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# Supplied Air Respirators How-To Guide

# **Components & Best Practices**

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While the specific needs of every facility will be different, this document will provide you with a basic overview of what is needed and points for consideration when setting up a supplied air system.

## Setting Up a Supplied Air Respiratory Protection System

The process of setting up a supplied air respiratory protection system can at first appear complicated, but we are here to simplify the process!

While the specific needs of every facility will be different, this document will provide you with a basic overview of what is needed and points for consideration when setting up a supplied air system.

GX4

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### Who should be involved in the planning process?

- Plant Manager
- Safety Officer
- Maintenance and electrical team
- Your respiratory protection manufacturer as your respiratory protection manufacturer we are here to provide expert advice to make sure you get set up with a system that is safe, efficient, and practical for your team members.

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### Basic Components of a Supplied Air System:

- 1 Air source
- 2 Air filtration
- 3 Gas monitor
- Air distribution
- INIOSH approved respirator assembly.



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### 5 NIOSH Approved Respirator Assembly

A NIOSH approved respirator assembly, often referred to as "hose to nose" to clarify the assembly's start and end points, is made up of the following components. For NIOSH certification, all these components must be from the same manufacturer and not interchangeable with parts from other brands to ensure compliance.

- A Headtop
- Breathing Tube: Connects the headtop to the flow control device.
- C Flow Control Device: Controls the flow rate of air entering the headtop (pictured is the C40<sup>™</sup> Flow Control Device, which can also heat and cool the incoming air).
- Airline Hose with Coupler.

### Maintenance Tip:

Proper storage of the airline hose via a hose reel or hose rack will prevent early damage to hoses and couplers.

### Additional Requirements:

 A written respiratory protection program that meets OSHA's Respiratory Protection Standard requirements
Medical evaluation for employees to assess their suitability

- for wearing the chosen respirator assembly
- Fit-testing (if using tight-fitting respirators).

### Air Source

### The most common air source to a supplied air system is a High-Pressure Air Compressor.

### **Compressor Placement**

The compressor should be located in an area with "clean air" to minimize the risk of contamination, i.e. away from vents and equipment or vehicle exhaust.

### **Compressor Size/Capacity**

- It is important to ensure the compressor will be able to accommodate the airflow required per respirator assembly. This is measured in cubic feet per minute (CFM), and will also vary based on the length of airline hose and type of flow control device being used. All supplied air respirator manufacturers will include a Breathing Air Pressure Chart detailing the air pressure requirements for that particular respirator set up (see example on page 7).
- If your facility has an existing compressor that provides air drops throughout a facility you will need to confirm that the existing system is suitable for Grade D Breathing Air and can provide the required CFM to each operator.

### **Breathing Air Compressor Systems**

A Breathing Air Compressor System is a compressor specifically dedicated to breathing air and may be an option you want to consider. These compressors often have filtration and carbon monoxide monitoring incorporated into the compressor setup, in which case additional in-line gas monitoring and filtration components are not needed.

### Air Qualitu

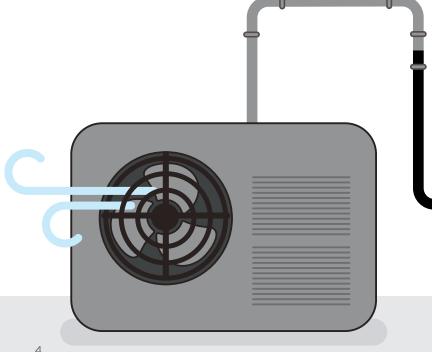
Per OSHA, the compressor air must meet Grade D breathing air requirements as described in ANSI/Compressed Gas Association Commodity Specification for Air G-7.1-2018.

Requirements for Grade D breathing air:

- Oxygen content between 19.5-23.5%
- Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less
- Carbon monoxide (CO) content of 10 ppm or less
- Carbon dioxide content of 1,000 ppm or less
- Lack of noticeable odor.

### Testing

- Although OSHA does not specify a time interval for testing, industry standard is to test annually and/or following any maintenance of your compressor.
- There are third party testing labs dedicated to compressed air testing and even specializing in breathing air standards.
- There are also companies that will provide you with an Air Sampling Kit, and a pass certificate upon your sampling achieving the target air quality.



