



Laboratory Gas Sampling & Small Cylinder Gas Control Guide

A Technical Buyer's Guide to Septum Regulators, Lecture Bottle Valves, Pressure Reducing Regulators and Adaptors

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Laboratory Gas Sampling & Small Cylinder Gas Control Guide

How to select gas valves, septum regulators, lecture bottle valves, pressure reducing regulators and adaptors for laboratory gas and specialty gas applications

Oxford Valves

Precision gas valves, regulators, adaptors and gas control components

About This Guide

Laboratory gas and small cylinder gas applications often require compact, precise and correctly matched gas control components. Depending on the application, a user may need to withdraw a sample through a septum, control gas from a lecture bottle cylinder, reduce pressure from a compact gas source, or connect a cylinder to a regulator, adaptor or instrument setup.

This guide explains how Oxford Valves gas control components are used in laboratory gas sampling, specialty gas packages, compact cylinder applications, syringe-based gas extraction, calibration gas sampling and analytical gas support.

It is written for laboratories, specialty gas suppliers, calibration gas fillers, research facilities, universities, analyser companies, gas detection companies, technical distributors and procurement teams.

Oxford Valves supplies gas valves, regulators, adaptors and gas control components. Oxford Valves does not supply laboratory gases, gas mixtures, gas generators, analytical instruments, complete laboratory gas systems or gas distribution systems.

Oxford Valves products are manufactured under ISO 9001 quality processes and should be selected according to the specific gas, cylinder, pressure, flow, material, seal and connection requirements.

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1. Why Laboratory Gas Component Selection Matters

Laboratory gas applications often involve smaller gas volumes, compact cylinders, specialty gases, analytical procedures or controlled sampling methods. The gas control component must be suitable for the cylinder, pressure, gas mixture, connection type and sampling method.

Incorrect component selection can create problems such as:

- unsuitable cylinder connection
- incorrect regulator type
- wrong outlet pressure
- incompatible outlet connection
- poor syringe sampling setup
- gas leakage risk
- unsuitable material for the gas mixture
- seal or septum incompatibility
- contamination risk
- difficulty connecting to laboratory equipment
- unsafe use above rated pressure

Laboratory gas components should never be selected by product name alone. The full application must be reviewed.

Important selection factors include:

- gas mixture
- cylinder type
- cylinder pressure

- inlet connection
 - outlet connection
 - required outlet pressure
 - sampling method
 - syringe and needle compatibility
 - body material
 - seat, seal and septum material
 - downstream instrument or adaptor requirement
-

2. Common Small Cylinder Gas Control Applications

Small cylinder and laboratory gas applications vary widely. Some users need controlled pressure delivery, while others need only to extract a small gas sample.

Common applications include:

- laboratory gas sampling
- syringe-based gas extraction
- calibration gas sampling
- specialty gas sample withdrawal
- lecture bottle cylinder control
- compact gas cylinder packages
- analytical gas applications
- research and testing facilities
- university laboratory gas use
- environmental monitoring laboratories
- gas detector calibration checks
- laboratory instrument verification
- portable gas analysis support
- small specialty gas package applications

Oxford Valves supports these applications through component supply, not through complete laboratory gas system supply.

3. Syringe-Based Gas Sampling

What Is Syringe-Based Gas Sampling?

Syringe-based gas sampling is a method where a gas sample is withdrawn through a septum outlet using a suitable syringe and needle.

Instead of continuously delivering gas through tubing, the user extracts a measured sample for analysis, verification or transfer to another test setup.

Where Syringe-Based Sampling Is Used

Syringe-based gas sampling may be used in:

- laboratory gas sampling
- calibration gas sample checking
- specialty gas analysis
- research procedures
- analytical method development
- portable gas sample withdrawal
- environmental gas checks
- aerosol gas package sampling

Why the Septum Outlet Matters

The septum outlet is the interface between the gas source and the syringe. It must be suitable for the pressure, gas mixture, needle method and sampling procedure.

A septum regulator or septum valve should be selected based on:

- inlet connection
 - maximum inlet pressure
 - outlet pressure where applicable
 - septum material
 - seal material
 - syringe and needle compatibility
 - gas compatibility
 - laboratory procedure
-

4. Septum Regulators

What Is a Septum Regulator?

