



Gas Control Component Selection Guide for Gas Detector Calibration & Bump Testing

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Gas Control Component Selection Guide for Gas Detector Calibration & Bump Testing

How to select valves, regulators, adaptors and flow control components for calibration gas cylinder packages and gas detection support applications

Oxford Valves

Precision gas valves, regulators, adaptors and gas control components

About This Guide

Gas detector calibration and bump testing depend on controlled gas delivery. The correct gas control component helps connect the calibration gas cylinder, control pressure or flow, and deliver gas to the detector or calibration accessory in a suitable way.

This guide explains how different gas control components are used in gas detector calibration and bump testing applications. It is written for gas detection companies, calibration gas suppliers, gas detector service providers, safety equipment distributors,

industrial safety teams, laboratories, field service engineers and international technical buyers.

Oxford Valves does not supply calibration gases, gas mixtures, gas generators, gas calibrators or complete gas distribution systems. Oxford Valves supplies the gas control components used with suitable cylinder packages and gas detection support equipment.

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1. Why Gas Control Component Selection Matters

Gas detectors are used to help identify hazardous gas conditions in industrial, marine, laboratory, mining, environmental and field safety environments. To remain useful, these instruments often need to be checked, bump tested or calibrated using a suitable calibration gas and a controlled gas delivery arrangement.

The gas mixture itself is only one part of the process. The cylinder valve, regulator, adaptor, tubing interface and flow control component also affect how gas reaches the instrument.

A suitable component selection helps ensure that:

- the cylinder connection matches the regulator or adaptor
- the regulator is suitable for the cylinder pressure
- the flow rate matches the detector or calibration cap requirement
- the material and seal configuration are suitable for the gas mixture
- the outlet connection matches the tubing or instrument setup
- gas is delivered only as required by the test method
- field users can operate the equipment practically and consistently

Incorrect component selection can lead to poor gas delivery, wasted gas, leakage risk, incompatible connections, unsuitable material use or unreliable calibration procedures.

Oxford Valves products are manufactured under ISO 9001 quality processes and are designed for technical buyers who require clear product selection, controlled manufacturing and application-specific support.

2. Calibration vs Bump Testing

What Is Gas Detector Calibration?

Gas detector calibration is the process of exposing a gas detection instrument to a known gas concentration so the instrument response can be checked and adjusted where required. Calibration helps confirm that the detector reading corresponds to the reference gas used during the procedure.

Calibration should be carried out according to the instrument manufacturer's instructions, the site procedure and any applicable safety requirements.

What Is Bump Testing?

Bump testing is a functional response check. The detector is exposed to gas to confirm that it responds and that alarms activate as expected. A bump test does not normally adjust the instrument and should not be treated as a full calibration.

Bump testing is commonly used before field use, during routine safety checks and in gas detection service programmes.

Why the Gas Control Component Matters

Both calibration and bump testing require controlled gas delivery. The component selected depends on:

- whether the detector is pumped or diffusion-based
 - the required gas flow rate
 - the cylinder connection
 - the cylinder pressure
 - the outlet tubing or calibration cap
 - the gas type and compatibility requirements
 - whether gas should flow continuously, on demand or only when manually released
-

3. Where Valves, Regulators and Adaptors Are Used

A typical gas detector calibration setup may include:

- a calibration gas cylinder
- a cylinder valve
- a regulator
- an adaptor where connections do not directly match
- tubing
- a calibration cap or instrument inlet
- a gas detector or docking equipment

Oxford Valves focuses on the gas control components within this setup, including:

- C10 Valves
- Fixed Flow Regulators
- Demand Flow Regulators

- Vari-Flow Regulators
- Dial-a-Flow Regulators
- Push Button Regulators
- Trigger Regulators
- Flow Control Valves
- Integrated C10 Valves
- Adaptors
- Pressure Reducing Regulators
- Solenoid Regulators where automated gas control is required

The correct selection depends on the application, not only the product name.

4. Fixed Flow Regulators

What Is a Fixed Flow Regulator?

A fixed flow regulator is designed to deliver gas at a preset constant flow rate. It is commonly used where a defined gas flow is required for gas detector calibration, bump testing or instrument verification.

Fixed flow regulators are often selected for diffusion-type gas detectors, standard calibration kits and routine bump testing applications.

When to Use a Fixed Flow Regulator

A fixed flow regulator may be suitable when:

- the instrument requires continuous flow during the test
- the detector or calibration cap has a defined flow requirement
- the user wants repeatable gas delivery without manual adjustment
- the application uses a standard calibration gas cylinder setup
- the flow rate does not need to change between instruments

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 depends on cylinder connection, inlet pressure, outlet pressure, outlet connection, gas compatibility, material requirement and required flow rate.

