



OPERATOR MANUAL

VIPER_{RECOVERY}[™] COMPRESSED AIR FOAM SYSTEM (CAFS)



**Multi-Purpose Portable Compressed Air Foam System
for
Fire Suppression and Prevention, Decontamination & Spill Response**

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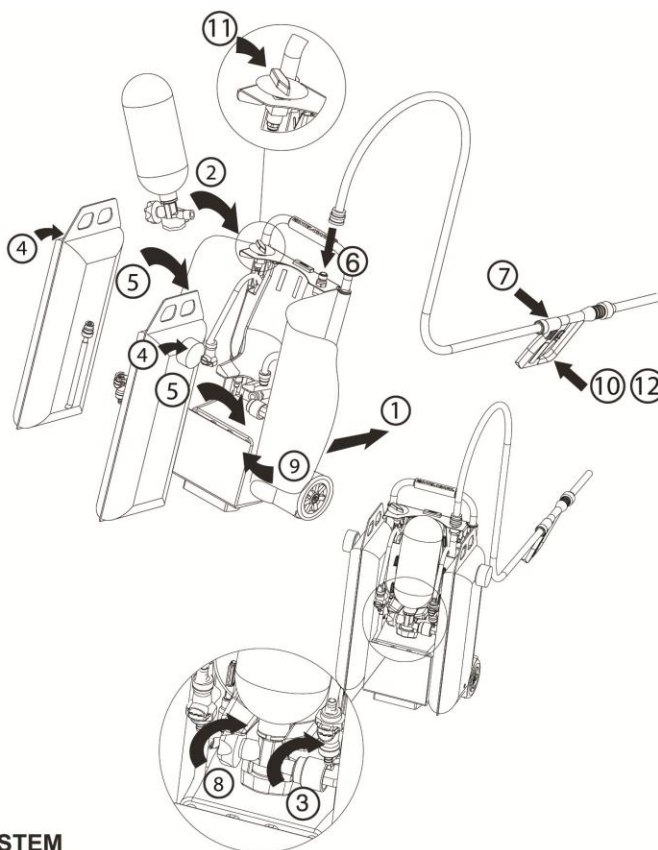
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VIPER™ QUICK START

This Quick Start guide is provided as a reference for trained/certified operators that are familiar with the VIPER system. DO NOT use this guide to operate this system without a careful review and understanding of the information provided in the Operator's Manual.

Perform pre-operational checks of the system – NEVER operate the system without performing a thorough inspection first. (See Section 4 of this manual.)



TO ACTIVATE SYSTEM

- ① Open body flaps.
- ② Insert fully charged air cylinder, buckle and tighten tank retention strap(s).
- ③ Connect air cylinder fitting to cylinder valve and hand tighten clockwise. **DO NOT OPEN AIR CYLINDER VALVE KNOB YET (STEP 8)!**
- ④ Fill fluid bladders.
- ⑤ Install fluid bladders by connecting male/female quick connects. Tighten inner panel strap.
- ⑥ Attach handset hose
- ⑦ Unlock handset trigger.
- ⑧ Completely open air cylinder by pushing valve knob and **SLOWLY** turning it counter-clockwise.
- ⑨ Close system body flaps and connect plastic buckle clips. Tighten to fit.
- ⑩ Squeeze handset trigger to release any trapped air.
- ⑪ Adjust air valve setting for wetter or drier foam as needed.
- ⑫ Squeeze handset trigger fully to apply foam.

NOTICE: You must thoroughly flush system prior to switching from one type of agent to another.

SECTION 1 – FRONT MATTER

Congratulations on your purchase of the VIPER_{RECOVERY} (VIPER) Compressed Air Foam system. The VIPER provides the user with the ability to apply minimally expanded (1:1) to highly expanded (~35:1) compressed air foam that is generated from on-board liquid resources. The VIPER is capable of creating and applying fire fighting foams, decontaminating foams and many other foam products, without modification or performance degradation.

Used and maintained properly the VIPER is an extremely safe and effective system that provides a single operator the ability to deploy up to ~140 gallons¹ of CAF from a single liquid fill.

The VIPER is a high pressure air unit. Although every effort has been taken to ensure the VIPER unit is safe to operate, the operator **MUST** be aware that this system uses high-pressure air to create and propel foam onto a target. Precautions **MUST** be taken to ensure operator safety.

Operators must read this manual and be familiar with the safety considerations outlined herein. Refer to the **Warning Summary** beginning on page 6 of this manual for an explanation of potential risks.

Throughout this manual important procedures, **Cautions** and **Warnings** will be clearly identified with the symbol below. Ensure the cautions, warnings and procedures specified herein are closely followed. Doing so will help ensure your VIPER system remains serviceable and can be safely employed with maximum effectiveness.



****NOTE****

This symbol is used throughout this manual to clearly indicate an **important procedural step or warning statement**.

When accompanied with the word “**WARNING**” this symbol indicates that personal injury or possibly death could result from not obeying the guidance.

When accompanied with the word “**CAUTION**” this symbol indicates that damage to the system or a component could result from not obeying the guidance.

Heed all warnings and cautions!

¹ The VIPER is available with 1, 1.5 or 2 gallon bladders, which change carrying capacity. It also has an operator adjustable air control valve that is used to control foam expansion, with the range being unexpanded (1:1) up to ~35:1 expansion. Using the optional Mid-X air aspirating nozzle increases achievable expansion up to ~70:1. The level of expansion achievable will vary based upon foam concentrate used, quality of water supply, operator adjustment of the ‘Air Control Valve’ and foam concentrate viscosity and quality among other things.

WARNING SUMMARY

This section contains general safety warnings and procedural cautions that must be understood and consistently applied during operation and maintenance of this equipment.

FAILURE TO OBSERVE THESE WARNINGS AND CAUTIONS COULD RESULT IN SEVERE PERSONAL INJURY OR LOSS OF LIFE AND/OR DAMAGE TO YOUR EQUIPMENT!



WARNING! Personnel using the VIPER to respond to a fire emergency must be educated in the basic principles of fire fighting to mitigate the risk of performing these inherently dangerous operations.



WARNING! Before operation, **ALWAYS** verify that all hoses and accessories are properly connected. Further, **ALWAYS** inspect the unit to ensure the integrity of the air cylinder is not compromised and that all lines are serviceable.



WARNING! NEVER operate a unit that has an identified air leak or worn or damaged air lines/discharge hose. Once pressurized, a loose/leaking/damaged connection may disconnect or rupture, potentially causing injury.



WARNING! After operation, **ALWAYS** turn off the air supply and bleed the handset hose to relieve the system of pressure. Failure to do so could result in injury and /or system damage.



WARNING! To enhance the service life of your VIPER system, we recommend only filtered/breathing quality air be used to charge the VIPER's air cylinder. **NOTE: This cylinder is not certified/authorized for use as a breathing air cylinder - DO NOT USE VIPER cylinders with breathing systems!**



WARNING! NEVER deploy liquid or foam onto a charged electrical fire. Foam, like water, is a conductive medium. Deployment of foam onto an electrically charged fire can result in electrocution!



WARNING! ALWAYS wear eye protection while operating any compressed air foam system!



WARNING! ALWAYS retest air cylinders every 5 years per DOT OFFC & DOT-SP11194 and per TC-SU5303. **NEVER** fill pressure air cylinders that are out of hydrotest period. Refer to DOT regulations at all times.

WARNING SUMMARY - Continued

WARNING! The VIPER backpack is capable of deploying chemical and/or biological decontaminating foams without modification. Operator must be fully trained in this type of operation. The standard protective ensemble (MOPP gear) is required at all times prior, during and after decontamination operations.



WARNING! ALWAYS treat the VIPER as though the discharge hose is energized. Once a system is pressurized it will remain so until the air supply is turned off and the handset is activated to release pressure in the lines.



WARNING! When using the VIPER **ALWAYS** point the discharge device in a safe direction and activate the handset to verify the system is not pressurized.



CAUTION! NEVER transport unrestrained/unsecured air cylinders. Doing so could result in cylinder damage, potentially rupturing the high pressure vessel. Always protect the air cylinder valve from impact, especially when transporting and/or filling cylinder.



WARNING! NEVER fill or use high pressure air cylinders that show signs of physical damage that may cause failure! Refer to DOT regulations at all times



CAUTION! Open the air cylinder valve **slowly** to reduce impact on the pressure regulation system! Rinse and inspect the cylinder periodically to insure material integrity!



WARNING! NEVER use high and low pressure sources to power the system at the same time! Doing so will result in severe damage to system!



WARNING! NEVER fill an air cylinder that has visible damage, unraveling or charring of composite fiber.

1.1 Revision Transmittal Page

VIPER_{RECOVERY} COMPRESSED AIR FOAM SYSTEM (CAFS)

OPERATOR MANUAL

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You, as the operator have valuable experience and insight. You can help improve this manual - If you find any mistakes or if you know of a way to improve the procedures, please let us know.

Contact us via telephone, email or mail.

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You WILL receive a reply!

DATE OF REVISION	SUMMARY OF CHANGE	PAGES CHANGED
Mar 2012	Initial Release	
June 2012	Revision 1	multiple
January 2014	Edits	multiple
July 2016	Review	multiple
January 2017	Revision transmittal, warranty change	8, 52

SECTION 2 - GENERAL INFORMATION

2.0 Scope of this Manual

This manual fully explains receiving, preparing for use, using and maintaining your VIPER. The manual is broken down into the sections below:

- VIPER Quick Start
- Section 1 – Front Matter: Safety Warnings, Table of Contents, OEM Contact Information
- Section 2 – General Information
- Section 3 – Equipment Data and Description
- Section 4 – Inspection, Preparation and Use of the VIPER
- Section 5 – Preventive Maintenance Checks
- Section 6 – Troubleshooting
- Section 7 – Supporting Information
- Section 8 – Frequently Asked Questions
- Section 9 – Repair Parts, Replacements & Consumables
- Reporting Equipment Improvement Recommendations (EIR)

Type of Manual:

Operator's Manual; Provides instructions for operating and maintaining the VIPER CAFS.

2.1 Equipment Model Number and Name

VIPER, Man-Portable CAFS (Compressed Air Foam System)

Intelagard P/N 46191601-V301 - with (2) 1 Gal bladders, without air cylinder

Intelagard P/N 46191601-V303 - with (2) 1.5 Gal bladders, without cylinder

Intelagard P/N 46191601-V302 - with (2) 2 Gal bladders, without air cylinder

Intelagard P/N 46191601-V311 - with (2) 1 Gal bladders, with 17 cu.ft. air cylinder

Intelagard P/N 46191601-V313 - with (2) 1.5 Gal bladders, with 17 cu.ft. air cylinder

Intelagard P/N 46191601-V312 - with (2) 2 Gal bladders, with 17 cu.ft. air cylinder

2.2 Serial Number Location

To locate the serial number of your VIPER, open the skin, and look behind the air cylinder (if installed). The air cylinder serial number is located on the data plate affixed to the cylinder itself.

VIPER Model

No: _____

VIPER Serial

No: _____

Air Cylinder Serial

No: _____

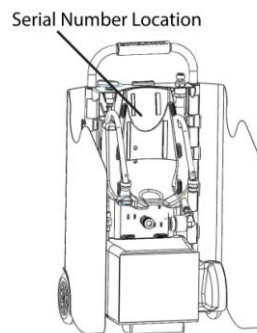


Figure 2.1 Serial Number Location

2.3 List of Abbreviations/Acronyms & Terms

The table below provides a definition for the common acronyms and terms used throughout this document.

CAF	Compressed Air Foam. Foam created by injecting air into a surfactant-carrying liquid solution such as the many fire foam concentrates/solutions commercially available
CAFS	Compressed Air Foam System. A system that uses compressed air as a primary energy source
CFM/SCFM	Cubic Feet per Minute/Standard Cubic Feet Per Minute – Alternate Unit of Measure for Pumping Throughput
Concentrate	A highly concentrated foam solution intended to be combined with water in the VIPER's liquid storage bladders
Dry Foam	'Dry' foam is a term used for highly expanded foam. The more air injected into the surfactant solution the greater the foam expansion. Dry foam uses more air/less liquid to create.
Expansion Ratio	Volumetric ratio of liquid volume present prior to expansion to foam volume created after expansion. A 1:1 ratio means the liquid has not been expanded. A 15:1 ratio means the liquid has been expanded to 15 times its original volume.
High-Pressure Air	The VIPER can accept air from one of two sources – a high-pressure SCBA air source or an air compressor. The SCBA cylinder, rated at 4500-PSI is the source of the VIPERs high-pressure air supply
Low-Pressure Air	Air compressors are the source for low-pressure air.
Solution	As used in this manual Solution refers to a either a water + foam concentrate mixture or a undiluted foam solution
PSI	Pounds per Square Inch – Unit of Measure for Pressure.
Wet Foam	'Wet' foam is a term used for CAF stream output that uses less air/more liquid in the stream, therefore is unexpanded, or minimally expanded.

