

Oxygen Generation Milspec MPOG™

Chemical oxygen generator providing 2600 litres of breathable oxygen



Introduction

The mil spec MPOG is a chemical oxygen generator that produces high purity oxygen suitable for breathing. The oxygen is produced by the thermal decomposition of chlorate block using an iron promoter. The generators consist of a chemical block sealed inside a stainless steel canister. This generator is sealed inside a further outer sealed stainless steel canister to minimise the chance of contamination and ensure the operational generator remains in good condition during storage before it is used. Therefore to use the generator the outer canister is first opened and the inner generator removed ready for use. The generator is initiated using a separate igniter match which is screwed into the top of the unit to initiate the chemical reaction. Once a unit has been started it cannot be stopped and will deliver 2600 litres of breathable oxygen over a 60 to 90 minute reaction period. During this oxygen delivery time the unit will heat up and the casing temperature will reach up to 500°C. At the end of this time the outside of the unit will remain hot for several hours.

WARNINGS

- The unit(s) will get very hot during use – ensure the unit is not used where skin contact or contact with flammable materials can occur.
- Pure oxygen is not flammable but will lower the ignition temperature of many flammable substances and make them burn faster if the concentration is allowed to increase significantly above normal air concentrations (21.5%) - ensure that the oxygen concentration will stay within acceptable limits for the application.
- Oil contamination in a pure oxygen environment is dangerous and can cause fast ignition, gaseous impurities or even explosions. It is therefore important that oil contaminated oxygen generators or accessories must not be used.
- Each unit provides 2600 litres of chemically pure breathable oxygen – ensure the enclosed volume it is used in is sufficient to avoid any issue of unacceptable over pressure.

General Safety

It is the responsibility of the facility managers to carry out a risk assessment of the operating procedures to be used for the deployment of chemical oxygen generators before they are put into service.

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The mil spec MPOG is intended to be used only by trained personal that are familiar with the local operating procedure(s).

An operational generator consists of three parts – the ‘oxygen generator canister’, a ‘tin opening key’ and a separate ‘igniter match’. Each unit requires an igniter match – ensure there is one igniter match for each generator available. The ‘tin opening key’ is used to open the outer canister tear-off seal and can be reused with further units.

Instructions for use

Opening outer canister

- Ensure an ‘igniter match’ is available before opening this canister (stored separately – not included in this canister) – see Figure 1.
- Check the package is undamaged and the match has not exceeded its expiry date. Do not open the igniter match packaging at this stage.
- Do not open the outer canister until immediately before use – once a generator is unsealed it should normally be used with 15 minutes but should not be left open for more than an hour before use (to minimise the chance of contamination and absorption of water vapour).
- Visibly examine the outer canister for damage and contamination by oil or water. Damaged units (large dents or breached canister) or severely contaminated units must not be used. They should be marked as ‘defective’ in the status box on the unit and returned to stores for proper disposal.
- Insert the ‘tin opening key’ onto the tear off tag and turn to break and remove the tear off seal – completely remove the seal but retain the key for further use. (see Figure 2)

WARNING - the seal edges may be sharp – take care to avoid cuts, use gloves if necessary.

- The inner oxygen generator canister **must** be completely removed from this outer canister before use.

Inner canister – starting the generator:

- The inner canister should be clean and dry - visually examine for contamination (oil or water). Do not use oil or water contaminated units as this indicates a failure of the outer canister.
- Do not use if indicator has turned colour (see Figure 3 for unchanged good indicator) – this indicates a failure of the outer storage canister – mark such units as ‘defective’ and return them to stores for safe disposal.
- Lift the ‘T’ handles to break the tear seal and completely

Figure 1 – igniter match



Figure 2 – key and tear strip



Figure 3 – ‘T’ handle / indicator



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remove the seal to expose the ignition port – (see Figure 4).

- Once the seal has been removed the unit should be started within 15 minutes. Unsealed unused units should be marked as 'unused' replaced in the outer canister marked 'do not use' and returned to stores for proper disposal. The top should be taped over to prevent contamination during storage and disposal.

