BRITISH COMPRESSED GASES ASSOCIATION
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TECHNICAL INFORMATION SHEET 7 - REVISION 2: 2015

GUIDELINES FOR THE SAFE TRANSPORTATION, STORAGE, USE AND DISPOSAL OF DRY ICE PRODUCTS

PRODUCT DESCRIPTION

Solid carbon dioxide, CO_2 (dry ice), is very cold at -78 °C. It sublimes by taking up heat from the surroundings i.e. turns directly from a solid into a gas, which is heavier than air. It is important to note that a small amount of dry ice will sublime to a large volume of gas. CO_2 gas is an asphyxiant and becomes increasingly intoxicating at higher concentrations. Contact with dry ice can cause cold burns and frostbite.

Where dry ice is used in association with food and drinks then it has to meet specific quality standards and the packaging and work areas have to meet specific hygiene standards. Refer to BCGA GN 14.

Dry ice is manufactured in the form of pellets, slices or blocks and may be supplied loose or in insulated containers. The hazards associated with dry ice in a customer call-collect situation come from:

- The product (pellets, slices, blocks);
- Types of packaging and insulation used;
- The way it is secured whilst in transit;
- The type of vehicle being used; and
- The length of time the journey takes.

Areas affecting the size of the risk include product packaging and insulation. Your supplier will have listed the hazards associated with the product on the wrapper or container in which the dry ice is supplied. The **Safety Data Sheet** provided by your supplier will inform you of the action to be taken in the event of an incident or emergency involving dry ice and the health hazards of the product. You should read this carefully before transporting, handling or using dry ice.

TRANSPORTATION

The most significant hazards arising from the transport of dry ice are:

- The creation of an unsafe atmosphere due to sublimation of the product (change of state from a solid to a gas) – the product will not 'melt' into a liquid.
- Spillage from an insecure load would lead to a higher rate of sublimation as the surface area of the product type increases – pellets being worse than slices which, in turn, are worse than blocks.
- Impact damage / injury - As with any heavy load, dry ice loads shall be **SECURED**.

AVOID transporting dry ice in the cab of a truck or the seating area of a car. Preferably transport dry ice in vehicles where the driver's cab is isolated from the load compartment. If this is not possible, the load should be well insulated and adequate ventilation shall be maintained.

ALWAYS ensure that there is adequate ventilation during transportation and before entering the load compartment to unload product. A warning label is to be displayed at all access points highlighting the danger of asphyxiation (the letters on which are to be a minimum of 25 mm high).

Drivers of vehicles carrying dry ice should be aware that the level of risk of an unsafe atmosphere occurring in the vehicle will depend on the following conditions:

- Quantity of dry ice being transported.
- Type of packaging and insulation used.
- The temperature of the load compartment.
- The length of time the product is held in an enclosed space.
- Vehicle ventilation – **ALWAYS** ensure that the heating / air supply is switched to draw in 'fresh air' from outside the vehicle.

ALWAYS secure the load compartment doors in the open position before entering. For large 'walk-in' load compartments, the doors should be capable of being opened from the inside.

ALWAYS unload product as soon as possible at the end of the journey and move to a suitable storage location.

ALWAYS carry a carbon dioxide (solid) Safety Data Sheet in the cab or driver's compartment of any vehicle that is carrying dry ice. For further information on transporting gases refer to BCGA GN 27.

BCGA TIS 7 Revision 2 Published: 28/10/2015 Produced by: BCGA TSC6 ISSN 0260 - 4809

STORAGE

ALWAYS store dry ice in an area which is:

- Well ventilated. The use of gas detection systems should be assessed.
- Preferably not below ground.
- Accessible with mechanical lifting equipment (where stored in large containers).
- Out of direct sunlight and away from sources of heat.
- Clean, to acceptable (food) hygiene standards.
- Secure – to prevent unauthorised access.
- Identified with appropriate safety and warning notices.

DO NOT store or use dry ice in any gas tight container. Within large containers, gas rich atmospheres will build up.

ALWAYS secure the container lid open before reaching in to unload the product.

DO NOT lean into the container.

Suitable dry ice containers are available from your supplier. Generally, the principle is – the better the insulation, the slower the sublimation rate and the longer the quality of the product will be maintained.

WORKING WITH DRY ICE

Many applications of dry ice result in the sublimation of the dry ice volume into the working area.

REMEMBER – a small amount of dry ice will sublime to a large volume of CO_2 gas.

ALWAYS seek professional advice on suitable ventilation systems. Use of dry ice will generate gaseous CO_2. This will require formal risk assessment under the UK Control of Substances Hazardous to Health Regulations (COSHH). The use of gas detection systems may be required.

Do not handle dry ice with bare hands. It can cause severe cold burns and frostbite. Use the appropriate Personal Protective Equipment, including gloves, eye protection and safety footwear.

ALWAYS keep dry ice away from children.

DO NOT play with dry ice. Playing games with dry ice is dangerous.

USE an insulated container to store dry ice.

DO NOT place dry ice in a domestic style refrigerator or freezer.

HOW TO USE DRY ICE

FREEZING: Place dry ice above items to be frozen. **DO NOT** allow direct contact with items to be frozen as superficial damage / freezer burn may occur.

ALWAYS defrost food completely before consumption.

COOLING: Place dry ice in bottom of cooler, cover with water ice or insulating material, then place cans, food etc. on top. **DO NOT** allow direct contact with dry ice. **DO NOT** put it into drinks.

SPECIAL EFFECTS: Use gloves to place small amounts of dry ice in hot water for fog. Can be used with a proprietary fog machine.

OTHER USES: Fresh meat processing and shipping ◆ De-flashing moulded rubber and plastic ◆ Low temperature testing ◆ Industrial cleaning (dry ice pellet-blasting) ◆ Shrink-fitting ◆ Laboratory cold-traps ◆ Inerting and purging ◆ Freeze-branding.

SAFE DISPOSAL

Dry ice sublimes to gas leaving no residue. However, care should be taken if surplus ice remains when the application for which it was intended is completed. Any left-over packaging should be disposed of with care and recycled wherever possible.

ALWAYS ensure that dry ice is disposed of in a safe place, that is:

- A well-ventilated area.
- Secured against access to passers-by – especially children and animals.

DO NOT dispose of dry ice in an area where CO_2 gas can collect in low-lying areas – garage pits, drains, confined spaces, etc.

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