Medical Oxygen

Integral Valve Cylinders Instructions For Use

Version 1021

Introduction

All cylinders supplied by BOC are designed to be as user friendly as possible making access to medical gases simple and straight forward.

Integral valve cylinders

Cylinders fitted with integral valves were introduced to improve the safety of medical gases administration. There are numerous benefits to this type of cylinder package which include:

→ **Built-in Regulator**
  Eliminating the need to fit a separate regulator before the gas can be administered to the patient
→ **Live Content Gauge**
  Shows oxygen contents, even when the cylinder is turned off
→ **Residual Pressure Valve**
  Retains a minimal positive pressure in the cylinder to prevent contamination when empty
→ **Simple to use Cylinder Valve Handwheel**
  Avoids the need for a separate valve key to operate the valve
→ **Easy and Clear Flow Selector**
  Firmly clicks into position to ensure the correct flowrates are delivered

→ **Firtree Outlet and Pressure Outlet**
  The valve outlets replicate the connections used in both hospital and ambulance settings for easy transfer of patients
→ **Integrated Carrying Handle**
  Ergonomically designed to make the cylinder easier to carry
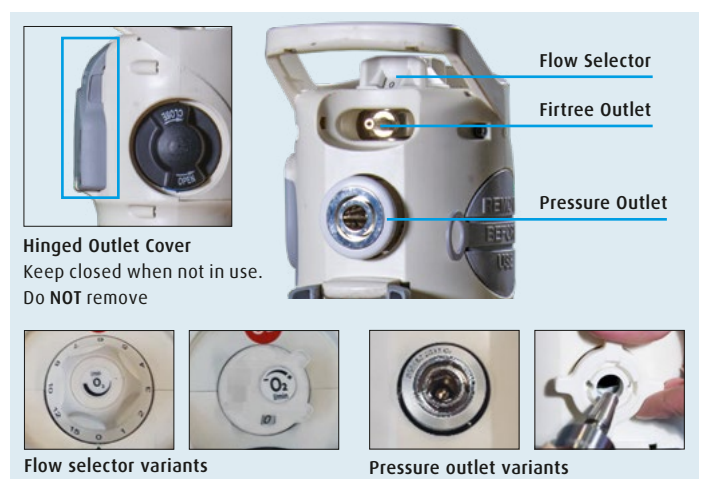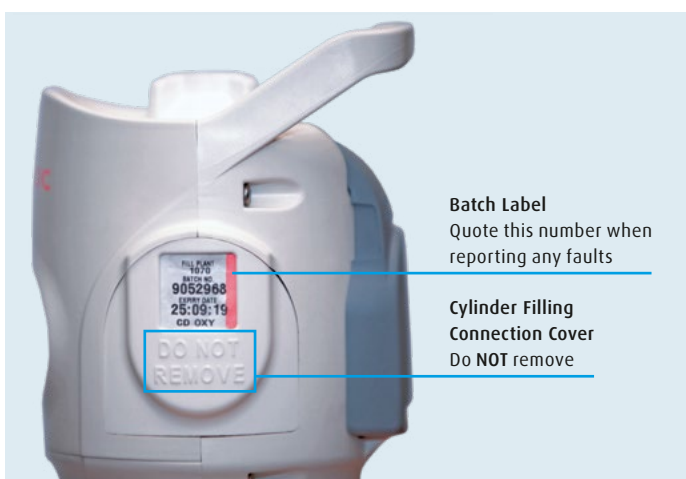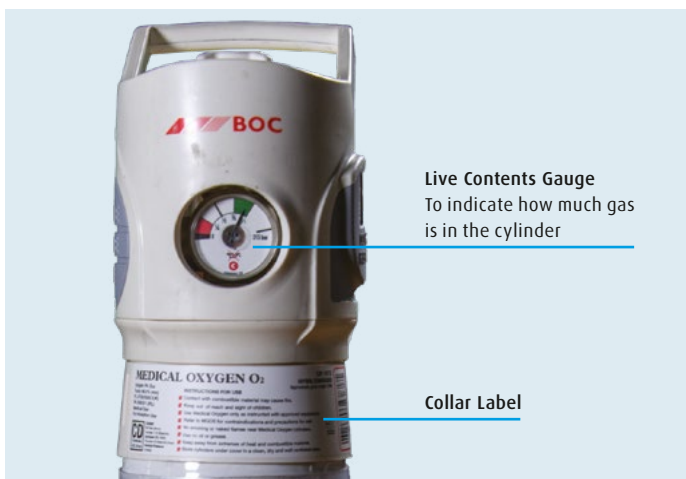→ **Clear Product Labelling**
  Provides essential information and simplified instructions about the product and how to operate the valve correctly
→ **Cylinder Valve Handwheel Cover**
  Acts as a tamper evident device to demonstrate the cylinder has not been used and is safe for patient use
→ **Hinged Outlet Cover**
  This ensures that the firtree and pressure outlets remain clean and uncontaminated when not in use

