Facility Requirements for the elan2 Office Liquid Nitrogen Generator

Overview

In order to ensure the proper operation of the elan2 Liquid Nitrogen Generator system so that the maximum production of liquid nitrogen can be realized, and the maximum lifetime of the instrument is possible, the following facilities requirements must be followed. Operating conditions outside of these conditions may result in a loss of performance, or damage to the instrument that is not covered under warranty or service contract.

Room Requirements

The elan2 Liquid Nitrogen Generators may not be placed in the following locations:

1. Closet spaces, or small storage rooms
2. Rooms smaller than 8 ft x 8 ft[1] (2.44 m x 2.44 m) with the door closed during operation

1. Small rooms can work if they have excellent temperature control and air flow exchange that meets or exceeds the minimum exchange volume of 50L per minute and 4100 BTU of heat production.

3. Outdoors

The elan2 Liquid Nitrogen Generators require a room with good air flow, good air quality,[2] low humidity, and reasonable temperatures. The following are the requirements for the room environment:

1. Room temperature should not exceed 25 °C (75 °F)[3] when the elan2 system is in operation. The ideal situation would be a room with its own thermostat and air conditioning vent.
    - The elan2 uses air to produce the liquid nitrogen. Good airflow is required. The minimum air flow/air exchange requirement for a room is 50L per minute.
    - The elan2 produces heat as a by-product of producing liquid nitrogen. The heat output of the instrument is approximately 4100 BTU.

NOTE:

A simple approximation is that it functions like a space heater. When the generator is working, the room temperature must not exceed 75 °F. Any room that is under consideration can be tested by placing a space heater in the room for 2 to 3 days - and monitoring the room temperature during that time. Caution must of course be observed when doing this, following the safety suggestions listed on the space heater or in the space heater user manual.

2. Room temperature should not continuously be less than 50 °F (10 °C).
3. Room humidity should not exceed 40% humidity.[4] If necessary, a dehumidifier can be placed in the room to reduce local humidity.
4. The room should be as clean of dust as possible.
    - This does not necessitate a clean room environment but environments like warehouses or fabrication facilities where dust is generated regularly as part of the environment may lead to damage and irreversible clogging of the air compressor or elan2 liquid nitrogen generator and damage not covered under warranty or service contract.
    - The dustier the room the more regularly the filters on the elan2 liquid nitrogen generator will need to be changed and the gratings on both the air compressor and elan2 liquid nitrogen generator system will need to be vacuumed and wiped clean with a dry lint free cloth.
5. The room cannot be a chemical or cleaning product storage area where acids, bases, or volatile organic compounds may be vaporized into the air. Intake of these gases into the elan2 will result in damage to the instrument that is not covered under warranty or service contract.

2. Rooms with dusty environments will require additional cleaning cycles to ensure the proper operation of the system. Dusty rooms may additional require the usage and regular replacement of air filters to ensure warranty coverage.
3. Production of liquid nitrogen results in the generation of heat which is vented out to the room. Air conditioning is recommended, but not required, in the room as long as the overall temperature does not exceed 25 °C (77 °F). Room temperatures over 90 °F (30 °C) will have dramatically reduced production
4. Rooms with higher humidity may result in lower liquid nitrogen production, and at very high humidity, the elan2 Liquid Nitrogen Generator may shut down. Additional cleaning cycles on the unit will help overcome slightly higher humidity levels, within limits.

