Bullard®

The Human Side of Safety.®
Since 1898.

Spectrum Pressure Demand Respirator Systems

Instruction Manual

Type C NIOSH Approval Numbers

TC-13F-387 and TC-13F-388 Combination SCBAand Type C Pressure Demand Class
TC-19C-354 Type C Pressure Demand Class

READ ALL INSTRUCTIONS AND WARNINGS BEFORE USING THIS RESPIRATOR. SAVE THIS MANUAL FOR FUTURE REFERENCE.

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Spectrum Series
Bullard
1898 Safety Way
Cynthiana, Kentucky 41031
800-827-0423

SPECTRUM-PDE
Open-circuit, Pressure Demand, Compressed Air, Combination Escape SCBA and Supplied Air Respirator
APPROVED ONLY IN THE FOLLOWING CONFIGURATIONS:

RESPIRATOR COMPONENTS

		1				2	3			4			Accessories																				Cautions & Limitations[2]
TC#	Protection[1]	Alternate Facepiece				Regulator Assembly	Harness Assembly			Alternate Hoses			Alternate Coupler Assemblies							Cover Lens	Anti-Fog Wipe	Extension Hose	Spectacle Kit	Spectacle Kit	Cover Lens	Small Nose Cup	Amplifier	Deflector						
		FF45S	FF45L	SPEC-PD-S	SPEC-PD-ML	RA45-B	ESC-5	ESC-10	RESC-5	5454	5457	5458	CA38	CA37	CA34	CA33	CA32	CA31	CA30S	LC	AFW45	EH45	PL	45PL	45LC	SNA45	AMP	ADEF						
13F-387	5 min/2216psi/SC/PD/SA	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	DEJMNOS					
13F-388	10 min/3000psi/SC/PD/SA	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	DEJMNOS					

1. PROTECTION
   SC-SELF CONTAINED
   PD-PRESSURE DEMAND
   SA-SUPPLIED AIR

2. CAUTIONS & LIMITATIONS
   D. Air-line respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA G-7.1 Grade D or higher quality.
   E. Use only the pressure ranges and hose lengths specified in the User's Instructions.
   J. Failure to properly use and maintain this product could result in injury or death.
   M. All approved respirators shall be selected, fitted, used and maintained in accordance with MSHA, OSHA and other applicable regulations.
   N. Never substitute, modify, add or omit parts. Use only exact replacement parts in the configuration specified by the manufacturer.
   O. Refer to User's Instructions, and/or maintenance manuals for information on use and maintenance of these respirators.
   S. Special or critical user's instructions and/or specific use limitations apply. Refer to User's Instructions before donning.

Spectrum Series
Bullard
1898 Safety Way
Cynthiana, Kentucky 41031
800-827-0423

SPECTRUM-PD
Type C Pressure Demand, Supplied Air Respirator

APPROVED ONLY IN THE FOLLOWING CONFIGURATIONS:

RESPIRATOR COMPONENTS																												
		1				2	3	4																				
TC#	Protection[1]	Alternate Facepiece				Regulator Assembly	Harness Assembly	Alternate Hoses			Accessories																	Cautions & Limitations[2]
								25'	50'	100'	Alternate Coupler Assemblies							Cover Lens	Anti-Fog Wipe	Extension Hose	Spectacle Kit	Spectacle Kit	Cover Lens	Small Nose Cup	Amplifier	Deflector	
		FF45S	FF45L	SPEC-PD-S	SPEC-PD-ML	PDR45	BHA	5454	5457	5458	CA38	CA37	CA34	CA33	CA32	CA31	CA30S	LC	AFW45	EH45	PL	45PL	45LC	SNA45	AMP	ADEF	
19C-354	SA/PD	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	BCDEJMNOS

1. PROTECTION
   SA-SUPPLIED AIR
   PD-PRESSURE DEMAND

2. CAUTIONS & LIMITATIONS
   B. Not for use in atmospheres immediately dangerous to life or health.
   C. Do not exceed maximum use concentrations established by regulatory standards.
   D. Air-line respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA G-7.1 Grade D or higher quality.
   E. Use only the pressure ranges and hose lengths specified in the User's Instructions.
   J. Failure to properly use and maintain this product could result in injury or death.
   M. All approved respirators shall be selected, fitted, used and maintained in accordance with MSHA, OSHA and other applicable regulations.
   N. Never substitute, modify, add or omit parts. Use only exact replacement parts in the configuration specified by the manufacturer.
   O. Refer to User's Instructions, and/or maintenance manuals for information on use and maintenance of these respirators.
   S. Special or critical user's instructions and/or specific use limitations apply. Refer to User's Instructions before donning.

⚠ WARNINGS ⚠

CAREFULLY READ AND FOLLOW THE INSTRUCTIONS IN THIS MANUAL BEFORE USE.

1) **Improper respirator use may cause injury or death. Improper use may also cause certain life-threatening delayed lung diseases such as silicosis, pneumoconiosis or asbestosis.**

2) **This respirator, when properly fitted and used, significantly reduces, but does not completely eliminate, the breathing of contaminants by the respirator wearer. This respirator will not provide protection against all chemical hazards or conditions.**

3) **Regulations require that the employer provide training to the user on the proper use, maintenance and limitations of this equipment. Each person using this respirator must first read and understand this entire instruction manual. The Spectrum Pressure Demand Respirator should only be used in accordance with these operating and maintenance instructions. If you have any questions concerning the use of this respirator, ask your employer or call Bullard Inside Sales at 800-827-0423.**

4) **Before using this respirator, be sure your employer has determined that airborne contaminant concentrations do not exceed those allowed by applicable OSHA, MSHA, EPA, NIOSH or ACGIH regulations and recommendations, or any other applicable regulations for pressure demand airline and self-contained breathing apparatus respirators. Federal law requires that your employer measure and monitor airborne contaminant levels in the work area.**

5) **DO NOT wear this respirator if conditions prevent a good face seal. [See OSHA regulation 29CFR1910.134(e)(5)(i)] Such conditions may include, but are not limited to:**
   - **the growth of a beard, bangs or sideburns that will pass between the facepiece sealing area and the face.**
   - **the use of spectacles that have temple bars. [Bullard offers a spectacle frame assembly that fits into the respirator facepiece for workers who require prescription eyewear.]**
   - **the use of caps, face or head coverings [that include straps or other material that pass(es) between the facepiece sealing area and the wearer's face]**
   - **missing teeth or dentures, facial deformities or deep scars.**

6) **The following warnings apply only to the Model Spectrum-PD respirator, the model that does not include an escape cylinder. DO NOT wear the Spectrum-PD model if any of the following conditions exist:**
   - **Atmosphere is immediately dangerous to life or health (IDLH).**
   - **You cannot escape without the aid of the respirator.**
   - **Atmosphere contains less than 19.5% oxygen.**
   - **Work area is poorly ventilated and contaminant concentrations are too high.**

⚠ WARNINGS ⚠ (continued)

7) **DO NOT wear either the Model Spectrum-PD or the Model Spectrum-PDE respirator if any of the following conditions exist:**
   - **Identity of contaminant(s) or their concentration(s) are unknown.**
   - **Contaminant(s) in work environment are in excess of maximum use concentrations (MUC) established by regulatory standards.**

8) **Bullard recommends that you DO NOT wear this respirator until you have passed a complete physical exam (perhaps including an x-ray), conducted by qualified medical personnel.**

9) **DO NOT modify or alter this respirator in any manner. Use only Spectrum Pressure Demand components and replacement parts manufactured by Bullard and approved by NIOSH for use with this respirator. Failure to use components and replacement parts approved by NIOSH for use with this respirator voids NIOSH approval of the entire respirator, invalidates all Bullard warranties, and may cause death, lung disease or exposure to other hazardous or life-threatening conditions.**

10) **Inspect all components of this respirator system during cleaning and before and after each use for signs of wear, tear or damage that might reduce the degree of protection originally provided. Immediately replace worn or damaged components with Bullard Spectrum Pressure Demand components approved by NIOSH for use with this respirator, or remove the respirator from service. (See INSPECTION, CLEANING AND STORAGE section for instructions on proper maintenance of Spectrum Pressure Demand Respirators.)**

11) **DO NOT connect the respirator's air supply hose to nitrogen, oxygen, toxic or inert gases. To prevent this, airline couplings used for this respirator shall be incompatible with outlets for other gas systems. Failure to connect to the proper air source may result in serious injury or death. Be certain your employer has determined that the breathing air source provides at least Grade D breathable air.**

12) **The following warning applies only to the Spectrum-PDE respirator, the model that includes an escape cylinder.**

    Separate regulations and procedures must be followed when this respirator is used in confined spaces. The procedures for confined space entry, operation and exit are defined in applicable regulations and standards, including 29CFR 1910.146. Model Spectrum-PD must not be used for confined space entry when the conditions are unknown.

13) **DO NOT use this respirator for firefighting, abrasive blasting or underwater diving.**

⚠ WARNINGS ⚠ (continued)

14) Bullard respirators, accessories and associated equipment should not be used in atmospheres in which contaminant concentrations may be above the lower explosive limit (LEL).

15)User repair of Bullard's Spectrum Pressure Demand Respirators is limited to replacement of components listed on the NIOSH approval label and repairs described in this manual. Disassembly should be performed only to the extent necessary to replace components. To protect your warranty and the NIOSH certification of this equipment, all other repairs must be done only by Bullard.

CAUTIONS AND LIMITATIONS

Model Spectrum-PDE

D-Airline respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA G-7.1 Grade D or higher quality.

E- Use only the pressure ranges and hose lengths specified in the User's Instructions.

J- Failure to properly use and maintain this product could result in injury or death.

M- All approved respirators shall be selected, fitted, used and maintained in accordance with MSHA, OSHA and other applicable regulations.

