



Calibration Gas Cylinder Components: A Technical Buyer's Guide

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Website: www.oxfordvalves.com

Email: info@oxfordvalves.com

Calibration Gas Cylinder Components

A Technical Buyer's Guide to Valves, Regulators, Adaptors and Flow Control Products for Calibration Gas Cylinder Applications

Oxford Valves

Precision gas valves, regulators, adaptors and gas control components

About This Guide

Calibration gas cylinder packages require the correct combination of valves, regulators, adaptors and flow control components. Each component must be selected according to cylinder type, gas mixture, pressure, flow requirement, connection standard, material compatibility, seal compatibility and end-use application.

This guide is written for calibration gas manufacturers, cylinder fillers, specialty gas suppliers, gas detection companies, technical distributors, safety equipment suppliers, laboratory gas users and procurement teams who need to understand the gas control components used with calibration gas cylinders.

Oxford Valves supplies precision gas valves, regulators, adaptors and flow control components. Oxford Valves does not supply calibration gases, gas mixtures, gas generators, gas calibrators, manifolds, outlet panels or complete gas distribution systems.

Oxford Valves products are manufactured under ISO 9001 quality processes and should be selected with appropriate technical review for the intended gas, cylinder, pressure, flow and connection requirements.

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1. What Is a Calibration Gas Cylinder Component?

A calibration gas cylinder component is any valve, regulator, adaptor or flow control product used to connect, control, release, reduce or deliver gas from a calibration gas cylinder.

These components may be fitted directly to the cylinder, connected after the cylinder valve, used as a connection converter, or selected as part of a portable gas delivery arrangement.

Common calibration gas cylinder components include:

- cylinder valves

- C10 valves
- integrated C10 valves
- fixed flow regulators
- push button regulators
- trigger regulators
- flow control valves
- gas cylinder adaptors
- filling adaptors
- outlet connection adaptors
- on/off adaptors
- press-to-check adaptors

The component must be matched to the cylinder and application. A product that looks physically similar may not be suitable if the pressure rating, connection direction, material or seal system is incorrect.

2. Why Component Selection Matters

Calibration gas cylinders are often used in safety, testing, laboratory and instrument verification applications. The cylinder may be used with portable gas detectors, fixed gas detection systems, analytical instruments, environmental monitoring equipment or laboratory sampling setups.

Incorrect component selection can create several problems:

- incompatible cylinder or regulator connection
- unsuitable pressure rating
- incorrect outlet connection
- gas leakage risk
- poor flow control
- excessive gas release
- unsuitable material for the gas mixture
- seal incompatibility
- regulator mismatch
- filling or dispensing error
- confusion between refillable and non-refillable cylinder components

Good component selection helps ensure that the cylinder package is practical, compatible and suitable for the intended gas control application.

Technical buyers should never select a valve, regulator or adaptor by thread name alone. The full application must be reviewed.

3. Main Components Used in Calibration Gas Cylinder Packages

A calibration gas cylinder package may include one or more gas control components, depending on the cylinder type and end use.

Cylinder Valve

The cylinder valve controls gas access from the cylinder. In compact calibration gas applications, C10 valves are commonly used.

Regulator

A regulator controls gas pressure or flow from the cylinder. Examples include fixed flow regulators, demand flow regulators, push button regulators, trigger regulators and pressure reducing regulators.

Flow Control Valve

A flow control valve controls gas delivery from a compatible gas source, such as an aerosol package, C10 cylinder or CGA600 cylinder.

Adaptor

An adaptor connects two different gas connection types. Adaptors may be used for dispensing, filling, conversion, on/off control or press-to-check operation.

Integrated Valve and Regulator Arrangement

An integrated C10 valve combines a cylinder valve function with a pressure reducing function in one compact assembly.

4. C10 Valves

What Is a C10 Valve?

A C10 valve is a compact self-closing cylinder valve commonly used on small portable calibration gas cylinders. It allows gas to be released when connected to a compatible regulator, adaptor or gas delivery device.

C10 valves are widely used in calibration gas and gas detection applications because they support compact cylinder formats and controlled gas delivery.