Spatial Requirements

The Office elan2 Liquid Nitrogen Generator is composed of two parts:

1. The Compressor
    - 17.5" wide x 17.5" deep x 15" high (45 cm wide x 45 cm deep x 38 cm high)
    - This must be installed in a location with at least 6 inches of space around the entire compressor.
    - The air compressor can be installed 15 to 50 feet away from the main unit. As this is the main source of noise, sometimes installation in a separate room, meeting all of the requirements set on the first page, is desirable. 15 foot of cabling is provided - if a distance of greater than 15 feet is desired, MMR Technologies must be notified prior to delivery of the instrument, and a surcharge may result for the additional tubing.
2. The Office Liquid Nitrogen Generator
    - 13" wide x 13" deep x 37" high (33 cm wide x 33 cm deep x 94 cm high)
    - The compressor may be placed in a well ventilated area that is up to 15 feet (4.5 meters) from the Generator.
    - There must be an open space in front of the elan2 system for easy access to transfer liquid nitrogen to the handheld liquid nitrogen devices.
    - The Generator, if installed in a separate location from the compressor, must have at least 6 inches of space around the unit on all sides. This unit must not be placed next to any instrumentation that generates heat or raises the humidity level of the room.

NOTE:

The Office elan2 system is typically installed with the Office Generator on top of the Air Compressor. This gives a minimal floor space footprint of approximately:

- 17.5" wide x 17.5" deep x 52" high (45 cm wide x 45 cm deep x 132 cm high)

NOTE:

It is strongly recommended that this instrument is not installed in the same room as an autoclave, oven, dish washer, washing machine or dryer setup, or similar appliances. Any humidity generating device could result in clogging of the elan2 and therefore reduced production of liquid nitrogen.

The Office System and air compressor can be installed in two different locations, where there is a 15 foot distance between the components.

If stacked, the complete system can bem 17.5 inches wide x 17.5 inches deep and 52 inches high.

Electrical Requirements

The elan2 Liquid Nitrogen Generator runs off of **TWO** standard wall outlets (110V/60 Hz in the USA, 220V/50Hz in the United Kingdom, Asia and Europe).

These wall outlets have the following requirements:

1. The wall outlets must be on a stable power grid and supply. Power fluctuations may result in damage to the compressor and loss of liquid nitrogen production.
2. The wall outlets should not be on the same circuit as any other large equipment (sterilizers, lasers, etc). The ideal setup is a dedicated line directly from the electrical box to ensure a steady power supply.
3. The combined wall outlets for the operation of the compressor and elan2 will need 13 Amps of current.

Uninterrupted Power Supply

An Uninterrupted Power Supply (UPS) is strongly recommended for use with the elan2 system. The UPS should have a rating of no less than 1500 Watts/2000 VA (1980 Watts/2200 VA is recommended).

NOTE:

APC manufactures a Smart-UPS setup that meets this criteria (APC Smart-UPS 2200 VA LCD 120V). There are other manufacturers with similar configurations and specifications that also will work.

Noise Output and Suggested Placement or Location Guidelines

The elan2 Liquid Nitrogen Generator has an air compressor associated with the system. This results in noise generation that can be disturbing if this system is installed in a location where people are on the phone or in a quiet room type environment. Additionally there will be a vibration level associated with the air compressor operation. The air compressor operates at a fairly consistent level of activity - typically operating for days on end without ceasing.

The specification for the noise for the combined operation of the air compressor and the Autotransfer Station is less than 55 dB (decibels) at 1 meter distance from the system. This is comparable in noise level to the following items during typical operation:[5]

- a window air conditioner unit
- washing machine
- hair dryer
- vacuum cleaner

It is strongly recommended that this system be installed in a location away from phone systems or office settings. Installation in laboratory locations, computer server rooms (with climate control), well ventilated and climate controlled storage rooms, or other locations that meet the facilities requirements is suggested.

Caution on Building Energy Saving Cycles

Many office and laboratory buildings shut down air conditioning and climate control environments during weekends and evenings. This may result in an environment that does not meet the facility requirements for operation of the elan2 liquid nitrogen generators. During these periods, clogging or loss of production may result. Long term operation under these conditions may lead to damage to the elan2 that is not covered under instrumentation warranty. Understanding your building environmental control cycles and determining if the room that the elan2 system is set up in will meet the facility requirements is an important step in determining the installation location.

5. This decibel level information has been excerpted from The Center for Hearing and Communication - Noise Center (http://www.lhh.org/noise/decibel.htm).