N- Never substitute, modify, add or omit parts. Use only exact replacement parts in the configuration specified by the manufacturer.

O- Refer to User's Instructions, and/or maintenance manuals for information on use and maintenance of these respirators.

S- Special or critical user's instructions and/or specific use limitations apply. Refer to User's Instructions before donning.

Do not use the air supply from the escape cylinder of this respirator for entry into unknown or hazardous atmospheres. Entry may be performed using the airline supply.

If the airline supply is interrupted, turn the cylinder valve of the escape cylinder counterclockwise at least one full turn to start the flow of air from the cylinder, disconnect the airline hose from the escape cylinder regulator hose, if necessary, and proceed immediately to a clean air environment. Anti-fog solution must be applied to the inner surface of the lens if the respirator will be used at temperatures below 32° F (0° C), also the plastic air deflector must be inserted into the facepiece. In cold temperatures do not exhale into the facepiece until mask is completely donned and the first breathe feature of the regulator has been activated by inhalation. Temperature range of operation is 0° F (-18° C) to 120° F (49° C).

Model Spectrum-PD

B- Not for use in atmospheres immediately dangerous to life or health.

C- Do not exceed maximum use concentrations established by regulatory standards.

D- Airline respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA G-7.1 Grade D or higher quality.

E- Use only the pressure ranges and hose lengths specified in the User's Instructions.

J- Failure to properly use and maintain this product could result in injury or death.

M- All approved respirators shall be selected, fitted, used and maintained in accordance with MSHA, OSHA and other applicable regulations.

N- Never substitute, modify, add or omit parts. Use only exact replacement parts in the configuration specified by the manufacturer.

O- Refer to User's Instructions, and/or maintenance manuals for information on use and maintenance of these respirators.

S- Special or critical user's instructions and/or specific use limitations apply. Refer to User's Instructions before donning.

Anti-fog solution must be applied to the inner surface of the lens if the respirator will be used at temperatures below 32° F (0° C), also the plastic air deflector must be inserted into the facepiece. In cold temperatures do not exhale into the facepiece until mask is completely donned and the first breathe feature of the regulator has been activated by inhalation. Temperature range of operation is 0° F (-18° C) to 120° F (49° C).

GENERAL INFORMATION

Bullard's Spectrum Pressure Demand Respirators are pressure demand systems that maintain positive pressure and provide a flow of air as the wearer demands it. Upon inhalation, the pressure in the facepiece is slightly reduced, thus initiating airflow from the system to meet the wearer's need for air. At the start of exhalation, airflow to the facepiece stops, and a positive pressure is maintained by the spring-loaded exhalation valve in the facepiece. Spectrum Pressure Demand Respirators are available with or without a Self-Contained Breathing Apparatus (SCBA) escape assembly. The respirator facepiece is available in two sizes. **The regulator including a bypass valve is only approved with those respirator models that incorporate an escape assembly.**

The Spectrum-PD is a Type C, pressure demand airline respirator. This assembly consists of a full facepiece, pressure demand regulator and regulator hose, harness assembly, coupler assembly and various lengths of air supply hose, which can be combined to a maximum of 300 feet (91 m) in length.

The Spectrum-PDE assembly is a combination respirator which includes an SCBA escape assembly and a Type C pressure demand airline respirator. This assembly consists of a full facepiece, second stage regulator assembly (including pressure demand regulator with bypass valve and regulator hose), escape assembly, coupler assembly and various lengths of air supply hose. The Spectrum-PDE, approved with a 5 or 10-minute cylinder, is approved for airline entry into hazardous atmospheres and emergency exit using the SCBA escape assembly in the event of a remote air supply failure. This respirator can be used in contaminated atmospheres which may be immediately dangerous to life or health (IDLH), only where the time needed to escape to an uncontaminated atmosphere is not greater than five or ten minutes, depending on which escape cylinder is used.

These respirators are approved to provide respiratory protection in general purpose applications, including spray painting, tank cleaning, chemical and pesticide handling, and other industrial or agricultural applications.

Spectrum Pressure Demand Respirators are compatible with breathing air sources such as breathing air compressors or breathing air cylinders that provide sufficient air volume, pressure and flow. Bullard offers air supply hose assemblies in different lengths that can be used separately or used together to connect the respirator to these breathing air sources. Contact Bullard at 800-827-0423 or reach your local authorized distributor for more information about the components of Spectrum Pressure Demand Respirators.

COMPONENT CONCEPT

Bullard Spectrum-PDE Pressure Demand Respirators consist of four components: full facepiece, regulator assembly (including first stage regulator and second stage regulator with bypass valve), harness assembly (including 5 or 10-minute cylinder), and air supply hose. All must be present and properly assembled to constitute a complete NIOSH-approved respirator.

SPEC-PDE-5

SPEC-PDE-10

Figure 1

Bullard Spectrum-PD Pressure Demand Respirators consist of four components: full facepiece, regulator assembly (including second stage regulator without bypass valve), harness assembly and air supply hose. All must be present and properly assembled to constitute a complete NIOSH-approved respirator.

SPEC-PD

Figure 2

WARNING!
Failure to use complete NIOSH-approved Bullard components and replacement parts voids approval of the entire assembly. Basic parts are listed on the NIOSH Approval Label on pages 1 and 2.

SPECIFICATIONS

Performance Specifications (both models)

Required Pressure Range	80-100 psig (552-690 kPa)
Air Supply Hose Lengths	25-foot (7.6 m), 50-foot (15.2 m) or 100-foot (30.5 m) lengths, with total length not more than 300 feet (91 m)
Peak Airflow (free flow) at 80 psig (552 kPa) at 100 psig (690 kPa)	 10-13 cfm (280-365 lpm) 13-18 cfm (365-510 lpm)
Typical static pressure maintained in facepiece	.9-1.4" H_20 (23-35 mm)
Operating Temperature Range	0°F (-18°C) to 120°F (49°C)
Cylinder Pressure, 5-minute	2,216 psig (15,280 kPa)
Cylinder Pressure, 10-minute	3,000 psig (20,685 kPa)

Materials of Construction

Headstrap	Neoprene rubber
Flange	Silicone rubber
Lens	Polycarbonate with anti-scratch coating
First Stage Regulator	Aluminum
Second Stage Pressure Demand Regulator	Glass-Filled Ultem®
Waist Belt, Shoulder Strap	Fire Retardant Nylon
5 and 10-Minute Cylinders	Aluminum

Weights

Respirator Without Cylinder	2.47 lbs (1,124 g)
5-Minute Cylinder Only	6.22 lbs. (2,824 g)
10-Minute Cylinder Only	8.99 lbs. (4,084 g)
Respirator With 5-Minute Cylinder	8.69 lbs (3,948 g)
Respirator With 10-Minute Cylinder	11.46 lbs (5,208 g)

Approval Numbers

SPEC-PD	TC-19C-354
SPEC-PDE-5	TC-13F-387
SPEC-PDE-10	TC-13F-388

OPERATIONS

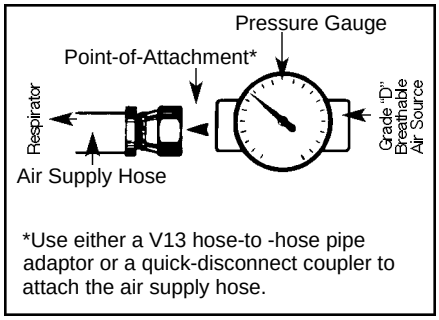


Figure 3

Limitations of Use

RESPIRATORY

Spectrum-PDE respirators are approved by NIOSH as combination SCBAand pressure demand respirators. The airline supply is used for entry into hazardous atmospheres, and the self-contained breathing apparatus is used for escape only. When used with an escape cylinder, the respirator is approved as a combination SCBAand pressure demand respirator and may be used for confined space entry or in IDLH conditions, in accordance with all applicable regulations.

Model Spectrum-PD, the model that does not include an escape cylinder, is NIOSH-approved for use in any atmosphere NOT immediately dangerous to life or health (IDLH) or from which the wearer can escape without the aid of the respirator.

The respirator is approved for use in temperatures between 0°F (-18°C) and +120°F (49°C).

HEAD

Spectrum Pressure Demand Respirators DO NOT provide head protection. Wear approved head protection if head protection is required. Bullard offers a complete line of industrial head protection products for use in a variety of work applications.

FACE

This respirator's lens meets ANSI Z87.1 - 1989 faceshield requirements for impact, penetration and optics. The lens provides LIMITED FACE PROTECTION. The Spectrum lens is not shatterproof.

EYES

Spectrum Pressure Demand Respirators provide LIMITED EYE PROTECTION from flying particles and splash per ANSI Z87.1 - 1989.

BODY

Spectrum Pressure Demand Respirators do not protect exposed areas of the body. Some contaminants can be absorbed directly through the skin, while others may irritate exposed areas.

Breathing Air Requirements

AIR QUALITY

⚠WARNING!⚠ : This respirator must be supplied with clean, breathable air, Grade D or better, at all times. This respirator does not purify air or filter out contaminants from the breathing air source.

Respirable, breathable air must be supplied to the point-of-attachment of the approved Bullard air supply hose. The point-of-attachment is the point at which the air supply hose connects to the air source. Bullard's extension hoses come standard with a V13 hose-to-pipe adaptor, which can be used to attach the air supply hose to the air supply. Aquick-disconnect coupler may also be used for attachment to the air supply. (Call Bullard Inside Sales for guidance on purchasing the correct fittings for the airline hose.) Apressure gauge attached to the air source is used to monitor the pressure of air provided to the respirator wearer (See Figure 3).

Supplied breathing air must ATAMINIMUM meet the requirements for Type 1 gaseous air described in the Compressed Gas Association Commodity Specification G-7.1 (Grade D or higher quality), as specified by Federal regulations 42 CFR, Part 84.141(b) and 29 1910.134(i).