Live Contents Gauge
To indicate how much gas is in the cylinder

Collar Label

Cylinder Valve Handwheel Cover
To use the cylinder, you **MUST** remove the cylinder valve handwheel cover first

Cylinder Valve Handwheel Variant 2

Cylinder Valve Handwheel

Cylinder Bar Code
Quote this number when reporting any issues

Batch Label
Quote this number when reporting any faults

Cylinder Filling Connection Cover
Do **NOT** remove

Flow Selector

Firtree Outlet

Pressure Outlet

Hinged Outlet Cover
Keep closed when not in use.
Do **NOT** remove

Flow selector variants

Pressure outlet variants

Safety information

Golden rules

1. **Ensure you are formally trained to use the integral valve oxygen cylinder correctly**
   The training should cover all aspects of the safe operation of the cylinder, the properties of the gas and how to avoid the potential risks to yourself and the patient, associated with using the medical oxygen cylinder
2. **Before using the cylinder check the contents gauge for cylinder content**
   This ensures there is enough gas available for patient treatment
3. **Always open and close the cylinder valve handwheel slowly**
   Opening the valve quickly can cause the gas to become hot, which may lead to a fire in the valve
   Although oxygen is non-flammable, it will strongly support combustion once a fire has started
   Note: When you turn on the cylinder, the internal residual pressure valve will make a loud click as it opens, indicating the valve is operating correctly
4. **Never use oil or grease near an oxygen cylinder or on any oxygen delivery equipment**
   Ensure your hands are clean as oils, greases and alcohol-based products can ignite automatically when in contact with medical oxygen
5. **Set up the cylinder away from the patient, ensuring the outlets are pointing away from yourself and the patient when you turn the cylinder on**
   It is important to make sure the cylinder is functioning correctly before administering the gas to the patient

Safety information and general precautions for using medical oxygen

General precautions

→ **Oxygen is non-flammable but strongly supports combustion**
   Be aware that things that are not normally combustible may burn violently in oxygen
→ **Do not store or use medical gas cylinders near naked flames, sources of ignition or combustible materials**
   These conditions increase the risk of a fire occurring
→ **Oxygen will be absorbed into bedding and clothing when exposed to the gas, making them burn violently if ignited**
   Make sure the patient's clothing is well aired before allowing them near any sources of ignition
→ **Smoking must not be permitted in the vicinity where cylinders are used or stored**
   A lit cigarette will burn violently in the presence of oxygen and can act as a source of ignition for oxygen enriched clothing or bedding
→ **Do not use oil or grease (or any oil-based products, including hand creams) when using an oxygen cylinder**
   Oils and grease can spontaneously ignite in the presence of oxygen especially in high temperature conditions

Cylinder storage

→ **Store medical oxygen cylinders securely in a safe area**
   To avoid cylinders falling over and causing injury
→ **Use appropriate signage to identify the approved storage areas, with separate areas for full and empty cylinders**
   To ensure staff select the correct cylinder for patient use
→ **Store medical cylinders separately from other non-medical cylinders**
   To avoid confusion when selecting medical gas cylinders for patient treatment
→ **Storage areas should be well ventilated, kept clean and dry, and preferably undercover**
   To ensure cylinders are maintained in a suitable condition for patient use
→ **Rotate the cylinder stock, by using the cylinder with the earliest expiry date on the batch label first**
   Ensure cylinders are always used within their expiry date. Cylinders past their expiry date should not be used and returned to BOC
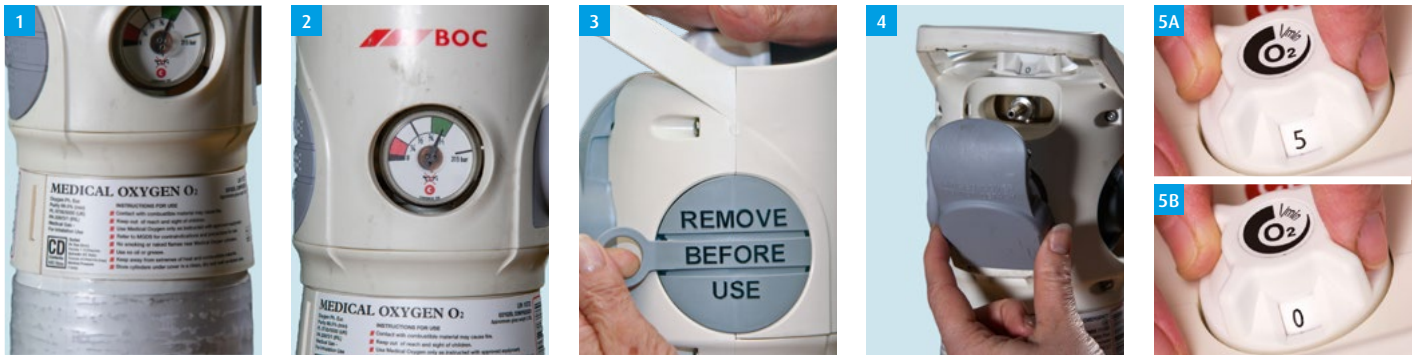
Cylinder use

