



# **Procedure**

## **Safety procedure for the safe filling of a Dewar at the liquid nitrogen tank**

**BS OHSAS 18001:2007**

**Process: PRSI – Proceed safe**

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## 0.1 Document log

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		Approved:	03.04.2014	Flavio Bavdaz (Prevention and Safety Manager)	<i>Approved</i>
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## 0.2 Previous revisions log

Rev00	First edition	Draw up:	04.04.2011	Flavio Bavdaz (Prevention and Safety Manager)	<i>Draw up</i>
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		Verified:	19.04.2011	Mauro Zambelli (Management System Manager)	<i>Verified</i>





## 1 Scope and field of application

This document provides a summary of the procedures for the filling of a Dewar at the 30,000 litre liquid nitrogen tank. Only properly trained personnel equipped with the necessary protective equipment are approved for performing the procedure.

*Purpose*

Contact the Prevention and Safety Service for any further information regarding the content of this document.

Further documentation is available on the website:  
<http://www.elettra.eu/activities/spp/safety.html>.

This procedure applies only to those who collaborate with Elettra for various reasons and who are *allowed* to fill a Dewar at the 30,000 litre liquid nitrogen tank.

*Field of application*

## 2 Responsibility

Responsibility for the correct application of the provisions of this procedure lies with all the staff and employees who work with Elettra and that are authorized to fill a Dewar at the 30,000 litre liquid nitrogen tank.

## 3 References

- *Procedura di sicurezza Riempimento dei Dewar presso il serbatoio di azoto liquido*, Ing. Stefano Bergamasco, 22 ottobre 2008
- Safety procedure to be adopted for handling liquid nitrogen BS OHSAS 18001:2007

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## 4 Operating procedure

1. Go to the covered enclosure located in the vicinity of the 30,000 litre liquid nitrogen tank with your own Dewar to fill
2. Verify beforehand that the following valves are closed:
  - V6 manual valve 'usage valve' (close by turning clockwise)
  - V12 manual vent valve 'bleeding valve' (close by turning clockwise)
  - General open switch (in position 1)
3. Connect your Dewar to the nitrogen extraction hose
4. Open the valves of the Dewar (air hole and nitrogen entry)
5. Open the solenoid valve used by pressing the green button 'APRE' (open) on the control panel
6. Very slowly open the V6 manual valve 'usage valve', turning it counter-clockwise until you reach the desired flow
7. At this point the Dewar will begin to fill. The timer on the control panel is set to an interval of about 6 minutes. **DO NOT CHANGE THE TIMER SETTINGS.** If you need to stop the supply of nitrogen before the timer ends, press the red button 'CHIUDE' (close). At the end of the first cycle of 6 minutes, the timer triggers the valve closed. If you require a longer dispensation, you need to then press the green button 'APRE' (open) again.  
**NOTE: WHEN FILLING A DEWAR WITH LIQUID NITROGEN, THE OPERATOR MUST REMAIN NEAR TO THE TANK IN ORDER TO ENSURE THE PROCESS IS COMPLETED CORRECTLY.**
8. Once the Dewar has been filled, close the solenoid valve using the control panel by pressing the red 'CHIUDE' (close) button
9. Close your Dewar valve
10. Bleed the V12 'bleeding valve' by turning it anti-clockwise; after completion, close the valve
11. Unplug your Dewar from the nitrogen extraction hose
12. Close the V6 manual valve 'usage valve' turning it in a clockwise direction





Fig. 1 – Manual valves

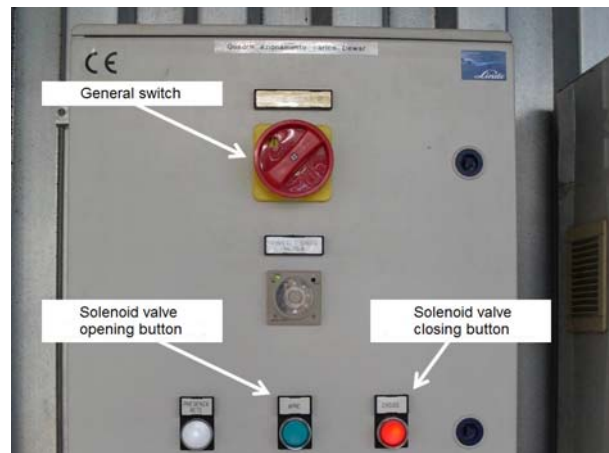


Fig. 2 – Solenoid valve table

## 4.1 Personal protective equipment

The Personal Protective Equipment that must be used when filling a Dewar are as follows:

- cryogenic gloves
- goggles

Trousers must be worn outside of footwear and be free from turn ups.

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## 4.2 Principal risks and behaviour in case of emergency

Exposure of the skin to very low temperatures can cause damage similar to burns. Prolonged exposure causes frostbite. Inhalation of vapours at low temperature can damage the lungs. Cryogenic liquids and vapours can cause eye damage. In contact with cold surfaces (pipes or non-insulated vessels), skin may adhere very firmly due to the freezing of traces of moisture and tear when you try to pull it away.

### 4.2.1 In case of injury from exposure to cold

- wash affected areas with plenty of warm water and avoid rubbing and pulling away the clothes covering the area if possible
- do not expose the area affected to direct heat
- if there are symptoms of frostbite, injury or extensive damage to the eyes is feared, take the victim to a doctor as soon as possible. In the meantime, protect the affected parts with soft garments that are clean and dry. Avoid blocking circulation, keep the patient warm and at rest: no alcoholic beverages.

### 4.2.2 In case of asphyxia

- Personnel working in an environment with low oxygen levels must be equipped with breathing apparatus



- the person must be taken as soon as possible into a normal atmosphere
- if there is respiratory arrest, they must be given artificial respiration and a medic must be called.

**NB:** In the case of an emergency escape of nitrogen (e.g. in the operation of the safety valve of the Dewar or plant) close the solenoid valve using the control panel by pressing the red button 'CHIUDE' (close) before leaving the area.



### 4.3 Overview of the Protection and Safety Service PSS

F. Bavdaz (HPSS)	8437 Mobile 335-7551663 E-mail: flavio.bavdaz@elettra.eu
T. Bonifacio (EPSS)	8297 E-mail: teresa.bonifacio@elettra.eu
M. Divo (EPSS)	8705 Mobile 335-1272647 E-mail: massimo.divo@elettra.eu