The requirements for Grade D breathable air include:

- Oxygen 19.5-23.5%
- Hydrocarbons or oil (condensed) in mg/m^3 . . . . . .5 mg/m^3 max.
- Carbon monoxide . . . . . .10 ppm max.
- Carbon dioxide . . . . . .1,000 ppm max.
- Odor . . . . . Lack of noticeable odor*
- No toxic contaminants at levels that make the air unsafe to breathe.

** Specific measurement of odor in gaseous air is impractical. Air normally may have a slight odor. The presence of a pronounced odor should render the air unsatisfactory.*

Contact the Compressed Gas Association (1725 Jefferson Davis Highway, Arlington, VA22202) for complete details on Commodity Specification G-7.1-1989.

AIR SOURCE

If your source of supplied air is an air compressor, locate it in a clean air environment.

The user must ensure that the air source has the capacity to deliver the air volume required by all users at peak demand.

Use suitable after-cooler/ dryers, filters, carbon monoxide monitors (like Bullard's Alert-1™ CO monitor), as necessary to assure clean, breathable air at all times.

When using the 5 or 10-minute escape cylinder with the respirator, the user must ensure that the cylinder is full before entering the work environment.

Breathing Air Pressure

⚠ DANGER ⚠ : FAILURE TO SUPPLYTHE MINIMUM REQUIRED PRESSURE AT THE POINT-OF-ATTACHMENT FOR YOUR HOSE LENGTH AND RESPIRATOR TYPE WILL REDUCE AIRFLOW AND MAY CAUSE INJURY, DISEASE OR DEATH.

The Breathing Air Pressure Table (See page 12) defines the air pressure ranges necessary to operate Spectrum Pressure Demand Respirators. Make sure you understand the information in this table before using this respirator.

Set relief valve (if applicable) at a maximum pressure of 125 psig (863 kPa). Check that your total connected hose length does not exceed 300 feet (91 m), and that the airline hose is comprised of no more than 5 lengths. Set the air pressure at the point-of-attachment to within the required pressure range of 80-100 psig (552-690 kPa). Before setting air pressure, be sure to turn off the second stage regulator by pressing the gray button.

Breathing Air Supply Hoses and Hose Fittings

Bullard air supply hoses approved by NIOSH for use with this respirator must be used between the fitting on the regulator hose or escape assembly, and the point-of-attachment to the air supply. When connecting lengths of V10 hose, use only Bullard V11 hose-to-hose adaptors. Secure connection(s) until wrench-tight and leak-free.

Escape Cylinder

The 5-minute escape cylinder stores 8 cubic feet (226 l) of air at 2,216 psig (15,280 kPa), and the 10-minute cylinder stores 15.2 cubic feet (432 l) of air at 3,000 psig (20,685 kPa). The cylinder valve controls the airflow and houses a safety relief device and a cylinder pressure gauge.

The first stage regulator reduces the cylinder pressure and supplies airflow to the facepiece. A check valve in the airline hose prevents cylinder air from flowing down the airline hose instead of into the mask and prevents inward leakage of contaminated air when disconnected from the air supply.

Pressure Demand Regulator (Second Stage Regulator)

Your second stage regulator is equipped with a first breath feature. This means the user can set the regulator to prevent air from entering the facepiece while donning the respirator. To engage the first breath feature and shut off airflow, press the gray button located on the side of the regulator.

Air pressure in the line does not flow into the respirator until the wearer activates flow by taking a first breath or by pressing the black manual override button located on top of the regulator.

In the case of restricted or interrupted airflow with the ESCBAmodels of this respirator, the user can open the bypass valve by turning the red knob on the second stage regulator counterclockwise until the desired constant airflow is achieved. In case of restricted or interrupted airflow with the PD model, the user can press and hold the black manual override button on top of the second stage regulator. These features override the first breath feature and allow for a continuous flow of air to the facepiece. (For instructions on emergency operation, see page 17.)

Breathing Air Pressure Table

This table defines the air pressure ranges necessary to provide Spectrum Pressure Demand Respirators with a volume of air that meets the pressure-demand requirements according to U.S. Government regulations (Ref. Title 42CFR Part 84).

1	2	3	4
Air Supply Hose	Air Supply Hose Length	Max. Number of Hose Sections	Req. Press. Range (psig air/kPa air)
V10	25-300 (7.6-91 m)	5	80-100 psig (552-690 kPa (kN/m^2)*)

* To convert your pressure range from kPa (kN/m^2)to bar, divide kPa by 100.

SPECTRUM-PD AND SPECTRUM-PDE RESPIRATOR ASSEMBLY AND USE

Assembly of Respirator

⚠ WARNING ⚠: Always don, remove and fit check Spectrum Pressure Demand Respirators in a safe, uncontaminated area.

When using the Spectrum-PDE respirator, the first stage regulator must be attached to the cylinder before the user connects the air supply hose to the air supply. Using the air supply hose with the regulator detached from the cylinder could result in loss of air, causing illness or death.

Before using this respirator, regulations require that the employer train the user in the proper use and maintenance of Spectrum Pressure Demand Respirators. It should only be used in accordance with these operating and maintenance instructions. If you have any questions concerning the use of this respirator, ask your employer.

1) Check Respirator Components
Remove respirator components from the box. Visually check each component to be sure that it is in good condition. (See maintenance section of the manual for information on identifying and checking condition of components.)

Make sure the approved part numbers on the respirator components match the numbers on the approval label. If you have any doubts, consult your respirator program administrator or Bullard Inside Sales prior to using the respirator.

⚠ WARNING ⚠: The mask cover must be used when operating this respirator. This part provides a secondary locking mechanism for the regulator adaptor and protects the exhalation valve from outside interference. Always ensure that the locking tooth on the cover is securely engaged into one of the adaptor teeth so as to prevent rotation.

2) Assemble Alternate Coupler Assembly on Respirator:
Standard assemblies for both the Spectrum-PD and Spectrum-PDE respirators come with a CA30 (Industrial Interchange) coupler assembly. The nipple is assembled onto the second stage regulator hose on the Spectrum-PD, and onto the first stage regulator hose on the Spectrum-PDE. The female coupler is snapped onto the nipple for shipment. If a different type of coupler assembly is desired, the user must purchase an approved coupler assembly (see page 26) and assemble following these instructions:

a. Remove the CA30 (Industrial Interchange) nipple using a wrench, being careful not to drop the in-line screen and retaining ring from the fitting on the hose.

b. Before connecting the other nipple, ensure that the in-line screen and white retaining ring are still in place inside the female threaded fitting.

c. Apply thread sealant on threads of new nipple and tighten with a wrench until wrench-tight and leak-free (Bullard recommends using Loctite 242).

Note: Be sure to re-install the metal tab before threading the male nipple to the regulator hose (See Figure 4).

3) Connect Coupler to Hose:
To attach the female coupler of the CA30 to the airline hose, screw the coupler onto the airline hose, using the adaptor that is attached to it. Thread sealant is not necessary at this connection (See Figure 5).

4) Connect to Air Source:
Connect the Bullard air supply hose to the air source supplying Grade D or better breathing air by connecting your airline hose to the point-of-attachment.

⚠ WARNING ⚠ : Carefully inspect threads and remove all foreign material which can enter the airline and block air flow. Do not use Teflon tape for any fittings or connections.

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Putting on the Respirator

1) Put on the Regulator and Harness Assemblies

To put on the Model SPEC-PD Regulator and Harness:

a. Position the dual buckle connector on the nylon belt. Fasten the belt at your waist or hip level and adjust for comfort. Move the connector to the right hip.

b. Position the shoulder harness pad on your left shoulder. Join the male buckles on the harness into the female buckles on the dual buckle connector.

c. Using the Velcro loops on the shoulder harness, secure the second stage regulator hose. The regulator should be positioned on the shoulder pad, below the Bullard logo.

d. Attach the snap hook on the dual buckle connector to the tab mounted on the regulator hose.

e. Adjust the length of the shoulder harness to a comfortable position by moving the plastic slide. (Close-up of finished assembly pictured in Figure 6.)

Note: If the regulator hose isn't long enough to be comfortable, purchase the EH45 extender hose. Using thread sealant, install the extender hose between the nipple and the regulator hose. Be sure to re-install the metal tab before threading the male nipple on to the extender hose.

To put on the Model SPEC-PDE Regulator, Harness and Escape Cylinder:

a. Verify that the air cylinder is turned off. Check that the cylinder gauge reads full. If the cylinder is not secured on the escape harness, fit it into the cylinder holster. (If using the 10-minute cylinder, see assembly instructions in the next column.)

b. Route the nylon belt through the lower belt loop hole on the cylinder holster.

c. Attach the first stage regulator to the escape cylinder by screwing it onto the male threaded connection on the cylinder (See Figure 7).

d. Using the Velcro loops on the shoulder harness, secure the second stage regulator hose. The regulator should be positioned on the shoulder pad, below the Bullard logo.

e. Attach the two male buckles on the shoulder harness to the female buckles on the cylinder holster, being careful to avoid twisting of the harness.

f. Pull the shoulder harness over your head and onto your left shoulder. Fasten the belt at your waist or hip level and adjust for comfort. Position the escape cylinder slightly behind your right hip. Adjust the shoulder harness and waist belt to be comfortably snug. The regulator hose will be routed across your back and over your shoulder. (Close-up of finished assembly pictured in Figure 8.)

To put on the 10-Minute Escape Cylinder:

When using the 10-minute escape cylinder, follow these instructions to prepare it for use:

a. If the cylinder is not secured on the escape harness, fit it into the cylinder holster.

b. Secure the top of the bottle using the black nylon cylinder strap provided with your 10-minute assembly. The strap should be routed through the top loop on the holster.

c. Route the black nylon belt through the top loop on the holster. Follow steps *c* through *f* above to complete donning process. (Close-up of finished assembly pictured in Figure 9.)