→ **Always use an appropriately designed cylinder support to hold the cylinder whilst in use near the patient**
   Avoid placing the cylinder on the patients bed when in use. The cylinder support should keep the cylinder upright to prevent it from falling over and causing injury
→ **Set up and test the cylinder before placing near the patient**
   By setting up the cylinder away from the patient, it ensures the cylinder is functioning correctly before administration
→ **Ensure the outlets are facing away from yourself and the patient when opening the valve**
   The safest way to prepare the cylinder is to open the cylinder valve handwheel with the outlets facing away from you and the patient, should an incident occur
→ **Always close the cylinder valve handwheel when the cylinder is not in use**
   Closing the cylinder valve handwheel stops unnecessary losses, which could lead to empty cylinders when oxygen is required

General warnings

→ **Never remove or de-face batch or collar labels**
   This ensures the correct information is available to the user to enable them to use the cylinder correctly. Unauthorised labels/tags must not be fitted
→ **Do not clean the cylinders with any materials which contain ammonium or chloride compounds**
   Ammonium and chloride compounds could cause corrosion of the brass valve which may result in problems with medical gas delivery
→ **Do not refill or tamper with the cylinder package**
   It is important that the cylinder is not contaminated during use as this may cause problems when refilled. Do not remove the white cylinder filling connection cover

# Using your integral valve cylinder is as simple as 1,2,3

Step 1: Selecting the right cylinder

→ **Check the collar label** to make sure it is the correct gas for patient treatment (see picture 1)
→ **Check the contents gauge** to ensure that you have sufficient gas available in the cylinder for the treatment (see picture 2)

Step 2: Preparing the cylinder ready for use

→ On first use, **remove the cylinder valve handwheel cover** to allow access to the cylinder valve handwheel (see picture 3)
→ **Open the hinged outlet cover** to allow access to the firtree outlet and/or the pressure outlet (see picture 4)
→ **Check the valve is turned off before connecting equipment** by turning the flow selector to 5lpm and ensuring no gas is flowing from the firtree (see picture 5A)
→ **Return flow selector to zero** (see picture 5B)
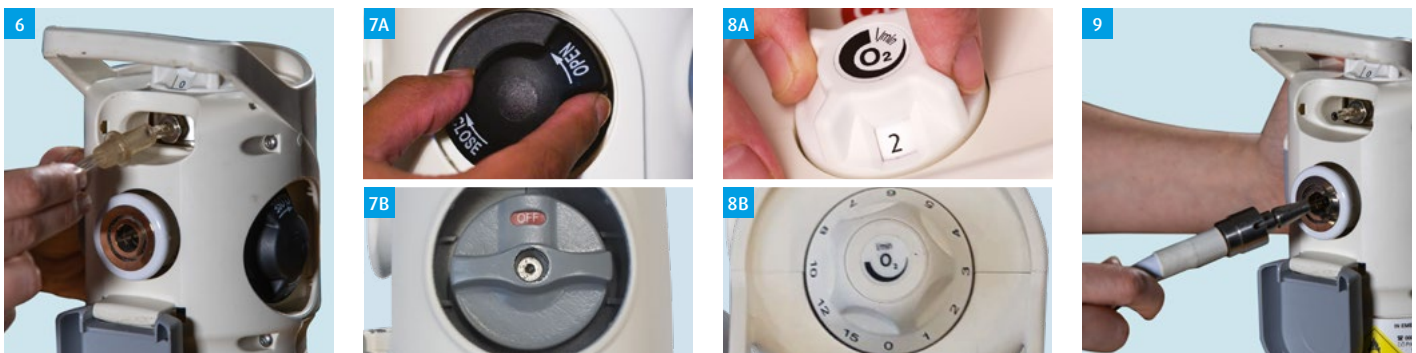
Images show the different types of cylinder valve handwheel