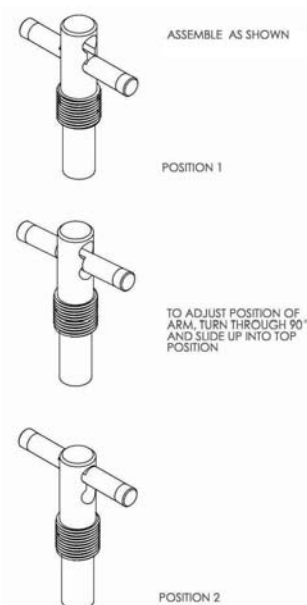
WARNING – exposed sharp edges to tear off seal.

Figure 4 – Top of inner canister



- Place the unit in a position away from flammable material or skin contact as determined by the operating procedure for the area.
- The unit is now ready to start: remove the igniter match from its packaging and ensure the red phosphorous end is present and has not been damaged. Avoid unnecessary contact with the red phosphorous end whilst handling.
- Place the toggle bar in the lower position hole (position 1 in Figure 5).
- Screw the 'igniter match' down into the central threaded ignition port in the top of the unit until resistance is felt then turn another half turn or until it can go no further– the unit will start.
- **DO NOT** remove the igniter match – as this would allow unfiltered gas to leave the unit.
- The unit will take a few minutes to become hot but will start delivering oxygen as soon as the igniter is screwed in.
- If after about 5 minutes the unit has not started (no oxygen being delivered or the unit not getting hot) unscrew the igniter match a couple of turns (do not completely remove) and place the toggle bar in the upper position (position 2 in Figure 5) then screw fully in until it can go no further – the unit should start.
- The unit will deliver oxygen from the top ports for between 60 and 90 minutes.
- The unit will remain hot for several hours after it has stopped delivering oxygen but can be handled if necessary with suitable heat resistance gloves.
- The used unit should be marked as 'USED' on both the generator and the outer tin and can then be safely stored back in the original outer canister and returned to stores for safe disposal.
- See separate instructions below for management of contaminated or failed units.

Figure 5 – toggle bar



Management of used, failed or contaminated units:

- A status panel is provided on both the inner and outer canisters to allow easy recording of the status of the units after use.

Descriptions of status:

Used – a unit that has been successfully started and operated to exhaustion and is no longer hazardous.

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Unused – a unit that has been opened and not used – this may be due to the moisture indicator showing a breach of the outer canister or damage to the canister(s) rendering the unit unserviceable – such units are considered a hazardous material for transport and disposal.

Contaminated – a unit that has been contaminated and as such is not serviceable – it needs to be marked as such and returned to stores for safe disposal as a hazardous waste.

Failed – a unit that has failed to start or has stopped for some reason prematurely.

Used units

These need to be placed somewhere safe away from flammable materials and allowed to cool. They should be marked with their status in the box provided and can then be returned to their outer canister and stored prior to disposal. They are not considered hazardous waste but do need to be disposed of via a licensed approved waste contractor.

Unused units

These **MUST NOT** be stored with the igniter match in place. If the igniter has been partly inserted it must be removed and stored separately prior to storage of the unit. These should be marked with their status in the box provided and returned into their outer canisters –the top should be taped over to prevent ingress of contamination. The units must be returned to stores for proper disposal as hazardous waste via an appropriately approved waste contractor. These units are still classified as a UN 1479 oxidising material. If the igniter match has been removed from its packaging and not used, it should be returned to the packaging and taped back in place then marked as ‘not to be used’. It will then remain a UN1944 match, safety for transport and disposal.

Failed units

In the unlikely event of a unit failing prematurely it should be treated similarly to an unused unit. When the unit has been allowed to cool and it is clearly not working the igniter match **must be removed** before the unit is returned to its outer canister and taped up ready for return to storage. The unit should then be treated the same as an unused unit.

Contaminated units

Any unit that has been identified as contaminated **MUST NOT BE USED** and should be marked as ‘contaminated’ in the status box provided. The igniter match must not be inserted into a contaminated unit. Such units should remain in the outer canister or be replaced in this if already removed and any open seals taped over to prevent further contamination. These units must be returned to stores with a note of the likely contaminant and treated as a potentially hazardous material. The units must be transported and disposed of as hazardous waste via an appropriately approved waste contractor. These units are still classified as a UN 1479 oxidising material but should be segregated from uncontaminated units.

Note: - any oxygen generator contaminated with hydrocarbons may explode if initiated.