TABLE 2.3.1 - Acronyms/Terms/Definitions

2.4 Purpose of Equipment

The VIPER CAF system is a multi-use, self-contained foam delivery apparatus specifically designed for rapid response to fire, hazmat and decontamination emergencies . The VIPER is capable of creating and applying foam solutions as an independent system, using only on-board resources (liquid and air). The VIPER has the ability to connect to an external air source (air compressor) in lieu of a high-pressure air cylinder. Utilizing an external air source eliminates the operational limitations imposed by using a limited on-board containerized air supply.

The VIPER is capable of applying numerous foam solutions, including:

- Class-A Fire Fighting Foams
- Class-B Fire Fighting Foams, Including:
 - Long duration proteins
 - AFFF
 - AR-AFFF
- Decontaminating foams such as EasyDECON® DF200
- Moldicides
- Many new wetting agents and combination A/B agents

Intelagard has conducted extensive research on suitability and compatibility of many commercially available foam concentrates, particularly those relating to the capability areas specified above. If you are unsure of the suitability of your foam concentrate or it's compatibility with the VIPER system contact Intelagard before using the concentrate with the VIPER system. Damage incurred as a result of the use of incompatible concentrates and/or solutions and non-filtered air is NOT covered by warranty.

For additional information on capabilities and employment modes see Section 3 (Equipment Data and Description) and Section 4 (Inspection, Preparation and Use of the VIPER) of this manual.

2.5 Safety, Care, and Handling

The VIPER uses high-pressure, containerized air as an energy source to both create and propel foam onto a target. Before operation, **always** verify that all hoses and accessories are properly connected. Further, always inspect the unit to ensure the integrity of the air cylinder is not compromised and all lines are serviceable.

2.5.1 High Pressure Air. The VIPER system uses a SCBA high-pressure air cylinder as the container for air energy for creating and propelling foam.. Users **MUST** exercise appropriate cautions when filling, transporting and using high-pressure air cylinders. The 4500-psi cylinders Intelagard provides are carbon fiber wrapped for added safety, and the valve of the air cylinder includes a burst disk.

SAFETY must always be foremost in the operators mind to prevent accidents or incidents that could lead to system damage and/or personal injury. Read and observe all safety warnings in this manual and **NEVER** attempt to operate a VIPER system with an air leak. If escaping air is heard once a system is pressurized turn off the air supply, activate the handset to release trapped air and fluid and then thoroughly inspect the system to identify the source of the air leak. **Do not use a system with an air leak!**

2.5.2 Hazardous Materials. The VIPER ships with the air cylinder empty (if purchased); therefore there are no hazardous material restrictions on transport or storage of the VIPER.

The VIPER is suitable for use with a multitude of foam concentrates, making it impossible to address all possible contingencies herein. Intelagard recommended Class A or B fire foam concentrates and EasyDECON® DF200 can be purchased through Intelagard. All concentrates are shipped with a Material Safety Data Sheet.

In the interest of personnel safety and system integrity, users must take the time to familiarize themselves with the qualities of the solutions they will apply with the VIPER by thoroughly reviewing the MSDS provided with the foam concentrates. Intelagard defers entirely to the statements, documentation and claims made by the foam or solution manufacturer.

2.6 Commercial Warranty Information

Intelagard provides a limited commercial warranty included in the purchase agreement and/or contract. Intelagard's commercial warranty is included at the end of this manual, and is available on our webpage, www.intelagard.com.

SECTION 3- EQUIPMENT DATA AND DESCRIPTION

3.0 Equipment Characteristics, Capabilities and Features

The VIPER is a fully self-contained, independently functioning and personally transportable Compressed Air Foam (CAF) generation apparatus, highly suited for fire fighting and hazardous vapor suppression, liquid spill response, and military and civil decontamination operations. The VIPER a multipurpose system designed to apply solutions for fire suppression (class A and B fires) fire prevention,, decontamination, hazardous material remediation, biohazard control, toxic material spill remediation, cleaning and mold control applications among other uses.

The VIPER is capable of applying most commercially available foam concentrates, including Class-A, long duration protein, AFFF, AR-AFFF, decontaminating foams, and many new wetting agents and combination A/B agents. The VIPER has many additional applications, including application of non-foaming liquid solutions and air aspirated foam with simple nozzle changes and control adjustments. Contact Intelagard for recommended foaming agents or with any questions regarding system capabilities.

The VIPER is powered by means of air energy, provided by an approved SCBA air cylinder or external air compressor². Air is injected into an a surfactant solution to create foam, which is propelled onto a target via the air energy. Intelagard offers approved 17 cu.ft. and 66 cu.ft. 4500-psi carbon fiber wrapped air cylinders for use with the VIPER. *Be aware that the length of time and number of bladder fills a cylinder will last depends heavily on the nozzle used, as well as other circumstances.* If using your VIPER with an air cylinder not purchased through Intelagard, it must meet Intelagard's criteria to avoid voiding the 1-year warranty provided with your system.



WARNING! NEVER use high and low pressure sources to power the system at the same time! Doing so will result in severe damage to system!

The energy in a single 17 cu.ft. air cylinder is sufficient to expand and apply 1 to 2 gallon loads of solution, depending on foaming agent, operator technique and wet/dry air control settings.

² To operate the VIPER without performance degradation an air compressor must be capable of providing 12-CFM of air at 100-110-PSI.

3.1 VIPER Physical Characteristics

System Specifications:

COMPLETE SYSTEM:

- Dry Weight: System (with hose and nozzle): ~19 lbs³ (8.6 kg)
- Empty 17 cu. ft. Air Cylinder: adds ~ 4 lbs³ (1.8 kg)
- Dimensions: ~26 in H x 15 in D x 11.5 in W⁴ (66 cm x 38 cm x 29 cm)

BLADDERS

- Liquid Capacity: ~2-4 Gallons⁵ (7.57 L - 15.14 L)
- Closure (Cap) Threaded

FRAME

- Material: High Impact Urethane

PUMP:

- Flow: ~5 gallons per minute⁶ (gpm) liquid flow rating
- Pressure: 100 psi (6.7 BAR) Optimum, 110 psi (7.6 BAR) Maximum

AIR INJECTION (Foam Expansion Control):

- Adjustable by mechanical valve, 90 degrees rotation, wet/dry setting

COMPRESSED AIR FOAM (CAF) MANIFOLD:

- Expansion: ~1:1 (liquid application) to ~35:1⁷
- Air Consumption: ~9.5 CFM Max⁸
- Resupply Ratio: ~2:1 MAX (~2-gal loads emptied per full 17 cu.ft. air cylinder)⁹
- Output Stream: ~105 gallons per minute finished foam¹⁰,
- Output Throw Distance: ~30 ft. MAX¹⁰ (9.1 m)

HARNESS:

- Construction: Nylon and Cordura® fabric; Black (Standard), Other colors optional, based on procurement quantity.

³ Dry weight does not include cylinder. An empty Intelagard 17 cu.ft. cylinder assembly (PN 46182004-V800) adds 3.88 lbs (empty 66 cu.ft. cylinder adds ~9 lbs.)

⁴ bladders and cylinder choice height may alter overall height by as much as 12 inches, length and width by as much as 3 inches.

⁵ 1, 1.5 or 2 gallon bladder sets available and will change fluid capacity.

⁶ The VIPER pump is rated to dispense 5-gallons of liquid per minute. When working in conjunction with the CAF components pump flow is reduced by as much as 35%.

⁷ Achievable expansion ratio depends on foam solution composition. Concentration and concentrate quality will affect finished foam expansion. Intelagard recommends and endorses specific foam formulations, contact Intelagard for additional information.

⁸ Air consumption varies according to foam solution make-up and wet dry setting. Re-supply ratio based on 17 cu.ft., 4500 psi cylinder

⁹ The tank to cylinder resupply ratio will vary according to bladder size, foam solution, nozzle selection and system settings (Wet/Dry)

¹⁰ Wet/Dry settings, foam product, nozzle used and wind will significantly affect air supply time, foam output stream and throw distance.

3.2 VIPER Operational Parameters

OPERATIONS	PARAMETER
Structure, Woodland Fire Fighting	Class-A Foam. See Foam Mixing and Nozzle Guidelines, Sec. 3.3.
Vehicle, Tire and Fuel Fires	Class B foam. See Foam Mixing and Nozzle Guidelines, Sec. 3.3.
Decontaminant Solution, EasyDECON® DF200	Available in a three-part formulation that ships in 5, 100 and 500 gallon configurations. Combine the 3 components according to the enclosed instructions, stir lightly and add the combined solution to the bladders. Do not dilute with water. Apply at expansion ratio best suited for the target area and agent challenge. Use the fan spray nozzle to apply foam to vertical surfaces.
Flow/Capacity/Output	Foam expansion is a function of the amount of air injected into a liquid solution. A higher "wet" setting will use more liquid and less air. A higher "dry" setting will use more air, and less liquid. Optimum settings must be determined by the operator based upon the environment, mission and specific challenges presented. As air consumption varies based upon the wet/dry setting, operators can expect to empty the fluid reservoir at least one time on a fully charged air cylinder. If 'wetter' foam is being applied the air supply will last comparatively longer than when applying 'dry' foam. ¹⁰
Set-up Times	Refill Time: ~1-5 minutes Pumping time: Subject to system settings System PMCS: < 10 minutes System Start-Up: < 1-2 minutes System Shutdown: < 1 minute Configure for external air: < 2 minutes
Foam Projection Distance	Projection distance is a function of wet/dry settings, foaming agent, air source and nozzle used and weather. With standard equipment projection distance is up to ~30 feet. ¹⁰
Operating Pressure	100-psi (6.9 BAR) Optimal, 110-psi (7.6 BAR) maximum
Low Pressure Air (Air Compressor) Requirements	Compressor must provide a minimum of 12-scfm at 100PSI optimum, 110-PSI maximum. Smaller compressors can be used – owner/operators should test their compressor to determine suitability
Foam Expansion	System: 1:1 (unexpanded) up to ~35:1 (35 times original liquid volume). With Mid-X Nozzle: ~70:1 achievable
Accessories	Call Intelagard for more information.

Table 3.2.1 - List of VIPER Operational Parameters

¹⁰ Wet/Dry settings, foam product, nozzle used and wind will significantly affect air supply time, foam output stream and throw distance.

3.3 Foam Mixing and Nozzle Guidelines

Foam Type	% Mix	Mix Ratio	Pre-Mixing	Nozzles
Class A	.5%	.64 oz. / 1 gal (18.93 ml / 3.78 L)	No	1,2,3,4
		.96 oz / 1.5 gal (28.39 ml / 5.68 L)		
		1.28 oz / 2 gal (37.85 ml / 7.56 L)		
Class A	1%	1.28 oz / 1 gal (37.85 ml / 3.68 L)	No	
		1.92 oz / 1.5 gal (56.78 ml / 5.68 L)		
		2.56 oz / 2 gal (75.71 ml / 7.56 L)		
Protein	3%	3.84 oz / 1 gal (113.56 ml / 3.68 L)	Yes	1,4
		5.76 oz / 1.5 gal (170.34 ml / 5.68 L)		
		7.68 oz / 2 gal (227.12 ml / 7.56 L)		
Protein	6%	7.68 oz / 1 gal (227.12 ml / 3.68 L)	Yes	
		11.52 oz / 1.5 gal (340.68 ml / 5.68 L)		
		15.36 oz / 2 gal (461.35 ml / 7.56 L)		
AFFF AR-AFFF	3%	3.84 oz / 1 gal (113.56 ml / 3.68 L)	Yes	1,2,3,4
		5.76 oz / 1.5 gal (170.34 ml / 5.68 L)		
		7.68 oz / 2 gal (227.12 ml / 7.56 L)		
AFFF AR-AFFF	6%	7.68 oz / 1 gal (227.12 ml / 3.68 L)	Yes	
		11.52 oz / 1.5 gal (340.68 ml / 5.68 L)		
		15.36 oz / 2 gal (461.35 ml / 7.56 L)		
Non-Foaming Agents	Per Manufacturer's Instructions			5
EasyDECON DF200® Crystal Clean®	100%	Full Strength	Yes	1,2,3,4,5

Nozzle Key: 1=Smooth Bore, 2=Fan Spray, 3=Mid X, 4= Piercing Tip, 5=Hazmat

NOTICE: You must thoroughly flush system prior to switching from one type of agent to another.