Images show the different types of flow selector

Step 3: Setting it up for patient use

(a) Using the firtree outlet:
→ **Turn the cylinder outlets away** from the patient and yourself
→ **Connect the mask/nasal cannula** to the firtree outlet (see picture 6)
→ **Slowly open the cylinder valve handwheel** fully (see picture 7A/7B)
→ **Select 5 lpm** using flow selector for a few seconds and check gas continues to flow (see picture 5A)
→ **Select the prescribed flow** using the flow selector (see picture 8A/8B)
→ **Fit the mask/nasal cannula** to the patient

(b) Using the cylinder pressure outlet:
→ **Turn the cylinder outlets away** from the patient and yourself
→ **Insert the probe** into the pressure outlet (see picture 9)
→ **Slowly open the cylinder valve handwheel** fully (see picture 7A/7B)
→ **Select 5 lpm** using flow selector for a few seconds and check gas continues to flow from the firtree outlet (see picture 5A)
→ **Return flow selector to zero** (see picture 5B)
→ **Turn on the equipment**

For the detailed instructions see overleaf.

Instructions for use

Initial safety checks

Before handling cylinders:
→ Ensure your hands are clean
→ If you have been using alcohol based gel or liquids make sure the alcohol has totally evaporated

When selecting the cylinder for use, check that the cylinder is clean and not damaged. Ensure the cylinder, particularly the firtree outlet and pressure outlet, are not contaminated with oils or grease such as those used in hand creams.

Step 1: Selecting the right cylinder

1.1 Check the collar label to ensure you have selected a medical oxygen cylinder.

1.2 Check the expiry date on the batch label.
The oxygen should not be used after this date and the cylinder returned to BOC.

1.3 Check the gauge to confirm the cylinder contents.
For new cylinders the needle should be in the green zone.

1.4 To determine there is enough gas in the cylinder check the duration chart for the required flow or use the BOC Remaining Time Estimator app.
If the needle is in the red zone consider selecting a new cylinder.

Step 2: Preparing the cylinder ready for use

2.1 To gain access to the cylinder valve handwheel, pull the tear ring to remove the cylinder valve handwheel cover.
Discard the cover in the appropriate recycling bin.

2.2 The cylinder valve handwheel must not be opened until after the equipment is connected.
Turn the cylinder valve handwheel clockwise to check it is closed.

2.3 Ensure the flow selector on top of the cylinder is set to zero before connecting any equipment.

2.4 Lower the hinged outlet cover to enable equipment to be connected.
Do not remove the hinged outlet cover as it must be closed after use to keep the outlets clean.

Step 3 (a): Setting up the cylinder for patient use using the firtree outlet

3.1 (a) Turn the cylinder so that the outlets are facing away from yourself and the patient before turning on the cylinder.
Keep the cylinder away from the patient until set up has been completed.
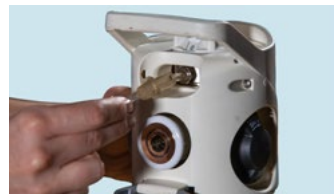
3.2 (a) Connect the tubing to the firtree outlet before opening the cylinder valve handwheel.
Ensure the tubing is pushed on securely.

3.3 (a) Turn on the cylinder by slowly rotating the cylinder valve handwheel anticlockwise at least one complete turn. Select 5 lpm on the flow selector and listen for the sound of the oxygen flowing from the firtree outlet.
Allow the oxygen to flow for at least 5 seconds to make sure the cylinder valve handwheel is turned on correctly.

3.4 (a) Once the cylinder has been checked for oxygen flow, select the prescribed patient flow rate for the required therapy and fit the administration equipment to the patient.
Ensure that the correct flow rate number is clearly visible in the flow selector window or aligned with the flow indicator arrow.

Step 3 (b): Setting up the cylinder for patient use using the pressure outlet

3.1 (b) Turn the outlets away from yourself and the patient before turning on the cylinder.
Keep the cylinder away from the patient until set up has been completed.

