

LAWRENCE FACTOR

High Purity At High Pressure
Gass- og PusteService AS
www.gpsas.no



Analysis

Purity Agents



Purifiers & Accessories



Cartridges

ANALYSIS
Service & Instruments

PURIFIERS
Appliances To 15,000 PSI

ACCESSORIES
Control & Service Items

CARTRIDGES
Adsorbent & Mechanical Filters

PURITY AGENTS
Media, Cleansers, & Lubes



PRODUCTS THAT PURIFY HI-PSI AIR & GAS



INTRODUKSJON

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FedEx Ground = 3 or more business days

US Postal: *Uninsurable. No traceability. L-Factor is not responsible for losses.*

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LAWRENCE FACTOR

High Purity At High Pressure

WHO IS THE COMPANY BEHIND THAT BREATHING MASK?

The origins of our company are rooted deeply in the field of high-pressure gases, founded in 1979 with the *FLASK* refillable filter cartridge for Scuba diving. Since that time, and through decades of technical advancement, L-Factor has become one of the most recognized names in breathing-air. But our expertise doesn't end there. Our purification products are found in a multitude of applications ... to name a few: in CNGV refueling stations, in aeronautical/space exploration, in scientific laboratories, in missile guidance systems. Still, whenever you see a breathing mask, be it in a hazardous environment, entering the scene of a fire, or plunging deep beneath the sea....think Lawrence Factor, the company that puts **pure** breathing air into that mask.



ABOUT THE PEOPLE AT L-FACTOR

Since our founding, Lawrence Factor has earned a reputation for quality, innovation, fair pricing, and homespun customer service. How do we do it? We dedicate ourselves to achieving these goals every single day...dedicated to the satisfaction of our customers and dedicated to the advancement of our products. Located on a 2 acre manufacturing campus, L-Factor houses an ISO accredited research lab, a fully fitted CNC machining facility, and a streamlined assembly floor. But most likely it's the L-Factor people that achieve the greatest results. It's a customer service staff the lives to see smiles beam thru the phone and it's the individuals who craft our products determined to see perfection in every detail.



You've made the right choice . . . L-Factor Purification Products



High Purity At High Pressure

The slogan "High purity at High pressure" perfectly sums up the theme in our products. Whether a filter cartridge or a length of stainless-steel tubing, every product in this catalog was *designed* for use with highly compressed and highly purified gases. The theme doesn't end with that, however. Behind the brand name on each package lies a product with a reputation for high quality...a reputation earned on an unending quest for dependable engineering, stout construction, and creative ideas. We know that more than just our reputation relies on these factors; your safety does!

New Parts

High Performance At High Pressure

Working in close coordination with our sister company, NEW PARTS, L-Factor is able to furnish you with high performance replacement parts for your Hi-PSI compressor and at an affordable price. Select from overhaul kits as well as a host of individual parts. NEW PARTS can provide most items to fit most brands coupled with the superb customer service you are accustomed to at L-Factor. NEW PARTS also offers equally superb tech-help to coach you thru even the most complicated repair procedure. Most NEW PARTS are normally in-stock and ready to ship - another benefit that you've come to expect from an L-Factor company.

NEW PARTS™

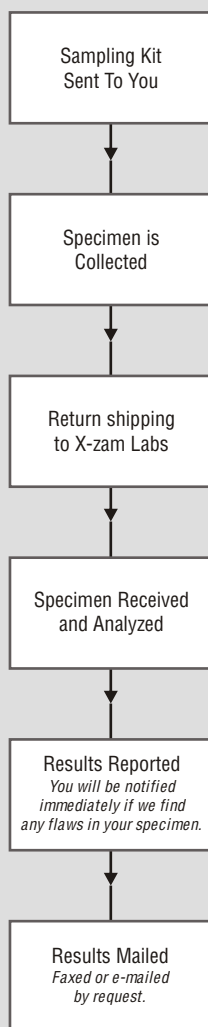
High Performance at High Pressure



IS MY AIR PURE ENOUGH TO BREATHE? HAS THAT MOISTURE BEEN SUBTRACTED FROM THIS NITROGEN? DOES OUR AIR MEET NFPA RECOMMENDATIONS? IF YOU'RE ASKING YOURSELF QUESTIONS LIKE THESE - THEN X-ZAM LABS IS YOUR BEST ANSWER. X-ZAM LABS CAN ANALYZE YOUR AIR/GAS AGAINST THE LIMITS SET BY AGENCIES SUCH AS OSHA, NFPA, PADI, AND THE U.S. NAVY.

The X-zam® Chain of Events

You have confidence and security in knowing that your air/gas system is being monitored by a team of experts. We'll help you every step of the way - if and when there is a problem. More than that, each time an X-zam® analysis is performed, you'll receive complete back-up documentation including a handsome certificate that you'll be proud to display and technical report showing all the analytes and the standard they're measured against. X-zam® Labs will electronically store these records for retrieval at any time in the future.



To maintain the integrity of your air/gas production, as in making any kind of product, you're wise to adhere to a quality assurance program. As part of that program - especially in the case of critically pure gases - it's prudent to include analysis of the result gas. You'll want to employ a third party lab to perform these unbiased analysis. A lab that uses precise scientific methods. One that's accredited by an international agency. One with agents across the globe. One such as Xzam® Labs at Lawrence Factor.

Using precision methodology, Xzam Labs carefully analyzes many types of inert air/gas specimens to search out even the smallest traces of undesirable contaminants. Undetected, these pollutants can have far-reaching or disastrous consequence: disabling illness, inoperative equipment, or simply ineffectual product. The reasons for accurate analysis are endless. You may simply be driven to comply with safety standards set by agencies such as the NFPA or OSHA.

With Xzam Labs, collecting a specimen is easy - you can do-it-yourself or one of our local agents can be enlisted to pay a house visit. The lab provides everything needed in our patented sampling kit, which is loaned to you at no charge. Trapping the specimen couldn't be simpler because our kit acts just like the cylinders you're already accustomed to filling - there are no complicated vials or gadgets. Tests can be conducted on a one-time basis or you may enroll in one of our programs where specimens are analyzed on a regular schedule. Or - if you analyze large numbers of specimens - there is the option to electronically submit your sample via our immediate response instrument: the Lab On Locale.

In the field of purified gases - no other firm matches the resources and qualifications of Lawrence Factor. With our purification expertise and technical support - Xzam Labs has a distinct advantage in analyzing compressed air/gas.



How To Order X-zam

There are two easy options when ordering X-zam . . .

1. House Call

An X-zam representative visits your test site, does the sampling for you. There may be an additional charge for this service.

2. Do-It-Yourself

The kits are sent to you on a pre-scheduled basis and you retrieve the specimen and send it to X-zam (or to your X-zam representative).

Placing Your Order

After completing the order form (at back of this section), call your local X-zam dealer or the X-zam customer service line (800-338-5493) for the agent nearest you. Be prepared to give the agent the information or fax the form.

When ordering X-zam please have the following information handy:

1. Test site address and phone.
2. Start date of your program.
3. The standard you want to meet (see the chart later in the section)
4. Program frequency desired.
5. Mailing address* where documents are to be sent.

* Note: For no additional charge, you may request that a copy of the report be faxed to you or mailed to PADI

X-zam Lab Question & Answer

What Is X-zam?

A division of Lawrence Factor™ skilled at searching out and reporting the constituents of most compressed gases. Only reliable scientific procedures are used which result in very accurate analysis. X-zam Labs are so proficient that they qualify for accreditation under the standards of ISO 17025 by the American Association of Laboratory Accreditation (A2LA). This accreditation is also recognized by Asia Pacific Laboratory Accreditation Cooperation (APLAC), European Cooperation for Accreditation (EA), Inter-American Accreditation Cooperation (IAAC), and the International Laboratory Accreditation Cooperation (ILAC).

Why should I have my gas analyzed by X-zam Labs?

The reasons are varied - but in most cases it has to do with quality control of a compressed air/gas product. In some cases a regulation is requiring you to perform regular analysis on your system. This is common for breathing air. In other cases you may be trying to locate a source of contamination in an air/gas system and X-zam is a perfect troubleshooting tool. In any case, it's just a matter of good sense to assure yourself, your staff, and your clients that your system is performing as it should.

What does X-zam Labs test for?

Often the motive for testing varies and so do the substances we look for. Some of the common constituents are oxygen, water vapor, carbon monoxide, hydrocarbons, oil vapors, particulate matter, halogenated solvents, and carbon dioxide. We also report unknown substances when they appear.

How often should I use X-zam Labs?

It depends on the purpose and usage of your air/gas system. You can order a one-time analysis, as well as a pre-scheduled program for weekly, monthly, or quarterly testing. An X-zam service rep will be happy to help you identify a program to best meet your needs.

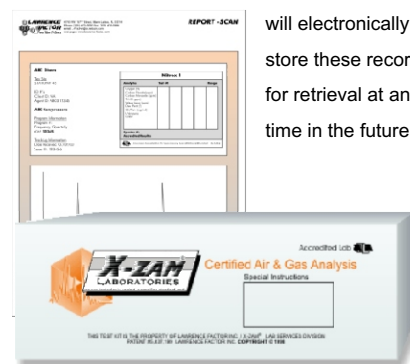
What is involved in an X-zam?

Collecting a specimen is quite simple with our application specific test kits. Look below to see just how easy it is.

What Do I Get From X-zam?

Confidence and security in knowing that your air/gas system is being monitored by a team of experts. We'll help you every step of the way - if and when there is a problem. More than that, each time we perform an X-zam analysis you'll receive complete back-up documentation; including a handsome certificate that you'll be proud to display and technical report showing all the analytes and the standard they're measured

against. X-zam Labs will electronically store these records for retrieval at any time in the future.



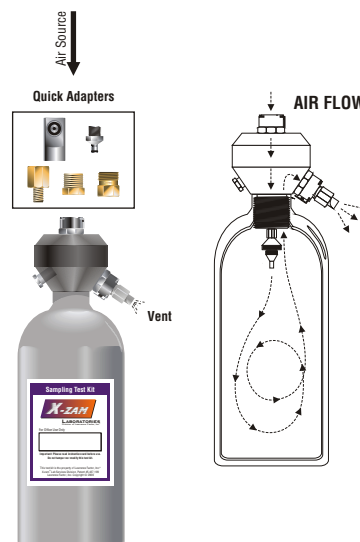
COLLECTING A SPECIMEN COULDN'T BE EASIER

The patented X-zam® kit is designed to operate automatically while collecting specimens of particles, condensables, and a live shot of the actual gas.

It is so easy to use:

1. Connect the special quick adapter to airline as instructed in the kit.
2. With the specimen free flowing from the quick adapter push into the X-zam auto sampling kit.
3. Leave connected for exactly 3 minutes while the X-zam auto sampling kit is collecting the specimen.
4. As the sample is collecting - complete the short questionnaire about the test site.
5. Disconnect the quick adapter, replace all items into the box provided, & return to your agent or X-zam Labs.

NOTE: Each kit is supplied with special adapters as determined by the testing preferences specified at time of order.



CO-Cop

The Self Test For Breathing Air

Of the many substances which can contaminate compressed breathing air, few are as deadly as carbon monoxide (CO). When used properly, CO-Cop™ can help to significantly reduce the risk of breathing compressed air contaminated by carbon monoxide. CO-Cop™ comes in three configurations to attach to SCBA valve, SCUBA valve, or SCUBA inflator hose and allows anyone to test the air in their tank for gross contamination by carbon monoxide. This easy-to-use

device installs quickly. A tiny amount of air is allowed to flow through CO-Cop™. If the air is contaminated by carbon monoxide, CO-Cop's™ replaceable detector capsule (1 included) will change color.

3 CO-Cop Models are Available

A) SCUBA Inflator Hose latches to the quick connect fitting of your inflator hose (may be incompatible with some models).

B) SCBA attaches to type 346 & 347 cylinder valve.

C) SCUBA Yoke clamps to the scuba tank valve.



CO-Cop™ should be a standard part of every gear bag. If CO-Cop™ or X-zam saves just one life - possibly your life - or prevents one

debilitating illness, our goal of helping to improving breathing air safety will have been attained.