A septum regulator is a specialised gas regulator designed for gas sample extraction through a septum outlet. It allows a syringe and needle to be used for withdrawing gas from a cylinder, aerosol package or gas source.

Unlike a standard regulator, which may deliver gas through a hose barb, taper, NPT outlet or tubing connection, a septum regulator is intended for sample extraction.

Where Septum Regulators Are Used

Septum regulators are used for:

- laboratory gas sampling
- syringe-based gas extraction
- calibration gas sampling
- specialty gas sample withdrawal
- gas analysis applications
- research and analytical testing
- environmental monitoring gas checks
- laboratory instrument verification
- portable gas sample withdrawal

Oxford Valves Product

Septum Regulators — OV-SR-1200 Series

The OV-SR-1200 Series includes septum regulators and septum valves for laboratory gas, calibration gas and specialty gas sampling applications.

Selection Factors

Before selecting a septum regulator, confirm:

- gas source type
- inlet connection
- maximum inlet pressure
- outlet pressure where applicable
- septum outlet requirement
- syringe and needle compatibility
- gas compatibility
- body material

- seat, seal and septum materials
 - laboratory sampling method
-

5. Aerosol Septum Valves

What Is an Aerosol Septum Valve?

An aerosol septum valve is designed for lower-pressure aerosol-style gas packages where a syringe is used to extract a gas sample through a septum outlet.

It should not be treated like a high pressure regulator. Aerosol septum valves are selected for suitable aerosol gas package applications.

Where Aerosol Septum Valves Are Used

Aerosol septum valves may be used for:

- aerosol gas package sampling
- low-pressure portable gas sampling
- laboratory sample extraction
- calibration gas sample checks
- research gas sample withdrawal
- compact gas test packages

Selection Factors

Before selecting an aerosol septum valve, confirm:

- aerosol inlet compatibility
- maximum inlet pressure
- septum outlet requirement
- gas mixture
- seal material
- sampling method
- syringe and needle compatibility
- laboratory procedure

The pressure rating must match the aerosol package and application.

6. High Pressure Septum Regulators

What Is a High Pressure Septum Regulator?

A high pressure septum regulator is used where gas samples need to be taken from a higher-pressure gas source and withdrawn through a septum outlet.

The regulator must be selected according to inlet pressure, gas compatibility, gauge range, material, seal system and sampling procedure.

Where High Pressure Septum Regulators Are Used

High pressure septum regulators may be used for:

- high pressure gas sampling
- laboratory gas sample withdrawal
- specialty gas analysis
- calibration gas verification
- research gas applications
- analytical gas sample transfer
- compact cylinder gas sampling

Selection Factors

Before selecting a high pressure septum regulator, confirm:

- maximum inlet pressure
- inlet connection
- outlet pressure
- septum outlet
- gauge requirement
- gas mixture
- material compatibility
- seat and seal compatibility
- syringe and needle compatibility
- laboratory safety procedure

High pressure sampling should be reviewed carefully before use.

7. Lecture Bottle Valves

What Is a Lecture Bottle Valve?

A lecture bottle valve is a compact cylinder valve used on lecture bottle cylinders. Lecture bottles are small gas cylinders commonly used for laboratory gases, specialty gases, research applications, analytical testing, calibration gas and compact gas supply.

The valve provides an on/off gas control function and connects the cylinder to a suitable regulator, adaptor or downstream gas delivery setup.

Where Lecture Bottle Valves Are Used

Lecture bottle valves are used in:

- laboratory gas cylinders
- specialty gas packages
- compact gas cylinder assemblies
- analytical gas applications
- calibration gas applications
- research and testing facilities
- educational and demonstration gas systems
- gas sampling systems
- environmental monitoring laboratories
- industrial laboratory gas setups

Oxford Valves Product

Lecture Bottle Valves — OV-LBV-1400 Series

The OV-LBV-1400 Series includes lecture bottle control valves for laboratory gas, specialty gas and compact cylinder applications.

Selection Factors

Before selecting a lecture bottle valve, confirm:

- cylinder is a compatible lecture bottle cylinder
- cylinder inlet thread
- required outlet connection
- maximum inlet pressure
- gas mixture
- body and bonnet material
- seat material

- internal component compatibility
 - regulator or adaptor compatibility
 - final laboratory or specialty gas application
-

8. Lecture Bottle Inlet and Outlet Connections

Lecture bottle valve selection depends strongly on the cylinder thread and outlet connection.