3.4 Location of Major Components

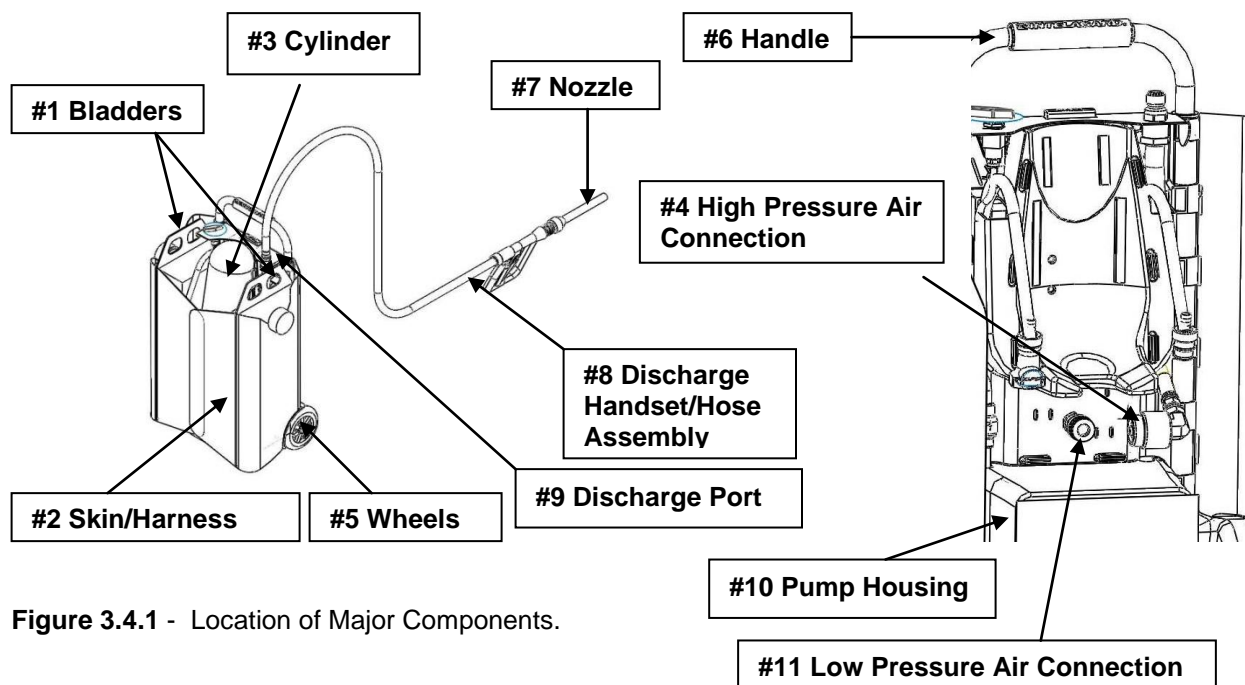


Figure 3.4.1 - Location of Major Components.

ITEM #	COMPONENT	FUNCTION
1	Bladders	Bladders act as a fluid reservoir. They are never pressurized. Bladders come in 1, 1.5 and 2 gallon sizes.
2	Skin/Harness	Mold/mildew resistant Cordura® fabric harness, integrated lumbar support
3	Air Cylinder	4350/4500-psi carbon fiber wrapped, 15-minute air cylinder; Standard US cylinders equipped with CGA valves w/burst disk
4	High Pressure Air Connection	This line connects the high pressure air cylinder to the plumbing system. <i>NEVER use this line as a lifting point!</i>
5	Wheels	Wheels for mobility
6	Handle	Retractable handle for easy rolling.
7	Nozzle	9.5mm smooth bore nozzle is standard – nozzles should be chosen to tailor foam application to the challenge(s).
8	Handset/Hose Assembly	5' x 1/2" hose, ships with trigger activated handset attached. Nozzle is attached to handset via quick connect
9	Discharge Port	Stainless steel connecting point for the VIPER handset/hose assembly.
10	Pump Housing	Contains one 1/2 inch pump. High pressure present. Access to the pump housing by anyone other Intelagard personnel will void warranty.
11	Low Pressure Air Connection	Connection port for low pressure air (compressor)

Table 3.4.1 – VIPER Major Components.

3.5 Description of Major Components

3.5.1 Bladders

The VIPER stores the liquid to be dispensed in a pair of bladders. These bladders are soft, removable/replaceable, and come in three sizes, 1, 1.5, and 2 gallons. Bladders must be used as a volume matched pair, and attach via quick disconnect fittings .

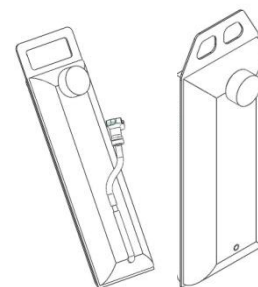


Figure 3.5.1 –VIPER_{RECOVERY} Bladders

3.5.2 Skin/Harness

The VIPER incorporates a custom designed skin that contains and protects the CAF system. This skin has a backpack harness incorporated into the design that may also be stowed for rolling operations. The skin has internal pockets that hold the bladders.

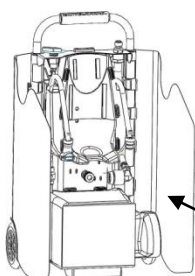


Figure 3.5.2 VIPER_{RECOVERY} Skin/Harness

3.5.3 Air Cylinder

Intelagard's VIPER air cylinders are 4500-psi carbon fiber wrapped 17 cu. ft. SCBA cylinders (66 cu.ft. cylinders are also available). They ship with the valve installed (CGA or DIN) and are ready to fill upon receipt and after inspection by an authorized/certified technician. Our standard cylinders have a DOT or CE label around the cylinder body and are certified for use only with Intelagard CAF systems. These carbon composite cylinders have a 15-year service life, and must be hydro-statically tested every five years per DOT test criteria. The date of manufacture and the service pressure rating can be found on the DOT label. Always inspect cylinders for damage prior to re-charging. Cylinders incorporate a serial number on the data plate.

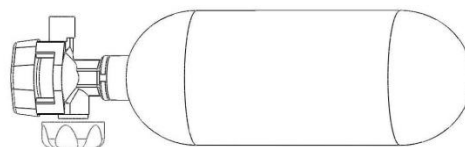


Figure 3.5.3 – VIPER_{RECOVERY} Air Cylinder



WARNING To maintain the integrity of the system Intelagard recommends using only breathing quality, filtered air to charge our cylinders. **Never** use a VIPER air cylinder as a breathing air cylinder!

O-Ring Location on
High Pressure
Connection

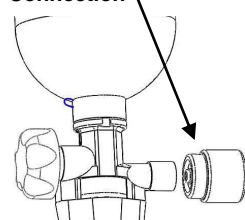
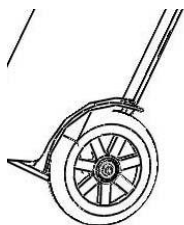


Figure 3.5.4 – VIPER_{RECOVERY} High Pressure Connection

3.5.4 High Pressure Connection

The air cylinder is connected to the VIPER with a standard high-pressure CGA fitting (optional DIN fittings are available) that is designed to accept any of the standard pressure ratings. The VIPER's high-pressure connection includes an O-ring (see figure 3.4.3) which must always be present for proper operation of system.

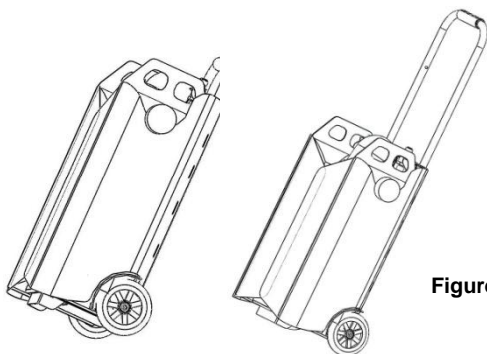
(3.5 - Description of Major Components, Continued)



3.5.5 Wheels

The VIPER is mounted on wheels for easy mobility across improved surfaces. When worn as a backpack, the wheels sit just outside of the hips, so the pack remains comfortable.

Figure 3.5.5 – VIPER_{RECOVERY} Wheel



3.5.6 Handle

The VIPER product line has a 2-position handle designed for ease in rolling the unit as a hand cart. The handle is activated by depressing a button on top of the unit, labeled “PUSH”, and pulling out, or pushing in on the handle, depending on whether the operator is intending to extend or retract the handle.

Figure 3.5.6 – VIPER_{RECOVERY} Handle retracted and extended.

3.5.7 Nozzle

The VIPER ships standard with one (1) 9.5mm smoothbore nozzle, which is a general purpose nozzle well suited for most applications. The smoothbore nozzle will yield the greatest throw distance (standoff range) for foam application.



Figure 3.5.8 – Discharge Hose/Handset Assembly

3.5.8 Handset & Hose Assembly

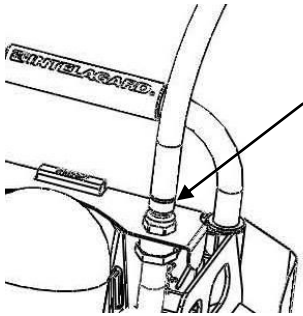
The VIPER ships with a standard 5 foot long x ½” (ID) handset & hose assembly. The handset comes pre-installed on the hose and is not available separately. The system connection end of the hose is equipped with a stainless steel quick-connect coupling to make connection to the VIPER unit’s discharge port quick and easy. The handset is constructed of durable molded plastics and has a locking handset trigger. The tip of the handset incorporates a brass quick-connect coupling for connecting nozzles.

Important: Never attempt to disconnect a handset from the VIPER while the cylinder valve is open or the system is pressurized. Always relieve pressure by squeezing the handset valve before breaking this connection!

The VIPER discharge hose is a multi-ply reinforced EPDM hose, and as such has a high degree of chemical compatibility. The hose has a flame resistant outer jacket. Intelagard recommends that VIPER owners/operators familiarize themselves with and adhere to the guidelines set forth in NFPA 1962 “Standard for the Inspection, Care and Use of Fire Hose, Couplings, Nozzles and the Service Testing of Fire Hose”.

(3.5 – Description of Major Components, Continued)

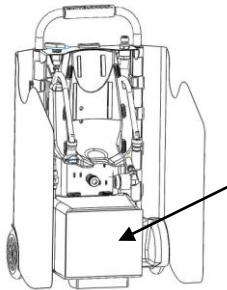
3.5.9 Discharge Port



Stainless steel connector that serves as the attaching point for the discharge hose. **NOTE:** Disconnecting the handset from energized systems (air turned on) will result in an energetic discharge of fluid from this port – ALWAYS ensure the air is turned off and trapped pressure is released from the system before disconnecting the handset. A VIPER that is stored in the 'ready' state (full of fluid) that does not have the handset connected will leak fluid from this port. Store full VIPER's with the handset attached.

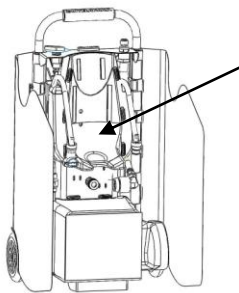
Figure 3.5.9 VIPER_{RECOVERY} Discharge Port

3.5.10 Pump Housing



The ½ inch pump that powers the VIPER is located in the pump housing. Access to this area by anyone other than Intelagard personnel will void warranty. **WARNING:** High pressure present.

3.5.11 Low Pressure Air Connection



VIPER users with an available compressed gas supply (nitrogen or compressed air) can operate the VIPER system by bypassing the internal regulation system and supplying regulated low pressure directly to the VIPER via the low pressure air connector. A compressed air supply regulated to 110 psi (7.6 bar) MAX can be connected via the female industrial interchange type quick-disconnect fitting. Air bottle must be removed to access this port. Compressor used must provide a minimum of 12-scfm at 100 psi (6.9 bar) optimum, 110 psi (7.6 bar) maximum. Owner/operators should test their compressor to determine suitability for use with the VIPER.

3.6 Location of VIPER Controls and Indicators

The VIPER is an uncomplicated system with simple, intuitive operator's controls and indicators, all of which are explained in this section.