Using CO-Cop Couldn't Be Easier

To Install

1. Attach CO-Cop to your tank.
2. Allow Air to flow through CO-Cop for about 15 seconds - just a tiny bit of air is needed.
3. Watch the capsule inside CO-Cop's transparent housing. If your air is contaminated by carbon monoxide, the capsule will change color within 2 minutes.
4. Detach CO-Cop from the tank.

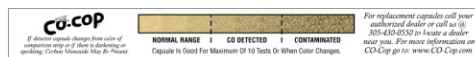


The Secret Of CO-Cop

Using a unique technology pioneered by Lawrence Factor, the replaceable capsule has a special carbon monoxide sensitive coating. When the air contaminated with carbon monoxide comes into contact with the capsule, it changes color.

Verifying A Color Change Is Easy

Affixed to the outside of the transparent housing is a color strip. The strip illustrates the color the capsule should be if your air is not contaminated by carbon monoxide.



Replacing The Capsule Is Easy

Using CO-Cop to test your air is easy, and so is replacing the detector capsule. One capsule is included with every CO-Cop and is good for up to 10 tests. Inexpensive replacement capsules are available from Lawrence Factor or your CO-Cop retailer.

To replace a capsule:

1. Grip the end fitting in one hand & the relief valve in the other (the relief valve has a rough finish to aid in gripping).
2. Twist the relief valve counter clockwise, unscrewing completely.
3. Slide out the spent capsule.
4. Insert fresh capsule and re-assemble CO-Cop in reverse order.

CO-Cop Q & A

I trust the air at my dive shop. Why would I want to test it?

Under certain conditions Carbon Monoxide can actually be produced by an oil lubricated compressor. Even the most diligent air station operator can fall prey to circumstances beyond their control where high levels of CO could be generated un-noticed. CO-Cop is your safety net in these rare occurrences.

I was taught that I should do a self test of the air in my dive cylinder by "sniffing". Isn't this sufficient?

CO is colorless and tasteless. In some cases, however, CO may be accompanied by a burnt odor but is not always the case. Chances are that smelling your air may not detect it. CO-Cop will.

What are the statistics on CO related dangers & injuries?

This is very difficult to answer because no studies have been conducted. As one of the busiest air analysis labs in the US and Europe (analyzing samples sent from all around the world), we have seen dangerous levels of CO in approximately 0.1% of the breathing air specimens that we analyze. We would consider this very high. It is also noteworthy to say that not all cases of CO poisoning result in death. Many cases of nausea and illness may be occurring but blamed on other causes. Don't let yourself become a statistic, use CO-Cop.

Is the air produced in remote dive locations more dangerous than in modern destinations?

Accidents can happen anywhere. The great majority of air stations are conscientious and most industrialized countries have established standards for breathing air. Air providers must abide by these requirements, including frequent third party analysis. This is not usually the case in undeveloped places and some air producers might be more relaxed about striving to meet air quality standards. Also, in many dive resort areas, the air provided by dive-tour operators is oftentimes produced by an outside contractor and so, even though the tour operator is reliable, the source of the air may not be. The bottom line is that, when on unfamiliar turf, it would be prudent to double check your air. You must assume responsibility for your own safety in much the same way that a skydiver should take responsibility for their own chute.

INCREASED AIR AWARENESS FOR DIVERS

In recent years, the increased use of Nitrox and mixed gases has led recreational divers to look closely at the “ingredients” in the air they breathe. Although the initial concern was to keep oxygen blending systems clean, the debate surrounding the specifications helped raise awareness of both consumers and purveyors of compressed air.

The Compressed Gas Association (CGA) recommends that compressed air for SCUBA diving to 130 feet/40 meters meet CGA Level E specifications for carbon monoxide and oil. CGA makes, but cannot enforce, such recommendations. Level E allows a maximum of 10 ppm of carbon monoxide, 500 ppm CO, 25 ppm methane, and 5 mg/m³ of condensed oils. OSHA and U.S. Navy allow 20 ppm of CO. All three allow odor, if it is “slight”, “not objectionable” or “not noxious/pronounced.”

The American Conference of Government Industrial Hygienists recommends a Threshold Limit Value-Time-Weighted Average for CO of 50 ppm at the surface. This means an individual can be exposed to 50 ppm of CO for eight hours without suffering ill effects. As concentration increases, exposure times must decrease. Maximum short-term exposure to CO (15 minutes in 24 hours) is 400 ppm.

These recommendations are useful, but the fact is, most recreational dive operators aren't required to test the air they're dispensing. A few states require testing, but for the most part, air quality is self-regulated. Since the mid 1980's, PADI has required that its Five-Star facilities test

their air and it is considering making the recommendation across the board for all PADI facilities. Recently, the requirement was changed to a prerequisite and shops must show that they have tested successfully for at least two quarters before receiving the Five-Star designation.

In the United States, shops must meet CGA Level E. Outside the U.S., shops are required to meet at least CGA Level E, unless local standards are more stringent. The specifications adopted by technical training agencies for oxygen-compatible air are necessarily much more strict than Level E. At Tek 93, an annual technical diving forum, American Nitrox Divers Inc. and the International Association of Nitrox and Technical Divers agreed that compressed air to be used with oxygen contain no more than 0.1 mg/m³ of condensed hydrocarbons and no more than 2 ppm CO. Each agency requires its facilities to participate in quarterly gas analysis such as that offered by X-zam™ Laboratories at Lawrence Factor.

Air testing, is an opportunity for education. If an air station fails to meet the specs, correcting any problems can be a learning experience. For example, with the best intentions, a compressor air intake pipe is placed on the roof of a building, but with no thought about the pollutants which might be exhausting from a nearby stovepipe.

CGA Grade E	
O ₂	20-22%
Co ₂	1000 ppm
CO	10 ppm
Hydrocarbons	25 ppm
H ₂ O	67 ppm
Dew Point	-50F
Oil/Particles	5 mg/m ³
Odor	none

DIVERS AIR - YOUR MAIN LIFE SUPPORT

an article reprinted from Underwater USA by Mike Casey & Joe Osterheim

You went through extensive training to become certified. You then probably spent much time and thought choosing equipment. Your mask must be comfortable, fins must fit well, and your tank, buoyancy compensator and regulator are the best your budget allows. You are also becoming more aware of the importance of exercise and good nutrition to safe diving and trying to make healthy changes in fitness and diet.

But how much thought do you give to filling your tank with compressed air? Compressed air is your main life support ingredient.

Air by nature, is composed of about 20.9 percent Oxygen and 78 percent Nitrogen; the balance of about 1 1/10 percent is traces of Argon, Carbon Dioxide, Neon, Helium, Methane, Krypton, Hydrogen, Nitrous Oxide and Xenon. Isn't the air in your scuba tanks the same air you're breathing right now? Well, yes and then some. Mother nature's air has been somewhat altered by substances introduced by industrial contaminants. You'll find some levels of Carbon Monoxide and Dioxide, Acetylene, Sulfur Dioxide, Solvents and depending on your location, other substances we'll call smog. The “brew” is drawn into the compressor and concentrated at up to 3500 psi on an average. This processing adds by-products, for example, lubricating oils and Carbon Dioxide. Contaminants greatly increase as compressor equipment begins to wear and operate outside of normal parameters. Just like water at your kitchen tap, dangerous substances can be removed by a properly designed and maintained purification system, part of any good air fill station.

Some of the major contaminants concerning the diver are

Carbon Monoxide, Carbon Dioxide, condensed oil and particulate matter and even water vapor. Some of these can be detected by taste and odor, others not. Some can cause health problems slowly over the long term without your knowing about it. Others occur during a dive where results can be suddenly dangerous or lethal.

The most harmful and immediate danger is from Carbon Monoxide (CO) whose safe limit is set at 10 parts per million (ppm). When CO combines with hemoglobin in red blood cells, it prevents blood from taking up oxygen. In other word, it suffocates you. Levels of 400 ppm result, at the very least, in headache and discomfort. Levels approaching 4000 ppm will prove fatal, subject to a range, because everybody is different and every dive is different. This can mean no repetitive dives, ever.

Carbon Dioxide (CO₂) is found in air at various levels and is a byproduct of animal (including human) metabolism. High levels are usually due to combustion/cooking exhaust or local atmospheric conditions. Problems from higher levels can range from hyperventilation to suffocation, which can also mean no more repetitive dives.

Another high-risk contaminant is oil vapor. Although effects are not as immediate or extreme as Carbon Monoxide, breathing oil-tainted air can land you a case of pneumonia.

Moisture in the air is a double-edged sword. While extremely dry air is good because it preserves your diving equipment and prevents regulator freeze-up in cold water, the discomfort it can cause may not be so nice. Air that is more humid is good for respiratory tract comfort, but bad for your equipment.

Several agencies set standards for breathing air. The Compressed Gas Association (CGA), the Occupational Safety and Health Administration (OSHA), the National Fire Protection Association (NFPA) and the United States Navy are just four. Contrary to the sometimes popular belief, OSHA regulates commercial dive operations but not recreational divers.

Diving industry standards dictate that breathing air suppliers subscribe to one of the major standards. PADI for example, requires their five star facilities to test air quarterly. Most recreational scuba applications use the Grade E standard, described by the CGA as the minimum grade for recreational diving.

Limits for Grade E are: 10 ppm Carbon Monoxide; 1000 ppm Carbon Dioxide; total hydrocarbon (methane gas) no more than 25 ppm; oil 5mg/m³ (five milligrams of oil and particulate together in a cubic meter of air). Water vapor content may vary with intended use, however, most recreational diving purposes usually allow 67 ppm, or air that is 10 degrees lower in dew point than the worst local weather conditions. Oxygen in the mix must be between 20 and 22 percent. Most industry standards call for testing every three months.

Remember, you are breathing compressed air and then entering the undersea world where your air supply is rather important. Consequences of poor breathing air include both short and long term effects. Just as exposure to second hand cigarette smoke has become an important health issue, so too is the air you breathe from your scuba tanks.