Selection Points

Before selecting a fixed flow regulator, confirm:

- cylinder connection
 - maximum inlet pressure
 - required fixed flow rate
 - outlet pressure requirement
 - outlet connection
 - gas mixture
 - material requirement
 - seal compatibility
 - whether a gauge is required
 - detector or calibration cap requirement
-

5. Demand Flow Regulators

What Is a Demand Flow Regulator?

A demand flow regulator supplies gas only when the connected instrument creates demand. This demand is usually created by an internal pump or sampling system.

Unlike a fixed flow regulator, a demand flow regulator does not deliver gas continuously. It responds to the instrument when gas is drawn.

When to Use a Demand Flow Regulator

A demand flow regulator may be suitable when:

- the gas detector has an internal pump
- the instrument draws sample gas
- gas should only be supplied when demanded
- the user wants to reduce unnecessary gas release
- the instrument or docking setup is designed for demand-based flow

Oxford Valves Product

Demand Flow Regulators — OV-DFR-400 Series

The OV-DFR-400 Series includes demand flow regulator options for pump-based gas detectors, sampling instruments, gas analysis equipment and portable calibration gas cylinder applications.

Selection Points

Before selecting a demand flow regulator, confirm:

- whether the instrument is pump-based
 - instrument flow requirement
 - instrument vacuum or demand capability
 - cylinder connection
 - maximum inlet pressure
 - outlet connection
 - gas compatibility
 - material requirement
 - seat, seal and diaphragm compatibility
-

6. Push Button Regulators

What Is a Push Button Regulator?

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

This makes push button regulators useful for short-duration gas release, bump testing and field checks where the user does not want continuous gas flow.

When to Use a Push Button Regulator

A push button regulator may be suitable when:

- the user needs manual short-duration gas release
- the application involves bump testing
- gas should only flow while the button is pressed
- portable field use is required
- operators need a simple manual release method

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 Points

Before selecting a push button regulator, confirm:

- C10 or other cylinder connection requirement
 - maximum inlet pressure
 - required fixed flow rate
 - outlet pressure
 - outlet connection
 - gas compatibility
 - material requirement
 - gauge requirement
 - test method or site procedure
-

7. Trigger Regulators

What Is a Trigger Regulator?

A trigger regulator releases gas when the user presses a trigger mechanism. Gas flow stops when the trigger is released.

Trigger regulators are useful for manual gas release where the operator wants direct control during a short gas exposure.

When to Use a Trigger Regulator

A trigger regulator may be suitable when:

- the user needs handheld manual gas release
- gas is required only for a short test period
- the application is portable or field-based
- bump testing or detector response checking is required
- the user prefers trigger-style operation rather than push button operation

Oxford Valves Product

Trigger Regulators — OV-TR-700 Series

The OV-TR-700 Series includes C10 trigger regulator options for calibration gas, handheld gas detector testing, bump testing and manual gas release applications.

Selection Points

Before selecting a trigger regulator, confirm:

- cylinder valve connection
 - maximum inlet pressure
 - fixed flow requirement
 - outlet pressure
 - outlet connection
 - gas compatibility
 - material requirement
 - gauge range
 - calibration cap or tubing setup
-

8. Vari-Flow and Dial-a-Flow Regulators

What Are Selectable Flow Regulators?

Vari-Flow and Dial-a-Flow regulators allow the user to select from multiple preset flow rates. They are useful when one regulator needs to support different detectors, calibration caps, tubing setups or test procedures.

They are not the same as infinitely adjustable needle valves. The user selects from defined flow positions.

When to Use Selectable Flow Regulators

Selectable flow regulators may be suitable when:

- different instruments require different flow rates
- service teams support multiple detector models
- one field kit needs several preset flow options
- the flow setting must be changed between procedures
- a fixed single flow is too limiting

Oxford Valves Products

Vari-Flow Regulators — OV-VFR-500 Series

Dial-a-Flow Regulators — OV-DAFR-600 Series

Both product categories support applications where multiple preset flow options are required. Selection depends on connection type, maximum inlet pressure, flow table requirement, material configuration, outlet connection and gas compatibility.