Where C10 Valves Are Used

C10 valves are commonly used on:

- portable calibration gas cylinders
- gas detector bump testing cylinders
- refillable calibration gas cylinders
- non-refillable calibration gas cylinders
- specialty gas sample cylinders
- laboratory gas packages
- environmental monitoring gas cylinders
- marine gas detection calibration cylinders
- industrial safety gas detection cylinder packages

Oxford Valves Product

C10 Valves — OV-C10-200 Series

The OV-C10-200 Series includes C10 valve options for calibration gas and specialty gas cylinder applications, including stainless steel, aluminium, brass, refillable, non-refillable and burst disc configurations.

C10 Valve Selection Factors

Before selecting a C10 valve, confirm:

- cylinder type
- refillable or non-refillable cylinder format
- gas mixture
- valve material
- seal material
- working pressure
- inlet connection

- outlet connection
 - regulator or adaptor compatibility
 - burst disc requirement where applicable
 - end-use application
-

5. Refillable vs Non-Refillable Cylinder Applications

Refillable and non-refillable calibration gas cylinders require different technical consideration.

Refillable Calibration Gas Cylinders

A refillable cylinder is designed to be filled, used, returned, inspected and refilled through a controlled filling process.

Refillable cylinder applications may require:

- suitable C10 valve configuration
- valve material matched to gas service
- refill process compatibility
- appropriate inlet connection
- appropriate outlet connection
- repeated-use consideration
- compatibility with filling equipment
- inspection and handling procedures

Refillable cylinders are commonly used by calibration gas suppliers, specialty gas companies, industrial gas companies and cylinder package providers.

Non-Refillable Calibration Gas Cylinders

A non-refillable cylinder is designed for single-use or disposable gas package applications and is not intended to be refilled after use.

Non-refillable applications may require:

- compact valve design
- suitable gas release method
- regulator compatibility
- adaptor compatibility
- portable use consideration
- pressure rating review

- disposal or recycling process consideration

Using a refillable valve where a non-refillable component is required, or using a non-refillable valve in a refillable cylinder programme, can create safety and compatibility problems.

6. C10 Valve Materials

Material selection is one of the most important parts of calibration gas cylinder component specification.

Stainless Steel C10 Valves

Stainless steel C10 valves are commonly selected where stronger material compatibility is required. They may be considered for reactive or mixed gas applications, subject to full gas compatibility review.

Aluminium C10 Valves

Aluminium C10 valves provide a lightweight option for suitable cylinder packages. They should be checked against the gas mixture, cylinder material, pressure and service conditions.

Brass C10 Valves

Brass C10 valves are typically used for compatible non-reactive gas applications. Brass should not be assumed suitable for every gas mixture.

Material Selection Checklist

Before selecting the body material, confirm:

- complete gas mixture
 - gas concentration
 - balance gas
 - moisture content
 - pressure
 - cylinder material
 - expected service conditions
 - seal material
 - filling and end-use procedure
-

7. Burst Disc Considerations

Some C10 valve configurations may include a burst disc pressure relief feature.

A burst disc is designed to relieve pressure under defined conditions if pressure exceeds the selected limit. Burst disc selection must be reviewed carefully because the required specification depends on the cylinder and application.

Selection should consider:

- cylinder specification
- working pressure
- gas mixture
- filling pressure
- temperature exposure
- transport conditions
- applicable safety requirements
- end-use environment

A burst disc should not be selected casually or copied from another cylinder package without technical review.

8. Integrated C10 Valves

What Is an Integrated C10 Valve?

An integrated C10 valve combines a C10 cylinder valve with a single-stage pressure reducing function in one compact assembly.

In a traditional setup, a calibration gas cylinder may use a cylinder valve and a separate regulator. An integrated C10 valve combines these functions into one product, helping simplify the cylinder-mounted gas control arrangement.

Where Integrated C10 Valves Are Used

Integrated C10 valves may be used in:

- portable calibration gas cylinders
- compact gas cylinder packages
- gas detector calibration kits
- gas detector bump testing
- specialty gas cylinder packages

- environmental monitoring gas packages
- industrial safety gas detection applications
- laboratory test gas applications
- portable gas analysis systems

Oxford Valves Product

Integrated C10 Valves — OV-IC10-900 Series

The OV-IC10-900 Series provides an integrated C10 valve and pressure reducing design for compatible compact cylinder applications.