⚠ WARNING ⚠ : The nylon strap provided with the 10-minute assembly must be used to prevent the cylinder from being unstable during certain activities.

(The respirator assembly must be secured as described above to help prevent the regulator hose from dislodging the respirator from the user's face.)

2) Put on the Facepiece

⚠WARNING ⚠: If working in cold temperatures, apply an anti-fog solution to the inside and outside of the lens before using this respirator. Allow the lens to dry before wearing. The plastic deflector needs to be inserted inside the facepiece. These steps are mandatory when the respirator will be used at temperatures below 32°F (0° C).

a. Release the headstraps to the full outward position by pulling the headstrap quick release tabs forward. When fully extended, tabs should be located at the headstrap latches.

b. Grasp the headstrap harness with thumbs through the straps. Spread outward.

c. Push the top of the facepiece flange up the forehead, brushing hair upward from the face seal area (See Figure 10). Continue up and over the head until the harness is centered at the rear of the head, and the chin rests in the chin cup.

d. Pull both lower straps at the same time towards the rear. Tighten the two temple straps (See Figure 11). Tighten the top head strap.

e. Adjust headstraps until the facepiece fits securely and evenly.

3) Perform Negative Pressure User Seal Check:

Note: Conduct user seal checks in a safe, uncontaminated environment.

a. With the facepiece on and secured, cover the regulator opening on the facepiece with the palm of one hand.

b. Inhale gently and hold your breath for a few seconds. The facepiece should pull in on your face without leaking. (See Figure 12)

c. If you detect a leak, reposition the facepiece, check the straps and repeat the negative pressure user seal check.

⚠WARNING ⚠: If you cannot obtain a proper fit, try another facepiece size and go through the same steps outlined above. If a proper fit is still not achieved, do not use this respirator. Failure to obtain a satisfactory seal could allow contaminants to leak into the facepiece, causing illness or death. (See WARNING number 5 on page 3 of this manual.)

Figure 10

Figure 11

Figure 12

4) Activate Respirator

a. After a staisfactory fit has been obtained, verify that the regulator hose and the airline hose are securely attached.

b. Turn on the air source, and ensure that the airline hose is connected to an air source set between 80 psig (552 kPa) and 100 psig (690 kPa).

c. Mount the regulator in its port in the facepiece by pressing firmly until you hear clicks which indicate that the blue release buttons have snapped into place. Do not hold down the release buttons on the regulator when mounting.

d. Take a sharp, deep breath to activate airflow. Take several breaths to check the flow of air into the facepiece. Airflow can also be activated by pushing the black override button on the front center of the regulator.

e. Enter the work environment.

Using the Escape Assembly

⚠WARNING⚠: Bullard's Spectrum-PDE escape cylinder is intended for emergency escape only in the event of a remote air supply failure. Do not use the escape cylinder air supply for entry into a hazardous atmosphere.

Activating the bypass valve rapidly depletes your air supply. Immediately exit to a safe area.

Under normal conditions, users will have up to 5 or 10 minutes in which to escape from a toxic environment. Stress and exertion may increase the amount of air consumed, thus reducing service time. Written procedures shall be prepared covering safe use of respirators in dangerous atmospheres that might be encountered in normal operations or in emergencies. Employees should be familiar with escape routes in advance and the time required to travel to a safe atmosphere.

1) Instructions for using Escape Assembly

a. If the airline supply is cut off while the user is in a hazardous atmosphere, turn the cylinder valve of the escape cylinder counterclockwise at least one full turn to start the flow of air from the cylinder.

b. If necessary, disconnect the airline hose from the escape cylinder regulator hose.

c. Proceed IMMEDIATELY to a clean-air environment.

d. When in a safe environment, remove the facepiece and turn the cylinder valve clockwise to shut off air from the cylinder.

⚠WARNING⚠: Do not overtighten the cylinder valve. Damage to the valve seat could result.

2) Emergency Operation

PROBLEM:
Restricted or interrupted airflow.

INSTRUCTIONS:

a. Open the bypass valve by turning the red knob on the second stage regulator counterclockwise until the desired constant airflow is achieved.

b. Engage escape assembly and proceed IMMEDIATELY to a clean-air environment. Disconnect air supply hose first if necessary.

c. Have the unit inspected and/or repaired by a certified repair technician before reuse. (Call Bullard Inside Sales for information).

PROBLEM:
First breath does not activate regulator (first breath feature failure).

INSTRUCTIONS:

a. Press the black rubber manual override button on the front center of the regulator to start airflow.

b. Engage escape assembly and proceed IMMEDIATELY to a clean-air environment. Disconnect air supply hose first if necessary.

c. Have the regulator inspected and/or repaired by a certified repair technician before reuse. (Call Bullard Inside Sales for information).

PROBLEM:
Air is flowing continuously (free-flow).

INSTRUCTIONS:

a. If the regulator will not shut off during extremely heavy breathing, exhale forcefully. The regulator should return to normal flow.

b. If the free flow continues, open and close the bypass once or depress the black manual override button once.

c. If the problem persists, immediately exit to an uncontaminated area. If you aren't able to exit to an uncontaminated area while connected to the airline hose, turn the cylinder valve of the escape cylinder counterclockwise at least one full turn to start flow of air from the cylinder. Disconnect the air supply hose and proceed to the uncontaminated area.

d. Have the pressure demand regulator inspected and/or repaired by a certified repair technician before reuse (Call Bullard Inside Sales for information).

Taking the Respirator Off

1. When finished working, leave the work area wearing the respirator and with the air still flowing.
2. Press the two blue release buttons and remove the second stage regulator from the facepiece.
3. Disconnect from the remote air source. If using the cylinder, close the cylinder valve by turning it clockwise.
4. Press the black manual override button on the second stage regulator to vent air from the lines.
5. Press the gray shutoff button on the second stage regulator.
6. Push the quick release tabs on the headstrap forward, and lift the facepiece away from the face.
7. Unsnap the waist belt and pull off the shoulder harness. Take care not to drop or impact the regulator or cylinder on the floor or another surface while removing the escape assembly.

Bullard CMC/Roco Rescue Respirator Assembly (PDER-5)

INDUSTRIAL RESCUE FULL BODY HARNESS

INSPECT BEFORE AND AFTER EACH USE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS

USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS

REPAIR ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS

Classified by Underwriters Laboratories Inc.® in accordance with the National Fire Protection Association Standard on Fire Service Life Safety Rope and System Components (NFPA 1983-1995) and the American National Standard for Construction and Demolition Operations (ANSI A10.14-1991).

Design Purpose

The CMC/Roco Industrial Rescue Full Body Harness is an entirely new design that integrates all of the CMC/Roco Industrial Rescue Harness design into a Class III full-body harness. When suspended by the back D Ring, the wearer is held in an upright position.

The CMC/Roco Industrial Rescue Full Body Harness is designed to be a rescue harness. Arescue harness must support the rescuer in comfort and allow him to work safely "on rope". This differs from a "fall protection" harness which is designed to catch a falling worker and then support him while he waits for rescue. We have tried to combine the necessary elements of both types, but where they conflict, we have leaned towards the rescue application.

Putting on the Harness

The CMC/Roco Full Body Rescue Harness is a sophisticated piece of rope rescue equipment. Time spent practicing donning the harness and adjusting the straps will increase your level of comfort and your ability to quickly put on and adjust the harness. Depending on whether you will be lifted from the shoulders or from the front waist D Ring, the proper adjustment will greatly increase your comfort.

Because confined space rescue often requires additional protective clothing, which can make stepping into harness leg loops difficult, the ends of the straps that connect the waist to the shoulder straps have not been turned over. This allows the straps to be unthreaded when donning the harness. **These straps should be backed up with an Overhand Knot.** It is the user's responsibility to make sure he is competent in threading the buckles and adjusting the harness.

We have found the following steps to be the most efficient for putting on the CMC/Roco Full Body Rescue Harness. Having someone help you put on the harness makes it quicker, particularly if you are wearing other protective gear. In most industrial rescue situations, someone should be available to assist and the resulting reduction in time is worth it.

1. Start by unthreading the straps that connect the waist to the chest. Loosen the waist strap and the leg loops as far as needed but do not pull the web out of the buckles.
2. Hold the harness by the top of the shoulder straps ensuring that the front straps are in a crossed pattern.
3. Grab the waist strap and hold the harness in front of you with the shoulder straps folded to the outside. Lower the harness until the leg loops are lying on the ground in the proper position. Make sure the straps to the leg loops are not twisted.
4. Step through the waist belt and into the leg loops. Pull the harness up to your waist and position slightly below the waist. Pull the waist straps forward, making sure each side is pulled evenly. When finished, the D Ring should line up in the center. Adjust the leg loops to the desired tightness (see figure A).
5. Bring the shoulder straps up from the sides and over onto the shoulders (as you would do with suspenders). These straps should have a crossed pattern in the front. Adjust the shoulder straps by pulling down to the desired tightness.
6. Check for any twists and make final adjustments for desired tightness.
7. Secure all waist and leg strap ends (extra lengths of webbing) by tying off the ends. The best tie-off is an Overhand Knot around the web. If that is not possible, the

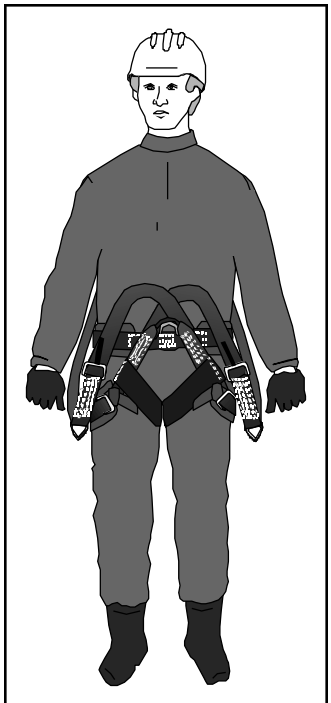


Figure A

next best is an Overhand Knot tied in the tail of the web and cinched at the buckle.Thus acting as a stopper to keep the strap from pulling through (see figure B).