Selection Points

Before selecting a Vari-Flow or Dial-a-Flow regulator, confirm:

- required flow settings
 - instrument manufacturer's recommended flow rate
 - cylinder connection
 - maximum inlet pressure
 - outlet connection
 - material requirement
 - seal compatibility
 - whether standard pressure or high pressure operation is required
-

9. C10 Valves for Calibration Gas Cylinders

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 controlled gas release when connected to a compatible regulator, adaptor or gas delivery device.

C10 valves are important because they are often the connection point between the cylinder package and the gas delivery equipment.

Where C10 Valves Are Used

C10 valves are used in:

- 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
- industrial safety gas detection support

Oxford Valves Product

C10 Valves — OV-C10-200 Series

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

Selection Points

Before selecting a C10 valve, confirm:

- refillable or non-refillable cylinder format
 - cylinder inlet connection
 - outlet connection
 - working pressure
 - gas mixture
 - valve body material
 - seat and seal compatibility
 - burst disc requirement where applicable
 - regulator or adaptor compatibility
-

10. Flow Control Valves

What Is a Flow Control Valve?

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

In calibration gas applications, flow control valves may be used with gas detectors, industrial safety monitors, calibration caps, tubing and portable test gas systems.

When to Use a Flow Control Valve

A flow control valve may be suitable when:

- the application requires direct flow control from a gas package
- the system uses aerosol, C10 or CGA600 gas source connections
- the user needs a valve arrangement rather than a full regulator type
- a visual flow reference is required on selected configurations
- the application is gas detector calibration, bump testing or portable testing

Oxford Valves Product

Flow Control Valves — OV-FCV-1000 Series

The OV-FCV-1000 Series includes aerosol, C10, CGA600 and S Flow configurations for calibration gas and industrial safety monitor applications.

Selection Points

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
 - tubing or calibration cap requirement
-

11. Adaptors and Connection Selection

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 a cylinder valve and regulator, filling equipment and cylinder valve, or gas source and downstream gas delivery equipment.

Adaptors should not be treated as universal fittings. They are pressure-containing components and must be selected carefully.

Where Adaptors Are Used

Adaptors are used for:

- C10 cylinder connections
- CGA600 cylinder connections
- CGA165 connections
- aerosol gas connections
- NPT connections
- regulator connection conversion
- filling applications
- on/off gas control
- press-to-check applications
- portable gas testing kits

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 Points

Before selecting an adaptor, confirm:

- inlet connection
 - outlet connection
 - male or female connection 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
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12. Material and Seal Considerations

Material and seal selection is important for valves, regulators, adaptors and flow control components.

No gas control product should be assumed suitable for all gases. Suitability depends on the complete gas mixture and operating conditions.

Factors That Affect Compatibility

Compatibility may depend on:

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

- diaphragm material
- exposure time
- application environment

Common Material Categories

Oxford Valves product ranges may include:

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

The correct material depends on the gas and application. 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 options may be selected for compatible applications where lower weight is useful.

Common Seat and Seal Materials

Oxford Valves product ranges may include materials such as:

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

Final selection should always be reviewed against the gas mixture, pressure, temperature and service conditions.

13. Product Selection Matrix

Application Requirement	Possible Oxford Valves Product
Continuous preset gas flow	Fixed Flow Regulator
Pump-based instrument gas demand	Demand Flow Regulator
Multiple preset flow settings	Vari-Flow Regulator or Dial-a-Flow Regulator
Manual short gas release by button	Push Button Regulator
Manual short gas release by trigger	Trigger Regulator
Compact calibration gas cylinder valve	C10 Valve

Application Requirement	Possible Oxford Valves Product
Combined C10 valve and pressure reducing function	Integrated C10 Valve
Direct gas flow control from aerosol, C10 or CGA600 source	Flow Control Valve
Connection conversion between cylinder, regulator or equipment	Adaptor
Automated electrical gas release	Solenoid Regulator
Controlled outlet pressure	Pressure Reducing Regulator
Laboratory syringe-based sample extraction	Septum Regulator

14. Common Mistakes to Avoid

Choosing Only by Thread Size

Thread size is important, but it is not enough. Pressure, gas compatibility, material, seal type, inlet direction and outlet connection must also be checked.

Confusing Fixed Flow and Demand Flow Regulators

A fixed flow regulator delivers gas continuously at a preset rate. A demand flow regulator supplies gas only when a pumped instrument draws gas. The wrong choice can affect calibration or bump testing procedures.

Using the Same Regulator for Different Gas Mixtures Without Review

Cross-contamination and compatibility issues may occur if one regulator is used across different gas mixtures without proper procedure and technical review.