3.2 (b) Check the probe is clean and free from oil and grease before inserting.
Push the probe into the pressure outlet firmly, applying moderate force until it clicks securely into position.

3.3 (b) Turn on the cylinder by slowly rotating the cylinder valve handwheel anticlockwise at least one complete turn. Select 5 lpm on the flow selector and listen for the sound of the oxygen flowing from the firtree outlet.
Allow the oxygen to flow for at least 5 seconds to make sure the cylinder valve handwheel is turned on correctly.

3.4 (b) Once the cylinder has been checked for oxygen flow turn the flow selector to zero.
The cylinder is now ready for you to turn on the medical device and start the patient therapy.

Step 4: Monitoring during use

4.1 Keep the cylinder upright and facing away from the patient using a suitable cylinder holder.
Avoid placing the cylinder on the patient's bed. If there is no alternative option when moving the patient, only place it on the bed after you have followed the setting up procedure.

4.2 Regularly check the patient's clinical condition during therapy to ensure it remains satisfactory.
If using a mask make sure that it remains fitted correctly. This will ensure that there are no leaks around the mask and that the patient is receiving the prescribed oxygen flow rate.

4.3 Use pulse oximetry where appropriate.
If the pulse oximeter indicates a low oxygen saturation, check the cylinder contents, check for flow and that the administration equipment is fitted to the patient correctly. If you can't identify the problem seek advice.

4.4 Check the contents gauge at regular intervals, to ensure there is sufficient oxygen available.
To determine there is enough oxygen in the cylinder check the duration chart for the required flow or use the BOC Time Remaining Estimator app.
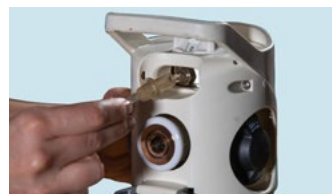
Step 5: After use

5.1 When administration is complete, remove the mask or nasal cannula from the patient.

5.2 Turn off the cylinder by rotating the cylinder valve handwheel clockwise until it comes to a stop.
Do not use excessive force.

5.3 If you have been using the firtree outlet then remove the tubing by firmly pulling the tube, whilst holding the cylinder handle.

5.4 If you have been using the pressure outlet fitted with a push ring, release the probe by pushing the outer ring.

5.5 If you have been using the pressure outlet fitted with a capstan, release the probe by rotating the capstan clockwise while applying pressure to the probe.

5.6 Turn the flow selector to 5 lpm and listen for the flow of oxygen to stop from the firtree outlet. When the flow stops turn the flow selector to zero.

5.7 Close the hinged outlet cover to protect the outlets from contamination when the cylinder is not in use and being returned to BOC for refilling.

5.8 Check the remaining cylinder contents using the gauge. If there is sufficient oxygen left for further treatments, return cylinder to designated "in use" store.
If the needle is in the red section return to the empty cylinder storage area.

Oxygen cylinder data

Cylinder data summary

Size	Gauge contents Flowrate (ltr/min)	Full (100%) (hr.min)	(mins)	Half (50%) (hr.min)	(mins)	Low (25%) (hr.min)	(mins)
CD oxygen (product code 101-CD)	15	0.30	30	0.15	15	0.07	7
Nominal contents: 460 litres	10	0.46	46	0.23	23	0.11	11
Nominal cylinder pressure: 230 bar	6	1.16	76	0.38	38	0.19	19
Water capacity: 2.0 litres	4	1.55	115	0.57	57	0.28	28
Nominal weight: 3.5 kg	2	3.50	230	1.55	115	0.57	57
	1	7.40	460	3.50	230	1.55	115
ZD oxygen (product code 101-ZD)	15	0.40	40	0.20	20	0.10	10
Nominal contents: 605 litres	10	1.00	60	0.30	30	0.15	15
Nominal cylinder pressure: 300 bar	6	1.40	100	0.50	50	0.25	25
Water capacity: 2.0 litres	4	2.30	150	1.15	75	0.37	37
Nominal weight: 4.1 kg	2	5.00	300	2.30	150	1.15	75
	1	10.00	600	5.00	300	2.30	150
HX oxygen (product code 101-HX)	15	2.33	153	1.16	76	0.38	38
Nominal contents: 2300 litres	10	3.50	230	1.55	115	0.57	57
Nominal cylinder pressure: 230 bar	6	6.20	380	2.40	160	1.20	80
Water capacity: 10.0 litres	4	9.35	575	4.47	287	2.23	143
Nominal weight: 19.0 kg	2	19.10	1150	9.35	575	4.47	287
	1	38.00	4080	34.00	2040	17.00	1020
ZX oxygen (product code 101-ZX)	15	3.22	202	1.41	101	0.50	50
Nominal contents: 3040 litres	10	5.04	304	2.32	152	1.16	76
Nominal cylinder pressure: 300 bar	6	8.22	500	4.10	250	2.05	125
Water capacity: 10.0 litres	4	12.40	760	6.20	380	3.10	190
Nominal weight: 14.0 kg	2	25.20	1520	12.40	760	6.20	380
	1	50.12	3000	25.00	1500	12.30	750