Confined Space Rescue

1. Assemble the detachable cylinder bag to the CMC/Roco Industrial Rescue Full Body Harness by looping the velcro attachment around the waist strap belt padding on the desired hip side for the air cylinder. Secure the velcro attachment once the cylinder bag is positioned properly.
2. Prior to sliding the 5-minute air cylinder into the detachable cylinder bag, verify the air cylinder is turned off, the gauge reads full and the air cylinder is properly located in the cylinder holster. Close the detachable cylinder bag below the female buckles on the cylinder holster and secure the velcro attachment.
3. Abelt attachment strap is included with the detachable cylinder bag. Insert the male buckle on the strap to the female buckle on the cylinder holster. Route strap through belt loop of cylinder holster then clip the strap to the front D-Ring located approximately at your center waist on the CMC/Roco Rescue Harness. Adjust the strap to the desired length for the air cylinder to be hanging comfortably between your legs. DO NOT overextend the strap length so that the regulator hose pulls on the facepiece.
4. Attach the first stage regulator to the escape cylinder by screwing it onto the male threaded connection on the cylinder (see figure 7 on page 14).
5. The regulator hose will be routed across your back and over your shoulder using the velcro attachment loops provided with the CMC/Roco Rescue Harness. If the regulator hose is too short, then you will need the EH45 extension hose (see figure 8 on page 14 for close-up of finished assembly).
6. Attach the snap hook on the detachable cylinder bag to the tab mounted on the regulator (see figure C).
7. Refer to page 13 prior to connecting to air source.
8. Refer to page 15 for putting on the facepiece and performing a negative pressure user seal check.
9. Refer to page 16 for activating respirator.
10. To remove the air cylinder from the detachable cylinder bag, open the bag by pulling the velcro apart. Lift the air cylinder out of the bag by using the belt attachment strap that is tethered to the center of the CMC/Roco Rescue harness. Remove fully from the bag (see Figure D).**NOTE: Only perform this operation when absolutely necessary.**
11. Carefully lower the air cylinder between your legs or to the desired position (see figure E).
12. When finished, raise the air cylinder back to bag by using the belt attachment strap again. Position the cylinder in the bag and secure firmly by closing the velcro attachments. **NOTE: All bodies are of different shapes and sizes. Test the assembly before using to ensure that all parts work and fit correctly.**

Adjustment: Rappel

For rappels, the waist and leg loops should be tight. Adjust the leg loops lower if you are getting any pinching between the legs.Attach your descender to both the front D Ring and the web loop at the waist.

Adjustment: Vertical Lift

For the most comfort in a vertical lift, the shoulder straps need to be as tight as possible. Hunch your shoulders and pull the straps tight. Position the shoulder rings just in front of the top of your shoulder. When the harness is loaded, the straps should not lift very far off of the shoulders. The safety line attaches to the large D Ring in the back.

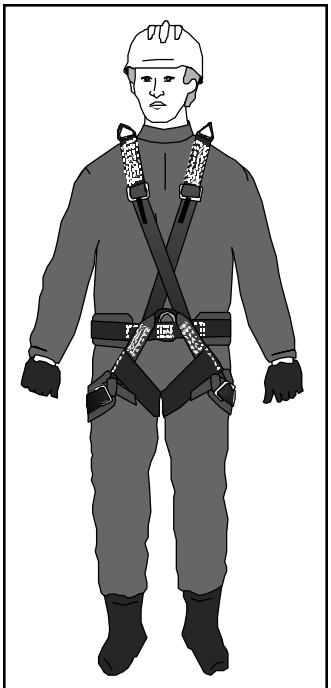


Figure B

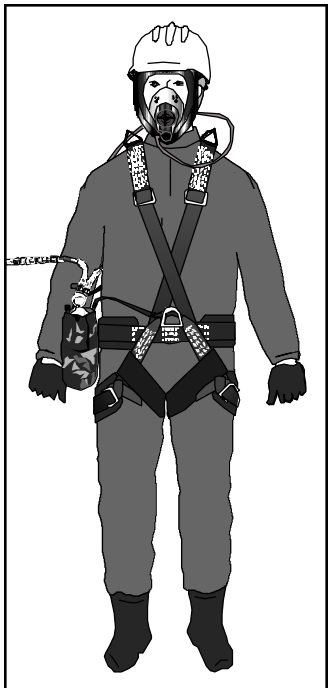


Figure C

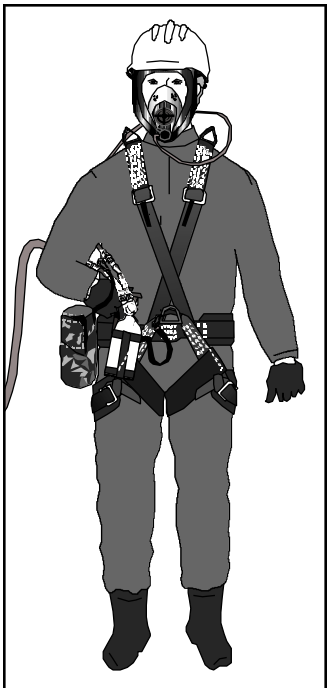


Figure D

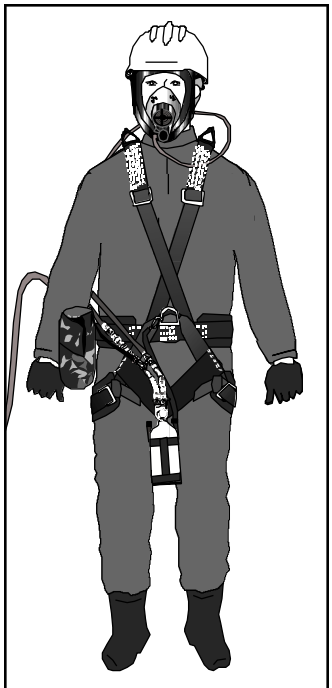


Figure E

CMC/Roco

INDUSTRIAL RESCUE FULL BODY HARNESS

Important Notes

- The CMC/Roco Full Body Rescue Harness was designed for rescue applications in which the wearer uses the harness primarily for positioning. High impact fall situations should be avoided. Always keep the safety line (belay) above the wearer and keep the slack in the safety line to a minimum.
- When attaching a rope or carabineer to the front of the harness, tie or clip into both the web loop and the steel D Ring in the front.
- The parachute quality buckles used on the CMC/Roco harnesses are the best buckles we have been able to find. They work best when kept tight and we recommend an Over Hand knot to protect against any inadvertent slipping.
- The position of the D Ring in the back was selected to avoid interference with backpack breathing apparatus and to be easy to reach by the wearer. If the potential for a fall exists, and if a carabineer attached to this D Ring could hit the wearer in the back of the head, a different connection point should be used. A web loop can be attached to the D Ring with a Girth Hitch allowing the carabineer to be positioned above the wearer's head.
- The D Ring at the rear of the waist is intended to pull a tag line behind the rescuer. In a crawling entry, it can be used to pull backwards on the wearer.

Tying Into the Harness

When attaching a rope or carabineer to the front of the harness, tie or clip into both the web loop and the steel D Ring in the front. For a belay anchor or hauling a rope, you can attach the carabineer to the D Ring on the back of the harness.

CMC harnesses are not intended for rock climbing. Climbing ropes should not be tied into the D Ring or connected into it with a carabineer.

Inspection

NFPAStandard 1983 recommends inspection of a life support harness after each use. ANSI Standard A10.14-1975 ed. states:

> 4.2 User's Inspections. Each belt and lanyard assembly shall be visually inspected for defects prior to each use. The assembly shall be inspected according to the manufacturer's recommendations not less often than twice annually. The date of each inspection shall be recorded on an inspection tag that shall be permanently attached to the belt.

Each department should develop a standard for inspection and each user should be trained to inspect high angle rescue equipment.

When inspecting the harness, check webbing for cuts, worn or frayed areas, broken fibers, soft or hard spots, or discolorations. Check the stitching for pulled threads, abrasions or breaks. If any of the above are noted, or if the harness has been subjected to shock loads, fall loads or abuse other than normal rappel or rescue use, the equipment should be retired. Keep the harness away from acids, alkalis, exhaust emissions, rust or strong chemicals.

Maintenance

If the harness becomes soiled, it can be washed in cold water with a mild detergent. CMC recommends the use of LIFELINE Cleaner. Dry out of direct sunlight. Do not dry in an automatic dryer.

Repair

CMC recommends that all repair work be done by the manufacturer. All other repair work or modifications may void the warranty and shall release CMC Rescue, Inc. from all liability and responsibility as the manufacturer.

⚠ WARNING ⚠ : The CMC/Roco full body harness was designed for rescue applications in which the wearer uses the harness primarily for positioning, not rock climbing, sport or pleasure rappelling, etc. Serious injury or death may result from the improper use of this equipment. This equipment has been designed and manufactured for use by experienced professionals only. Do not attempt to use this equipment without proper training. Do not use the harness when: webbing has cuts, worn or frayed areas, broken fibers, soft or hard spots, or discolorations; stitching has pulled threads, abrasions or breaks; or if the harness has been subjected to shock loads, fall loads or abuse other than normal rappel or rescue.

DISASSEMBLY AND CLEANING

Figure 13

Figure 14

Figure 15

⚠ WARNING ⚠: Special procedures are required to disinfect and decontaminate this respirator. YOU MUST follow the instructions of the manufacturer who supplies the disinfecting or decontamination equipment or chemicals.

Note: DO NOT clean the facepiece with the regulator attached.

You must ensure that this respirator is not damaged when using disinfecting or decontamination equipment or chemicals.