Ignoring Outlet Connection

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

Exceeding Pressure Ratings

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

Assuming One Material Is Suitable for Every Gas

Gas compatibility must be checked. Brass, brass nickel plated, aluminium and stainless steel configurations have different suitability depending on the gas mixture and operating conditions.

Treating Adaptors as Universal

Adaptors have specific inlet and outlet directions, pressure ratings, material configurations and intended uses.

15. Technical Buyer Checklist

Before requesting a quote or selecting a gas control component, collect the following information:

Application

- Gas detector calibration
- Bump testing
- Portable field calibration
- Fixed gas detection calibration
- Laboratory test gas
- Process gas analysis
- Environmental monitoring
- Automated gas control
- Cylinder package assembly

Gas and Cylinder

- Gas mixture
- Concentration
- Balance gas
- Cylinder type
- Refillable or non-refillable cylinder
- Cylinder pressure
- Cylinder valve connection
- Cylinder size or package type

Regulator or Valve Requirement

- Fixed flow

- Demand flow
- Selectable flow
- Push button release
- Trigger release
- Flow control valve
- Pressure reducing regulator
- Solenoid operation
- Adaptor or connection conversion

Technical Data

- Maximum inlet pressure
 - Required outlet pressure
 - Required flow rate
 - Inlet connection
 - Outlet connection
 - Material preference
 - Seal or seat requirement
 - Gauge requirement
 - Tubing or calibration cap interface
 - Instrument make and model where relevant
 - Destination country or market
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16. Oxford Valves Product Mapping

Gas Detector Calibration & Bump Testing

Relevant products:

- 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
- C10 Valves — OV-C10-200 Series
- Flow Control Valves — OV-FCV-1000 Series
- Adaptors — OV-A-800 Series

Calibration Gas Cylinder Components

Relevant products:

- C10 Valves — OV-C10-200 Series
- Integrated C10 Valves — OV-IC10-900 Series
- Fixed Flow Regulators — OV-FFR-300 Series
- Push Button Regulators — OV-PBR-1100 Series
- Flow Control Valves — OV-FCV-1000 Series
- Adaptors — OV-A-800 Series

Portable Gas Detection & Field Calibration

Relevant products:

- C10 Valves — OV-C10-200 Series
- 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
- Adaptors — OV-A-800 Series

Automated Gas Control

Relevant products:

- Solenoid Regulators — OV-SR-1300 Series
 - Flow Control Valves — OV-FCV-1000 Series
 - Adaptors — OV-A-800 Series
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17. Frequently Asked Questions

What gas control components are used for gas detector calibration?

Gas detector calibration may use fixed flow regulators, demand flow regulators, push button regulators, trigger regulators, C10 valves, flow control valves and adaptors. The correct product depends on the cylinder, instrument, pressure, flow requirement and calibration method.

What is the difference between calibration and bump testing?

Calibration checks and adjusts the detector response against a known gas concentration. Bump testing is a shorter functional test that confirms the detector responds to gas exposure and alarms as expected.

When should a fixed flow regulator be used?

A fixed flow regulator is used when the application requires a preset continuous flow rate. It is common in gas detector calibration and routine bump testing where the required flow is known.

When should a demand flow regulator be used?

A demand flow regulator is used when the instrument has an internal pump or sampling system that draws gas as required. It supplies gas only when the instrument creates demand.

What is a C10 valve used for?

A C10 valve is commonly used on portable calibration gas cylinders. It provides a compact self-closing cylinder valve connection for compatible regulators, adaptors or gas delivery components.

What is the difference between a push button regulator and a trigger regulator?

Both are manual gas release regulators. A push button regulator releases gas when a button is pressed. A trigger regulator releases gas when a trigger mechanism is pressed.

Are adaptors universal?

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

Does Oxford Valves supply calibration gases?

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

Can Oxford Valves help with product selection?

Yes. Oxford Valves can support technical buyers with product selection based on application, gas type, cylinder type, pressure, flow, connection, material and seal requirements.

18. Request Technical Support

For product selection support, please provide as much information as possible.

Include:

- application
 - gas type or gas mixture
 - cylinder type
 - refillable or non-refillable cylinder format
 - maximum inlet pressure
 - required outlet pressure
 - required flow rate
 - inlet connection
 - outlet connection
 - material preference
 - seal or seat requirement
 - instrument or downstream equipment details
 - quantity required
 - destination country or region
 - any drawings, samples or existing product references
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Final product suitability should always be confirmed against the specific gas, pressure, flow, cylinder, connection, material, seal and application requirements.