	CGA GRADE A (ANSI/CGA 67.1, 97)	CGA GRADE D (ANSI/CGA 67.1, 97)	CGA GRADE E (ANSI/CGA 67.1, 97)	CGA GRADE EN 12021 (ANSI/CGA 67.1, 97)	CGA GRADE J (ANSI/CGA 67.1, 97)	CGA GRADE L (ANSI/CGA 67.1, 97)	CGA GRADE N (ANSI/CGA 67.1, 97)	NFPA 1500 - CGA GRADE D (ANSI/CGA 67.1, 97)	NFPA 1500 - CGA (ANSI/CGA 67.1, 97)	NFPA 1404 (ANSI/CGA 67.1, 97)	NFPA 99 (ANSI/CGA 67.1, 98, 97)	PADI 5 STAR (ANSI/CGA 67.1, 97)	CGA GRADE (ANSI/CGA 67.1, 97)	OSHA CFR 29 (CFR 1910.134, 39)	FEDERAL 11-A (FPM 1910.104, 89)	U.S.P. (U.S. PHARMACOPEIA)	O.C.A. (OXYGEN COMPATIBLE AIR) (IAINTDANDI '93)	NITROX I	NITROX II	US NAVY/ANSEA (NAVSEA 0994-LF-001-91(1)15 F-83)	AMBIENT-REFERENCE (NORMAL ATMOSPHERIC AIR)
OXYGEN (O2)	19.5-23.5 (%)	19.5-23.5 (%)	20-22 (%)	20-22 (%)	19.5-23.5 (%)	19.5-23.5 (%)	19.5-23.5 (%)	19.5-23.5 (%)	20-22 (%)	19.5-23.5 (%)	19.5-23.5 (%)	20-22 (%)	19.5-23.5 (%)	19.5-23.5 (%)	20-22 (%)	19.5-23.5 (%)	20-22 (%)	31-33 (%)	35-37 (%)	20-22 (%)	20.9 (%)
Carbon Dioxide (CO2)	—	1000 (PPM)	1000 (PPM)	500 (PPM)	5 (PPM)	—	500 (PPM)	1000 (PPM)	1000 (PPM)	1000 (PPM)	1000 (PPM)	1000 (PPM)	500 (mL/m3)	1000 (PPM)	500 (PPM)	1000 (PPM)	1000 (PPM)	1000 (PPM)	1000 (PPM)	1000 (PPM)	340 (PPM)
Carbon Monoxide (CO)	—	10 (PPM)	10 (PPM)	15 (PPM)	1 (PPM)	—	10 (PPM)	10 (PPM)	10 (PPM)	10 (PPM)	10 (PPM)	10 (PPM)	5 (mL/m3)	10 (PPM)	10 (PPM)	10 (PPM)	2 (PPM)	10 (PPM)	10 (PPM)	20 (PPM)	16 (PPM)
Hydrocarbons (CH4) as Methane	—	—	25 (PPM)	—	.5 (PPM)	—	—	—	25 (PPM)	—	—	25 (PPM)	25 (mL/m3)	—	25 (PPM)	—	25 (PPM)	25 (PPM)	25 (PPM)	25 (PPM)	.16 (PPM)
Water Vapor (H2O)	—	♦ 67 (PPM)	♦ 67 (PPM)	—	1.08 (PPM)	24 (PPM)	♦ 67 (PPM)	24 (PPM)	24 (PPM)	♦ 67 (PPM)	422 (PPM)	♦ 67 (PPM)	27 (mL/m3)	♦ 67 (PPM)	♦ 67 (PPM)	♦	♦ 67 (PPM)	♦ 67 (PPM)	♦ 67 (PPM)	—	—
Dew Point	—	-50°F	-50°F	-11°C	-104°F	-65°F	-50°F	-65°F	-65°F	-50°F	-20°F	-50°F	-53°C	-50°F	-50°F	♦	-50°F	-50°F	-50°F	—	—
Oil & Particles	—	5 (mg/m3)	5 (mg/m3)	5 (mg/m3)	♦	—	NONE	5 (mg/m3)	5 (mg/m3)	5 (mg/m3)	5 (mg/m3)	5 (mg/m3)	1 (mg/m3)	5 (mg/m3)	5 (mg/m3)	♦	.1 (mg/m3)	5 (mg/m3)	5 (mg/m3)	5 (mg/m3)	—
Odor	—	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	—
Nitrogen Dioxide (NO2)	—	—	—	—	.1 (PPM)	—	2.5 (PPM)	—	—	—	—	—	.3 (mL/m3)	—	—	2.5 (PPM)	—	—	—	—	.02 (PPB)
Nitric Oxide (NO)	—	—	—	—	—	—	2.5 (PPM)	—	—	—	—	—	—	—	—	2.5 (PPM)	—	—	—	—	2 (PPB)
Sulfur Dioxide (SO2)	—	—	—	—	.1 (PPM)	—	5 (PPM)	—	—	—	—	—	—	—	—	5 (PPM)	—	—	—	—	.02 (PPB)
Hal. Solvents	—	—	—	—	.1 (PPM)	—	—	—	—	—	—	—	—	—	.2 (PPM)	—	—	—	—	—	—
Acetylene (C2H2)	—	—	—	—	.05 (PPM)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.02 (PPB)
Nitrous Oxide (N2O)	—	—	—	—	.1 (PPM)	—	—	—	—	—	—	—	2.5 (mL/m3)	—	—	—	—	—	—	—	.03 (PPB)
Hal. Hydrocarbons	—	—	—	—	—	—	—	—	—	—	—	—	5 (mL/m3)	—	—	—	—	—	—	—	—

♦ May vary with intended use. ♦ Not applicable: However is reported. ♦ Quarterly testing is recommended (NFPA). ★ Quarterly testing is required (PADI).
 CGA - Compressed Gas Association, ANSI - American National Standard, NFPA - National Fire Protection Association, PADI - Professional Association of Diving Instructors,
 OSHA - Occupational Safety & Health Act, ANDI - American Nitrox Divers International, IAINTD - International Association of Nitrox Technical Divers



STAIN TUBES . . . WHY NOT?

Measuring contaminants with stain tubes (sometimes called colorimetric tubes) is quick. Gathering the results is immediate. BUT stain tubes are not especially the favorite when accessing critically pure gases such as breathing air.

While claims of being reliable are true under most circumstances - in many other ways stain tubes fall short of satisfying good quality control practices.

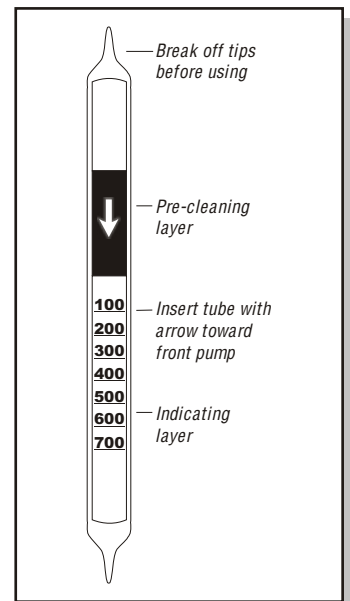
For instance:

- You are left with little evidence or permanent documentation once the tube has been used & discarded.
- Readings of the stain score are subjective to human interpretations.
- Stain reagents may be somewhat inaccurate due to naturally occurring variations in the gels. There are no feasible means of traceability nor calibration.

A great deal of inadequacies in stain tubes arise out of limited shelf life. Minor impurities or moisture content will largely affect the shelf life differently from batch to batch. Storage temperatures impact shelf life and diminish accuracy, as well. These kinds of spoilage are undetectable and there is no way of knowing that your test results might be tainted.

The greatest deficiency comes into play with errors in stain length readings. Several causes are to blame. Among them are shifting and loosening of the gels within the tube. This causes an inaccuracy of the zero point and, hence, errors on the stain length reading. Additionally at fault are variances in sample volume, flow rate through the tube, and manufacturing inconsistencies in tube diameters. These errors can amount to as much as 50% deviation!

In conclusion, tests have shown color stain tubes to be unreliable in cases where accuracy is mandated or where permanent records must be kept. When human lives are at stake - true scientific methods are the only acceptable means of certifying the purity of your breathing air.



3 Easy Steps to Order

Step 1 ADDRESSES

Sampling Location (This is where the sampling kit will be sent)

Mailing Address (This is where the reports will be sent)

Co. Name _____

Contact Name _____

Address _____

City _____ State _____ Zip _____

Phone Number _____ Fax Number _____

Same As Sampling Location Other (see address below)

Co. Name _____

Contact Name _____

Address _____

City _____ State _____ Zip _____

Additional Mailing Address

Send additional copy of report to PADI Send additional copy of report to address below.

Co. Name _____ Contact Name _____

Address _____ City _____ State _____ Zip _____

Step 2 TYPE OF ANALYSIS (Please, check only one box.)

Industrial Compressed Air

- CGA Grade A
- NFPA 1404
- Instrument Air

Industrial Breathing Air

- CGA Grade D
- OSHA CFR 29

Diving-Surface Air Supplied Diving (Hookah)

- CGA Grade D Z-180
- OSHA CFR 29

Diving-SCUBA (Recreational)

- CGA Grade E NAVSEA
- PADI 5 Star O.C.A.
- Z-180

Fire Brigades-SCBA

- NFPA 1500 - Grade D
- NFPA 1404
- Z-180

Fire Brigades-SCBA + Dive (For Underwater Recovery Units)

- NFPA 1500- Grade E

Medical

- NFPA 99
- CGA GRADE N

Miscellaneous

- Ambient Air
- Spectral/Fluid
- Test Kit On Loan - Qty: _____
(For registered Agents Only)

Step 3 FREQUENCY (Please, check only one box.)

Contract Frequency: One Time Semi-Annual Quarterly Monthly

Start Now

Program Start Date: _____/_____/_____

Ordered By: _____

Co. Name: _____

Date: _____/_____/_____

Phone No: _____

*Send Completed Copy To Your Authorized Lawrence Factor Dealer - Call 1-800-338-5493 For A Dealer Near You.

Ambient Air

Item No.	Frequency	Application
LS-902371	Semi Annual	Ambient
LS-902372	Quarterly	Ambient
LS-902373	Monthly	Ambient

CGA Grade A

Item No.	Frequency	Application
LS-901770	One Time	Industrial Compressed Air
LS-901771	Semi Annual	Industrial Compressed Air
LS-901772	Quarterly	Industrial Compressed Air
LS-901773	Monthly	Industrial Compressed Air

CGA Grade D

Item No.	Frequency	Application
LS-901070	One Time	Industrial Breathing Air
LS-901071	Semi Annual	Industrial Breathing Air
LS-901072	Quarterly	Industrial Breathing Air
LS-901073	Monthly	Industrial Breathing Air

CGA Grade E

Item No.	Frequency	Application
LS-901170	One Time	Diving / Scuba
LS-901171	Semi Annual	Diving / Scuba
LS-901172	Quarterly	Diving / Scuba
LS-901173	Monthly	Diving / Scuba

CGA Grade N

Item No.	Frequency	Application
LS-902170	One Time	Health Care Facilities
LS-902171	Semi Annual	Health Care Facilities
LS-902172	Quarterly	Health Care Facilities
LS-902173	Monthly	Health Care Facilities

Instrument Air

Item No.	Frequency	Application
LS-901370	One Time	Industrial Compressed Air
LS-901371	Semi Annual	Industrial Compressed Air
LS-901372	Quarterly	Industrial Compressed Air
LS-901373	Monthly	Industrial Compressed Air

NAVSEA

Item No.	Frequency	Application
LS-902070	One Time	Diving / Scuba
LS-902071	Semi Annual	Diving / Scuba
LS-902072	Quarterly	Diving / Scuba
LS-902073	Monthly	Diving / Scuba

NFPA 1404

Item No.	Frequency	Application
LS-902670	One Time	Fire Fighting / SCBA
LS-902671	Semi Annual	Fire Fighting / SCBA
LS-902672	Quarterly	Fire Fighting / SCBA
LS-902673	Monthly	Fire Fighting / SCBA

NFPA 1500 Grade D

Item No.	Frequency	Application
LS-901270	One Time	Fire Fighting / SCBA
LS-901271	Semi Annual	Fire Fighting / SCBA
LS-901272	Quarterly	Fire Fighting / SCBA
LS-901273	Monthly	Fire Fighting / SCBA

NFPA 1500 Grade E

Item No.	Frequency	Application
LS-901570	One Time	Fire Fighting / SCBA + Dive
LS-901571	Semi Annual	Fire Fighting / SCBA + Dive
LS-901572	Quarterly	Fire Fighting / SCBA + Dive
LS-901573	Monthly	Fire Fighting / SCBA + Dive

NFPA 99

Item No.	Frequency	Application
LS-902570	One Time	Health Care Facilities
LS-902571	Semi Annual	Health Care Facilities
LS-902572	Quarterly	Health Care Facilities
LS-902573	Monthly	Health Care Facilities

O.C.A. - Oxygen Compatible

Item No.	Frequency	Application
LS-909170	One Time	Diving / Scuba
LS-909171	Semi Annual	Diving / Scuba
LS-909172	Quarterly	Diving / Scuba
LS-909173	Monthly	Diving / Scuba

ANALYSIS

OSHA CFR 29

Item No.	Frequency	Application
LS-902470	One Time	Industrial Breathing Air
LS-902471	Semi Annual	Industrial Breathing Air
LS-902472	Quarterly	Industrial Breathing Air
LS-902473	Monthly	Industrial Breathing Air

PADI 5 STAR

Item No.	Frequency	Application
LS-22904072	Quarterly	Diving / Scuba

Z-180

Item No.	Frequency	Application
LS-906070	One Time	Diving / Scuba
LS-906071	Semi Annual	Diving / Scuba
LS-906072	Quarterly	Diving / Scuba
LS-906073	Monthly	Diving / Scuba

CO-Cop

Item No.	Frequency	Application
LP-602253-AF	NA	SCUBA Yoke
LP-602753-AF	NA	SCUBA Inflator
LP-602853-AF	NA	SCBA - Handwheel

CO-Cop (Capsules)

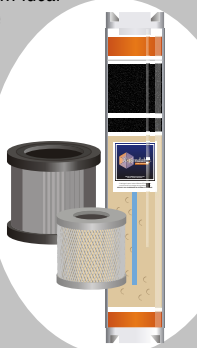
Item No.	Frequency	Application
LP-604053-OO	NA	Capsules - 1 pc

FOR RELIABLE AIR/GAS PURIFICATION, YOU NEED A FILTRATION APPLIANCE THAT PERFORMS TO THE HIGHEST STANDARDS. ONE DESIGNED TO LICK THE MOST TENACIOUS IMPURITIES. ONE THAT IS ABLE TO FLEX WHEN TECHNOLOGY DOES.