### **Optional Radex® Airline Filter Attachments:**

These attachments are for environments that are humid, have excessive moisture, oil, and/or other particulates in the air offering additional filtration prior to the Radex Filter. These attachments can be used together or individually as needed.

## Air Monitoring & Filtration



Compressed breathing air must be monitored for Carbon Monoxide levels; some facilities may also require monitoring for additional gases such as Oxygen and Hydrogen Sulfide. Compressed air must be filtered to ensure any excess moisture or oil is removed. GVS-RPB<sup>®</sup> gas monitoring and filtration options include:

### GX4<sup>®</sup> Gas Monitor

- Can monitor for Carbon Monoxide (CO), Oxygen (O<sub>2</sub>), and Hydrogen Sulfide (H<sub>2</sub>S)
- Connects to Radex airline filter
- Regular testing of the alarm and sensor cartridges should be undertaken every 30 days to ensure they are within calibration
- Real time monitoring with alarm and optional strobe.

### **GX4 Power Options:**

GX4

For maximum flexibility when it comes to job sites, the GX4 can be set up in two different power configurations. 12V DC Cable with Battery Clips for remote job sites, or 110/240V AC Adapter Plug for longer term applications.

### Radex<sup>®</sup> Airline Canister

- Can be wall or floor mounted
- 2-outlet or 6-outlet Radex configurations are available
- The 6-stage filter cartridge removes moisture, odor, and particulates down to 0.5 microns from the compressed air stream
- Radex filter cartridge replaced approximately every 3-months
- Attachments can be added on to provide additional filtration and air pressure regulation.

The Radex Filter system contains 6-stages of filtration media, to further filter compressed air and protect the respirator user from solid and/or liquid particulates, such as dusts 0.5 microns in size or larger, mists and/or odors. The filter system DOES NOT filter CO-Carbon Monoxide.

### Safety Tip:

The optional GVS-RPB Auxiliary Strobe Light and Alarm connects to the GX4 as an additional safety measure. With a 50ft cable it should be positioned in a location easily visible to all operators connected to that air supply.

#### Auto Drain Unit:

The Radex will accumulate moisture in the filter tank and should be drained, the Auto Drain Unit is provided to offer an automatic drain to the unit rather than manually opening the ball valve at the bottom of the unit.

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onal safety measure. d in a location easily ted to that air supply.

# Air Distribution to Operators

### Hose Length

- The maximum length of hose allowed, as determined by the Code of Federal Regulations and measured from the Point of Attachment to the operator, is 300 feet.
- GVS-RPB<sup>®</sup> offers hoses in lengths of 25, 50 and 100 feet.

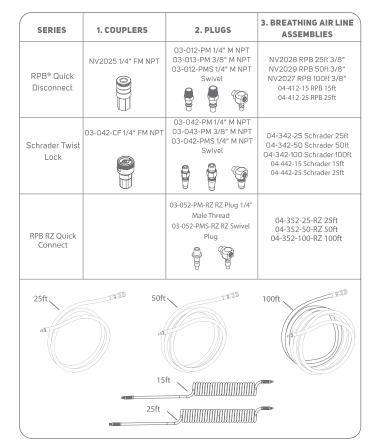
### Fittings

- Each manufacturer has approved fittings for use with their respirator assemblies. It's important to understand the use of any non-approved fitting will void the NIOSH approval of the assembly.
- GVS-RPB's standard fittings include RPB Quick Disconnect, Schrader, and the RZ fitting (proprietary to GVS-RPB).

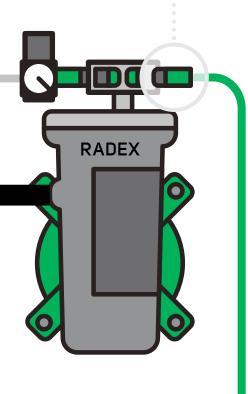
### **Point of Attachment**

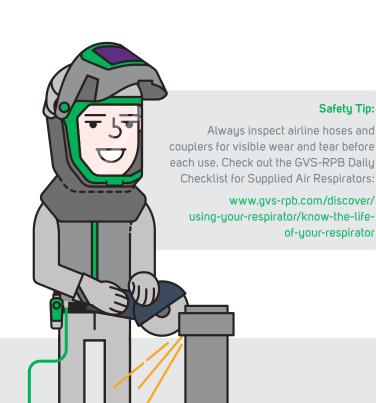
The Point Of Attachment (POA), is where the fitting on an Air Supply Hose attaches to the compressed air source. The point of connection when using GVS-RPB Radex® Filtration, is at the coupler at the top of the Radex. For safety reasons, all of the components used from the Point of Attachment to the Respirator MUST all be of the same manufacturer. As seen here in our NIOSH approved Respirator Assembly Components.

