold and provide an effective thermal isolation. A cotton inner glove supports a maximum of wearing comfort. For extended periods working in the cold and when there are risks of spilling liquids, the waterproof (WP) type offers superior protection – as all waterproof (WP) gloves are outfitted with an additional seamless inner glove. This avoids that liquids reach the hand, coming through the seams.

CRYO GLOVES® and CRYO GLOVES® WP are available in wrist, mid arm, elbow and shoulder length.

CAUTION: Not intended for immersion in liquid nitrogen or other cryogenic liquids! Please pay attention that the gloves fit well – choose the right size for every user!

### CE-CERTIFICATE AND MAXIMUM RANKING FOR THE EN 511 NORMATIVE

All models CRYO GLOVES®, CRYO GLOVES® WP and CRYO INDUSTRIAL® Gloves WP are with CE-certificate and are proofed according to EN 388 normative (Safety Gloves against mechanical risks), EN 420 normative (Safety Gloves, Common Requirements) and of course EN 511 normative\* (Safety Gloves against cold).

The unique and effective protection against ultra-cold demonstrates the maximum ratio for convective cold: 3 and contact cold: 2/3! (As far as we know, excellent surpassing figures for Safety Gloves against cold)

To guarantee the effective protection in ultra-low temperature environments as well as protection from cryogenic splashes, the manufacturer made provable testing in addition to EN 511 normative in cryogenic atmospheres. Therefore all Tempshield CRYO GLOVES

\* according to EN 511 normative, only a temperature range to -50°C is tested.



Dewar flask and CRYO GLOVES, wrist length



CRYO TEMP SHIELD Set, a complete PSA Set: CRYO GLOVES, shoulder length; CRYO APRON; Face Shield; Warning Signs

safety garments provide effective proven and reliable protection in ultra-low temperatures down to -160°C – while daily practice, for already more than 25 years.

### LABOplus

#### The European Tempshield Representative

LABOplus, based in Munich, Germany, is the European General Agent for Tempshield Inc., since 1986. We specialise in Consulting, Marketing, Sales and Distribution of the whole range of CRYO GLOVES safety garments.