PURITY & PERFORMANCE

The reason for the exceptional performance of all Lawrence Factor air/gas purifiers can be found at the core of their cartridge towers. Inside are L-Factor Xpendable® and Xtractor™ filters. By far, the most respected brand of high-pressure cartridges-they can be quickly and easily configured to conform to evolving demands or technology. This not only makes them ideal for meeting the latest purity requirements but for use at experimental sites and laboratories.

L-Factor "X" cartridges are offered in a wide range of models, formulated to scores of specific applications. They are completely self-contained so that contaminants are retained in the cartridge; producing a formidable barrier to a huge array of substances.



FLEXIBILITY FOR THE FUTURE

An L-Factor purification appliance is versatile. It's one that won't easily become obsolete. As our scientists work toward developing new purification technology - new cartridges are frequently introduced-giving you a greater range of options. This means that by upgrading your cartridges you can always enhance the performance of your L-Factor purification appliance.

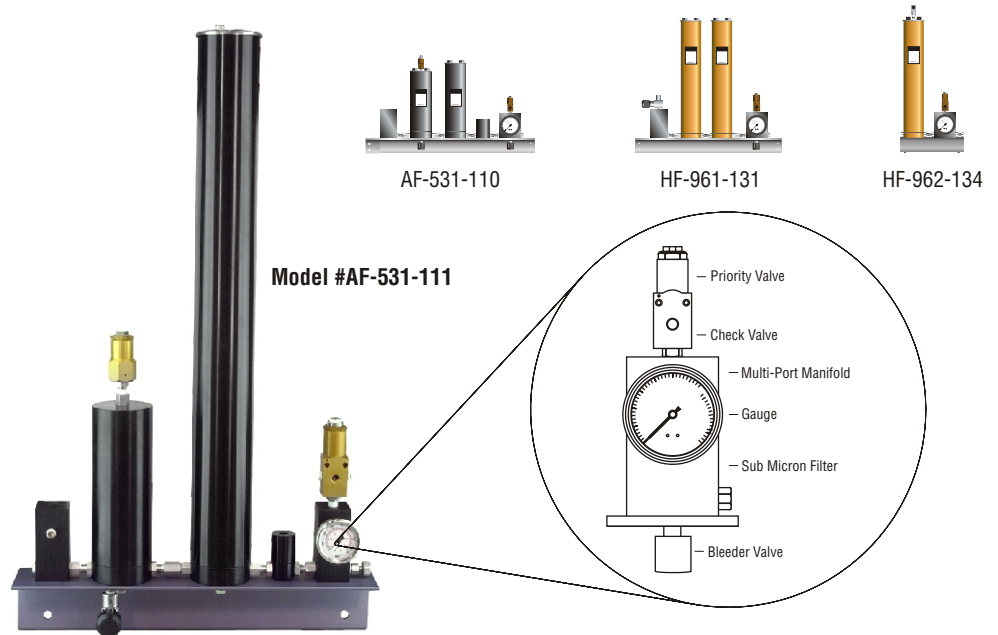
Join the future and make the natural choice in compressed air/gas purification. Contact our sales department for an explanation on how an L-Factor Purification Appliance can flex for you tomorrow.

High pressure tasks sometimes depend on high-pressure air & gas. For instance; a diver plunging into the oceans depths toting a capsule of air on his back, or a fire/rescue worker venturing into the smoky unknown with an even tinier capsule, technicians viewing their work through lenses of ultra-pure nitrogen, or a transit-driver at the helm of a bus fueled by a tank of natural gas. Getting those gases as clean, dry, and pure as possible requires equipment that can work under pressures even higher, without fail.

L-Factor air/gas purifiers are built to serve critically pure needs and at pressures up to 15,000psi. Based on a disposable cartridge concept, Lawrence Factor appliances are able to produce air & gases which exceed most recognized purity standards. In this manner your exacting requirements can be met by configuring (or re-configuring) the cartridges at any time - time after time.

Look over an L-Factor purification appliance. Immediately apparent are brawny qualities like all stainless steel fasteners and couplers. However, it's not only what you see but what you don't see. More subtle are the aerospace grade metals in our pressure vessels; veneers of protective plating making them impervious to nature's meanest elements; rigorous testing, a sanitizing scrub down before leaving our factory; and the all o-ringed joints which make it a snap to change cartridges or perform regular service.

These are qualities you can't discern just by looking but they are a part of every Lawrence Factor purification appliance. The result of all this care is a purification appliance meant to last for many years and require a minimum amount of maintenance - a reflection of our concerns for your concerns.



Understanding the Function of an L-Factor Appliance

Every L-Factor appliance works on the simple concept of pushing your gas through a series of filter cartridges housed within vessels rated for your working pressure. The condition of the resulting gas is precisely controlled through configuration and selection of cartridges. When the gas quality begins to diminish the cartridges are replaced with fresh ones.

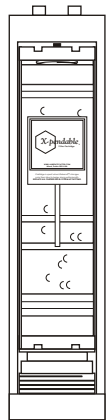
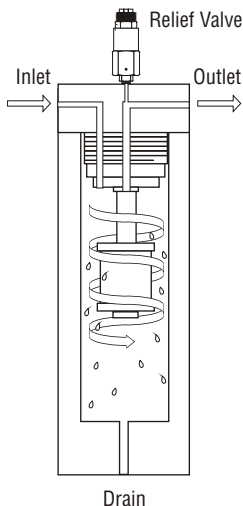
Gas staging through a typical L-Factor appliance is outlined below:

Entry

- Cooled gas enters through a *Multi-Port Manifold*.
- Several gas sources can be piped to one inlet manifold.

Stage 1 (Condensable Removal)

- *Mechanical Cartridge Holder*
 - Particles and droplets (water and oil) are squeezed from the gas.
 - Fluid is drained off periodically via a manual or automatic valve.
 - Relief Valve protects against over-pressurization.
 - Check Valve prevents back flow of gas after leaving mechanical filter.

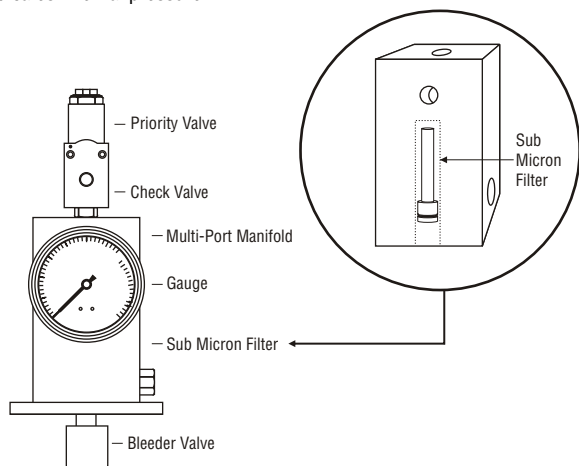


Stage 2 (Vapor removal)

- *Adsorbent Cartridge Holder(s)*
 - Gaseous contaminants (such as water, hydrocarbons, solvents, and carbon dioxide) are isolated and contained on various adsorbents, desiccants, and catalysts.
 - Particles generated by adsorbent chemicals, which may escape to the gas stream, are captured by barriers built into the cartridges.

Discharge

- Purified gas leaves through a multi-port manifold.
- Final capture of particle fines is made by a sub-micron filter.
- Bleeder valve permits drainage of gas from unit.
- Priority valve maintains constant pressure within the filters.
- Check valve prevents back flow of gas.
- Gauge indicates internal pressure.



INCLUDED WITH EVERY L-FACTOR APPLIANCE

- One full set of our X-pendable® & X-tractor™ cartridges specific to your application
- Lifetime warranty against corrosion of the cartridge holders
- Full one-year warranty on complete unit
- Toll-free technical help
- Instruction manual

APPLIANCE OPTIONS

- Freestanding chassis
- Automatic condensate drain
- Electronic cartridge monitor
- X-zam® air analysis program
- Spare cartridge set
- Non-Hydrocarbon grease
- Spanner wrench

TIPS

After owning an L-Factor appliance here are some things you can do to enhance it's superior performance

- Employ the most efficient coalescing technology available.
- Keep the air/gas as cool as possible - as little as a 20 degree increase in temperature can reduce cartridge capacity by 50%.
- Replace cartridges as a complete set.

TO LOCATE A DEALER NEAR YOU

Call Monday - Friday
8:30 am to 5:00 pm est.
800-338-5493 or
305-430-0550

check out our website:
www.Lawrence-Factor.com

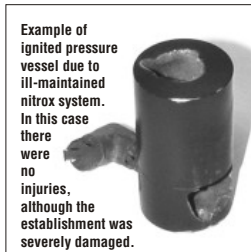
SPECIALTY APPLICATIONS



WHEN MIXING SOMETHING MORE ACCURATE THAN A HIGHBALL . . .

There are a number of recipes for mixing up a batch of Oxygen Enriched Air (NITROX). Illustrated here is a partial pressure method you can use with an oil-lubed compressor as the air source. It is the most convenient and affordable way for any fill station owner to add Nitrox to his mix of products. Before getting started, however, we implore you to read the following discussion:

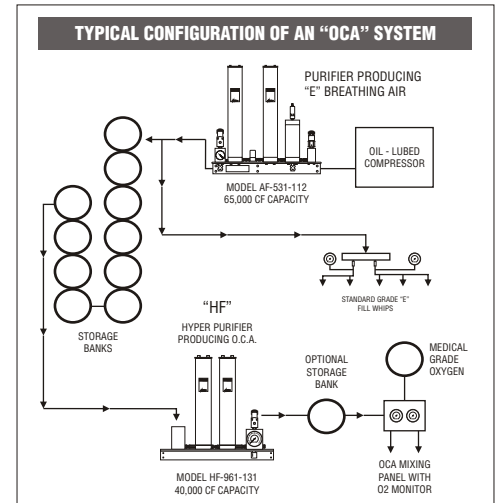
- When air for recreational diving fails to meet prescribed specs - the repercussions may easily endanger life or health. At another level, air being prepared for mixing into high-pressure oxygen can be just as unforgiving - with the potential rising to



"extremely risky - extremely quickly". Compressed oxygen is highly volatile in the presence of fuel (for instance: particles & lubricant oils) and we have seen cases where dive air systems have erupted into explosive flamethrowers virtually within seconds! We cannot stress too much that it is critically important to keep your nitrox system well maintained and contaminant free.

- Like any finicky piece of apparatus - a nitrox blending system will pose its' share of idiosyncrasies during construction and installation. It takes a professional to recognize these developments as they arise. It also takes experience to know how to solve them. Once installed, trained personnel are required in order to continue operating it properly. We cannot stress too much that a nitrox system, with sufficient

safety features built-in, must be **installed and operated by qualified professionals.**



AN L-FACTOR HF APPLIANCE IS THE PERFECT CHOICE FOR POLISHING AIR TO BE MIXED WITH OXYGEN



CNGV APPLIANCES FOR SMALL TO MEDIUM SIZED FUELING STATIONS

Advantages:

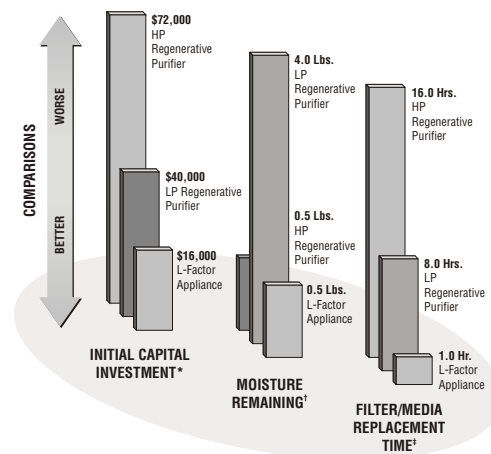
A superior choice, in many respects, as shown in comparisons against high and low-pressure regenerative dryers.