### Air Supply Hoses



Safety Tip:







### **Pressure Settings**

The GVS-RPB® Respirators, NOVA 3®, NOVA 2000®, Z-Link®, Z4®, T-Link®, and T200<sup>™</sup> all require air pressure ranges to provide a volume of air that falls within the required range of 6-15CFM or 170-425lpm according to U.S. Government regulations, (42 CFR, Part 84, Subpart J, 84.150).

Breathing table charts can be found in Instruction Manuals for each respirator for further reference. Pressure settings are determined by a combination of factors: Air Source, Type of Air Supply Hose, Flow Control, Air Supply Hose Length, and Number of Sections of Hose. Airline hoses can only be used in 25', 50', and 100' sections, and up to 300' total maximum.

### **Calculating Pressure Settings**

To calculate the correct breathing pressure required, follow the steps below, ensuring you are referencing the correct Breathing Air Pressure Table for your specific headtop.

1. Use the correct air source. Do not use an ambient air pump, as it does not supply enough pressure (column 1).

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 Confirm the part number of the air supply hose you are using (column 2),



and the flow control device you are using (column 3).



3. Check your GVS-RPB Air Supply Hose is within the correct length (column 4) and the correct number of hose sections (column 5).

4. Set the air pressure at the point of attachment within the range specified (column 6).

#### Example: Z-Link Breathing Air Pressure Table

The below page from the Z-Link user manual details the air pressure requirements for various set ups.

I.e. A Z-Link respirator using a Constant Flow Valve and connected to a 50ft airline hose will require 12-14PSIG, whereas a Z-Link respirator using a C40<sup>™</sup> Climate Control Device and connected to an airline hose with a total length of 200ft will require a much higher pressure of 75-100PSIG.

#### **BREATHING AIR PRESSURE TABLE**

S - SPECIAL OR CRITICAL USERS INSTRUCTIONS - SAR TABLE 1.1 This table lists air pressure ranges needed to provide the RPB Z-LINK with the volume of air that falls within the required range of 6-15cfm or 170-425 lts/min according to U.S government regulations. Maximum hose pressure is 300 psi.

1. AIR SOURCE	2. AIR SUPPLY HOSE	3. FLOW CONTROL DEVICE USED WITH 04-830 BREATHING TUBE ASSEMBLY	4. SUPPLY HOSE LENGTH (FT)	5. MAX NUMBER OF SECTIONS	6. PRESSURE RANGE (PSIG AIR)
	NV2028 (25R) NV2029 (50R) NV2027 (100R)	03-101 Constant Flow Valve Assembly (High Pressure)	25 50 100 150 200 250 300	1 1 2 3 4 5 6	10 - 14 12 - 14 17 - 19 21 - 23 25 - 27 28 - 31 31 - 34
N 2222/000H7 04-352-55-RZ (25R) 04-352-50-RZ (50H) 04-352-100-RZ (100H)	03-500 C40 Climate Control Assembly	25 50 100 150 200 250 300	1 1 2 3 4 5 6	55-80 60-85 65-95 70-95 75-100 80-100 90-100	
Portable or Stationary	04-342-25 (25ft)	25 50 100 Flow Vaive Assembly (High Pressure) with 200 Schrader Filting 250 04-142-25 (259)	50 100 150 200	1 1 2 3 4 5 6	20-22 24-26 28-30 32-34 36-38 38-40 44-46
Compressor Portable or Stationary Compressor	04-342-50 (50ft) 04-342-100 (100ft)	03-500 C40 Climate Control Assembly with Schrader Fitting	25 50 100 150 200 250 300	NUMBER OF SECTIONS 1 1 2 3 4 5 6 1 1 2 3 4 5 6 6 1 1 2 3 4 5 5 6 6 1 1 2 3 4 5 5 6 6 1 1 2 3 4 5 5 6 6 7 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 8 8 8 7 8 7 8	65-80 70-85 75-95 80-95 85-100 90-100 95-100
	04-412-15 (15ft) 04-412-25 (25ft)	03-101 Constant Flow Valve Assembly (High Pressure) 03-500 C40 Climate	15 25 15	1	9 - 14 11 - 15 55 - 80
	04-442-15 (15ft)	Control Assembly 03-101 Constant Flow Valve Assembly (High Pressure) with Schrader Fitting	25 15 25	1	55 - 80 21-30 23-33
	04-442-25 (25ft)	03-500 C40 Climate Control Assembly with Schrader Fitting	15 25		65-80 65-80