Selection Factors

Before selecting an integrated C10 valve, confirm:

- cylinder type
 - cylinder capacity
 - cylinder inlet connection
 - working pressure
 - gas mixture
 - body material
 - valve pin, valve seat and piston materials
 - seal compatibility
 - outlet connection
 - downstream tubing or adaptor requirement
 - application type
-

9. Fixed Flow Regulators

What Is a Fixed Flow Regulator?

A fixed flow regulator delivers gas at a preset flow rate. It is commonly used where controlled, repeatable gas delivery is required from a calibration gas cylinder to a detector, calibration cap, tubing arrangement or instrument.

Where Fixed Flow Regulators Are Used

Fixed flow regulators are used for:

- gas detector calibration
- gas detector bump testing

- handheld gas detector testing
- portable calibration gas cylinders
- disposable calibration gas cylinders
- refillable calibration gas cylinders
- laboratory test gas applications
- environmental monitoring support
- industrial safety gas detection

Oxford Valves Product

Fixed Flow Regulators — OV-FFR-300 Series

The OV-FFR-300 Series includes fixed flow regulator options for calibration gas and gas detection applications.

Selection Factors

Before selecting a fixed flow regulator, confirm:

- cylinder connection
 - maximum inlet pressure
 - required fixed flow rate
 - required outlet pressure
 - outlet connection
 - gas compatibility
 - material requirement
 - seal compatibility
 - gauge requirement
 - tubing or calibration cap setup
-

10. Push Button Regulators

What Is a Push Button Regulator?

A push button regulator releases gas when the user presses a button. When the button is released, gas flow stops.

This makes push button regulators suitable for short-duration gas release, handheld gas detector checks and bump testing applications where continuous gas flow is not required.

Where Push Button Regulators Are Used

Push button regulators may be used for:

- handheld gas detector bump testing
- gas detector calibration checks
- portable calibration gas cylinders
- C10 calibration gas cylinders
- manual gas release applications
- gas detection service kits
- industrial safety gas detection checks
- field calibration kits

Oxford Valves Product

Push Button Regulators — OV-PBR-1100 Series

The OV-PBR-1100 Series includes push button and push type regulator options for calibration gas and handheld gas detector applications.

Selection Factors

Before selecting a push button regulator, confirm:

- cylinder valve connection
 - maximum inlet pressure
 - required fixed flow rate
 - outlet pressure
 - outlet connection
 - gas compatibility
 - material requirement
 - seal compatibility
 - gauge requirement
 - test method
-

11. Flow Control Valves

What Is a Flow Control Valve?

A flow control valve controls gas flow from a cylinder, aerosol package or gas source to downstream equipment.

In calibration gas applications, flow control valves may be used where a user needs direct control of gas flow from a compatible gas package.

Where Flow Control Valves Are Used

Flow control valves are used for:

- gas detector calibration
- bump testing
- industrial safety monitor checks
- portable calibration gas cylinders
- aerosol calibration gas packages
- C10 calibration gas cylinders
- CGA600 calibration gas cylinders
- portable gas testing systems
- environmental monitoring support
- laboratory test gas applications

Oxford Valves Product

Flow Control Valves — OV-FCV-1000 Series

The OV-FCV-1000 Series includes flow control valve options for aerosol, C10, CGA600 and portable calibration gas applications.

Selection Factors

Before selecting a flow control valve, confirm:

- gas source type
 - inlet connection
 - outlet connection
 - working pressure
 - gas compatibility
 - body material
 - seal material
 - whether a flow meter is required
 - downstream tubing or instrument connection
 - application type
-

12. Gas Cylinder Adaptors

What Is a Gas Cylinder Adaptor?

A gas cylinder adaptor is a connection component used to join two different gas connection types.

Adaptors may be used between:

- cylinder valve and regulator
- cylinder valve and filling line
- gas source and delivery equipment
- regulator and downstream fitting
- C10 connection and CGA connection
- aerosol connection and cylinder interface
- NPT connection and regulator or valve interface

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.