- Significantly lower capital investment - saving as much 75% over regen systems.
- Low installation costs. Just bolt and go.
- Simplistic design leads to minimal maintenance requirements and little down time.
- Wide selection of cartridges available. This enables experimentation or changes in efficiency by simply inserting new cartridges.
- Replacing cartridges in a swift and simple exercise - minutes vs. hours or days.
- Up to 4 times more capacitance for moisture.
- There are no electrical controls thereby eliminating the risk of accidental gas ignition.

Limitations:

- Frequent cartridge changes could limit practicality of use in higher demand situations.
- May not be operated at temperatures above 120° F.
- Some gas will be vented to atmosphere during cartridge change.

LAWRENCE FACTOR Appliances Compared:



* Prices are for a 1 million cubic feet L-Factor Appliance and comparable high and low pressure regenerative systems. Prices were accurate at time of publication.

† Based on 7 pounds of water per 1 million cubic feet of gas as it leaves the gas pipeline.

‡ For HP regenerative systems, media change can take up to 16 hours if oil contaminated.

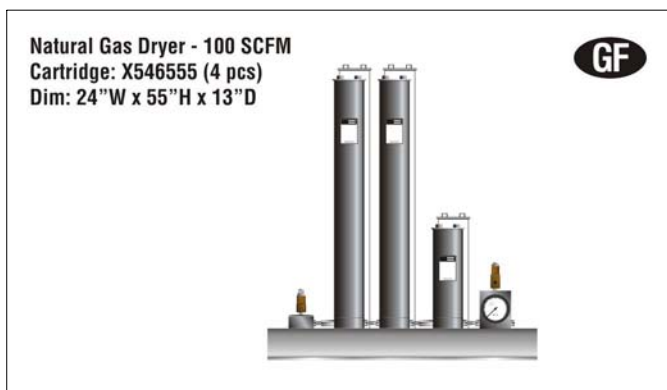
CNGV Appliances

For Small To Medium Sized Fueling Stations Developed specifically for dehydrating and filtering of CNG fuels used in vehicles, the L-Factor GF series of appliances are perfect for smaller fueling stations. Due to our "once-thru" cartridge concepts, contaminants remain in the cartridges; there is no loose desiccant to contend with or clean up after; and little danger of environmental pollution.

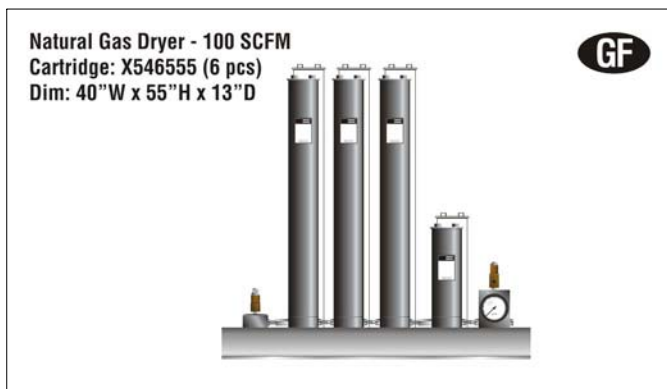
Included: Inlet manifold, check valve, relief valve, priority valve, petcock vent, pressure gauge, all stainless steel couplers and fasteners, micron particle filter, X-pendable® cartridge set, instruction manual, full 1 year warranty and lifetime warranty against corrosion of the cartridge holders.

Specifications: Working Pressure 2000 - 5000 psi, Max. Operating Temperature 120°F, Safety Factor 4:1, Cycle Life 15,000

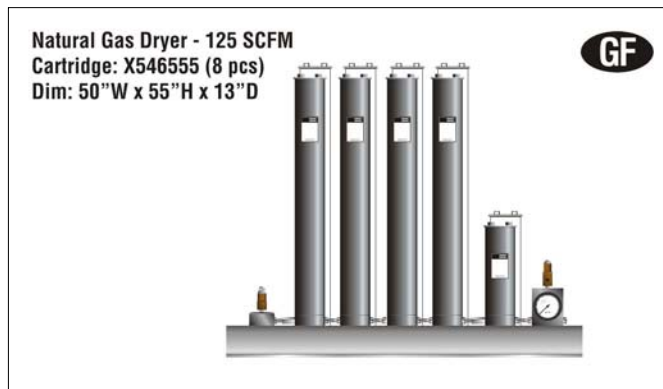
Construction of Cartridge Holder: "AF" Type - 5000 psi - Aluminum Super Towers



Item No.	Cubic Feet	SCFM
GF-544-142-P	425000	100



Item No.	Cubic Feet	SCFM
GF-544-143-P	625000	100



Item No.	Cubic Feet	SCFM
GF-544-144-P	1000000	125

Economy Purifiers

For low flow rates or smaller air/gas producers - these units serve up a power-packed purifier in a tiny package. By combining coalescing and adsorbent purification under one roof-at a conservative price and without sacrificing performance.

Included: Check valve, relief valve, priority valve, drain valve, pressure gauge, all stainless steel couplers and fasteners, micron particle filter, cartridge set, instruction manual, full 1 year warranty and lifetime warranty against corrosion of the cartridge holders.

Specifications: Working Pressure 2000 - 5000 psi, Max. Operating Temperature 120°F, Safety Factor 4:1, Cycle Life 15,000

Construction of Cartridge Holder: "AF" Type - 5000 psi Aluminum



Item No.	Cubic Feet	SCFM
AF-541-101-F	13000	8

High Capacity Purifiers

In those cases where production volumes are moderately high - these purifiers will keep your investment affordably low. We've extended the height of our standard cartridge holder, thereby housing a longer, 5-pound cartridge. Dubbed the "super tower" - this results in a purifier which allows nearly as much adsorbent content in a single tower as you'd get in two of our standard housings.

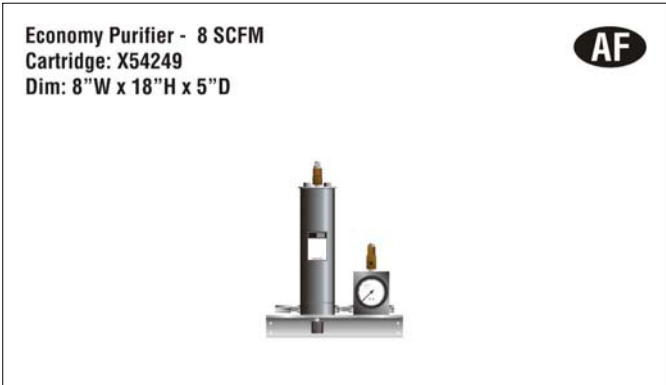
Included: Inlet manifold, check valve, relief valve, cartridge change indicator, priority valve, drain valve, petcock vent, pressure gauge, all stainless steel couplers and fasteners, micron particle filter, X-pendable® cartridge set, instruction manual, full 1 year and lifetime warranty against corrosion of the cartridge holders.

Specifications: Working Pressure 2000 - 5000 psi, Max. Operating Temperature 120°F, Safety Factor 4:1, Cycle Life 15,000

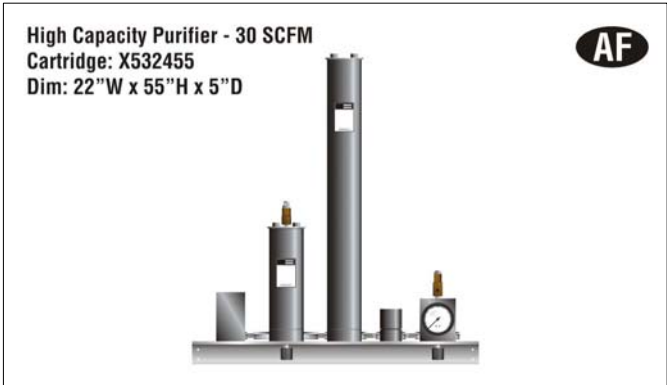
Construction of Cartridge Holder: "AF" Type - 5000 psi Aluminum. Overhead clearance for cartridge changes = 44".



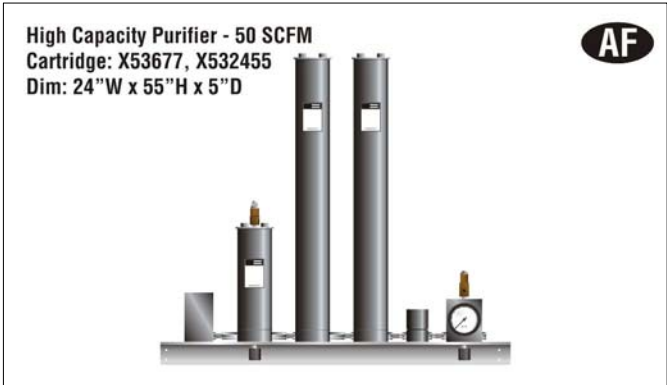
Item No.	Cubic Feet	SCFM
AF-541-103-F	18000	12



Item No.	Cubic Feet	SCFM
AF-541-104-F	6500	8



Item No.	Cubic Feet	SCFM
AF-531-140-F	55000	30



Item No.	Cubic Feet	SCFM
AF-531-142-F	125000	50

Hyper Purifiers

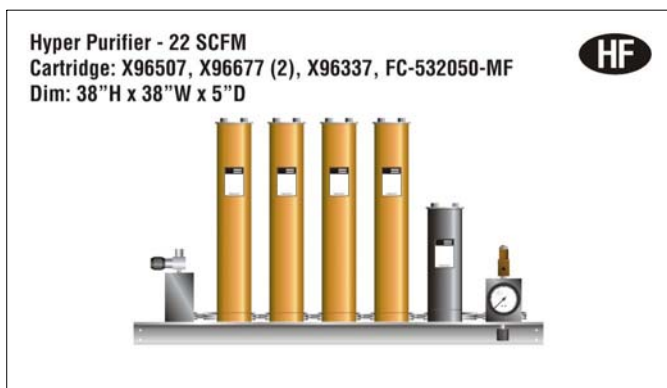
Polishing clean gases to ultra pure levels (up to 99.99%) requires equipment designed to those standards. Our Hyper Purifiers will meet the demands of applications such as very pure laboratory gases, blending gases, oxygen compatible air, and anywhere that "zero air" might be required. Hyper Purifiers are a sensible and simple way to process these gases. Determining the appropriate model is easy too - with the help of our technical representatives.

Included: Inlet isolation valve and manifold, redundant check valves, priority valve, pressure gauge, petcock vent, all stainless steel couplers and fasteners, high efficiency micron filter, X-pendable® cartridge set, instruction manual, full year warranty.

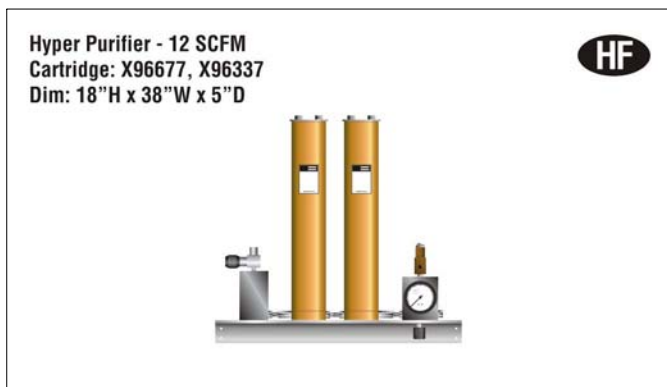
Specifications: Working Pressure 2000 - 5000 psi, Max. Operating Temperature 100°F, Safety Factor 4:1, Cycle Life 15,000

Construction of Cartridge Holder: Aluminum with Bronze Hard Anodize

Optional: High Capacity Micronic Filter and Ultra Efficiency Micron



Item No.	Cubic Feet	SCFM
HF-961-114-F	75000	22



Item No.	Cubic Feet	SCFM
HF-961-131-F	40000	12



Item No.	Cubic Feet	SCFM
HF-962-134-F	7000	6

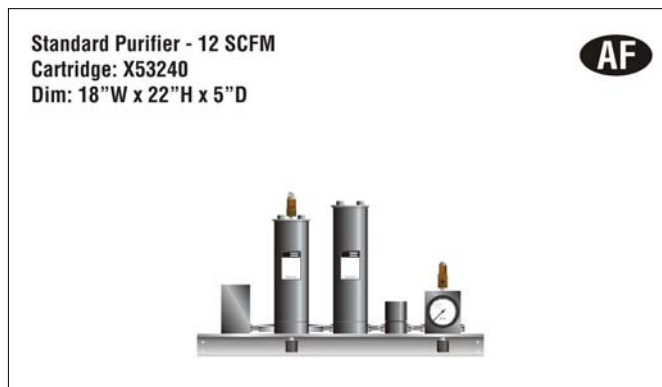
Standard Purifiers

Suited to producing average amounts and types of purified air/gas - our standard purifiers satisfy flow demands between 6 and 75 SCFM. These units are the staple of the breathing air industry - including fire brigades and dive retailers.