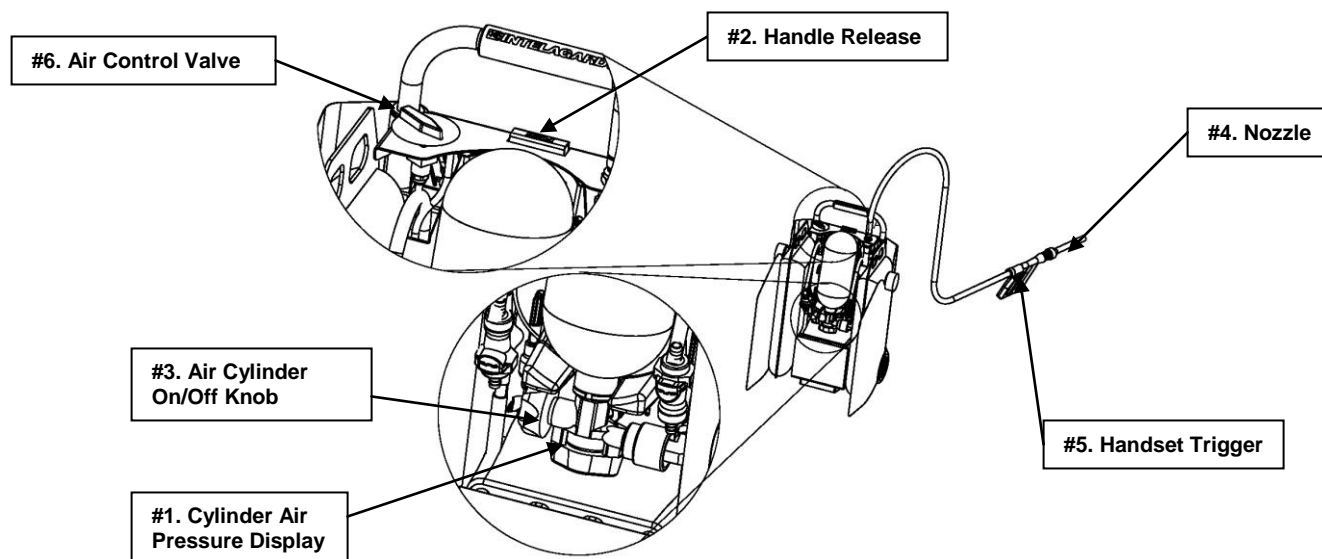


Figure 3.6.1 - VIPER Controls and Indicators

ITEM #	COMPONENT	FUNCTION
1	Air Cylinder Pressure Display (CGA Valves Only)	Displays the amount of air in the air cylinder
2	Handle Release Button	This button allows the operator to extend or retract the handle.
3	Air Cylinder Air On/Off Knob	Push-to-turn knob used to turn airflow from the cylinder On or Off. Once turned on the system is energized – always point the discharge nozzle in a safe direction! To turn the air ON turn the knob counter-clockwise. To turn the air OFF push in on the knob and turn clockwise
4	Nozzle	Nozzles are interchangeable, and used to tailor foam application to best suit the challenge/mission – see pages 24-25 for additional information
5	Handset Trigger	Use to control foam distribution – essentially the 'On/Off' control for foam distribution
6	Air Control Valve	This is a range selector dial, labeled 'Wetter Foam' and 'Dryer Foam'. Used to select the amount of air injected into the foam; controls the expansion ratio of the delivered product

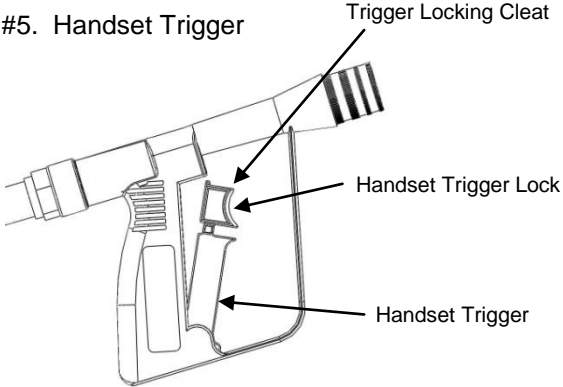
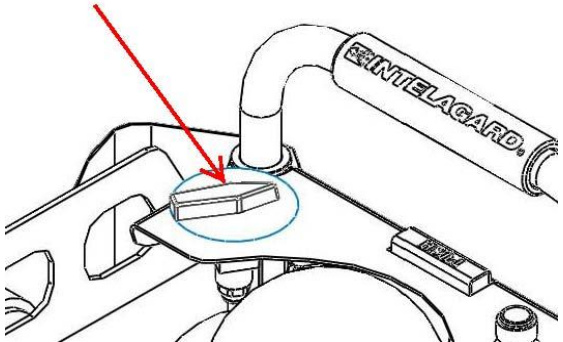
Table 3.6.1 - VIPER Controls & Indicators

3.7 Description of VIPER Controls and Indicators

CONTROL / INDICATOR	FUNCTION
#1. Air Cylinder Pressure Display (CGA Valves Only)	Numeric gauge, numbered in graduations of 10, with the scale from 0 (zero) to 40 and ending at 45, which is indicated as "Full". Gauge scale indicates the number of PSI x 100. As the air supply is depleted the indicator arrow will move down the scale, when at or near 0 the air cylinder is depleted and will require replacement or refilling. This gauge is principally used to determine the fill status of a cylinder before and after a mission. The heads-up pressure gauge (on the left shoulder strap) is used to monitor air available during a mission.
#2. Handle Release Button	The handle release button allows the operator to extend the handle during rolling operations for ease of transport and reduced fatigue. Handle may be retracted for storage/ backpack operations.
#3. Air Cylinder- Air On/Off Knob	<p>The "On/Off" valve controls the air flow from the high-pressure air cylinder to the VIPER unit. The valve is a 'push to turn' valve.</p> <p>To turn the air ON: The operator must turn the valve in a counter-clockwise direction to turn the air supply ON.</p> <p>To turn the air supply off it is necessary to push in on the valve and turn it in a clockwise direction.</p>
#4. Nozzle	<p>A nozzle is essentially an operator control as the nozzle used allows the operator to tailor how the foam is delivered during an operation.</p> <p>Smoothbore – Greatest throw range/general purpose nozzle</p> <p>Optional Nozzles:</p> <ul style="list-style-type: none"> Fan Spray – Large area coverage – good for ceilings, walls, sides of vehicles Mid-X – Ideal for smothering, flooding and vapor suppression. Piercing Tip – Used to force foam into enclosed spaces, such as rooms, engine compartments, etc Hazmat - Used to dispense non-foaming agents.

Table 3.7.1 – Description of VIPER_{RECOVERY} Controls and Indicators

(Table 3.7.1 – Description of VIPER Controls and Indicators, Continued)

CONTROL / INDICATOR	FUNCTION
<p>#5. Handset Trigger</p> 	<p>The handset trigger is used by the operator to control foam dispersal. This is a dual function handset.</p> <p>If the operator squeezes the top of the trigger with the index finger the handset will not lock – use the index finger trigger for intermittent spray operations.</p> <p>Using the lower (larger) portion of the trigger will lock the trigger in the 'On/Down' position. Use this for continuous spray operations.</p> <p>To unlock the trigger squeeze the index finger (upper) portion of the trigger</p> <p>For operator controlled, intermittent spray operations use only the upper portion of the trigger to avoid locking it in place.</p>
<p>#6. Air Control Valve</p> 	<p>The Air Control Valve is located on the top plate, above wearers left shoulder. The valve has a range, from 'Wetter' to 'Drier' foam. The valve controls the amount of air injected into the foam concentrate, therefore the expansion ratio.</p> <p>At the Full Wet setting the water/concentrate solution is unexpanded – the operator will observe a watery stream with traces of white concentrate in it. The wetter setting uses more liquid, less air – therefore the liquid bladders will deplete faster than the air resource.</p> <p>At the Full Dry setting air resources will be depleted faster as the concentrate will be fully expanded. For most concentrates a full dry setting will generate foam at a ~35:1 expansion ratio. At full dry setting the unit will consume more air to expand the solution, therefore air will deplete faster at 'drier' settings</p>

3.8 VIPER Modes of Operation

The VIPER is capable of being used in two (2) different configurations, as explained below. Utilizing optional nozzles the capabilities of the system can be further expanded and tailored to specific missions /challenges.

3.8.1 Standard Configuration: Self-Contained, High Pressure Air Cylinder. In this mode the VIPER utilizes on-board consumable supplies, including water, foam concentrate and high-pressure containerized air to create and propel foam onto a target.

Utilizing on-board air stored in the 4500-psi carbon fiber wrapped air cylinder the VIPER injects air into a concentrate solution to create foam, which may be unexpanded (1:1) or fully expanded (~35:1). The operator has a “air inject” dial over the wearers left shoulder that allows them to select a desired foam expansion ratio. Air and solution are combined in the VIPER to create foam, which is then expelled from the nozzle when the operator activates the handset trigger. In this standard configuration the VIPER can create and propel both fire fighting and decontamination foams. Operator settings will affect the burn rate of the consumables (air and solution).

3.8.2 Alternate Configuration: External Air Source (Compressor). The VIPER has a low pressure air connection port located above the pump housing, behind the air bottle. This connectin enables the VIPER to utilize an external, low-pressure air supply in lieu of the high-pressure air cylinder. For large, sustained missions or fixed-site protection containerized air may be impractical or less desirable. Owners/operators with access to an air compressor that is capable of providing 12-CFM of air at 100 to 110-PSI can connect this air compressor to the VIPER with standard air line, thus eliminating the requirement for containerized (high-pressure) air. With a compressor capable of providing the volume of air specified above the VIPER user will not note any performance degradation using low-pressure air in lieu of a high-pressure air source. Owners must note that a compressor operates off a stored air supply – under-rated compressors can operate the VIPER but there will be a progressively larger loss of performance commensurate with less capable compressors. **Never operate the VIPER using high and low pressure air sources simultaneously! This will cause severe damage to the system!**

Powering the VIPER with low pressure air requires the purchase of an air supply line, available through Intelagard or our distributors. Air supply lines are available in lengths up to 100 feet. To achieve performance similar to that experienced using a high pressure air cylinder the air compressor must be capable of providing 12-cfm at a minimum pressure of 85-psi, with 100-psi being optimum, and 110-psi being maximum. At less than 100-psi the VIPERs performance, particularly throw range, will be degraded.

Depending on the compressor used it may be possible to use more than 100 feet of air line. See Section 7, paragraph 7.1 for additional information on using an air compressor for air energy in lieu of a high-pressure air cylinder.

3.9 Nozzle Options.

The VIPER ships standard with a 5-foot discharge hose and trigger operated handset. The handset is equipped with a quick-change coupler to allow rapid and easy exchange of the nozzle used. Nozzle changes allow the operator to tailor the foam application to best suit the mission being performed. An explanation of the available nozzles and their intended roles follows.

3.9.1 Smooth bore Nozzle, 9.5mm P/N 46191603-V901 The VIPER ships standard with a 9.5mm smooth bore nozzle, which is a general purpose nozzle. Using the smooth bore nozzle the operator will have the ability to project foam up to ~30 feet (dependent upon wet/dry setting and other operational parameters). Foam projection distance varies based upon the nozzle used, foam expansion setting, concentrate qualities and climatic conditions, principally wind. Generally the smooth bore is used for distance

spraying and covering the target with foam. The smooth bore may be used effectively for 1:1 up to ~35:1 expansion applications.



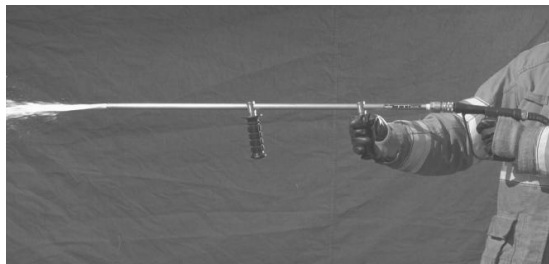
3.9.2 Fan Tip Nozzle (Optional Item) P/N 46191603-V924 The fan tip nozzle is well suited to laying down a thin, uniform layer of foam, making it ideal for covering large surfaces with minimum splash-back and waste. Based upon expansion ratio, the foam will easily adhere to wall and ceilings, and the application pattern is well suited for 'painting' targets with a thin foam layer. Held waist high by an average operator and passed slowly over the target surface the fan spray will lay down a very uniform layer of foam ~3 feet in width.



3.9.3 Mid-X Nozzle (Optional Item) P/N 46191603-V921 The Mid-X nozzle is an air aspirating nozzle that introduces additional air into the foam product at the nozzle, making expansion ratios of up to ~70:1 achievable. Achieving this expansion requires the operator to turn the 'Air Control' dial (over wearers right hip) to full wet. The Mid-X nozzle is well suited to mop up operations after a fire is reduced. At a possible expansion ratio of ~70:1 the foam VIPER will dispense a very thick layer of foam, completely covering the target area. This foam blanket both serves to smother, thus preventing reigniting, and to trap vapors, preventing off-gassing of potentially harmful materials.



3.9.4 Piercing Tip Nozzle (Optional Item) P/N 46191603-V922 The piercing tip nozzle is a stainless steel smoothbore nozzle intended to be used to force foam into an enclosed space such as a room, vehicle interior or engine compartment, either by breaching with the tip of the nozzle or by inserting the tip through an existing gap. This allows the operator to attack a fire without direct exposure to the source of the fire. Once a fire has been sufficiently reduced the operator can then switch to one of the other nozzles to completely reduce the fire. The piercing tip nozzle has a maximum foam throw range of up to ~20 feet (based on expansion, wind and concentrate, etc.).



CAUTION! When using the piercing tip nozzle to breach an object, such as a window, grip the nozzle by the handgrips provided on the nozzle itself to thrust the tip through the object. **DO NOT** grip the plastic handset when piercing an object. It may break!

3.9.5 Hazmat Nozzle (Optional Item) P/N 46191603-V021 The Hazmat Nozzle is specifically designed for dispensing non-foaming agents, although EasyDECON DF200 can also be deployed using this nozzle. The Hazmat nozzle orifice is fully adjustable from a straight stream to a wide cone spray. The flow rate of the nozzle also changes as the pattern is adjusted. The Air Control Valve should be in the “Wetter Foam” position when using this nozzle.