Inlet Connection

The valve inlet connection must match the lecture bottle cylinder thread.

Common Oxford Valves lecture bottle valve inlet options include:

- 3/8" NGT Male
- 5/8" x 18UN

These inlet thread types are not interchangeable.

Outlet Connection

The outlet connection must match the regulator, adaptor or downstream gas equipment.

Oxford Valves lecture bottle valve outlet options include:

- CGA 170/110
- CGA 180/110

The correct outlet should be selected according to the gas application, regulator compatibility and downstream connection requirement.

Connection Selection Checklist

Confirm:

- cylinder thread
- valve inlet connection
- required outlet connection
- regulator compatibility
- adaptor compatibility
- gas application
- pressure rating
- material compatibility

9. Pressure Reducing Regulators

What Is a Pressure Reducing Regulator?

A pressure reducing regulator reduces high inlet pressure from a gas cylinder or gas source to a lower controlled outlet pressure.

In laboratory gas applications, pressure reducing regulators may be used where downstream equipment, tubing, instruments or gas delivery systems require controlled pressure rather than direct cylinder pressure.

Where Pressure Reducing Regulators Are Used

Pressure reducing regulators are used for:

- laboratory gas supply
- specialty gas systems
- analytical instrument gas control
- calibration gas delivery
- controlled low-pressure gas delivery
- research and testing facilities
- gas analysis applications
- compact gas cylinder systems
- process gas analysis support

Oxford Valves Product

Pressure Reducing Regulators — OV-PRR-1500 Series

The OV-PRR-1500 Series includes pressure reducing regulators for calibration gas, specialty gas, laboratory gas and analytical gas applications.

Selection Factors

Before selecting a pressure reducing regulator, confirm:

- maximum inlet pressure
- required outlet pressure range
- single-stage or two-stage requirement
- inlet connection
- outlet connection
- gas compatibility

- regulator material
 - valve seat, seal and diaphragm compatibility
 - gauge requirement
 - downstream instrument or tubing setup
-

10. C10 Valves for Compact Laboratory Gas Packages

What Is a C10 Valve?

A C10 valve is a compact self-closing cylinder valve commonly used on small portable calibration gas cylinders and compact gas packages.

In laboratory gas applications, C10 valves may be used on small gas cylinders where controlled gas release is required through a compatible regulator, adaptor or gas delivery device.

Where C10 Valves Are Used in Laboratory Applications

C10 valves may be used for:

- compact calibration gas cylinders
- laboratory gas packages
- specialty gas sample cylinders
- environmental monitoring gas cylinders
- portable gas analysis cylinders
- small gas detector calibration cylinders
- controlled test gas packages

Oxford Valves Product

C10 Valves — OV-C10-200 Series

The OV-C10-200 Series includes C10 valve configurations covering stainless steel, aluminium, brass, refillable, non-refillable and burst disc options.

Selection Factors

Before selecting a C10 valve for a laboratory gas package, confirm:

- refillable or non-refillable cylinder format
- cylinder inlet connection
- outlet connection
- working pressure

- gas mixture
 - valve body material
 - seal compatibility
 - regulator or adaptor compatibility
 - burst disc requirement where applicable
-

11. Adaptors for Laboratory Gas Connections

Why Adaptors Are Used

Laboratory gas setups may require adaptors when the cylinder, valve, regulator, filling line or downstream equipment connection does not directly match.

Adaptors may be used between:

- cylinder valve and regulator
- lecture bottle valve and regulator
- C10 valve and gas delivery device
- regulator and tubing
- cylinder valve and filling equipment
- aerosol package and sampling component
- NPT connection and gas control component

Oxford Valves Product

Adaptors — OV-A-800 Series

The OV-A-800 Series includes adaptor configurations for calibration gas, C10, CGA600, CGA165, aerosol, filling, NPT, on/off and press-to-check applications.

Selection Factors

Before selecting an adaptor, confirm:

- inlet connection
- outlet connection
- male or female direction
- working pressure
- body material
- seal or seat material
- gas compatibility

- whether the adaptor is for filling, dispensing, conversion, on/off control or press-to-check use

Adaptors should never be treated as universal fittings.

12. Material and Seal Considerations

Material and seal compatibility are critical in laboratory gas and specialty gas applications.