Included: Inlet manifold, check valve, relief valve, cartridge change indicator, priority valve, drain valve, petcock vent, pressure gauge, all stainless steel couplers and fasteners, micron particle filter, X-pendable® cartridge set, instruction manual, full 1 year warranty and lifetime warranty against corrosion of the cartridge holders.

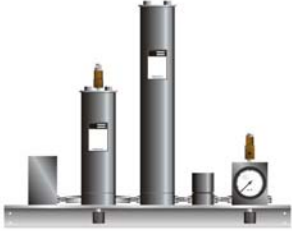
Specifications: Working Pressure 2000 - 5000 psi, Operating Temperature 120°F, Safety Factor 4:1, Cycle Life 15,000

Construction of Cartridge Holder: "AF" Type - 5000 psi Aluminum



Item No.	Cubic Feet	SCFM
AF-531-110-F	13000	12


Standard Purifier - 20 SCFM
Cartridge: X53247
Dim: 18"W x 22"H x 5"D



AF

Item No.	Cubic Feet	SCFM
AF-531-111-F	26000	20

Standard Purifier - 60 SCFM
Cartridge: X53507, X53677 (2 pcs), X53437
Dim: 38"W x 38"H x 5"D



AF

Item No.	Cubic Feet	SCFM
AF-531-114-F	140000	60


Standard Purifier - 40 SCFM
Cartridge: X53677 & X53247
Dim: 24"W x 38"H x 5"D



AF

Item No.	Cubic Feet	SCFM
AF-531-112-F	65000	40

Standard Purifier - 40 SCFM
Cartridge: X53677 (2 pcs) & X53247
Dim: 30"W x 38"H x 5"D



AF

Item No.	Cubic Feet	SCFM
AF-531-113-F	110000	40


Adsorbent Cartridge Holder

With their rugged construction and wide choice of configurations - L-Factor™ Adsorbent Cartridge Holders are a convenient way to upgrade your purification system or to add a "point of use" adsorbent filter. Combined with an L-Factor™ X-pendable® cartridge - our cartridge holders can solve most any impurity concern in your compressed gas. Choices of materials include Aluminum, Steel, and Stainless Steel with pressure ratings running up to 15,000 psi. Each holder includes one X-pendable® Cartridge and a lifetime warranty against corrosion. Please specify application in order to determine proper cartridge.

Included: Parts List, Decal with Cartridge Number, Cartridge (customer must specify application), & Warranty (1 year)

Adsorbent Cartridge Holder
Max Pressure: 700 psi
Material: Aluminum

AB



pu-820035-ab


AB Type - Aluminum - 700 psi

Item No.	Cartridge Style	SCFM
PU-820035-AB	82 Series, 6 Lb.	30

CYCLE LIFE: 15,000 MATERIAL: 6061 Aluminum SAFETY FACTOR: 4:1 FINISH: Hard Anodize

Adsorbent Cartridge Holder
Max Pressure: 5000 psi
Material: Aluminum

AF



pu-530001-af pu-530002-af pu-530003-af pu-530005-af

AF Type - Aluminum - 5000 psi

Item No.	Cartridge Style	SCFM
PU-240001-AF	24 Series, 1 Lb.	40
PU-440001-AF	44 Series, 1 Lb.	40
PU-530001-AF	53 Series, 1 Lb.	40
PU-530002-AF	53 Series, 2 Lb.	60
PU-530003-AF	53 Series, 3 Lb.	75
PU-530005-AF	53 Series, 5 Lb.	75
PU-960003-AF	96 Series, 3 Lb.	30

CYCLE LIFE: 15,000 MATERIAL: 7075 T6 Aluminum SAFETY FACTOR: 4:1 FINISH: Hard Anodize

Adsorbent Cartridge Holder
Max Pressure: 6000 psi
Material: Steel

CE



pu-530001-ce

CE Type - Steel - 6000 psi

Item No.	Cartridge Style	SCFM
PU-200005-CE	20 Series, 5 Lb.	120
PU-530001-CE	53 Series, 1 Lb.	30
PU-810005-CE	81 Series, 5 Lb.	120

CYCLE LIFE: 100,000 MATERIAL: 4130 Steel SAFETY FACTOR: 4:1 FINISH: Zinc Coated

Adsorbent Cartridge Holder
Max Pressure: 6000 psi
Material: Stainless Steel

TE



pu-60003-te

TE Type - Stainless Steel - 6000 psi

Item No.	Cartridge Style	SCFM
PU-600003-TE	60 Series, 3 Lb.	75

CYCLE LIFE: 200,000 MATERIAL: 17-4 Stainless Steel SAFETY FACTOR: 4:1 FINISH: Brushed / Turned

Adsorbent Cartridge Holder
Max Pressure: 15,000 psi
Material: Stainless Steel

TH



pu-540001-th

TH Type - Stainless Steel - 15,000 psi

Item No.	Cartridge Style	SCFM
PU-540001-TH	54 Series, 1 Lb.	40

CYCLE LIFE: 200,000 MATERIAL: 303 Stainless Steel SAFETY FACTOR: 4:1 FINISH: Brushed / Turned


Duplex Cartridge Holder


The economy approach both mechanical and adsorbent filtration under one roof. These L-Factor Duplex Holders are a clever design which shortcuts the need for separated housing in low flow air/gas systems. They are ideal for portable compressors under 10 cfm.

Included: Parts List, Decal with Cartridge Number, Cartridge (customer must specify application), & Warranty (1 year)

Recommended: Spare Cartridge, High Purity Thread Lube, & Seal Kit

Duplex Cartridge Holder
Max Pressure: 5000 psi
Material: Aluminum





pu-540024-af

Aluminum - 5000 psi

Item No.	Cartridge Style	SCFM
PU-540024-AF	20 Micron, 54 Series .5 Lb	8
PU-540025-AF	20 Micron, 54 Series 2.5 Lb	20

CYCLE LIFE: 15,000 MATERIAL: 7075T6 Aluminum SAFETY FACTOR: 4:1 FINISH: Hard Anodize


Mechanical Cartridge Holder


Intended to remove the bulkiest solids, particle, and droplets - a Mechanical Cartridge Holder is a keen approach at initiating the purification process. Placement at the inlet to an adsorbent purifier - the mechanical filter tackles the heavier contaminants before they overload the adsorbent cartridges. Like other L-Factor filtration components - our Mechanical Cartridge Holders are available in an assortment of ratings and materials. If your purification requirements are highly stringent - we offer hop up kits which can increase efficiency to as high as 99.9% and at sub micron ratings.

Included: Parts List, Decal with Cartridge Number, Cartridge (customer must specify application), & Warranty (1 year)

Recommended: Spare Cartridge, High Purity Thread Lube, & Seal Kit

Mechanical Cartridge Holder
Max Pressure: 6000 psi
Material: Aluminum





pu-530020-ae

AE Type - Aluminum - 6000 psi

Item No.	Cartridge Style	SCFM
PU-530020-AE	Hanging, 20 Micron	75
PU-530021-AE	Standing, 20 Micron	75

CYCLE LIFE: 50,000 MATERIAL: 7075T6 Aluminum SAFETY FACTOR: 4:1 FINISH: Hard Anodize CARTRIDGE STYLE: Bronze

Mechanical Cartridge Holder
Max Pressure: 6000 psi
Material: Aluminum / Stainless Steel






pu-530020-te


TE Type - Stainless Steel w/Aluminum Head - 6000 psi

Item No.	Cartridge Style	SCFM
PU-530020-TE	Hanging, 20 Micron	75
PU-600020-TE	Standing, 20 Micron	75

CYCLE LIFE: 200,000 MATERIAL: 17-4 Stainless Steel SAFETY FACTOR: 4:1 FINISH: Brushed / Turned CARTRIDGE STYLE: Bronze

Mechanical Cartridge Holder
Max Pressure: 15,000 psi
Material: Stainless Steel





pu-540021-th

TH Type - Stainless Steel - 15,000 psi

Item No.	Cartridge Style	SCFM
PU-540021-TH	Hanging, 0.1 Micron	75

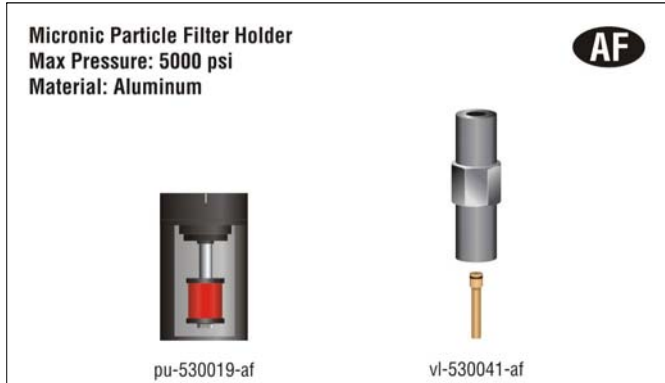
CYCLE LIFE: 200,000 MATERIAL: 303 Stainless Steel SAFETY FACTOR: 4:1 FINISH: Brushed / Turned CARTRIDGE STYLE: Micro Fiber

Micronic Particle Filter Holder

An L-Factor In-Line Micronic Filter strategically placed at usage points along your compressed air/gas system can protect devices and controls against particle solids. Simple to install and changing cartridges is easy.

Included: Parts List, Decal with Cartridge Number, Cartridge (customer must specify application), & Warranty (1 year)

Recommended: Spare Cartridge, High Purity Thread Lube, & Seal Kit



Aluminum - 6000 psi

Item No.	Cartridge Style	SCFM
PU-530019-AF	0.1 Micron, Opt. 0.01 Micron	125
VL-530041-AF	2 Micron, Opt. 10 Micron	20

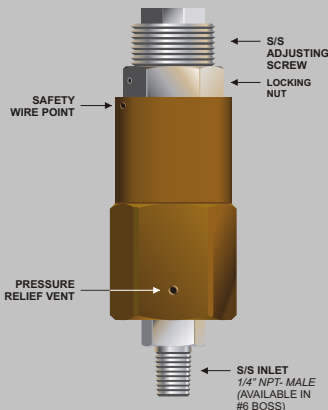
CYCLE LIFE: 15,000 MATERIAL: 7075T6 Aluminum SAFETY FACTOR: 4:1 FINISH: Hard Anodize

KEEPING YOUR AIR&GAS PURIFICATION SYSTEM PERFORMING AT TIP TOP
 CONDITION REQUIRES SUPERIOR MAINTENECE PRODUCTS. L-FACTOR
 MAKES IT CONVENIENT TO GET THOSE PRODUCTS - PRODUCTS KNOWN
 FOR RELIABILITY, RUGGEDNESS, AND PERFORMANCE.

**Relief Valve
 #VL-530130-TH**

A product so reliable yet so fairly priced that it is destined to rise above other industry favorites. This pressure relief valve has proven itself dependable, stout, resistant to harsh environments, easy to maintain, and well designed.