SECTION 4 – INSPECTION, PREPERATION & USE OF THE VIPER

4.0 General and Uncrating

Section 4 prescribes the procedures to be taken by operators upon receipt of a VIPER system. Uncrate your system - inventory and inspect all items. The contents of your crate will be dictated by your agreement at the time of purchase – check your purchase agreement to determine if all items are present at the time of uncrating!

Your VIPER and purchased accessories are generally shipped in a durable, re-sealable wooden crate that should be retained for repacking the VIPER for storage, deployment or shipping. The wooden crate serves to secure the unit and components during transport, preventing damage, while also serving to protect the contents from the environment. The top of the crate is secured with metal quick disconnect clamps that are easily removed with a screw driver. Retain the clips for re-use.

Upon unpacking the contents of the crate it is prudent to immediately inventory and inspect the contents. If any defects are noted, such as missing components, or transport damage immediately contact the distributor from which you purchased the system to file a claim for action/corrective action.

4.1 Inventory and Inspection

After opening the crate locate the packing slip and inventory crate contents. Table 4.1.1 provides a detailed listing of the items shipped standard with the VIPER – contents may vary based upon your purchase agreement.

Name/Nomenclature, Quantity and Part Number	Description	Action
VIPER , Intelagard P/N 46191601- V301 - with (2) 1 Gal bladders, without air cylinder Intelagard P/N 46191601- V303 - with (2) 1.5 Gal bladders, without air cylinder Intelagard P/N 46191601- V302 - with (2) 2 Gal bladders, without air cylinder Intelagard P/N 46191601- V311 - with (2) 1 Gal bladders, with 17 cu.ft. air cylinder Intelagard P/N 46191601- V313 - with (2) 1.5 Gal bladders, with 17 cu.ft. air cylinder Intelagard P/N 46191601- V312 - with (2) 2 Gal bladders, with 17 cu.ft. air cylinder	VIPER , with Harness/Skin	Inspect the Skin/Harness for any obvious defects. Inspect the fluid bladders for obvious damage such as tears, and ensure that caps are present. Note the VIPER serial number (the location on the unit is shown on P. 9 of this manual) and record for future reference. Note the presence and condition of both the Air Control Valve and the Handle release button on the top of the system.

Table 4.1.1 Standard equipment shipped with the VIPER

Name/Nomenclature, Quantity and Part Number	Description	Action
1 each, 17 cu.ft. Carbon Fiber Wrapped Air Cylinder ¹¹ P/N 46182004-V800 (optional)	Air cylinder comes with CGA valve pre-installed, standard. DIN valves are optional NOTE: Cylinders are shipped empty as standard practice. Prior to operating your VIPER it will be necessary to have the cylinder charged. Military contracts may require cylinders to ship full – check the pressure gauge on the valve (CGA only) to determine fill status.	Inspect the cylinder for any obvious impact damage. Any obvious damage to the cylinder that appears compromise the carbon fiber wrapping means the cylinder should be inspected by a certified official before being used. For CGA-valve equipped cylinders – verify the pressure gauge is intact. Rub marks are routine wear and are not cause for concern. Note and record the cylinder serial number, present on the cylinder data plate
1 each, Handset/Hose Assembly PN 46191603-V933	5'x1/2" (ID) discharge hose tipped with trigger activated handset	Inspect hose for cuts, tears cracks. Activate the handset trigger. NOTE - the upper portion of the trigger is a trigger lock. Lock the trigger down then unlock the trigger using the lower portion of the trigger to do so.
1 each, 9.5mm Smoothbore nozzle P/N 46191603-V901	General purpose nozzle	Verify presence; inspect; attach/detach. Ships attached to the handset with a brass quick connect coupling. Remove the nozzle from the handset and reinstall to verify attaching hardware functions properly
2 each, 8-ounce containers of Class A foam concentrate P/N 46191606-V837	8-ounce containers of Class A foam concentrate	Class A concentrate included with system for training/testing or on-mission use.
Operator Manual/P/N 55101516-V301	1 copy provided per system	Verify presence – Read and Heed all instructions.

Table 4.1.1 Standard equipment shipped with the VIPER, (continued)

4.2 Optional Items

These items will be present only if procured at the time of system purchase. Check the terms of your purchase agreement to determine if these items are to be included.

Name/Nomenclature, Quantity and Part Number	Description	Action
1 each, Fan Spray Nozzle PN 46191603-V924	Fan spray nozzle for applying a uniform blanket of foam. See Section 3, Paragraph 3.8.2 for a description of the nozzle	Verify presence/inspect for any obvious physical defects. Install on handset and remove to verify quick coupling is working properly

Table 4.2.1 Optional Items

Name/Nomenclature, Quantity and Part Number	Description	Action
1 each, Mid-X Nozzle PN 46191603-V921	Mid-X nozzle for dispensing a thick layer of foam. See Section 3, Paragraph 3.8.3 for a description of the nozzle	Verify presence/inspect for any obvious physical defects. Install on handset and remove to verify quick coupling is working properly
1 each, Seal Kit PN 31181606-V500	The seal kit includes replacement O-rings for the VIPER. See figure 4.3.1 below	Small package contains O-rings and Teflon (thread) tape. Store in a safe place to prevent loss.

Table 4.2.1 Optional Items (continued)

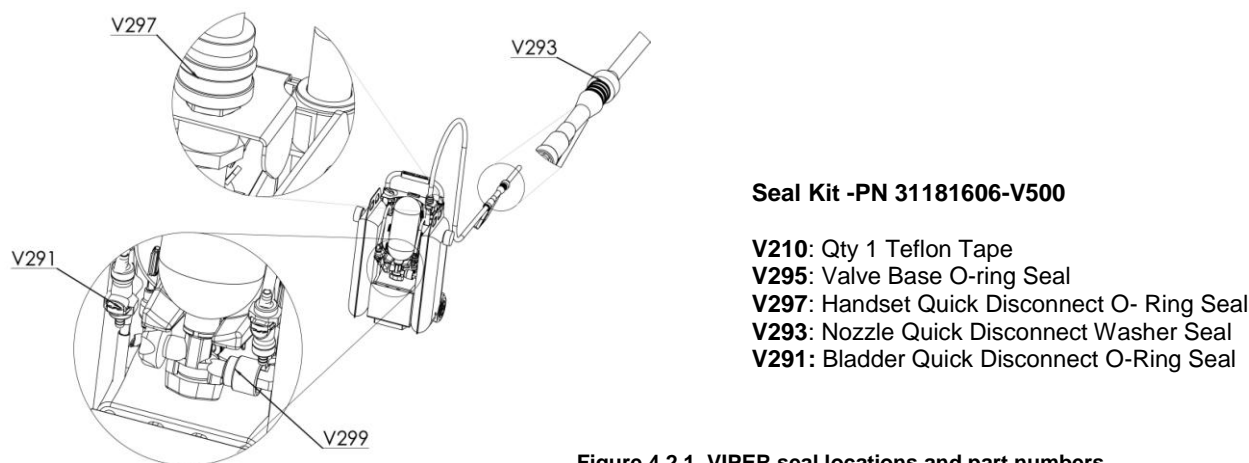


Figure 4.2.1 VIPER seal locations and part numbers

4.3 Prepare for Use – Configure the VIPER for Operation

NOTE: Prior to first use of the VIPER system it will be necessary to have the air cylinder charged by authorized personnel unless your purchase agreement stipulated that cylinders were to be shipped full. Note the pressure gauge on the air cylinder valve (CGA valves only). Verify the cylinder is not charged by observing the pressure gauge, which should read zero (0-psi). When transporting full cylinders from the fill center it is imperative that the charged cylinders be secured to prevent movement during transport. **ENSURE** your cylinders are charged with filtered, breathing quality air – not industrial air. See Section 6, paragraph 6.2 for additional information on cylinder charging. **NOTE:** It is advisable to position the VIPER on a table, tailgate or other elevated surface to make it easier to don the unit once it is filled with fluid. Ensure the surface you place the system on is capable of supporting the VIPER's weight when full.

4.3.1 Open the system. For configuring your VIPER for use, it will be easiest to place the unit on a table. Undo the buckle that holds the outer case flaps closed, and open the system, exposing the bladder pockets, connectors, and the high pressure CGA connection.

(4.3 - Prepare for Use, Continued)

4.3.2 Install Charged Air Cylinder. Place the cylinder in the cylinder recess of the VIPER body – ensure the high-pressure air connection on the valve is facing the systems high-pressure air line connection. Before connecting the air line clip the cylinder retention strap around the neck of the cylinder and cinch the strap down so it is tight. Ensure the cylinder is resting securely in the cylinder mount!



WARNING: Air cylinders are under high-pressure and must be treated with respect and caution! DO NOT attempt to use the VIPER system until you have taken the time to review the Warnings and Cautions in this manual – read the manual completely!

4.3.3 Connect the Cylinder to the VIPER Unit. After the air cylinder is strapped into the cylinder rest the high pressure air connection (see figure 4.4.1, below) can be connected to the air cylinder. Mate the connector to the cylinder threads – **watch for cross threading!** Tighten the connection hand-tight, until it is snug. **DO NOT** turn the air cylinder on at this time!

4.3.4 Fill and Install Fluid Bladders.

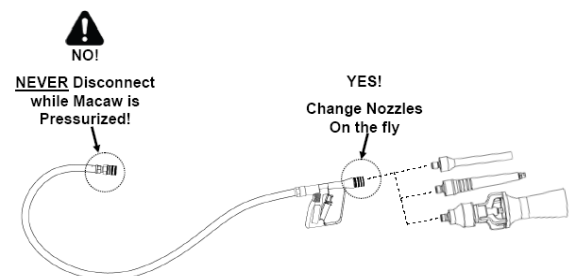
Step 1. Remove the bladders from the VIPER and dispose of any contents in the bladders. Rinse the bladders thoroughly, and fill with the fluid of your choice, generally a fire suppression foam mixture or decontamination formulation – always add water first, concentrate second.

Step 2. Replace the caps on the bladders, and insert them into the pockets on the wings of the VIPER skin, making sure that the quick disconnects are paired properly.

Step 3. Attach the bladder quick disconnects, listening for an audible click that occurs when a positive seal is made. Remember to connect both bladders.

Operators and maintainers need to be cognizant of the fact that the liquid storage bladders are **not** pressure vessels. Once the air is turned on the closed plumbing of the system is pressurized, not the bladders. This design allows operators to disconnect and change bladders on the fly.

4.3.5 Attach Handset Hose. Connect the handset hose to the discharge port on the VIPER body (on top of the unit, by carry handle). Pull the quick connect on the discharge hose back, mate it to the discharge port and release the quick connect. Verify that a good connection has been made by lightly pulling on the handset hose. If necessary attach the nozzle to the handset in the same way the discharge hose was connected. Lightly tug on the nozzle to verify the connection is complete.



(4.3 - Prepare for Use, Continued)



WARNING! Before turning the air supply on ensure the handset hose is correctly attached to the VIPER's discharge port. Also verify that the handset trigger **IS NOT** locked in the down (on) position. Pressurizing the system with the handset trigger locked down will result in foam discharge as soon as the air is turned on

4.3.6 Unlock Handset Trigger. Press down on trigger lock.

4.3.7 Open Air Cylinder. Push valve knob and **SLOWLY** turn it counterclockwise to stop. Ensure air cylinder is fully opened.



CAUTION! It is NOT recommended to turn the air supply on and then leave the system dormant. Leave the air off until system use is imminent.

4.3.8 Close VIPER Body Flaps and Secure.

4.3.9 Squeeze Handset Trigger To Release Any Trapped Air.

4.3.10 Adjust Air Control Valve. The air control valve is located over the wearers left shoulder, next to the carry handle. Typically a good starting setting is midway between the dry and wet settings.

NOTE: As the VIPER is an emergency response fluid pumping system Intelagard strongly recommends that the system be inspected and tested every 30 days. It is recommended that operators affix a label to the VIPER system or use a grease pencil to annotate the date the concentrate

When preparing to use a VIPER system that has been filled with water and concentrate solution and then left dormant ALWAYS perform this additional step before conducting spray operations:

Grasp the VIPER by the handle and shake the VIPER for 3-5 seconds. Performing this step helps to ensure that the concentrate is dispersed within the water. Failure to perform this step could have a direct impact on the quality of the foam produced and system performance!



WARNING! Once the air supply knob is turned on the unit is pressurized! It is very important that operators inspect all couplings and attachments before pressurizing the system to avoid system damage and possible injury to personnel. Always treat the VIPER as though it is pressurized – if unsure point the nozzle in a safe direction and activate the handset. If foam discharges verify the air supply is turned off. If the air is turned off yet the system still discharges a small volume of foam this means the trapped pressure was not released from the system after the air supply was turned off – this is a very important procedural step.