Common Adaptor Types

Oxford Valves adaptor applications may include:

- C10 adaptors
- CGA600 adaptors
- CGA165 adaptors
- aerosol adaptors
- NPT adaptors
- filling adaptors
- on/off adaptors
- press-to-check adaptors
- C10 to CGA600 adaptors
- C10 to CGA165 adaptors
- aerosol to C10 adaptors

Selection Factors

Before selecting an adaptor, confirm:

- inlet connection
 - outlet connection
 - male or female connection direction
 - working pressure
 - gas compatibility
 - body material
 - seal or seat material
 - filling, dispensing, conversion or control function
 - whether the adaptor includes a valve
 - downstream equipment requirement
-

13. Connection Types and Adaptor Direction

Connection direction is critical in gas control systems. A connection name alone is not enough.

For example:

- C10 male is different from C10 female
- CGA600 male is different from CGA600 female
- C10 to CGA600 is different from CGA600 to C10
- NPT male is different from NPT female
- filling connections may not be suitable for dispensing use

Always confirm both sides of an adaptor before ordering.

Connection Review Checklist

Confirm:

- cylinder valve connection
- regulator inlet connection
- regulator outlet connection
- adaptor inlet connection
- adaptor outlet connection
- male or female direction
- thread standard
- sealing method
- pressure rating
- application type

A gas adaptor should never be forced onto an incompatible connection.

14. Material and Seal Compatibility

Material and seal compatibility must be reviewed for every calibration gas cylinder component.

Body Materials

Oxford Valves product ranges may include:

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

Seal and Seat Materials

Oxford Valves product ranges may include materials such as:

- Viton
- Buna-N
- Teflon
- PCTFE
- HNBR

Compatibility Factors

Product suitability depends on:

- gas mixture
- concentration
- balance gas
- moisture content
- pressure
- temperature
- body material
- seal material
- seat material
- diaphragm material where applicable

- cylinder type
- filling process
- end-use application

No component should be assumed suitable for every gas. Final compatibility should always be confirmed before publishing specifications, quoting or placing an order.

15. Product Selection Matrix

Requirement	Possible Oxford Valves Product
Compact self-closing cylinder valve	C10 Valve
Refillable calibration gas cylinder valve	Refillable C10 Valve
Non-refillable calibration gas cylinder valve	Non-Refillable C10 Valve
Cylinder valve with pressure reducing function	Integrated C10 Valve
Preset gas flow delivery	Fixed Flow Regulator
Manual short-duration gas release	Push Button Regulator or Trigger Regulator
Direct gas flow control from gas source	Flow Control Valve
Connection conversion	Gas Cylinder Adaptor
Filling line connection	Filling Adaptor
On/off control at adaptor	On/Off Adaptor
Manual press-to-check function	Press-to-Check Adaptor
Controlled outlet pressure	Pressure Reducing Regulator
Pump-based instrument gas demand	Demand Flow Regulator

16. Common Selection Mistakes

Choosing Only by Thread Name

Thread name is not enough. Pressure rating, material, seal type, connection direction and application must also be checked.

Confusing Refillable and Non-Refillable Use

A refillable cylinder package and a non-refillable cylinder package may require different valve configurations.

Assuming All C10 Valves Are the Same

C10 valves may differ by material, inlet connection, working pressure, refillability, seal system and burst disc requirement.

Treating Adaptors as Universal

Gas adaptors are not universal. Each adaptor has a defined connection direction, pressure rating, material and intended use.

Ignoring Gas Compatibility

Brass, brass nickel plated, aluminium and stainless steel configurations have different suitability depending on the gas mixture and application.

Overlooking Seal Materials

Seal and seat materials must be checked against the gas mixture, pressure, temperature and service conditions.

Selecting the Wrong Outlet Connection

A product may have the correct inlet but the wrong outlet for the regulator, tubing, calibration cap, filling line or instrument.

Using Filling Adaptors Without Suitable Procedures

Filling adaptors should only be used in suitable filling systems by trained personnel.

Exceeding Rated Pressure

No valve, regulator, adaptor or flow control component should be used above its specified pressure rating.

17. Technical Buyer Checklist

Before requesting a quote, collect the following information.