The facepiece lens can be scratched through careless or abusive handling. DO NOT use abrasive cleaners or pads. DO NOT towel dry.

Note: Inspect all components of this respirator system during cleaning and before and after each use for signs of wear, tear or damage that might reduce the degree of protection originally provided. Spectrum-PD and PDE models must be inspected at least once each month and after each use. Immediately replace worn or damaged components with Bullard Spectrum-Pressure Demand Series components or remove the respirator from service.

Cleaning and Sanitizing the Facepiece

⚠ WARNING ⚠: Before disassembly, make sure that all air is bled from the lines. Shut off or deplete the air supply to prevent equipment damage or personal injury.

1) Disassembling your Facepiece

a. If the regulator is still attached, grasp the facepiece with one hand and press the two blue buttons to release it from the facepiece. Pull the regulator from its port in the facepiece and set aside (See Figure 13).

b. Depress the button on the base of the mask cover. Remove the regulator adaptor by turning it counterclockwise (See Figure 14). Remove lens port gasket from its port.

c. Lift the mask cover off the facepiece (See Figure 15).

d. Remove the nosecup from the speaker/exhalation body (See Figure 16).

e. Remove the outer locking nut by turning counterclockwise (See Figure 17).

f. Remove the speaker/exhalation body from the lens (see Figure 18).

Figure 16

Figure 17

Figure 18

g. Remove the exhalation valve assembly from the speaker/exhalation body by grasping the raised wings on the exhalation valve seat and turning counter-clockwise (See Figure 19).

h. Disassemble the exhalation valve assembly by removing the spring retainer, spring, plate, exhalation valve PD, stem and outer o-ring and set aside (See Figure 20).

i. Remove the speaker/exhalation body o-ring from the speaker/exhalation body. Hold the speaker/exhalation body and turn the speaker diaphragm counter-clockwise to remove it (See Figure 21).

j. Remove the speaker diaphragm o-ring from the o-ring seat in the speaker/diaphragm body (See Figure 22).

k. Remove the inhalation valve flaps from the nosecup (See Figure 23).

Note: Inspect components before and after cleaning according to instructions on pages 24 and 25 of this manual.

2) Cleaning Facepiece Components

a. Make a cleaning solution from warm water (about 120°F or 67°C) and mild detergent or a germicidal disinfecting detergent.

b. Using a soft cloth or brush, wash the facepiece assembly with cleaning solution.

c. Wipe any areas still showing stubborn accumulations of foreign matter with a cloth moistened in a detergent or, if necessary, mineral spirits or naphtha, until clean.

d. Rinse facepiece completely in clean, warm water. Shake to remove excess water, and allow to air-dry away from direct heat, sunlight or contaminants.

e. After cleaning, you may apply anti-fog solution to the inner surface of the lens with a Bullard anti-fog wipe (AFW45).

Allow the coating to dry for 15 minutes before using the facepiece.

⚠WARNING⚠: Anti-fog solution must be applied if the respirator will be used at temperatures below 32°F (0°C).

3) Cleaning Plastic Components

a. Immerse all plastic components in the same cleaning solution used for the facepiece.

b. Wipe any areas still showing stubborn accumulations of foreign matter with a cloth moistened in a detergent or, if necessary, mineral spirits or naphtha, until clean.

c. Rinse thoroughly with clean, warm water. Allow to air-dry away from direct heat, sunlight or contaminants.

4) Cleaning Nosecup, Gaskets, O-rings, Exhalation Valves, Inhalation Valves and all other rubber components

a. Immerse all rubber components in the same cleaning solution used for the facepiece.

b. Rinse thoroughly with clean, warm water. Allow to air-dry away from direct heat, sunlight or contaminants.

Note: When cleaning the exhalation valve, pay particular attention to removal of all soap residue from the valves. Rinse thoroughly by holding directly under running water.

Figure 19

Figure 20

Figure 21

Figure 23

Figure 22

Cleaning the Second Stage Regulator

⚠ WARNING ⚠ : Do not allow water or cleaning solutions to enter the regulator. Contaminants such as dirt, dust or soap residue could degrade regulator performance and may cause it to fail, possibly resulting in injury or death.

Do not submerge the regulator in water or cleaning solutions. It may be partially submerged only as instructed in step 5c below.

During cleaning, always hold the regulator with the outlet tube facing downward during washing and rinsing.

1. Make a cleaning solution from warm water (about 120° F or 67° C) and mild detergent or a germicidal disinfecting detergent. Have a bucket of fresh water available for rinsing.
2. With the regulator facing downward, clean the exterior surfaces and the interior of the outlet tube with a soft brush.
3. With the regulator facing downward, wipe the exterior surfaces and the interior of the outlet tube with a damp cloth or sponge.
4. Dry regulator with a clean cloth or with low pressure (15 psig or 103 kPa maximum) clean air.
5. If dirt or debris interferes with the first-breath-on mechanism, clean it as follows:
   a. Lift the edge of the rubber manual override button with a small, flat-blade screwdriver, and peel it off.
   b. Place the red protective cap over the outlet tube.
   c. Hold the regulator with the cover facing downward and rinse in a shallow bucket of fresh water.
   d. Allow the water to drain, and dry with low pressure air (15 psig or 103 kPa maximum) directed into the venting groove under the shutoff button.
   e. Replace the manual override button.

Cleaning the Exterior Surfaces of the Respirator

The hoses, harness, cylinder and pressure demand regulator assembly may be hand-sponged with warm water and a mild detergent, then rinsed and air-dried. Take care to not get water inside any of the components.

Overhaul Frequency

At a minimum, Bullard first and second stage regulators must be sent to Bullard once a year for servicing, which includes cleaning and flow testing.

Bullard recommends that the respirator's first stage regulator be overhauled every three years. Every six years, the respirator's second stage regulator should be overhauled, even with infrequent use. Spectrum Pressure Demand Respirators subjected to severe service such as heavy use, extreme temperatures, or exposure to chemicals, require more frequent servicing. (Call Bullard Inside Sales for information.)

⚠ WARNING ⚠ : User repair of Bullard's Spectrum Pressure Demand Respirators is limited to replacement of components listed on the NIOSH approval label and repairs described in this manual. Disassembly should be performed only to the extent necessary to replace components. To protect your warranty and the NIOSH certification of the equipment, all other repairs must be done only by Bullard.

REASSEMBLY AND STORAGE

Reassembling Your Facepiece

1. Before beginning reassembly of the internal facepiece components, pull the headstrap around the front of the lens to keep it out of the way. Reassemble your facepiece by reversing the disassembly directions. It may be helpful to refer to disassembly photos.

2. To reassemble the exhalation valve assembly: insert the stem into the exhalation valve PD. Insert the pin into the small hole in the exhalation valve seat and place the plate and spring on top of the exhalation valve. Attach the spring retainer to the exhalation valve seat.

3. Place the exhalation valve seat o-ring around the exhalation valve seat. Insert the assembly into the back side of the speaker/exhalation body and turn clockwise to tighten.

4. Place the speaker/exhalation o-ring over the speaker/exhalation body and insert arrow up into the upper hole in the lens. **Note:** The lower portion of the body is notched, and the opening in the lens has a raised guide to assist you in correct assembly.

5. Replace the outer locking ring by sliding it over the outer portion of the speaker/exhalation body and turning clockwise to tighten.

6. Slide the inhalation valve flaps over the posts located on the inside of the nosecup. Place the nosecup back into the facepiece by feeding the large hole on the nosecup around the speaker/exhalation body, aligning the arrow in the nosecup with the arrow on the speaker/exhalation body.

7. Place the speaker diaphragm o-ring in the o-ring seat located on the front of the speaker/exhalation body. Replace the speaker diaphragm by turning clockwise to tighten.

8. Place the mask cover over the front of the speaker/exhalation body assembly and snap into place. Insert the lens port gasket into the lower opening on the lens. Insert the regulator adaptor on top of the gasket. Hold the facepiece steady with one hand, while turning the regulator adaptor clockwise. You should hear a hard click as a tooth on the adaptor engages with the tooth on the mask cover.

REASSEMBLY AND STORAGE

Figure 24

Figure 25

Figure 26

Figure 27

Figure 28

Replacing Facepiece Lens

1. Remove lens by unscrewing the two screws on sides of the lens clamp (See Figure 24). Remove the lens clamps from the flange. Remove the lens assembly from the flange. Remove all facepiece components by following disassembly instructions. Reassemble all the facepiece components on the new lens.
2. Feed the edge of the plastic lens into the groove of the silicone facepiece flange. Check for distortion of the flange. Feed the lens clamps over the silicone flange.
3. While holding the mask, verify that the nuts are in the slots located on the lower lens clamp (See Figure 25). Insert the screws and tighten several threads. Tighten screws evenly and slowly, bringing both halves of the clamp together until completely tight.

Replacing In-Line Screen

1. Disconnect nipple from regulator hose (if using Spectrum-PD) or from first stage regulator (if using Spectrum-PDE). (See Figure 26)
2. Reach inside female threaded fitting and pull out white retaining ring (See Figure 27) and inline screen (See Figure 28).
3. Insert new screen, then retaining ring. Reattach nipple to regulator hose or first stage regulator, using thread sealant on the male threaded fitting.

Storage of your Pressure Demand Respirator

1. Inspect, clean and repair as required before storing this respirator.
2. Firmly hand-tighten the first stage regulator to a fully charged cylinder.
3. Secure the air cylinder in the harness.
4. Press the override button on the second stage regulator.
5. Fully loosen all the facepiece head straps.
6. Place the facepiece in a plastic storage bag.
7. Store away from dust, sunlight, extremes of heat and cold, excessive moisture or damaging chemicals. Store the respirator so it is protected from distortion from the weight or pressure of surrounding objects.