### Scan this QR code

View and download GVS-RPB Breathing Air Pressure Tables (located within GVS-RPB Headtop Instruction Manuals), which include additional breathing airline hose options: 04-342-25, 04-342-50, 04-342-100, 04-412-15, 04-412-25, 04-442-15, and 04-442-25.

### Common Questions

### I'd like to switch to GVS® respirators for my supplied air system, do I also have to change my existing gas monitor and filtration to GVS brand?

While it is ideal to have the same manufacturer support all parts of your supplied air system, there are no regulations indicating that is mandatory. It can be changed at a later date if desired.

### Is there anything I would need to modify on my current gas monitor and/or filter to accommodate for GVS supplied air respirators?

Per NIOSH 1910.134(i)(8), the employer shall ensure that breathing air couplings are incompatible with outlets of non-respirable air and/or other gas systems. GVS provides non-common fittings for our respirators, such as the RPB® Quick Release, Schrader, and RZ Fitting. Our RPB Quick Release is our most commonly provided fitting. Most other manufacturers provide a common Hansen Industrial Quick Disconnect with their equipment, meaning GVS would need to supply our non-common RPB Quick Connect coupler to change on your existing gas monitor and/or filter.

### I have existing supplied air respirators and will be changing to GVS respirators, do I have to change the breathing air supply hose?

Yes. The National Institute for Occupational Safety and Health (NIOSH) issues certificates of approval for specific and complete respirator assemblies after the respirator has been evaluated and found to comply with all the requirements of the NIOSH regulations at Title 42, Code of Federal Regulations (CFR) Part 84 (42 CFR Part 84). As part of this approval, only GVS branded breathing air supply hoses are tested and approved for use with GVS respirators.

### How many operators can I run off a Radex<sup>®</sup> Airline Filter?

If using a Radex for multiple operators, our O4-906 (6-Outlet) is recommended. This unit can accommodate up to 5 operators, depending on the particular flow control device being used with the respirator. However, it is recommended that with use of the C40 or 4000 Series Cooling/Heating Tubes, only 3-4 operators should connect in order to accommodate the 25CFM required per operator for optimum performance.

### Calibrations How-To and Who can do them?

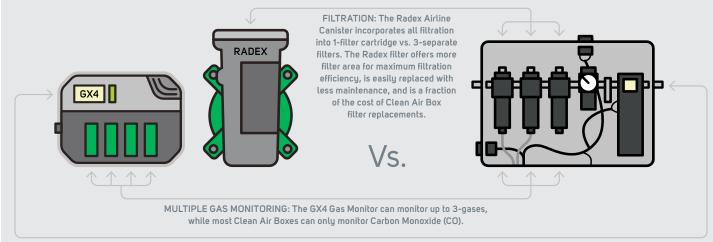
While the gas sensors typically have a 2-year lifespan, a calibration check will need to be performed every 30-days. This can be done by the customer or outsourced through a distributor that offers service. The calibration gas and regulator can be purchased to do yourself, as seen on page 11. Review GX4® instruction manual for additional details.