No valve, regulator or adaptor should be assumed suitable for all gases. Suitability depends on the full gas mixture and operating conditions.

Compatibility Factors

Review:

- gas mixture
- gas concentration
- balance gas
- moisture content
- pressure
- temperature
- body material
- seat material
- seal material
- septum material
- diaphragm material where applicable
- exposure time
- sampling method
- laboratory procedure

Common Body Materials

Oxford Valves product ranges may include:

- stainless steel
- brass
- brass nickel plated
- aluminium
- aluminium anodised

Stainless steel is commonly selected where stronger material compatibility is required.

Brass and brass nickel plated configurations are generally used for compatible non-reactive gas applications.

Aluminium and aluminium anodised configurations may be selected where lower weight is useful and the gas mixture is compatible.

Common Seat, Seal and Septum Materials

Oxford Valves product ranges may include:

- Viton
- Buna-N
- Teflon
- PCTFE
- HNBR
- septum materials according to model

Final compatibility should always be reviewed before product selection.

13. Product Selection Matrix

Laboratory Requirement	Possible Oxford Valves Product
Syringe-based gas sample extraction	Septum Regulator
Aerosol gas package sampling	Aerosol Septum Valve
Higher pressure syringe-based sampling	High Pressure Septum Regulator
Compact laboratory cylinder on/off control	Lecture Bottle Valve
Controlled outlet pressure	Pressure Reducing Regulator
Compact calibration gas cylinder valve	C10 Valve
Connection conversion	Adaptor
Direct flow control from gas source	Flow Control Valve
Portable calibration gas delivery	Fixed Flow Regulator
Pumped instrument sampling	Demand Flow Regulator
Multiple preset flow rates	Vari-Flow or Dial-a-Flow Regulator

14. Common Selection Mistakes

Using a Septum Regulator for Continuous Gas Delivery

Septum regulators are designed for syringe-based sample extraction. For continuous gas delivery, another regulator type may be more suitable.

Treating an Aerosol Septum Valve Like a High Pressure Regulator

Aerosol septum valves are intended for compatible lower-pressure aerosol applications. They should not be used as high pressure regulators.

Ignoring Syringe and Needle Compatibility

The syringe and needle must be suitable for the septum, gas sample, pressure condition and laboratory procedure.

Selecting a Lecture Bottle Valve by Outlet Only

Lecture bottle valve selection must consider both inlet thread and outlet connection. The cylinder thread, pressure rating and material compatibility must also be checked.

Confusing NGT and UN Threads

3/8" NGT Male and 5/8" x 18UN are different inlet thread types and must not be treated as interchangeable.

Ignoring Outlet Pressure

Pressure reducing regulators must be selected according to the outlet pressure required by the downstream instrument or gas delivery setup.

Treating Adaptors as Universal

Adaptors have specific connection direction, pressure rating, material configuration and intended use.

Assuming One Material Works for Every Gas

Material and seal compatibility must be reviewed for the complete gas mixture and operating conditions.

Exceeding Pressure Ratings

No valve, regulator, adaptor or sampling component should be used above its rated pressure.

15. Technical Buyer Checklist

Before requesting a quote, collect the following information.

Application

- laboratory gas sampling
- syringe-based sample extraction
- calibration gas sampling
- specialty gas analysis
- lecture bottle cylinder control
- compact gas cylinder package
- analytical instrument gas supply
- laboratory test gas
- environmental monitoring laboratory use
- research or university application

Gas Information

- gas mixture
- concentration
- balance gas
- moisture content
- reactive or non-reactive classification
- compatibility concern
- operating environment

Cylinder Information

- lecture bottle cylinder
- C10 cylinder
- aerosol gas package
- compact calibration gas cylinder
- high pressure cylinder
- cylinder pressure
- refillable or non-refillable format
- cylinder inlet thread

Component Requirement

- septum regulator
- aerosol septum valve
- high pressure septum regulator
- lecture bottle valve
- pressure reducing regulator
- C10 valve
- adaptor
- flow control valve
- fixed flow regulator
- demand flow regulator

Connection Information

- inlet connection
- outlet connection
- male or female direction
- cylinder thread
- regulator connection
- adaptor connection
- tubing or instrument connection
- CGA outlet requirement
- NPT requirement where applicable