4.4 Operating the VIPER

Provided the VIPER has been properly inspected and configured it is now ready for use. Perform the following steps to apply foam with the VIPER:

STEP 1. If you have not done so already, turn the cylinder air supply on by **slowly** turning the air On/Off valve counter-clockwise – it is not necessary to push in to turn the air on. When the air is turned on you will hear the pump ‘chug’ briefly as air enters the lines. At this time listen for a ‘hissing’ indicating a possible leak at a connection. If escaping air is heard immediately turn the air off, bleed the pressure from the system by activating the handset and then trouble shoot the system.

If the system is ready to go and spray operations are imminent, grasp the VIPER by the handle on top of the system and shake slightly for two to three seconds. This helps ensure the concentrate is mixed in the bladders.

STEP 2. Don the pack, or extend the handle and roll. Secure the handset, point in a safe direction and activate the handset trigger briefly to charge the system – you will hear the pump cycle.

- If necessary make adjustments to the “Wet/Dry setting.
- The VIPER is now charged and capable of producing foam on demand by activating the handset trigger.

4.5 Air Control (Foam Expansion) Settings and Adjustment.

Operators will, through training and regular use, become familiar with the qualities and virtues of expanded foams versus unexpanded liquids. The air control dial on the top of the system is used to control the amount of air injected into the concentrate solution, therefore the expansion of the foam. Every fire (challenge) is unique, so there is no one single setting that will be optimum for each challenge.

Using the air control dial on the system the operator can adjust the foam expansion ratio on the fly while performing spray operations.

Turning the dial to the full ‘Wetter Foam’ setting (up) will result in minimal expansion of the concentrate. At full wet the system will dispense a watery solution with traces of concentrate visible in the stream. The ‘wetter’ the setting the faster the on-board liquid resources are exhausted and the longer the air supply will last.

Turning the dial fully (down) to the ‘Dryer Foam’ setting will inject maximum air into the solution stream thus creating highly expanded (up to ~35:1) foam. In this state the foam will have a consistency similar to shaving cream. A dry foam setting consumes air faster while using less fluid.

The VIPER system will expand concentrates to up to ~35-times their original liquid volume simply by adjusting the air control valve. With the optional Mid-X nozzle, which is an air aspirating nozzle, expansion ratios of up to ~70:1 are achievable.

During initial training operators should adjust the air control setting to observe and familiarize with adjusting the foam expansion ratio.

4.6 Refilling Operations

4.6.1 Fluid Depletion/Refill Operation. When the VIPER liquid bladders are nearly empty there will be a noticeable degradation of foam stream quality, likely accompanied by irregular/intermittent foam discharge and pump ‘sputtering’. If the fluid bladders are completely empty the pump will cycle (chug) until the air is turned off. The operator must back out to a safe area, and remove the VIPER to replenish the fluid bladders. Liquid depletion rates will vary significantly based upon the air control valve (foam expansion) setting. ‘Dry’ foam will use more air less fluid and ‘wet’ foam will use more fluid, less air to create. To refill the VIPER’s liquid storage bladders, perform the following procedures:

STEP 1. Open the VIPER skin, and disconnect the bladder quick disconnect fittings. The fluid in the VIPER bladders is never under pressure – there is no need to turn off the air supply at this time unless the air cylinder will be exchanged.

STEP 2. Remove and refill bladders, or replace with previously filled and staged bladders. If refilling with water and concentrate, add the water to the bladders first.

NOTE: There will be residual concentrate remaining in the bladders that will foam during the refill operation – the faster the water is added (the greater the water pressure) the more this will occur. This is a harmless effect of adding water into a bladder with residual concentrate in it. Operators should wipe away the foam that emerges from the bladder and continue to fill the bladder until it is full.

STEP 3. Replace the caps on the bladders, and give them a good shake for 2-3 seconds before reinstalling them in the VIPER.

STEP 4. If necessary exchange the air cylinder (see Section 4.6.2, below).

STEP 5. If air supply is adequate, continue the mission.

4.6.2 Air Depletion/Cylinder Exchange. Air depletion will vary significantly based upon the air control valve (foam expansion) setting. ‘Dry’ foam uses more air to expand the foam, where as ‘Wet’ foam uses less air.

STEP 1. Back out to a safe distance from the hazard. Open the VIPER skin, and gain access to the air supply valve.

STEP 2. Turn the air supply (‘On/Off’ knob) to the ‘Off’ position by rotating the knob clockwise (you may have to push the knob in before rotating on some cylinder valves). This turns the air supply off – **NOTE:** The system has air trapped in the lines – after turning the air supply off you **must point the nozzle in a safe direction and activate the handset to release the trapped air**. Failure to do so before attempting to disconnect the air cylinder can result in system damage.

STEP 3. Detach the air cylinder by unscrewing the high-pressure connection – as this connection is hand tight it should unscrew very easily – remember, it was tightened only

(4.6 - Refilling Instructions, Continued)

until snug – if resistance to detaching seems too high the system is likely still pressurized! If the system is depressurized remove the high-pressure connection and unsnap the cylinder retention strap.



CAUTION! If the high-pressure connection does not turn easily the air is likely not turned off, or is not turned off fully! Make sure the air supply is turned completely off and repeat the operation to release the trapped air by activating the handset. Disconnecting the cylinder with the air on will result in a very energetic discharge of air – injury could result and the high-pressure connection o-ring will be blown .

STEP 4. Exchange the air cylinder. Snap the cylinder retention strap around the cylinder. Connect the high-pressure fitting to the air cylinder. **WATCH FOR CROSS THREADING!**

STEP 5. IMPORTANT! Verify the handset trigger is not locked in the down/on position. Slowly pressurize the system by turning the On/Off valve counter-clockwise – it is not necessary to push the valve in to turn the air supply on. Listen for pressure entering the system – also listen carefully for the ‘hiss’ of escaping air that may indicate an air leak. If there are no air leaks check fluid levels and continue the mission. If air can be heard escaping from the system immediately turn the air off, activate the handset to release trapped pressure and trouble shoot.

4.7 System Shut Down.

Once the mission is complete perform the steps outlined below to shut-down the VIPER system.

STEP 1. Turn the air supply off by pushing in on the valve and turning in a clockwise direction.

STEP 2. Bleed the system of any trapped air by pointing the handset in a safe direction and squeezing the handset trigger. Hold the trigger in the on position until all air has been relieved from the lines.

STEP 3. If the system is to be stored during cold temperatures (near freezing and below) the fluid bladders must be drained and filled with winterizing solution or freeze-proof fire foam solution. See paragraph 4.11 for additional information.

STEP 4. If the cylinder is to be removed for recharging disconnect the high-pressure line and remove the cylinder.

STEP 5. If the system is to be stored for a long period of time or a different liquid solution is to be used for the next operation it is strongly recommended that a minimum of two gallons (one gallon per bladder) of pure, clean water be cycled through the system to purge the internals of any remaining residue. Doing so will ensure trapped solution does not clog the fluid lines of the system.

4.8 Storage Options

4.8.1 Storage in a Ready State. The VIPER system can be stored full of water and Class A or AFFF fire foam concentrate as long as the unit is protected from freezing (not AR-AFFF). The solution in the VIPER (water + AFFF concentrate) will freeze at or about 28 degrees Fahrenheit. If freezing temperatures are likely but there is a need to maintain the VIPER system in a ready state (full of fluid) it is advisable that the owner procure freeze-protected foam concentrate from one of the many concentrate manufacturers. Intelagard has conducted extensive research on the various foam concentrates available – they are not all created equal! Contact Intelagard for our recommendations.

To place the VIPER in a ready state, after shutdown replenish the air supply and refill the fluid bladders. If you will be storing the VIPER with a different concentrate than what was last sprayed it is advisable to rinse the VIPER bladders out and cycle 1-2 gallons of clean water through the system.

Once the VIPER's consumables have been replenished the system is ready for stand-by. DO NOT turn on the air supply until it is time to conduct a spray mission. Energizing the system places the fluid in the lines under pressure – protracted inactivity with a pressurized system unnecessarily taxes the systems components and creates a dangerous condition in that someone that does not know the unit is energized may activate the handset or disconnect the discharge hose.



WARNING! Disconnecting the discharge hose from a VIPER that is pressurized will result in an energetic discharge of fluid from the hose connector on top of the unit. ALWAYS make sure the air supply is off and the system is bled of any trapped pressure before disconnecting the handset!

Important: Never attempt to disconnect a handset from the VIPER while the cylinder valve is open or the system is pressurized. Always relieve pressure by squeezing the handset valve before breaking this connection!

The VIPER system can be stored with a water/Class A or water/AFFF concentrate mixture (solution) in the fluid storage bladders for up to 180 days. The concentrate will retain the capability to effectively extinguish fires for a minimum of 180 days (6 months). Do NOT store the VIPER with AR-AFFF in the bladders. AR-AFFF will break down and become ineffective over the course of a day.

4.8.2 Short-to-Long Term Storage/Inactivity (Non-Ready State). A system that is being shut-down for short-term storage and does not need to be maintained in a ready state should have a minimum of two gallons (one gallon per bladder) of clean water cycled through it prior to storage. Performing this 'flushing operation' will clean the fluid lines and prevent trapped materials from possibly clogging the lines. After the system is flushed it should be emptied completely and stored in a freeze protected environment. Note – if there is still small amounts of fluid in the system owners must be aware that disconnecting the handset hose will allow fluid to slowly 'weep' from the discharge port. This is normal and does not indicate a maintenance issue.

4.9 Freeze Protecting the VIPER

There are two possibilities to consider when storing the VIPER under conditions where the unit may be subjected to freezing temperatures:

4.9.1 Empty (Non-Ready State). In order to prepare the unit for storage under cold weather conditions you must remove as much water as possible from the bladders and lines. After flushing the system with water to rinse the lines out adjust the air control to 'full dry' and activate the handset to force trapped fluid from the lines. When all of the fluid has been evacuated from the system turn the air supply off, release the trapped air pressure by activating the handset. Add two gallons of a propylene glycol anti-freeze solution to the bladders.

Reconnect the air supply, energize the system and discharge a small amount of the anti-freeze solution into an approved container. Turn the air supply off, release the trapped pressure and store the VIPER. The unit should then be marked in accordance with local procedures to indicate the system is winterized.

4.9.2 Full (Ready State). Owners may have a need to maintain the VIPER in a ready-to-use state during cold weather. It is recommended that a VIPER in ready (full) state be stored in a temperature controlled area to prevent freezing.

SECTION 5 – PREVENTIVE MAINTENANCE CHECKS

5.0 General

The VIPER system is designed to be easy to maintain and use. Periodic inspection of the system will help to ensure it remains in good working order. Due to the risks associated with working high-pressure systems Intelagard does not recommend that untrained/uncertified personnel attempt to repair the high pressure componentry of the system.

DO NOT attempt to access the Pump Housing area of your VIPER – doing so WILL void your warranty!

Intelagard is committed to supporting our customers with prompt, professional service. If you are experiencing a problem with your system that you cannot correct you are encouraged to contact us by phone or throughout web site. Please refer to page 5 for complete contact information.

The checks prescribed herein state the recommended frequency in the “interval” column:

- **BEFORE:** Inspect this item before placing the system into operation
- **DURING:** While using the system operators should monitor the specified components for correct operation and/or serviceability
- **AFTER:** After you have used the VIPER system these checks/procedures must be performed to ensure your system is ready for the next use and remains in good working order.
- **MONTHLY:** Perform these checks once per month minimum

The last column, ‘Not Fully Mission Capable If’ details conditions that will render the system unusable, or useable with degraded performance

Item No	Interval	Item for Inspection	Procedure	Not Mission Capable If
1	Before After Monthly	VIPER Unit Physical Inspection	Conduct a thorough physical inspection of the entire unit – look for obvious damage that will impair safe/effective operation	Missing components; structure damage to bladders, frame, or air cylinder; air or fluid leaks
2	Before After	Air Cylinder	Verify the air cylinder is charged by checking the pressure gauge on the cylinder neck	Cylinder not charged
3	Before After	Air Cylinder	Inspect the threads of the air cylinder and the threads of the high-pressure fitting on the VIPER – ensure they are clean and undamaged	Threads dirty or damaged. If damaged have the cylinder inspected at your filling station

Table 5.01. – VIPER PMCS

Item No	Interval	Item for Inspection	Procedure	Not Mission Capable If
4	Before After Monthly	High Pressure Line & Cylinder Connection	<p>Inspect the high pressure connection that mates to the cylinder valve. Note the presence and condition of the O-ring – see Figure 5.0.1, below</p> <p>Inspect the cylinder retention strap for cuts, dry rot, or missing/damaged buckle</p> <p>Inspect the high pressure line of the system – look for obvious conditions that could result in air leaks</p>	<p>O-ring missing or damaged. System will leak air. Replace O-ring before attempting to operate</p> <p>Cylinder retention strap unusable</p> <p>High pressure line damaged/leaking</p>