Further information is available on www.bochealthcare.co.uk including:
→ Patient Information Leaflet
→ Medical Gas Data Sheet (including Summary of Product Characteristics)
→ Cylinder Data Chart

Further advice and education material about the correct use of integral valved medical oxygen cylinders can be obtained for your staff on our training site www.boctraining.co.uk

The Remaining Time Estimator app can be downloaded free from the Google Play Store. Search for Remaining Time Estimator and select the app with the icon shown here.

Checking for leaks

When setting up the cylinder, if you suspect that you have a leak when you turn the cylinder on you should check the system set up carefully, following the instructions below:

If you are using the firtree outlet:

1	Turn off the cylinder by closing the cylinder valve handwheel slowly.
2	Allow any gas in the system to vent through the face mask/nasal cannula connected to the tubing.
3	Disconnect the tubing and inspect for damage.
4	Reconnect the tubing to the firtree outlet and turn on the cylinder valve handwheel slowly. Recheck for leaks.
5	If the leak continues and appears to be coming from the cylinder valve, close the cylinder valve handwheel and follow the Complaint Procedure.

If you are using the pressure outlet to connect tubing using a medical oxygen probe:

1	Turn off the cylinder by closing the cylinder valve handwheel slowly.
2	Turn off the medical device connected to the cylinder.
3	Select a flow using the flow selector and wait for any gas to stop flowing out of the firtree outlet. Return the flow selector to zero.
4	Remove the probe from the pressure outlet and inspect for any wear or damage.
5	Reconnect the probe, ensuring it clicks firmly into position and turn on the cylinder valve handwheel slowly. Recheck the probe/tubing for leaks.
6	Check the medical device for leaks. If the downstream equipment is leaking, replace as appropriate.
7	If the leak continues and appears to be coming from the cylinder valve, close the cylinder valve handwheel and follow the Complaint Procedure.

Complaint procedure

Having filled the cylinders, we take great care to ensure that they are working correctly and safe to use.

But if you have a leak you cannot rectify or if you identify there is something else faulty with the cylinder, it is important that you report this immediately to BOC. We will try to help you fix it, but if this is not possible you will need to return it to BOC so we can identify the root cause for the fault.

Having identified a faulty cylinder, you need to:

1   Return the cylinder to the cylinder store, so that it can be securely stored in a designated area for return to BOC.

2   Attach a label to the cylinder, indicating the identified fault. Note the cylinder bar code number and the batch details as we will require you to give us this information so we can ensure that the correct cylinder is collected.

3   Phone BOC Customer Service on **0800 111 333**. The Customer Service Agent will ask you for the details about each cylinder under complaint, the bar code and batch details and the identified fault. You will be given a separate complaint reference number for each faulty cylinder.

4   When the BOC driver next comes to site, they will request that you identify the complaint cylinder so they can record its collection. A replacement cylinder will be supplied at the same time.

5   If you request a report, this will be provided once BOC has completed their investigation.

To assist with reporting complaint cylinders, BOC can provide you with a simple leaflet describing the procedure and some labels to assist with the process. Ask you Customer Service Agent or your Account Manager, if you would like some labels sent to you.

Complaint cylinder

Customer	
Location	
Barcode	
Date reported	
Complaint	

Phone complaint details

Barcode	
Complaint	
Batch number	

BOC ref.

1. Segregate complaint cylinder from all other cylinders
2. Fill in details on front of label as detailed in complaints procedure
3. Attached label to complaint cylinder with a cable tie
4. Remove customer receipt section, use these details to register complaint with CSC

Part no: 19332748

Customer receipt

1. Call CSC on 1890 355 255 to register complaint
2. Provide CSC with cylinder batch number and barcode as detailed on reverse
3. Record BOC complaint reference number on receipt

Notes

Notes