Sampling or Delivery Requirement

- syringe-based extraction
- continuous gas delivery
- controlled pressure delivery
- controlled flow delivery
- pumped instrument draw
- manual gas release
- outlet pressure required
- flow rate required

Material and Seal Information

- stainless steel requirement
- brass nickel plated requirement
- aluminium requirement
- seat material

- seal material
- septum material
- diaphragm material where relevant
- compatibility notes

Commercial Information

- quantity
 - destination country or region
 - drawings or samples
 - existing part reference
 - required documentation
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16. Oxford Valves Product Mapping

Septum Regulators — OV-SR-1200 Series

Used for syringe-based gas sample extraction, laboratory gas sampling, calibration gas sampling and specialty gas sample withdrawal.

Lecture Bottle Valves — OV-LBV-1400 Series

Used on compatible lecture bottle cylinders for laboratory gas, specialty gas, calibration gas and compact cylinder applications.

Pressure Reducing Regulators — OV-PRR-1500 Series

Used where high inlet pressure must be reduced to a lower controlled outlet pressure for laboratory gas, specialty gas and analytical gas applications.

C10 Valves — OV-C10-200 Series

Used on compact calibration gas and specialty gas cylinder packages where a C10 valve connection is required.

Adaptors — OV-A-800 Series

Used where laboratory gas, lecture bottle, C10, aerosol, NPT, CGA600 or CGA165 connections need to interface with another component.

Flow Control Valves — OV-FCV-1000 Series

Used where gas flow must be controlled from a compatible aerosol, C10 or CGA600 gas source.

Related Regulator Products

- Fixed Flow Regulators — OV-FFR-300 Series
 - Demand Flow Regulators — OV-DFR-400 Series
 - Vari-Flow Regulators — OV-VFR-500 Series
 - Dial-a-Flow Regulators — OV-DAFR-600 Series
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17. Frequently Asked Questions

What is a septum regulator?

A septum regulator is a specialised gas regulator with a septum outlet that allows a syringe and needle to be used for gas sample extraction.

What is a septum regulator used for?

Septum regulators are used for laboratory gas sampling, calibration gas sampling, syringe-based gas extraction, specialty gas analysis and portable gas sample withdrawal.

What is an aerosol septum valve?

An aerosol septum valve is a lower-pressure septum valve used with compatible aerosol gas packages for syringe-based sample extraction.

What is a lecture bottle valve?

A lecture bottle valve is a compact on/off cylinder valve used on lecture bottle cylinders for laboratory gas, specialty gas, calibration gas and compact gas applications.

What inlet connections are used on lecture bottle valves?

Oxford Valves lecture bottle valve options include 3/8" NGT Male and 5/8" x 18UN inlet connections depending on model.

What outlet connections are used on lecture bottle valves?

Oxford Valves lecture bottle valve options include CGA 170/110 and CGA 180/110 outlet connections depending on model.

What is a pressure reducing regulator used for in laboratory gas applications?

A pressure reducing regulator reduces high inlet pressure from a cylinder or gas source to a lower controlled outlet pressure suitable for downstream laboratory equipment or gas delivery setups.

Are septum regulators suitable for continuous gas delivery?

Septum regulators are intended for syringe-based gas sample extraction. For continuous gas delivery, a fixed flow regulator, pressure reducing regulator or flow control valve may be more suitable depending on the application.

Are adaptors universal?

No. Adaptors must be selected according to inlet connection, outlet connection, male or female direction, working pressure, material, seal type and application.

Does Oxford Valves supply laboratory gases?

No. Oxford Valves supplies gas valves, regulators, adaptors and gas control components. Oxford Valves does not supply laboratory gases, specialty gas mixtures, gas generators, analytical instruments or complete laboratory gas systems.

18. Request Technical Support

For support selecting a laboratory gas sampling or small cylinder gas control component, please provide:

- application
- gas type or mixture
- cylinder type
- cylinder pressure
- required component type
- inlet connection
- outlet connection
- required outlet pressure
- required flow rate where applicable
- sampling method
- syringe and needle requirements where applicable
- body material preference

- seal, seat or septum requirement
- regulator or adaptor compatibility requirement
- quantity
- destination country or region
- drawings, samples or existing references if available

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Final product suitability should always be confirmed against the specific gas, cylinder, pressure, flow, connection, sampling method, material, seal and application requirements.