CYLINDER MAINTENANCE AND RECHARGING

⚠ WARNING ⚠

1. **Only trained personnel may store, fill, service, maintain, handle, use or dispose of cylinders used with the Bullard Spectrum. Follow the guidelines of the Compressed Gas Association (CGA) pamphlets P-1, C-1, C-6.2, G-7 and G-7.1 - 1989, as appropriate. Always follow established safety precautions when recharging cylinders.**
2. **Do not fill the aluminum cylinder if it is not marked as being hydrostatically tested within 5 years of the current date.**
3. **Do not alter cylinders used with the Bullard Spectrum.**
4. **Fill only to the stamped service pressure. Do not overfill.**
5. **Do not fill a leaking cylinder. Depressurize immediately.**
6. **Do not tamper with the safety pressure relief device. Rapid depressurization when the safety pressure relief device activates will cause excessive noise. During rapid depressurization, cylinders may become vallistic and cause injury. Stay clear of cylinders when the safety relief device is activated.**
7. **Do not expose cylinders used with this respirator to open flame or heat sources which may heat the cylinder to 350° F (177° C). Cylinders damaged by fire or exposed to heat of 350° F (177° C) must be destroyed.**
8. **Repainted or refinished cylinders must be hydrostatically tested before reuse.**
9. **Inspect cylinders before each filling. Remove cylinders from service which have cuts, gouges, dings, bulges, corrosion, etc. A special internal and external visual inspection of cylinders must be completed at least every time the cylinder is hydrostatically tested. Follow the guidelines of CGA C-6.2.**
10. **Do not fill with oxygen.**
11. **Do not use caustic paint strippers or corrosive cleaners.**
12. **Do not remove, obscure or alter any labels on cylinders.**

Recharging the Cylinder

1. Recharge the cylinder with Grade D or cleaner air, conforming to the Compressed Gas Association Specification G-7.1-1989. Moisture content, expressed as dewpoint, shall be maintained at -65°F (-54°C) or lower, or less than 24.0 PPM by volume moisture content.
2. Remove the first stage regulator from the cylinder and place the cylinder in a suitable safety sleeve or filling area. The cylinder may be partially immersed (DO NOT submerge the cylinder valve) in a water bath to minimize the temperature rise that occurs as the cylinder is filled. The filler hose should be equipped with a restraining cable to prevent uncontrolled “whipping” in case of hose failure.
3. Connect the filler hose, and open the cylinder valve FULLY. Aseparate metering valve must be used to control fill rate.
4. Fill the cylinder slowly, at a rate not exceeding 500 psig (3,448 kPa) per minute. When the cylinder is full, close the cylinder valve. Allow the cylinder to cool to room temperature. Check the gauge reading. If necessary, “top off” to achieve full service pressure.
   Note: Fast filling may cause an excessive rise in the cylinder temperature, resulting in a pressure drop as the cylinder cools. Final charge should be 2,216 psig (15,280 kPa) for the 5-minute cylinder, or 3,000 psig (20,685 kPa) for the 10-minute cylinder. Aslight top-off may be necessary when the cylinder cools.
5. Use particular care to ensure that an air cylinder is never connected to a source capable of supplying air at a pressure greater than the maximum service pressure of that cylinder.
6. Slowly bleed pressure from the filling lines.
7. Disconnect the filling line.

COMPONENT INSPECTION

Component	Look For
Facepiece Flange, Headstrap, Nosecup and all other rubber components	• Tears, nicks, cracking and loss of pliability. • Deterioration from age, heat or contamination.
Buckles and Slides	• Latches cracked or fractured. • Bails crushed, bent or corroded.
Gaskets and O-rings	• Deterioration from age, heat or contamination. • Distortion. • Wear and abuse.
Exhalation Valve and Inhalation Valves	• Tears, nicks, cracking and loss of pliability. • Deterioration from age, heat or contamination. • Wear and abuse.
Facepiece Lens	• Nicks, scratches or abrasions which could impair visibility. • Deep gouges or cracks which could reduce impact resistance.
All Other Plastic Parts	• Stripping of threads or evidence of cross-threading on threaded parts. • Any other evidence of wear and abuse.
Second Stage Regulator	• Cracks or heat damage to housing or cover. • Faulty operation of first-breath-on button, bypass valve or override buttons. • Dirt and debris in the outlet port; screen and grill cracked. • Hose cracked, abraded or leaking. • Sticking release and shutoff buttons. • Fittings corroded. • Clogged in-line screen.
First Stage Regulator	• Hose cracked, abraded or leaking. • Fittings corroded. • Damaged threads on regulator body. • Damaged or missing gasket inside female threaded part. • Damaged, missing or obstructed bronze sintered filter inside female threaded part.

COMPONENT INSPECTION

Component	Look For
Air Cylinder and Valve	• Dents, gouges, blisters or cuts. • External damage to cylinder valve. • Smooth operation of valve handwheel. • Damaged threads on valve outlet. • Cylinder pressure gauge lens scratched; pointer deformed or stuck. • Gauge reading incorrectly. • Hydrostatic test date not within five years from current date.
Airline Hoses/Regulator Hose	• Hose cracked, kinked, crushed, blistered, abraded or leaking. • Loose connectors and quick couplers. • Swivel nut gaskets damaged or missing. • Fittings corroded.
Harness	• Excessive wear or fraying. • Cuts, nicks or broken stitching. • Buckles damaged or cracked.

⚠ WARNING ⚠ : If problems are detected with the first stage regulator, second stage regulator or escape cylinder, all repairs must be done only through Bullard. For details, call Bullard Inside Sales at 800-827-0423.

FIT TESTING

According to OSHA's revised Respiratory Standard, 29 CFR 1910.134, all tight-fitting facepieces must now be fit tested, regardless of the mode of operation. This includes all respirator models in the Spectrum Series. Users must pass either a qualitative or quantitative fit test, and fit testing must be performed in the negative pressure mode. Bullard's QNFT45 fit test kit converts the Spectrum facepiece to the negative pressure mode, and can be used for either type of fit testing. The instruction sheet that accompanies the kit provides guidance on its proper use.

The options for qualitative challenge agents include: isoamyl acetate (banana oil), irritant smoke, saccharin and Bitrex (denatonium benzoate). Quantitative options include generated aerosol (like the fit test chamber in Bullard's lab), ambient aerosol CNC (Portacount method), or controlled negative pressure (Dynatech Nevada Fit Tester 3000 method). The minimum fit factor for a full-face respirator is 500.

The qualitative fit test protocols that had existed in the substance-specific standards (except Bitrex, which is new) have been updated in the revised standard with minor changes and will now be used for all substances. Fit testing shall be performed prior to initial use, whenever a different respirator is used, and at least annually thereafter. An additional fit test must also be performed whenever there are changes in the employee's physical condition that could affect respirator fit, such as dental changes or an obvious change in body weight.

PARTS AND ACCESSORIES FOR BULLARD SPECTRUM-PRESSURE DEMAND RESPIRATORS

Cat No.	Description

SPECTRUM-PDE RESPIRATOR ASSEMBLIES
(bypass valve standard on all PDE assemblies)

SPEC-PDE-5L*	Respirator with medium/large facepiece, pressure demand regulator and 5-minute escape assembly with CA30 coupler assembly
SPEC-PDE-10L*	Respirator with medium/large facepiece, pressure demand regulator and 10-minute escape assembly with CA30 coupler assembly

SPECTRUM-PDE RESPIRATOR ASSEMBLY COMPONENTS

1) Alternate Facepiece - Includes all parts of face mask, with exception of second stage regulator. (Both facepiece assemblies come standard with a medium/ large nosecup. A small nosecup is available as a replacement part, under cat. no. SNA45.)

SPEC-PD-ML	Full Facepiece Medium/Large
SPEC-PD-S	Full Facepiece Small

2) Regulator Assembly

RA45*	Includes first stage regulator, second stage regulator with bypass and CA30 coupler assembly

3) Harness Assembly

ESC-5	Includes 5-minute cylinder, belt, escape harness and cylinder holster
ESC-10	Includes 10-minute cylinder, belt, escape harness and cylinder holster

4) Alternate Hoses

5454	25-ft. (7.6 m) extension hose
5457	50-ft. (15.2 m) extension hose
5458	100-ft. (30.5 m) extension hose

SPECTRUM-PDE REPLACEMENT PARTS

Coupler Assemblies - All coupler assemblies include male threaded nipple, female threaded coupler and adaptor, which connect the respirator to the airline hose.

CA30	Industrial Interchange steel, with ball lock
CA30S	Industrial Interchange stainless, with ball lock
CA31	Schrader
CA32	Snap-Tite steel
CA33	Snap-Tite brass
CA34	Snap-Tite stainless
CA37	Cejn
CA38	Bayonet
EH45	Extension Hose
PDR45-B	Includes second stage regulator with bypass
CYL-5	5-Minute Escape Cylinder
CYL-10	10-Minute Escape Cylinder
ILS45	In-Line Screen for Regulator Hose (5/pkg)
4613	Fire Retardant Nylon Belt

Cat No.	Description

SPECTRUM-PD RESPIRATOR ASSEMBLIES
(bypass valve not included on PDassemblies)

SPEC-PD-L*	Respirator with medium/large facepiece, pressure demand regulator, belt harness assembly and CA30 coupler assembly

SPECTRUM-PD RESPIRATOR ASSEMBLY COMPONENTS

1) Alternate Facepiece - Includes all parts of face mask, with exception of second stage regulator. (Both facepiece assemblies come standard with a medium/ large nosecup. A small nosecup is available as a replacement part, under cat. no. SNA45.)