### Do you have to purchase a GX4 for every Radex purchased?

Best practice is to have a GX4 for each Radex for audible and visible alarm notification purposes. However, it can be determined upon the compressed air source, does your facility have a single or multiple compressors providing the breathing air to operators? Also, are the areas requiring breathing air in close proximity to each other? For example, a single air compressor ran to a blast booth and paint booth that are in same building side by side, you could use only one GX4 Gas Monitor with a Remote Strobe Alarm, placing the remote strobe alarm in an area that can be seen and heard by all operators. Each remote strobe alarm is provided with a 50' cable to be ran into a shared notification area or a supervisor area.

### GX4 + Radex Set-Up vs. Clean Air Box

The most familiar/common supplied air filtration with carbon monoxide monitoring, is known as a Clean Air Box, Air Filtration Box, or similar terminology. GVS-RPB's GX4 Gas Monitor with Radex Airline Canister combined performs not only the same functions, it exceeds, with additional safety features and ease of use as seen below.



REAL-TIME DATA LOGGING: The GX4 Gas Monitor logs monitor history every minute, with all data logs easily accessible via cell phone or remotely.

### Installation Guidance

### Hard Ducting from Radex vs. Running Airline Hose direct from Radex

In some cases, due to the amount of operators or work area conditions, you may want to consider hard ducting from the Radex Filter rather than running airline hoses initially. Be sure when choosing to use hard ducting to consider pressure drop calculations and ducting materials. When choosing to hard duct, each new connection should be provided with an additional pressure gauge with relief valve to assure recommended pressures. Then at each new connection, GVS-RPB® Breathing Airline Hoses should be connected at that point.

Example shown in the illustration below.

### Heavy-Duty Case and its Purpose

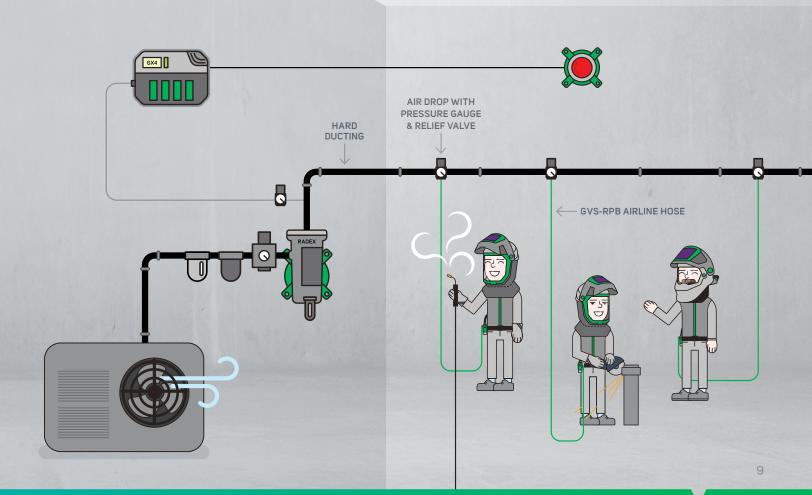
Due to most environments, it is best to keep the GX4® protected from the elements, see page 11 for Heavy-Duty Carry Case.



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### Maintenance and Benefits of C40<sup>™</sup> Cooling/Heating Vortex

The C4O Cooling and Heating Vortex, can withstand extreme conditions of work environments. It is built for longevity with the ability to be cleaned and maintained. As seen here, all components can be cleaned and/or replaced. See the C4O Operations Manual online for more details.



### Your Guide to Selecting a Respirator by Application

Explore the versatility of GVS-RPB<sup>®</sup> headtops that pair seamlessly with the Radex<sup>®</sup> Airline Filter and GX4<sup>®</sup> Gas Monitor across various industries. Discover the perfect match for your application with our comprehensive range.



#### Common Terminology

CFM: Cubic feet per minute. Used in relation to a respirator's required airflow.

Fit Test: The use of a protocol to assess the fit of a respirator on an individual. This can be done based on a qualitative (QLFT) or quantitative (QNFT) method.

NIOSH: The National Institute for Occupational Safety and Health.

**NIOSH Approved Respirator:** OSHA permits only NIOSH approved respirators to be used to protect workers. A NIOSH approved respirator has been evaluated and found to comply with all requirements of Title 42, Code of Federal Regulations, Part 84 and the manufacturer's Quality Management Plan has also been assessed and found to be satisfactory.

OSHA: Occupational Safety and Health Administration.