Testing and practical use has shown that it can withstand thousands of cycles without leaking-by or drifting. The body is constructed of high tensile, hard coated aluminum while all whetted areas are corrosion resistant materials such as stainless steel or plastic resin. The inlet fitting, also stainless steel, comes standard with 1/4" npt-male threads but can be easily swapped for Boss or Metric versions. Plenty of attention has been paid to details such as polished edges, pre-taped pipe thread, inclusion of safety wire, instruction manual and our unparalleled 12-month "Critical Factor" warranty.




As reliable as your equipment may be-there will come a time when it will require some maintenance or perhaps you will simply want to enhance it's performance. This is the time where an L-Factor high-pressure accessory can satisfy your needs.


Just as rugged and reliable as our purification appliances - because many of these are the very same components that go into our appliances - they are built to those same high standards. Of course, all L-Factor air/gas accessories are crafted to serve critically pure needs and at highly elevated pressures - some as high as 10,000 psi.


We offer a healthy selection of valving, piping & hose, gauges, and air&gas controls - all constructed of the toughest materials, withstanding nature's meanest elements. Our engineers took extra care that these products would have as few moving parts as possible - knowing that this feature will keep them operating far longer than most and make them a snap to service.





Bleed & Flow Valves


	Item No.	VL-530115-TE
	Rating	6000 psi
	Petcock Bleeder, 1/4" NPT-Male	

	Item No.	VL-530118-TE
	Rating	6000 psi
	In-Line Bleeder, 1/4" NPT-Female	


	Item No.	VL-530119-TE
	Rating	6000 psi
	In-Line Bleeder, 1/4" NPT-Female, 1/4" NPT-Male	


	Item No.	VL-531120-TE
	Rating	6000 psi
	Bleeder Petcock w/Stem, 1/4" NPT-Male	


	Item No.	VL-530112-BE
	Rating	6000 psi
	In-Line Globe Valve, 1/4" NPT-M (in) x 1/4" NPT-F (out)	


	Item No.	VL-531121-TE
	Rating	6000 psi
	Bleeder Petcock w/Stem, 1/4" BSP-Male	


Check Valves

	Item No.	VL-530120-TE
	Rating	6000 psi
	1/4" NPT-Female (in & out)	


	Item No.	VL-530121-TE
	Rating	6000 psi
	#6-Boss Male (in & out)	


	Item No.	VL-530122-TE
	Rating	6000 psi
	1/4" NPT-Male (in & out)	


	Item No.	VL-530123-TE
	Rating	6000 psi
	1/4" NPT-Male (in) x #6 Boss-Male (out)	


	Item No.	VL-530124-TE
	Rating	6000 psi
	1/4" NPT-Female (in) x 1/4" NPT-Male (out)	

Cylinder Charging


	Item No.	FB-006112-MT
	Rating	5000 psi
	CGA Handwheel & Nipple, 1/4" NPT-Male, CGA 347	


	Item No.	VL-530014-BD
	Rating	3500 psi
	Scuba Yoke w/Bleed & On/Off Valve	

	Item No.	VL-530150-TD
	Rating	3500 psi
	Scuba Yoke w/o Bleeder, 1/4" NPT-Female Inlet	


	Item No.	VL-530113-BD
	Rating	3500 psi
	Scuba Yoke w/Bleed, 1/4" NPT-Female	


Gauge


	Item No.	GG-531005-TG
	Rating	0-7500 psi
	Pressure Gauge 1/4" NPT Lower Inlet	


	Item No.	GG-531105-TG
	Rating	0-7500 psi
	Pressure Gauge, 1/4" NPT Back Inlet	


Hoses & Tubing


	Item No.	TU-530010-TF
	Rating	5000 psi
	High Pressure Tubing, 6mm OD, 304 Stainless Steel	

	Item No.	TU-530012-AC
	Rating	2000 psi
	High Pressure Tubing, 12mm OD, Aluminum	


	Item No.	TU-530015-PF
	Rating	5000 psi
	High Pressure Hose, Assembly, Custom Length	


	Item No.	TU-530016-TE
	Rating	6000 psi
	High Pressure Tubing, 1/8" OD, 304 Stainless Steel	

	Item No.	TU-530017-TF
	Rating	5000 psi
	High Pressure Tubing, 1/4" OD, 304 Stainless Steel	


	Item No.	TU-530018-TF
	Rating	5000 psi
	High Pressure Tubing, 3/8" OD, 304 Stainless Steel	


Indicator

	Item No.	GI-531920-AG
	Rating	6000 psi
	Cartridge Change Indicator 1/4" NPT-F	


	Item No.	GI-532020-AG
	Rating	6000 psi
	Cartridge Change Indicator #6 Boss-F	

Manifolds


	Item No.	MN-530014-AF
	Rating	5000 psi
	Manifold, 5 port, 1/4" NPT	


	Item No.	MN-530019-AF
	Rating	5000 psi
	Manifold, 7 ports, 1/4" NPT	


Priority Valve

	Item No.	VL-530141-TG
	Rating	7000 psi 75 SCFM
	Standard Version, 1/4" NPT-M Inlet (S/S), two 1/4" NPT-F Outlet	

Relief Valve

	Item No.	VL-530131-TH
	Rating	1000 to 7000 psi 50 SCFM
	Relief Valve, 1/4" NPT-M	

	Item No.	VL-530111-AF
	Rating	200 to 6000 psi 30 SCFM
	Relief Valve, 1/4" NPT-M	

	Item No.	VL-530130-TH
	Rating	1000 to 5000 psi 50 SCFM
	Relief Valve, 1/4" NPT-M	

Service Kit for Bleed & Flow Valves



Item No.	RK-534140-SF
Fits	L-Factor
Tip for Bleeder & Petcock Valves	

Service Kit for Cartridge Holders



Item No.	OK-535306-OO
Fits	LF Holder
O-ring Kit	



Item No.	SK-101003-BC
Fits	Allied Air 2333
O-ring Set for Standard Cartridge Holder	



Item No.	SK-220026-HS
Fits	Bauer 61860
Service Kit for FC-220029-SB (61860)	



Item No.	SK-222203-BC
Fits	Bauer N4735 & N4736
O-ring Set for Standard Cartridge Holder	



Item No.	SK-242403-BC
Fits	Air Dry
O-ring Set for Standard Cartridge Holder	



Item No.	SK-353501-BC
Fits	Fluid PAC2333
O-ring Set for Standard Cartridge Holder	



Item No.	SK-363601-BC
Fits	Eagle 50-L310
O-ring Set for Standard Cartridge Holder	



Item No.	SK-444402-BC
Fits	Aero Dri 5815
O-ring Set for 44 Style Cartridge Holder	



Item No.	SK-533003-BC
Fits	Poseidon
O-ring Set for 30 Style Cartridge Holder	



Item No.	SK-535306-BB
Fits	L-Factor
O-ring Set for 53 Style Cartridge Holder	




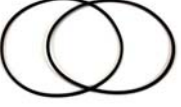
Item No.	SK-535306-VT
Fits	L-Factor
O-ring Set for 96 Style Cartridge Holder	




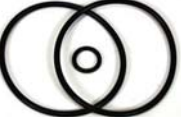
Item No.	SK-535310-BB
Fits	L-Factor
O-ring Set for Mechanical Filter Housing	


ACCESSORIES


	Item No.	SK-535394-BB
	Fits	L-Factor
	Quad Seal for Specialty Cartridge Holder	


	Item No.	SK-600020-BB
	Fits	L-Factor
	O-ring Set for 60 Style Cartridge Holder	

	Item No.	SK-656503-BC
	Fits	Mako M310
	O-ring Set for Standard Cartridge Holder	

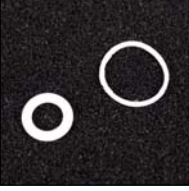
	Item No.	SK-727202-BC
	Fits	Robbins Aviation
	O-ring Set for Standard Cartridge Holder	


	Item No.	SO-222204-BC
	Fits	Bauer N04586
	O-ring for P-O Filter Unit	

	Item No.	SO-222205-BC
	Fits	Bauer N00062
	O-ring for Final Filter Unit	


	Item No.	SO-222206-BC
	Fits	Bauer N03556
	O-ring for Interstage Filter Head	


Service Kit for Check Valves


	Item No.	GK-530200-SF
	Fits	L-Factor
	Soft Goods Service Kit for Check Valve	

	Item No.	RK-530200-HS
	Fits	L-Factor
	Complete Service Kit for Check Valve	


Service Kit for Indicators


	Item No.	EL-531926-RA
	Fits	L-Factor
	H2O Indicator Capsule for Indicator	

	Item No.	EL-652653-OO
	Fits	Mako M7414
	CO Button & H2O Ring for Visual Monitor	


	Item No.	GK-530023-SF
	Fits	L-Factor
	Soft Goods Kit for Indicator	


Service Kit for In-Line Filter Holders

	Item No.	EL-534051-E
	Fits	L-Factor
	2 Micron Element for In-Line Filter Holder	

	Item No.	EL-534051-G
	Fits	L-Factor
	10 Micron Element for In-Line Filter Holder	


Service Kit for Priority Valves


	Item No.	RK-530201-HS
	Fits	VL-530110-AF
	Complete Service Kit for Priority Valve	

	Item No.	RK-530210-HS
	Fits	L-Factor
	Complete Service Kit for Priority Valve	

Service Kit for Relief Valves

	Item No.	RK-530202-HS
	Fits	VL-530111-AF
	Complete Service Kit for Relief Valve	

	Item No.	RK-530203-HS
	Fits	VL-530130-TH
	Complete Service Kit for Relief Valve	

	Item No.	RK-530204-HS
	Fits	VL-530131-TH
	Poppet for Relief Valve	

AS SEEN BY A PEARL WRAPPED AROUND AN IRRITATING PEBBLE - THE NATURAL WORLD HAS ITS WAY OF OUTSMARTING POLLUTANTS. L-FACTOR HAS WOVEN THOSE TACTICS - STEEPED IN SCIENCE & TECHNOLOGY - INTO OUR FILTERS: SNARING PARTICLES ON SUB-MICRON SPIDER WEBS, FORCING VAPORS INTO TURBULENT RAINFALL, OR PUTTING UP MOLECULAR DAMS TO STOP GASEOUS IMPURITIES. WHEN SOLVING YOUR PURITY NEEDS - X-PENDABLE® & X-TRACTOR™ CARTRIDGES ARE THE NATURAL CHOICE.

Improve the performance of your current purifier by installing L-Factor cartridges. We offer versions to fit many OEM brands.



ALLIED AIR PRODUCTS, INC.



If your requirements involve Hi-psi air or inert gases, L-Factor™ “once through” X-pendable® filters are highly effective. X-pendables® are recognized worldwide as the premier filter cartridge. Precision engineered and charged with laboratory formulated purifying media, our filters are designed for optimum removal of contaminants.

Outside an X-pendable®, for instance, is a rugged transparent shell with electronically welded seams. Because it’s transparent, you can use your X-pendable® filter cartridge to easily watch the performance of your compressed air/gas system - observing unusual accumulations of sediment or moisture in the cartridge. As an additional aid, many cartridges include our trademark LifeBand™ that changes color to alert you when your X-pendable® has exceeded its useful life. Unlike metal filters, an X-pendable® will never rust or corrode. Plus, with our special welding process, an X-pendable’s® seams won’t split.

Inside is a carefully balanced mixture of adsorbents such as Vaporshell™ for moisture removal or activated carbon to eliminate oil vapors, and a micronic filter element for pre-filtering of fine dust and grit. We employ a variety of Desiccants which have been activated to maximum adsorbency. By activation, the desiccants can hold up to 22% of their own weight in water vapors. This enables us to drop dewpoints as low as -100°F. In all, L-Factor™ has developed, blended and activated more than 16 species of adsorbents and catalysts which are used in X-pendable® Cartridges. In some cases, particularly for specialized applications, a filtering agent may be specially treated to enhance effectiveness. Hundreds of X-pendable® models are available. This translates into the ideal filter cartridge designed for unusual applications and experimental sites or simply to better enhance a standard application.



**X-PENDABLE
FILTER CARTRIDGE
(ADSORBENT)**

**GETTING THE BEST
PERFORMANCE OUT OF
X-PENDABLE CARTRIDGES**

- All cartridges in the system must be replaced together as a set.
- Do not swap used cartridges from one tower to another.
- Avoid contamination of the downstream system and lines by replacing the cartridges before they are spent.
- Maximum cartridge life once installed is six months regardless if it has not reached the full processing capacity.