Cylinder Information

- Cylinder type
- Cylinder size
- Refillable or non-refillable format
- Cylinder material

- Cylinder inlet thread
- Cylinder pressure
- Filling pressure where relevant

Gas Information

- Gas mixture
- Concentration
- Balance gas
- Moisture content
- Reactive or non-reactive classification
- Application environment

Component Requirement

- C10 valve
- Integrated C10 valve
- Fixed flow regulator
- Push button regulator
- Trigger regulator
- Flow control valve
- Adaptor
- Filling adaptor
- Pressure reducing regulator

Connection Information

- Inlet connection
- Outlet connection
- Male or female direction
- Thread standard
- Regulator compatibility
- Adaptor compatibility
- Tubing or instrument connection

Performance Information

- Maximum inlet pressure
- Required outlet pressure
- Required flow rate
- Gauge requirement
- Manual or automatic operation

- Short-duration or continuous flow requirement

Material and Seal Information

- Body material preference
- Seat material requirement
- Seal material requirement
- Diaphragm material where applicable
- Compatibility notes
- Any existing approved material specification

Commercial Information

- Quantity
 - Destination country or region
 - Required documentation
 - Existing drawings or samples
 - Existing part reference
 - Application notes
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18. Oxford Valves Product Mapping

Calibration Gas Cylinder Valves

- C10 Valves — OV-C10-200 Series
- Integrated C10 Valves — OV-IC10-900 Series
- Lecture Bottle Valves — OV-LBV-1400 Series, where compact laboratory cylinder packages are involved

Regulator Options

- Fixed Flow Regulators — OV-FFR-300 Series
- Demand Flow Regulators — OV-DFR-400 Series
- Push Button Regulators — OV-PBR-1100 Series
- Trigger Regulators — OV-TR-700 Series
- Vari-Flow Regulators — OV-VFR-500 Series
- Dial-a-Flow Regulators — OV-DAFR-600 Series
- Pressure Reducing Regulators — OV-PRR-1500 Series

Connection and Flow Control Options

- Adaptors — OV-A-800 Series

- Flow Control Valves — OV-FCV-1000 Series
 - Solenoid Regulators — OV-SR-1300 Series, where electrical gas control is required
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19. Frequently Asked Questions

What components are used on calibration gas cylinders?

Calibration gas cylinders may use C10 valves, integrated C10 valves, fixed flow regulators, push button regulators, trigger regulators, flow control valves and adaptors depending on the cylinder type and application.

What is a C10 valve?

A C10 valve is a compact self-closing cylinder valve commonly used on portable calibration gas cylinders. It supports controlled gas release when connected to a compatible regulator or adaptor.

What is the difference between a refillable and non-refillable C10 valve?

A refillable C10 valve is used on a cylinder designed to be refilled through a controlled filling process. A non-refillable C10 valve is used on a cylinder package that is not intended to be refilled.

What is an integrated C10 valve?

An integrated C10 valve combines a C10 cylinder valve function with a pressure reducing function in one compact assembly.

When is a fixed flow regulator used?

A fixed flow regulator is used where gas must be delivered at a preset flow rate for calibration, bump testing or instrument checking.

When is a push button regulator used?

A push button regulator is used where the operator needs manual short-duration gas release. Gas flows when the button is pressed and stops when the button is released.

What is a gas cylinder adaptor used for?

A gas cylinder adaptor is used to connect two different gas connection types, such as C10, CGA600, CGA165, aerosol or NPT connections.

Are gas adaptors universal?

No. Adaptors are not universal. They must be selected according to connection type, male or female direction, pressure rating, material, seal type and application.

How should material be selected?

Material selection should be based on the complete gas mixture, pressure, moisture content, temperature, cylinder type and operating conditions. Stainless steel, brass, brass nickel plated and aluminium configurations have different suitability depending on the application.

Does Oxford Valves supply calibration gas?

No. Oxford Valves supplies gas control components such as valves, regulators, adaptors and flow control products. Oxford Valves does not supply calibration gases, gas mixtures, gas generators, gas calibrators or complete gas distribution systems.

20. Request Technical Support

For support selecting a calibration gas cylinder component, please provide:

- application
- cylinder type
- refillable or non-refillable format
- gas type or mixture
- cylinder pressure
- required flow rate
- required outlet pressure
- inlet connection
- outlet connection
- body material preference
- seal or seat material requirement
- regulator or adaptor compatibility requirement
- quantity
- destination country or region
- drawings, samples or existing references if available

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Email: info@oxfordvalves.com



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