POA: Point of Attachment. The point at which the respirator assembly connects to the supplied air source.

**Respiratory Protection Program:** A written respiratory protection program with required worksite-specific procedures and elements for required respirator use, such as respirator selection, cleaning, storage, fit testing, medical evaluations, and worksite-specific training.

#### **References & Helpful Links**

OSHA Respiratory Protection Standard: <a href="https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134">www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134</a> NIOSH approves respirators in accordance with 42 Code of Federal Regulations Part 84 and provides guidance for their use in occupational settings: <a href="https://www.cdc.gov/niosh/topics/respirators/">www.cdc.gov/niosh/topics/respirators/</a>

Code of Federal Regulations: www.ecfr.gov/current/title-42/chapter-I/subchapter-G/part-84/subpart-J

## Supplied Air Products & Part Numbers



### Radex<sup>®</sup> Packages

04-900	Radex Airline Filter 2-Outlet System
04-906	Radex Airline Filter 6-Outlet System
04-907	Radex Complete Breathing Air System - GX4 Gas Monitor, Pre-Filter, Micro Mist Filter, & Aluminum Wall Bracket
04-908	Radex Complete 6-Outlet Breathing Air System - GX4 Gas Monitor, Pre-Filter, Micro Mist

Filter, & Aluminum Wall Bracket

### GX4<sup>®</sup> Gas Monitor Packages

	08-400	GX4 Gas Monitor - no Sensor
Kan	08-400-01	GX4 Gas Monitor
		- Power Adapter Pack,
STORE OF		& 10ppm CO Cartridge
	08-400-01-RZ	GX4 Gas Monitor
		- Power Adapter Pack,
		& 10ppm CO Cartridge
	08-400-02	GX4 Gas Monitor
2 mars		- Power Adapter Pack,
		& 5ppm CO Cartridge
2333	08-400-02-RZ	GX4 Gas Monitor
		- Power Adapter Pack,
		& 5ppm CO Cartridge
	08-401-01	GX4 Gas Monitor - 12 Volt Battery
		Clips, & 10ppm CO Cartridge
and the second second	08-401-01-RZ	GX4 Gas Monitor - 12 Volt Battery
23337		Clips, & 10ppm CO Cartridge
	08-401-02	GX4 Gas Monitor - 12 Volt Battery
		Clips, & 5ppm CO Cartridge

#### GX4<sup>®</sup> Gas Monitor Parts & Accessories

Auna	04-924	Auto Drain Unit
	04-925	Micro Mist Filter 1/2"
()	04-927	Mainline Pre-filter
	04-962	Super High Flow Regulator (includes 04-915)

Ŷ	08-231	GX4 Aluminum Wall Bracket
	08-435	Strobe Light with 50ft Cable
	08-436	Auxiliary Strobe Light & Alarm Tower with 50ft Cable
- Contraction of the second se	08-424	GX4 Heavy Duty Field Case
0	08-451	GX4 Calibration Flow Regulator (for CO & Zero Air Gas Bottles)
	08-452	GX4 Calibration Flow Regulator (for H <sub>2</sub> S Gas Bottles, includes hose and fitting)
	08-460	GX4 Zero Air (HAZMAT)
	08-461	GX4 CO 20ppm (HAZMAT)
	08-462	GX4 H2S 20ppm

### **Breathing Airline Hoses**

	Breathing Airline Hose - 3/8in, RPB Quick Release Coupler		
	NV2027	100ft	
	NV2028	25ft	
and the second s	NV2029	50ft	
	Breathing Airline Hose - 3/8in, Schrader Coupler		
	04-342-100	100ft	
	04-342-25	25ft	
Salt Star	04-342-50	50ft	
	Breathing Airline Hose - 3/8in, RZ Coupler		
Q	04-352-100-RZ	100ft	
	04-352-25-RZ	25ft	
	04-352-50-RZ	50ft	
S.	Recoil Breathing Airline Hose - 3/8in, RPB Quick Release Coupler		
	04-412-15	15ft	
	04-412-25	25ft	
	Recoil Breathing Airline Hose - 3/8in, Schrader Coupler		
	04-442-15	15ft	
	04-442-25	25ft	

### Want to know more? Get in touch with our team today!

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