Table 5.01. – VIPER PMCS

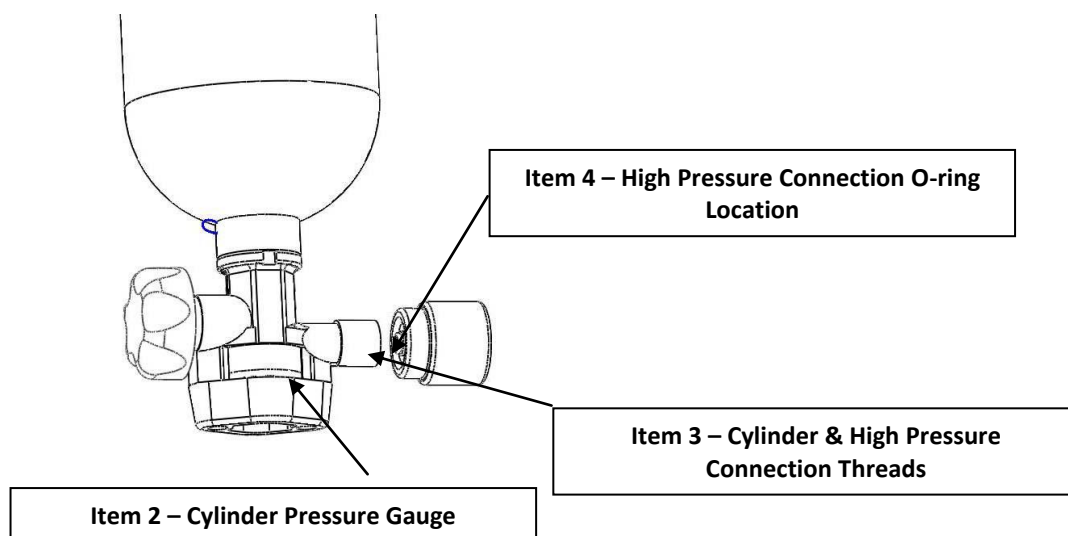


Figure 5.0.1 – High Pressure Connection


Item No	Interval	Item for Inspection	Procedure	Not Mission Capable If
5	Before After	System Quick-Connects: Discharge Hose to VIPER Connector & Discharge Handset to Nozzle Connectors	<ul style="list-style-type: none"> Visually inspect inside cavity for dirt or debris. Clean as necessary Visually inspect the 'check balls' by looking inside the fitting cavity. Ensure that there are no missing check balls. Visually inspect the o-ring inside the fitting cavity for any obvious nicks or cuts. Ensure spring collar slides back and forth freely and returns to a forward position under spring pressure when released. Connect the handset to the VIPER. Ensure that the spring collar returns completely forward. Pull <u>lightly</u> outward on the handset hose to ensure a firm connection. Connect the nozzle to the handset – ensure the spring collar returns to a forward position thus locking the nozzle in place 	<p>Handset or nozzle connections dirty – clean before use</p> <p>Connectors do not lock in place – clean thoroughly</p> <p>Ball bearings missing – could result in a poor connection and disconnecting during operations while under pressure – replace component</p> 

Table 5.01. – VIPER PMCS (continued)



Item No	Interval	Item for Inspection	Procedure	Not Mission Capable If
6	Before Monthly	Discharge Hose	<p>Look for any swollen sections of hose along the entire length of the VIPER® Handset hose. If a swollen section is found, remove hose from service and replace.</p> <p>Bend the handset hose and examine closely - check for cracking, nicks, and abrasions.</p> <p>While bending the hose listen for popping or cracking noises - noise indicates aged reinforcement ply within the hose, or dry rot</p>	<p>Integrity of the discharge hose is compromised by cuts or tears – replace</p> 
7	Before After Monthly	Handset	<p>Inspect the handset for any obvious physical damage.</p> <p>The handset has glass-reinforced injection molded housing with a spring return cartridge valve attached internally to the trigger.</p> <p>It is important to routinely inspect this gun for:</p> <ul style="list-style-type: none"> • Cracks and damage to the outer housing. • Free movement (without binding) of the trigger and trigger-lock mechanisms. • Signs of leakage around the connecting ends or component seams. 	<p>Handset trigger fails to return to the off position when released – ensure that you are not locking it into place by squeezing the lower portion of the trigger.</p> <p>Cracks in the fluid carrying portion of the handset</p> <p>Missing hardware</p> <p>Handset does not securely lock the discharge nozzle into place – exchange nozzles to determine if the handset or nozzle is at fault</p> 

Table 5.01. – VIPER PMCS (continued)

Item No	Interval	Item for Inspection	Procedure	Not Mission Capable If
7	Before During After Monthly	Seal Location	<p>Inspect all air and fluid line connections of your VIPER unit</p> <p>Before, during, and after operation be observant – note any air or fluid leaks from any airline or fluid line connections</p> <p>See Figure 4.3.1, page 32 for all seal locations</p>	<p>Systems with air leaks must be shut down for safety.</p> <p>Attempt to trouble shoot – users ARE NOT authorized to attempt to repair high pressure components without training and certification from authorized Intelagard personnel</p>

Table 5.01. – VIPER PMCS (continued)

5.1 Periodic Maintenance Checks

Item No	Interval	Item for Inspection	Procedure	Not Mission Capable If
P-1	Monthly	System	<p>Intelagard <u>strongly</u> recommends periodically cycling the fluid through your system or exchanging the fluid as part of a routine maintenance/training program – this is an emergency response fluid pumping system – leaving the system unchecked for prolonged periods of time increases risk!</p> <p>NOTE: If the system is to be stored where temperatures can drop below 32 degrees F you must taken action to prevent freezing – see Section 4, paragraph 4.11</p>	System has not been activated and tested within the last six months.
P-2	Every 5 years	Cylinder	Have cylinder hydrostatically tested	Cylinders fails certification

Table 5.1 – Periodic Maintenance Checks

SECTION 6 – TROUBLESHOOTING

Refer to the following chart if you have any problems with the operation of your system.

PROBLEM	SOLUTION
System does not function when air cylinder is opened and trigger is squeezed.	Check cylinder air pressure. Replace with a full air cylinder.
System operates, but produces only water or non-expanded foam solution.	Check air valve setting on right side of unit. Open valve fully. If open, check for foam in the water, and for quality of foam.
Unit produces good quality foam at first, but quality deteriorates as tank empties.	Mix foam concentrate into water more thoroughly.
Pump slows down during continuous use in cold environments.	System components may be icing. Warm the unit for a few minutes, and keep it warm prior to use.
When air cylinder is opened, pump cycles continuously and will not prime.	Briefly squeeze handset trigger to allow trapped air to escape so pump can prime.
After use, pump cycles continuously regardless of handset trigger being off	Fluid bladders are empty. Shut off air cylinder valve, bleed pressure, and refill.

If you experience any additional problems with the operation of your system, call Intelagard Customer Support at 800-468-6090, or 303-309-6309.

SECTION 7 – SUPPORTING INFORMATION

7.0 General

This section provides additional information on operating the VIPER with a low-pressure air source as well as general information regarding cylinder recharging.

Section 6 contents:

- 7.1 – Using the VIPER with a Low Pressure Air Source (Compressor)
- 7.2 – About Air Cylinder Recharging
- 7.3 – Using the VIPER with EasyDECON® DF200
- 7.4 – Cylinder Compatibility Information

7.1 Using the VIPER with a Low Pressure Air Source

The VIPER is capable of using air from an air compressor as an alternate air energy source, in lieu of using a high pressure air cylinder. The VIPER is equipped with an air compressor port connection inside the skin, behind the CGA connection. The port is designed to accept an industrial standard ¼" (inch) air quick-connect fitting on a standard air hose. Air hose lengths up to 100-feet (30.5-m) have been used effectively.

To effectively power the VIPER without any noticeable change in performance of the system (when compared to using high-pressure) a compressor must be capable of providing a minimum of 12-CFM of air at 100-110 PSI.

It should be noted that compressors capable of providing less than 12-CFM at 100-PSI are capable of powering the VIPER - although at reduced performance levels. VIPER owners desiring to use the VIPER with a low-pressure air system (compressor) can safely test the VIPER with their compressor system to determine performance - however ensure that air input pressure never exceeds 110-PSI – doing so overtaxes the pump and airlines and will cause system damage.



CAUTION!

Air compressor input pressure must never exceed 110-PSI – System damage can occur and the warranty shall be rendered void.

To use the VIPER with an air compressor perform the following steps:

STEP 1. Remove and safely store the air cylinder – using an air compressor to provide air means the air cylinder will not be used.

STEP 2. Perform before operation maintenance checks as prescribed in Section 5.

(7.1 - Using the VIPER With a Low Pressure Air Source, Continued)

STEP 3. On completion of the maintenance checks prepare the VIPER for operations – fill bladders with solution, connect handset hose, adjust air control valve.

NOTE: Do not connect air hose at this time. Air compressors provide a continuous stream of air - once the air hose is connected the system will be energized.

STEP 4. Adjust the air compressor to provide optimum air flow. 100 to 110-PSI at 12-CFM is optimum. Exceeding air input pressure of 110-PSI will result in system damage. Start the air compressor and allow the air tank to fill completely.

STEP 5. Verify the handset **IS NOT** locked down – once the air line is connected the system will be energized. After verifying the handset is not locked down, connect the airline.

STEP 6. Begin spray operations.

NOTE: Setting the VIPER to dispense 'dry' (highly expanded) foam consumes more air – the higher the expansion setting the greater the demand on the air compressor. If you are having problems with the compressor air supply being inadequate to sustain performance there are several possible causes:

- Air compressor was not allowed to fully charge (fill) before beginning spray operations
- Air compressor under-rated
- The air compressors air reservoir is too small

If your compressor is not keeping up with the air demand during spray operations:

- Adjust air control valve to 'wetter' setting – this will decrease air consumption.
- Remedy 2: Spray in short bursts rather than continuous streams.

7.2 About Air Cylinder Recharging

In the independent mode of operation the VIPER back utilizes a ~17 cu. ft. ,4500-psi carbon fiber wrapped emergency air cylinder equipped with a CGA equipped valve (standard) or DIN valve (optional). Any facility with the ability to recharge SCBA cylinders with filtered, breathing quality air will have the ability to recharge the air cylinders. VIPER users that do not have a high-pressure refill capability are encouraged to contact their local fire department. Professional fire fighters use SCBA breathing air systems in the performance of their duties therefore will often have the ability to recharge the VIPER's air cylinders or refer you to a filling location.

Standard air compressors, such as those present in many garages and maintenance facilities are low-pressure systems –they DO NOT have the ability to generate the pressure necessary to recharge the VIPER's air cylinder.

(7.2 - About Air Cylinder Recharging, Continued)

ALL VIPER users must be aware of the hydrostatic test requirements for high pressure cylinders. Additional information on cylinder safety as it applies to recharging operations is provided below.

7.2.1 Hydrostatic Testing. These air cylinders are reusable items provided they have been hydrostatically tested and passed within the last five years. Note the last test date which is annotated on the cylinder data plate. Do not use cylinders that have not been inspected within the last five years.

7.2.2 Cylinder Safety Ratings and Features. Per United States DOT regulations Intelagard's air cylinders are manufactured and certified to with a factor of 3.33 times the operating pressure of the cylinder. In accordance with this standard Intelagard cylinders are rated for operating pressure of 4500-PSI, therefore they are certified to be capable of withstanding up to 14,985-PSI.

The valve of the air cylinder incorporates a burst disk. This disk is a built in safety feature. In the event a cylinder's internal pressure should exceed 6750-PSI the burst disk is designed to rupture and release the air from the cylinder in a controlled manner. The burst disk is a safety feature designed to prevent the over-charging of air cylinders

7.2.3 Intelagard does not manufacture high pressure compressor systems suitable for cylinder recharging operations. Due to our smaller systems reliance on high pressure air cylinders for air energy we have a good deal of experience and insight into the available high pressure recharging systems that are commercially available. If you have questions on recharging systems/stations please contact Intelagard.

7.3 VIPER Decontaminant/Disinfectant Application Capability

The VIPER is capable of employing decontaminating foams as well as fire fighting foams. Intelagard recommends the use of EasyDECON® DF200 for decontaminating chemical and biological agents as well as conducting disinfecting operations and or/mold remediation activities. EasyDECON® DF200 was developed by Sandia National Laboratory and has been licensed by Intelagard subsidiary EFT (EnviroFoam Technologies). Please contact Intelagard for additional information on EasyDECON® DF200.

7.4 Cylinder Compatibility Information

Intelagard provides a carbon fiber wrapped cylinder that incorporates the added safety features of a burst disk in the valve and carbon fiber wrapping. It is understood many of our clients may already have cylinders that they wish to use with the VIPER system. Herein please find the essential cylinder compatibility information.

7.4.1 Third party manufactured cylinders that are to be used with the VIPER must be compliant with DOT, CGA, DIN or CE certified. Look for this information on the data plate.

(7.4 - Cylinder Compatibility Information, Continued)

7.4.2 For cylinders to fit safely and securely into the VIPER they must be between 5.5 and 7 inches in diameter (13.9 – 17.8 cm) and less than 16-inches in length. Longer cylinders can be accommodated when being used in cart mode.