SPEC-PD-ML	Full Facepiece Medium/Large
SPEC-PD-S	Full Facepiece Small

2) Regulator Assembly

PDR45*	Includes second stage regulator with CA30 coupler assembly (no bypass)

3) Harness Assembly

BHA	Includes belt,buckle connector and shoulder strap

4) Alternate Hoses

5454	25-ft. (7.6 m) extension hose
5457	50-ft. (15.2 m) extension hose
5458	100-ft. (30.5 m) extension hose

SPECTRUM-PD REPLACEMENT PARTS

Coupler Assemblies - All coupler assemblies include male threaded nipple, female threaded coupler and adaptor, which connect the respirator to the airline hose.

CA30	Industrial Interchange steel, with ball lock
CA30S	Industrial Interchange stainless, with ball lock
CA31	Schrader
CA32	Snap-Tite steel
CA33	Snap-Tite brass
CA34	Snap-Tite stainless
CA37	Cejn
CA38	Bayonet
EH45	Extension Hose
4613	Fire Retardant Nylon belt

Cat No.	Description

ACCESSORIES AND KITS

Facepiece Component Replacement Parts

QNFT45	Quantitative Fit Test Kit Includes fit test adaptor, facepiece, sampling adaptor, 1/8" barbed mask probe and one filter cartridge
LCK	Lens Clamp Replacement Kit Includes upper and lower clamps with screws and nuts
RLS	Lens Replacement
FK-ML	Medium/large facepiece flange
FK-S	Small facepiece flange
HSK	Includes headstrap with 5 buckles and 5 slides
RAK	Includes o-ring for regulator adaptor, regulator adaptor and lens port gasket
MCK	Includes mask cover
SEK	Includes speaker diaphragm, outer cocking ring, o-ring for speaker diaphragm, o-ring for speaker/exhalation body and speaker/exhalation body
EV-PDK	Includes spring retainer, spring PD, plate, exhalation valve PD and stem
EVO	Includes exhalation valve seat, o-ring for exhalation valve seat
LNK	Includes nosecup and 2 inhalation valve flaps

Facepiece Replacement Component Packages

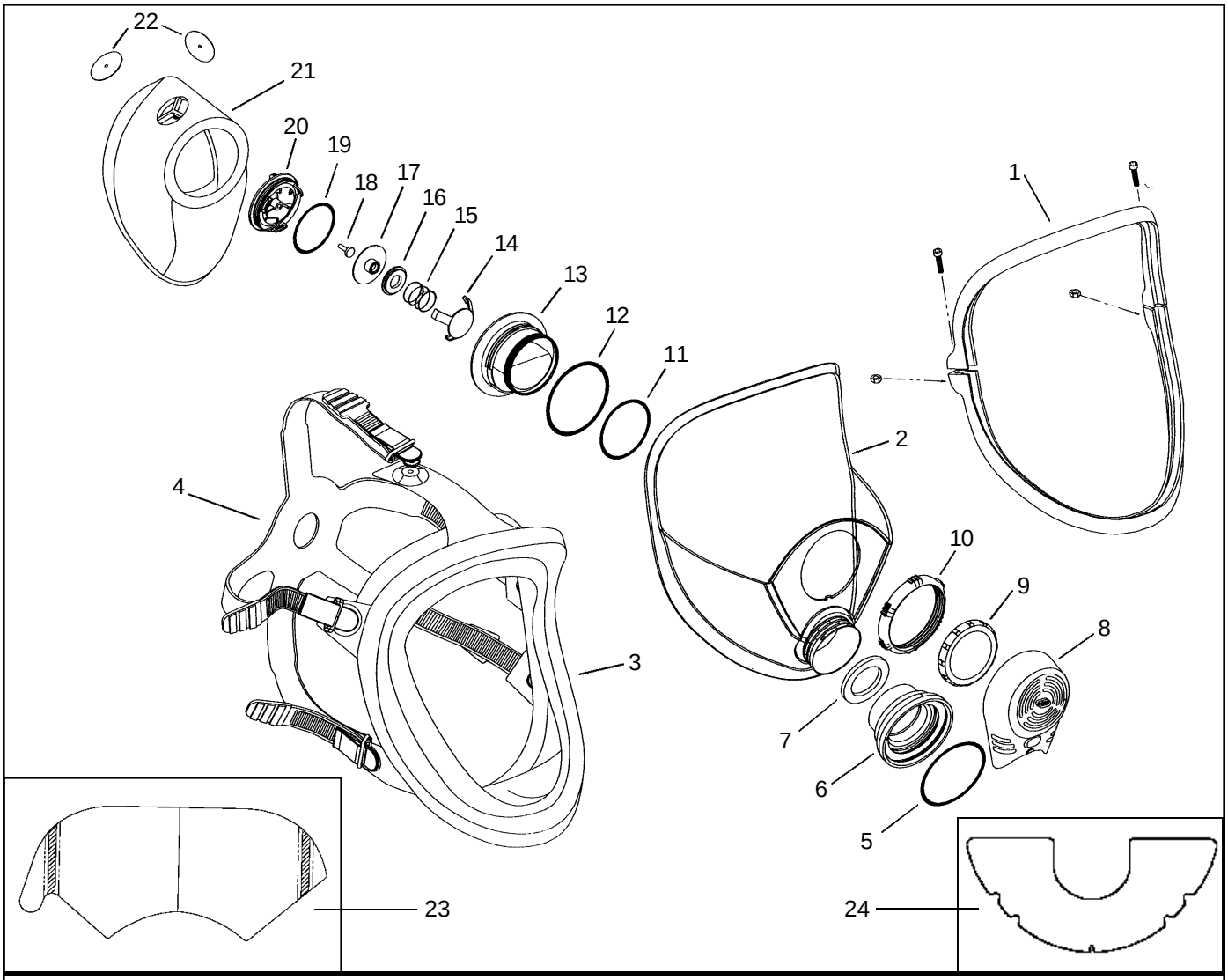
6037	Spectrum PDSpring (5/pkg)
6039	Lens Port Gasket (5/pkg)
6040	O-ring, Speaker Diaphragm (5/pkg)
6041	O-ring, Speaker Exhalation (5/pkg)
6042	O-ring, Exhalation Valve (5/pkg)
6043	Inhalation Valve Flap (5/pkg)

Accessories

AFW45	Anti-Fog Lens Wipes (10/pkg)
ADEF	Air Deflector (5/pkg)
SPEC-PL	Spectacle Frame Assembly
PCC45	Protective Cleaning Cap (5/pkg)
SPEC-LC	Mylar Lens Covers (25/pkg)
FTR45	Fit Test Refill - Includes 15 feet of Tygon tubing, 25 suction cups and 25 clips
HFC45	HEPA cartridges for quantitative fit testing (6/carton)

*** These assemblies include Industrial Interchange (Hansen compatible) fittings. To order a different fitting, purchase a coupler assembly separately and replace parts according to instructions that accompany the product.**

FACEPIECE COMPONENT DRAWING



FACEPIECE COMPONENTS AND KITS

Cat. No.	Description
1. **LCK**	Lens Clamp
2. **RLS**	Replacement Lens
3. **FK-ML & FK-S**	Facepiece Flange
4. **HSK**	Headstrap with Buckles and Slides
RAK (Includes parts 5, 6 and 7)	
5. O-ring, Regulator*	
6. Regulator Adaptor	
7. Gasket, Lens Port	
8. Mask Cover	
SEK (Includes parts 9 - 13)	
9. Speaker Diaphragm	
10. Outer Locking Ring	
11. O-ring , Speaker Diaphragm*	
12. O-ring , Speaker/Exhalation*	
13. Speaker/Exhalation Body	
EV-PDK (Includes parts 14 - 18)	
14. Spring Retainer	
15. Spring, PD*	
16. Plate	
17. Exhalation Valve, PD*	
18. Stem	
EVO (Includes parts 19 and 20)	
19. O-ring for Exhalation Valve Seat*	
20. Exhalation Valve Seat	
LNK (Includes parts 21 and 22)	
21. Nosecup	
22. Inhalation Valve Flap*	
23. **SPEC-LC**	Mylar lens covers (25/pkg)
24. **ADEF**	Air Deflector (5/pkg)

*Packaged as replacement parts in quantities of 4 or 5. (See Page 28)

Return Authorizations

IMPORTANT: THE FOLLOWING STEPS MUST BE COMPLETED BEFORE BULLARD WILLACCEPTANYRETURNED GOODS. PLEASE READ CAREFULLY.

Follow the steps outlined below to return goods to Bullard for repair or replacement under warranty or for paid repairs:

1. Contact your Bullard Inside Sales Representative by telephone or in writing at:

   Bullard
   1898 Safety Way
   Cynthiana, KY 41031-9303
   Toll-Free: 800-827-0423
   Phone: 606-234-6611

   In your correspondence or conversation with your Inside Sales Representative, describe the problem as completely as possible. For your convenience, your representative will try to help you correct the problem over the phone.

2. Verify with your representative that the product should be returned to Bullard. Inside Sales will provide you with written permission and a return authorization number as well as the labels you will need to return the product.

3. Before returning the product, decontaminate and clean it to remove any hazardous materials which may have settled on the product during use. Laws and/or regulations prohibit the shipment of hazardous or contaminated materials. Products suspected to be contaminated will be professionally discarded at the customer's expense.

4. Ship returned products, including those under warranty, with all transportation charges pre-paid. Bullard cannot accept returned goods on a freight collect basis.

5. Returned products will be inspected upon return to the Bullard facility. Your Inside Sales Representative will telephone you with a quote for required repair work which is not covered by warranty. If the cost of repairs exceeds stated quote by more than 20%, your Inside Sales Representative will call you for authorization to complete repairs. After repairs are completed and the goods have been returned to you, Bullard will invoice you for actual work performed.

The Human Side of Safety.®
Since 1898.

1898 Safety Way
Cynthiana, KY 41031-9303
Toll-Free: 800-827-0423
Phone: 606-234-6611
Fax: 606-234-6858

Visit Our Web Site: http://www.bullard.com

Bullard is an
ISO 9001-certified company

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