Traceability – through life management

Each generator has a unique lot number as well as an ‘Expiry’ date to allow traceability and management of the units. This data is indelibly engraved on the outer canister and inner canister of the units and is repeated as both normal text and an optically readable 2D data matrix. The units also have a status box that can be used to show the status of used units as documented above. It is therefore recommended that used units should always be returned to their original outer canister

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after use to allow easy management of the units. The machine readable data matrix allows fast and easy recording of the movement of the units through storage, transfers to and from the place of use and subsequent disposal. It is recommended that the users set up a recording system capable of recording the status of the individual units throughout their use, up to the point of disposal. Please contact Molecular Products Ltd for a recommended data matrix reader.

Transport classification

The generator block is supplied and transported to the customer as a UN1479 oxidiser block. It does not form an oxygen generator until the other components necessary for its use are present. The igniter matches are supplied as separate UN1944 safety matches and are not despatched using the same transport as the oxidiser block.

Oxidiser block:

Proper shipping name: UN 1479 Oxidising solid N.O.S (contains sodium chlorate)

Transport classification: Oxidiser

Hazard classification 5.1

Packing Group: II

Igniter Match:

Proper shipping name: UN 1944 Matches safety

Transport classification: Flammable solid

Hazard classification 4.1

Packing Group: III

Handling and storage

The units are supplied fitted with handles on both the outer and inner tins to facilitate safe manual handling and movement of the units. The handles are designed for simple manual handling and are not suitable for crane lifting of single or multiple units and are not designed to withstand a tethered drop.

The units are supplied in their own purpose built stillage to facilitate bulk handling and transportation. The stillages are designed to withstand stacking up to four units high when loaded as supplied. Each stillage has a maximum gross load of 500kg as supplied. Holes (25mm) are provided on each of the four uprights to facilitate crane lifting using appropriate lifting accessories.

Each mil spec MPOG has a gross weight of circa 12.5 kg and are supplied 25 units to a stillage. The stillage has a maximum gross weight of 500 kg.

The 'igniter matches' are supplied in sealed pouches in boxes suitable for long term storage in clean dry conditions. It is recommended that the igniter matches are stored in the boxes until needed. The facility will require one igniter match for each generator canister. Consideration should be given to provide a small number of additional igniter matches to allow for damage in storage and use that may occur. The expiry date of the matches should be the same or later than the mil spec MPOG units they are intended to be used with at the time of supply / installation. It is recommended that the 'igniter matches' are not stored in the same lockers as the canisters but do need to be readily available within the facility to allow easy access when the units are needed.

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The outer can 'tin opening key' for the tear off strip is considered a reusable part but sufficient keys should be available to ensure they are available when required. Again they need to be stored in the facility where they are readily available when required.

Responsibilities and liability statement

The mil spec MPOG oxygen generator is designed to be a single use item. The mil spec MPOG oxygen generator is designed to be used as part of a purpose built air purification system that can operate within the documented design parameters No liability can be accepted for generators that are used outside the designed operating mode.

If the mil spec MPOG has been damaged by abuse in storage or transport or is contaminated by hydrocarbons, moisture or any flammable contaminant then units **MUST NOT BE USED** and should be disposed of.

Only remove the seals immediately before use. The seals are designed to protect the unit in storage and prior to use. Units left unsealed for extended periods may not start and are prone to contamination and can absorb atmospheric water vapour. Once the seals have been removed the unit should normally be used or discarded within 15 minutes.

The mil spec MPOG should only be used as part of a refuge or enclosed environment system specifically designed for its use. The manufacturer's advice for mil spec MPOG use should be used when planning the operating procedures.

The performance is guaranteed only if the units are used and stored within the declared operational limits set by the manufacturer and documented for the mil spec MPOG.

Used, or discarded unsealed oxygen generators must be disposed of via a suitably qualified waste disposal contractor in accordance with local legislation.

The way that the units are used is the responsibility of the user and /or facility operator. It is strongly recommended that the facility operator should carry out a risk assessment of the way in which the unit(s) are to be used before they are deployed

Failure to follow the guidance above is entirely at the user's risk and discretion. Molecular Products Ltd can give no guarantee of the mil spec MPOG performance outside of the above conditions.

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