7.4.3 Cylinder pressure ratings must be 2216, 3000, 4350 or 4500-PSI, or between 150 to 310-BAR.

7.4.4 If so equipped, the cylinder valve gauge should match the cylinder service pressure – always check the cylinder labeling before filling.

7.4.5 Cylinders that have been filled with industrial air (non-breathing quality air) are not to be used for breathing air use!

If in doubt about cylinder compatibility contact Intelagard.



Figure 7.4.1 – Example of the types of valve assemblies available – CDIN on the left, CGA (standard) on the right

SECTION 8 – FREQUENTLY ASKED QUESTIONS

Q: Where can I get my cylinder filled/refilled?

A: Many fire departments use breathing air, therefore have, or have access to a recharging system.

Q: What can I spray with my VIPER?

A: Fire foam solutions, protein foams, decontaminating foams and many others. Contact Intelagard if you have specific questions.

Q: Can I use my VIPER air cylinder for other applications?

A: NO – this cylinder is made for use with Intelagard products – using it with other systems could void your warranty and endanger you and/or others.

Q: How do I protect my VIPER from freezing?

A: See section 4.10 of this manual. If you have concentrate/freezing questions please contact Intelagard.

Q: If I have a warranty claim who do I contact for resolution?

A: The supplier who sold the VIPER to you. Intelagard's contact data is provided on page 9 of this manual.

Q: Where can I learn more about EasyDECON® DF200?

A: www.intelagard.com

Q: Can I use an air compressor to provide air energy instead of the air cylinder?

A: Yes – see section 6.1 of this manual.

Q: Can my personal air compressor charge my high pressure air cylinder?

A: No – a standard air compressor cannot be used to charge high-pressure air cylinders – this requires a specialized compressor.

Q: Does the VIPER have a National Stock Number?

A: Not as of the printing of this manual.

Q: Can I ship my air cylinders full of air?

A: Yes, but this will require hazardous material certification and placards.

Q: When I disconnect the handset my VIPER leaks from the discharge port – is it broken?

A: NO – this is a function of the design – A VIPER stored full must have the handset attached.

SECTION 9 – REPAIR PARTS, REPLACEMENTS & CONSUMABLES

9.0. Repair Parts, Replacements, Consumables & Optional Items

The VIPER unit is designed to be rugged, and easy to use and maintain. In the unlikely event that your VIPER unit breaks or is damaged through routine use Intelagard offers a 1-year warranty – see page 14 for terms. If the damaged unit is out of warranty or the component is not covered please contact Intelagard for replacement parts and/or instructions.

9.1 VIPER Systems

Part #	Description	Note
46191601-V301	VIPER (w/o cylinder) Includes: Black skin; (2) 1 gallon bladders; air compressor port; 5-foot long handset hose, with handset and standard 9.5mm smoothbore nozzle; 2-each 8-oz containers of Class A foam (sample – for training/testing); Operators Manual	Options available are addressed in the options section of this worksheet.
46191601-V303	VIPER (w/o cylinder) Includes: Black skin; (2) 1.5 gallon bladders; air compressor port; 5-foot long handset hose, with handset and standard 9.5mm smoothbore nozzle; 2-each 8-oz containers of Class A foam (sample – for training/testing); Operators Manual	Options available are addressed in the options section of this worksheet.
46191601-V302	VIPER (w/o cylinder) Includes Black skin; (2) 2 Gallon bladders; air compressor port; 5-foot long handset hose, with handset and standard 9.5mm smoothbore nozzle; 2-each 8-oz containers of Class A foam (sample – for training/testing); Operators Manual	Options available are addressed in the options section of this worksheet.
46191601-V311	VIPER (w/cylinder) Includes: 17 cu ft. 4500-psi carbon fiber wrapped air cylinder (CGA Fitting). Black skin; (2) 1 Gallon bladders; air compressor port; 5-foot long handset hose, with handset and standard 9.5mm smoothbore nozzle; 2-each 8-oz containers of Class A foam (sample – for training/testing); Operators Manual	Options available are addressed in the options section of this worksheet.
46191601-V313	VIPER (w/cylinder) Includes: 17 cu ft. 4500-psi carbon fiber wrapped air cylinder (CGA Fitting). Black skin; (2) 1.5 Gallon bladders; air compressor port; 5-foot long handset hose, with handset and standard 9.5mm smoothbore nozzle; 2-each 8-oz containers of Class A foam (sample – for training/testing); Operators Manual	Options available are addressed in the options section of this worksheet.

Part #	Description	Note
46191601-V312	VIPER (w/cylinder) Includes: 17 cu. ft. 4500-psi carbon fiber wrapped air cylinder (CGA Fitting). Black skin; (2) 2 Gallon bladders; air compressor port; 5-foot long handset hose, with handset and standard 9.5mm smoothbore nozzle; 2-each 8-oz containers of Class A foam (sample – for training/testing); Operators Manual	Options available are addressed in the options section of this worksheet.

9.2 VIPER Spares/Repairs

Part #	System Description	Note
PN 46191603-V933	Handset & Hose Assembly, 5-feet in length, ½" ID	Stock unit replacement. Handset & hose, pre-assembled – <u>Does not</u> include nozzle
PN 31181606-V500	Seal Kit	Kit includes : <ul style="list-style-type: none"> • Roll, Teflon Tape Plus 2 ea: <ul style="list-style-type: none"> • Valve connection O-rings • Valve base O-rings • Handset Q-disconnect o-rings • Nozzle Q-disconnect washer
PN 46191603-V901	Smoothbore, general purpose nozzle, 9.5mm	Standard unit replacement. Provides maximum foam throw distance.

Note:

Attempts to repair, replace or adjust high-pressure components will void the warranty on the unit and expose operators to potential danger. Please DO NOT attempt to repair or replace any high-pressure sub-systems or components without express authorization from Intelagard!

9.3 VIPER Optional Accessories/Replacement Parts

Part #	Description	Note
46182004-V800	17 cu. ft. 4350/4500-psi Carbon Fiber Wrapped Air Cylinder, with preinstalled valve	Recommend minimum 1 per VIPER
46191603-V969	Basic Nozzle Kit Noun: ASSORTMENT, C-2 NOZZLE KIT, Includes MID-X, Fan, and 9.5mm smooth bore	Provides the ability to apply foam in the manner most suitable for the mission and desired end-state.
46191603-V922	Piercing Nozzle	Designed to 'push' foam into a structure or vehicle through a small breach
46191603-V935	10-foot Handset Hose, with connectors; ASSEMBLY, HANDSET HOSE, TRIGGER ACTION VALVE, 1/2" ID X 10' L; w/Class 2 connectivity	Provides increased operational range for the spray operator
40142002-V670	100-foot Air Compressor Hose Noun: ASSEMBLY, CLASS 2/3 UMBILICAL AIR HOSE, MALE INDUSTRIAL INTERCHANGE (ALL) X 100 ft L; W/Class 2 & 3 connectivity	As above, but significantly increases operational range

9.4 VIPER Consumables

FIRE

Part #	System Description	Notes
46191606-V838	Class-A Foam Concentrate Phos-Chek WD881 Case, 24-each 8-oz containers	Class A is used for structure fires – wood, paper, etc. Class A is also suitable for training/familiarization with the VIPER unit.
46191606-V841	Class-A Foam Concentrate Phos-Chek WD881 Pail, 5-gallon	Class A is used for structure fires – wood, paper, etc. Class A is also suitable for training/familiarization with the VIPER unit.
46191606-V840	AFFF Foam Concentrate Chemguard Case, 12-each 20-oz containers	AFFF is used for vehicle, fuel and rubber fires.
46191606-V842	AFFF Foam Concentrate Chemguard Pail, 5-gallons	AFFF is used for vehicle, fuel and rubber fires.

9.5 Decontamination/Training

Part #	System Description	Note
200-1533	EasyDECON DF200 Training Solution 5-gallon pail/kit	Configured as actual DF200 for training realism
200-1535	EasyDECON DF200 Training Solution 100-gallon drum kit	Configured as actual DF200 for training realism
200-1536	EasyDECON DF200 Training Solution 500-gallon tote kit	Configured as actual DF200 for training realism

9.6 Decontamination/EasyDECON DF200

Part #	System Description	Note
200-5312	EasyDECON DF200, Actual 2-gallon kit	Military-grade decontaminant
200-5313	EasyDECON DF200, Actual 5-gallon kit	Military-grade decontaminant
200-5315	EasyDECON DF200, 100-gallon drum kit	Military-grade decontaminant
200-5316	EasyDECON DF200, 500-gallon tote kit	Military-grade decontaminant
200-9030	Fortifier Test Kit, 30-sample kit	Used to re-certify formulation during and after storage

INTELAGARD, INC. LIMITED WARRANTY

Intelagard's Warranty obligations are limited to the terms set forth below:

Intelagard warrants to the original purchaser that the Macaw® Backpack, the Merlin® Handcart and the SwiftCAF® Family of Products are free of defects in materials and workmanship under normal use and service for a period of three years from the date of purchase by the original purchaser. Intelagard warrants to the original purchaser that all other Intelagard products are free of defects in materials and workmanship under normal use and service for a period of one year from the date of purchase by the original purchaser. These periods of time will be referred to as the "Warranty Period" in this document.

Intelagard's obligation under this Warranty is specifically limited to replacing or repairing its products or parts thereof which are shown by Intelagard's examination to be in a defective condition attributable hereunder to Intelagard. This Warranty covers net cost of parts and labor only. Mileage, delivery, shipping and travel time, including diagnostic calls to analyze the problem, are not covered by this or any other warranty. In the event of a Warranty claim by an end-user, an authorized Intelagard representative or distributor shall be responsible for the initial investigation and Warranty claim. To qualify for this Warranty, alleged defective product must be returned to Intelagard at its address listed below, transportation charges prepaid, within a reasonable time after discovery of alleged defect, and in no event later than the expiration of the Warranty period. In no case will labor associated with removal and replacement/repair of defective components be reimbursed without prior written approval, from a Director or Officer level representative of Intelagard. If, as a result of Intelagard's examination of the returned product Intelagard concludes that a product defect attributable hereunder to Intelagard exists, Intelagard shall cure such defect within a reasonable time, not to exceed forty five (45) days after such examination is completed.

The remedy of repair or replacement parts shall be carried out by Intelagard or a distributor trained and authorized to do repairs on Intelagard products ("Authorized Distributor"). This Warranty is not transferable. The total responsibility of Intelagard for claims, losses, liabilities, or damages, whether in contract or tort, related to its products shall not exceed the purchase price. In no event shall Intelagard be liable for any special, indirect, incidental, or consequential damages including, but not limited to, loss of use of facilities or product, loss of profits, property damage or lost production, whether suffered by the buyer or any third party. Repair parts and replacement products covered under this Warranty are furnished, at Intelagard's option, on an exchanged basis and will either be reconditioned or new. All replaced products and parts will become the property of Intelagard. Intelagard may request that the buyer replace defective parts with new or refurbished user installable parts that Intelagard provides in fulfillment of its Warranty obligation. A replacement product or part, including a user installable part that has been installed in accordance with instructions provided by Intelagard, assumes the remaining Warranty Period of the original product. Parts provided by Intelagard in fulfillment of its Warranty obligation must be used in products for which Warranty services are claimed. Workmanship related to non-warranty repairs shall be warranted for a ninety (90) day period.

Failure to follow procedures as laid out in this Warranty statement may cause forfeiture of claim. Distributors or end-users automatically deducting the value of a Warranty claim from outstanding balances due prior to receiving written notification of Intelagard approval of the Warranty claim may be subject to forfeiture of the entire claim.

The above remedy of product defects is the purchaser's sole remedy.

Any modifications made, expiration of product, and/or the addition of other product to this product by the purchaser may render this Warranty null and void. All Warranty repairs reimbursable under this Warranty must be performed by an Authorized Distributor using Intelagard approved replacement parts. Repairs or attempted repairs by anyone other than an Authorized Distributor are not reimbursable under this Warranty. In addition, these unauthorized repair attempts may result in additional malfunctions, and will void this Warranty.

This Warranty applies only to parts or components which are defective and does not cover repairs necessary due to normal wear, misuse, accidents, collision with any object, fire, flooding, sand, dirt, windstorm, hail, lightning, earthquake or other acts of God, act of war or hostilities, exposure to weather conditions, theft, abuse, modifications made by owner without the written permission of Intelagard, or lack of proper maintenance. Wear caused by chemicals, abrasions, improper storage, or exposure to excessive temperature is not considered a defect and is not covered by this Warranty. Maintenance and wear items are not warrantable items. Regular, routine maintenance of product to keep it in proper condition is the responsibility of the owner. Intelagard makes no representations and disclaims all warranties of any kind, express or limited relative to any third-party foam and solution product that may be resold by Intelagard, and defers entirely to the statements, documentation, warranties and claims made by the foam or solution manufacturer.

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