Tips On Getting The Best Performance Out Of X-pendable® Cartridges . . .

- * All cartridges in the system must be replaced together as a set.
- * Do not swap used cartridges from one tower to another.
- * Avoid contamination of the downstream system and lines by replacing the cartridges before they are spent.
- * Maximum cartridge life once installed is six months regard less if it has not reached the full processing capacity.

RELIABLE SHELF LIFE

X-pendable® cartridges come with a guaranteed 2-year shelf life so long as the airtight wrapper has not been opened. If you are in doubt about the manufacture date, contact your dealer or the customer service extension at L-factor™ to determine remaining shelf life. Reliability and freshness of the cartridge should be questioned after this date.

GOOD FILTRATION PRACTICES

No matter what quality filter cartridge that you are using, proper system maintenance, operating environment and scheduled filter changes will dictate the results and longevity of your cartridges. The most common cause of poor air/gas quality is to exceed the useful life of the cartridges.

1. The lower you keep the operating temperature of your filter system, the greater the lifespan you can expect between cartridge changes.

2. Efficient coalescor ahead of the cartridge system will add to filter life. Since coalescors are available in many efficiency ratings (from 50% to 99.9%) the ability of this equipment to eliminate condensables before entering the cartridge is an obvious part of the longevity puzzle.

3. Variations in pressures and flows will have a definitive bearing on cartridge performance. A priority valve at the discharge from your purification system is a must. This will maintain a minimum pressure (i.e. 2000 psi) within the system. In certain cases, a flow governor will be indicated as well.

4. The correct choice in cartridges is naturally an important factor. Even if your system is marked for certain cartridges, these are usually chosen by the original equipment manufacturer for typical conditions and average uses.

5. A good quality control program for the product you are making (and purified air/gas is a product) should be implemented. This would include keeping of log books, scheduled maintenance, frequent cartridge changes and frequent testing of the air/gas for purity assurance.

X-pendable®, How It Works

USEFUL CARTRIDGE LIFE

X-pendable® filter cartridges function by attracting and holding contaminants onto various types of “adsorbent” media’s. These adsorbents, however, possess a limited capacity for these substances - at most 25% of the weight of the media. Once that capacity has been reached, the cartridge must be replaced. Also, the amount of media capacity is affected by . . .

* PARTICULAR APPLICATION

type of gas, levels of purity, etc.

* OPERATING CONDITIONS

pressure and temperature

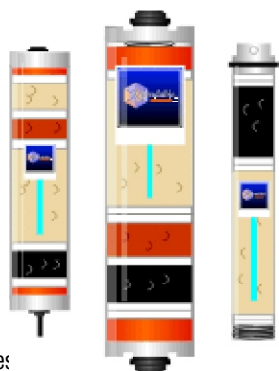
* THROUGHPUT RATE

Standard Cubic Feet per Minute (SCFM)

* TYPE OF ADSORBENT

Molecular Sieves, Silica Gel

Activated Carbon



Even minor changes in any of these variables (temperature) could drastically impact the overall cartridge capacities. The Purification X-perts® at Lawrence Factor®, Inc. are able to calculate these capacities based on the operating conditions at your particular site. Contact your L-Factor™ dealer or the Techline extension at Lawrence Factor® directly to obtain this service: 305-430-0550.



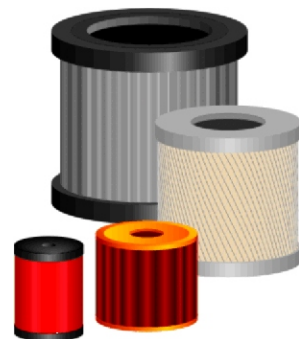
X-tractor™ Filters For Purity & Efficiency

You get competitive pricing and Lawrence Factor® dependability with the X-tractor. There are two types of X-tractor filters and both are safely disposable.

Intake X-tractor Elements, used at the air intake of compressors for pre-filtering, efficiently remove airborne particles as tiny as 5 microns. Coalescing X-tractors are placed at the filter system inlet to force out up to 99.9% of airborne water and oil droplets and vapor. Priced economically enough to be thrown away, coalescing X-tractors are constructed of an array of materials including: resin fibers, sintered metals, fabrics and fibers.

Used in conjunction with L-Factor X-pendable® cartridges, X-tractors complete a smoothly working arrangement designed to elicit optimum performance from your compression-purification system. Working together, they remove a huge assortment of solid, gaseous and vaporized contaminants, including:

Carbon Monoxide, Carbon Dioxide, Water, Chemical Fumes, Degreasing Vapors, Offensive Odors and Tastes, Water Vapor, Oil and Oil Vapors, Particles to .05 Microns, Halogenated Solvents, Chloro-Methyl-Ether, Organic Vapors, Sandblast Dust, Hydrocarbons, Asbestos, Vinyl Chloride Monomer and many others.



FILTER RATING

Due to the wide selection of cartridges that L-Factor offers - you may want some help in choosing one that's more suitable than the one you now use - whether that means economizing or enhancing performance. To help you with this - L-Factor has devised a Performance Rating for each X-pendable Cartridge. These ratings are listed in our product charts.

Ratings Are Expressed As A Code:

The first two characters (letters) designate the typical application for that cartridge or "Application Indicator".

- | | |
|-------------------------------------|------------------------------------|
| BR = Breathing Air | CD = Carbon Dioxide Removal |
| DR = Air/Gas Drying | ND = Inert Gas Drying |
| CL = Air/Gas Cleaning | NG = Natural Gas Drying |
| OD = Air/Gas Sweetening | PA = Particulate Removal |
| CM = Carbon Monoxide Removal | OY = Oxygen |

The numerical characters (digits) designate the performance scale - with a range of 1 to 10 we'll call this the "Performance Rating".

- | | | |
|--------------------|--------------------------------------|------------------|
| 1 = Poorest | 5 = Standard (OEM Equivalent) | 10 = Best |
|--------------------|--------------------------------------|------------------|

4 Easy Steps In Identifying A Cartridge:

Step 1: To start - you will have to know the "standard" cartridge that fits your cartridge holder. This is usually marked on the cartridge holder or manufacturers' instructional manual.

Step 2: If this is an OEM cartridge-then first convert over to an L-Factor equivalent (**PD1803 = X65247**).

Step 3: Take note of the 5th and 6th digit(s) of the L-Factor product number. This indicates the cartridge size. We'll call this digit the "Size Indicator"



Step 4: Now select an alternative cartridge.

- A. Select from the same "Series Chart" in which the OEM cartridge was listed (**X65247 = 65 Series**).
- B. Choose a cartridge ending with the same "Size Indicator" (**X65247 = size 7**).
- C. Choose a cartridge with the same "Application Indicator" (**BR**).
- D. To improve performance & capacity - choose a cartridge with a "Performance Rating" *higher* than 5 (**Rating Code = BR6**)
- E. To economize - choose a cartridge with a "Performance Rating" *lower* than 5.

***NOTE: BY ECONOMIZING YOU MAY BE SACRIFICING SAFETY OR PERFORMANCE.**

CARTRIDGES



Aero Dri / Kiko / Gannon - 44 Series (Adsorbent)

Item No.	Fits	Rating
X44100	MA1	DR3
X44190	NA	CL6
X44220	C1AC	OD5
X44250	C1AA	DR4
X44350	NA	ND6
X44420	C06	CM6
X44440	NA	CM6
X44520	NA	CL5
X44670	C113X	DR5
X44680	C14A	ND5
X44690	NA	DR4



Aero Dri / Kiko / Gannon - 44 Series (Coalescor)

Item No.	Fits	Rating
FC-444401-WF	MF-1-5894	10 Micron



Aero Sub - 17 Series (Adsorbent)

Item No.	Fits	Rating
X176212	NA	CL5



Air Dry Corporation of America - 18 Series (Adsorbent)

Item No.	Fits	Rating
X18247	G4047-1C9-R	BR5
X18620	G4087-1-R	CL5
X18627	G4047-R	CL5
X18677	G4041-R	DR5



Air Dry Corporation of America - 20 Series (Adsorbent)

Item No.	Fits	Rating
X201011	G4075	DR3
X202211	G4077	OD5
X202411	G4077-1C9	BR5
X202511	G4076	DR4
X203511	G4072-1	ND6
X204211	NA	CM6
X206511	G4074	NG5
X206611	G4073	NG5
X206711	G4071	DR5
X206811	G4072	ND5

X206711-C	G4071 Special	DR6
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Air Dry Corporation of America - 24 Series (Adsorbent)

Item No.	Fits	Rating
X24100	G4085	DR3
X24107	G4045	DR3
X24220	G4087	OD5
X24227	G4047	OD5
X24240	G4087-1C9	BR5
X24247	G4047-1-C9	BR5
X24250	G4086	DR4
X24257	G4046	DR4
X24350	G4082-1	ND6
X24357	G4042-1	ND6
X24420	NA	CM6
X24427	NA	CM6
X24430	NA	CM6
X24480	G408-C-9	CM5
X24487	G404-C-9	CM5
X24500	NA	DR4
X24507	NA	DR4
X24620	G4087-1	CL5
X24627	G4047-1	BR5
X24650	G4084	NG5
X24657	G4044	NG5
X24660	G4083	NG5
X24667	G4043	NG5
X24670	G4081	DR5
X24677	G4041	DR5
X24680	G4082	ND5
X24687	G4042	DR5



Air Dry Corporation of America - 45 Series (Adsorbent)

Item No.	Fits	Rating
X45100	G4065	DR3
X45220	G4067	OD5
X45250	G4066	DR4
X45420	NA	CM6
X45440	NA	CM6
X45520	NA	CL5
X45650	G4065	NG5
X45670	G4061	DR5
X45680	G4067	ND5



Air Dry Corporation of America - 79 Series (Adsorbent)

Item No.	Fits	Rating
X792211	G4091-7	OD5
X792411	NA	BR5

X793511	G4092-1	ND6
X796311	NA	CL5
X796711	G4090-0	DR5



American Bristol Industries - 27 Series (Adsorbent)

Item No.	Fits	Rating
X274951	60XCAC	BR5
X275451	60CAC	CM5
X27670	60X-10C	DR5
X276751	60X	DR5



Alkin - 14 Series (Adsorbent)

Item No.	Fits	Rating
X14247	6556	BR5
X14248	Alkin Purifier	BR5
X14249	6556	BR5
X14628	7293	CL5
X14677	Alkin	DR5
X14678	Alkin Dryer	DR5



ANDI - 94 Series (Adsorbent)

Item No.	Fits	Rating
X942450	NA	BR5
X94247	7-023-1	BR5
X946250	7-027	CL5
X94677	7-024	DR6



Allied Air Products - 10 Series (Adsorbent)

Item No.	Fits	Rating
X10228	NA	OD5
X10248	AP-1	BR5
X10628	NA	CL5
X10678	AP-2	DR5



Bauer Compressor - 22 Series (Adsorbent)

Item No.	Fits	Rating
X22077	NA	OD6
X22217	58823	OD7
X22220	NA	OD5
X22227	58823 Special	OD5
X22231	67224	BR5
X22237	58827	BR5
X22240	58821	BR5
X22241	NA	BR5
X22247	058827 Special	BR5
X22257	58824	DR4
X22377	60035	DR5
X22420	80114	CM6
X22427	68416	CM6
X22437	NA	CM6
X22470	63282	CM8
X22471	63283	CM8
X22477	65562	CM8
X22501	NA	DR4
X22511	61686	CL5
X22517	60036	CL5
X22560	60030	CL5
X22570	60031	BR5
X22571	61687	BR5
X22577	60037	BR5
X22620	58820	CL5
X22621	62565	CL5
X22627	58826	CL5
X22650	72767	NG5
X22657	NA	NG5
X22670	NA	DR5
X22671	NA	DR5
X22677	58825	DR5



American Bristol Industries - 26 Series (Adsorbent)

Item No.	Fits	Rating
X26222	50AC	OD5
X26242	50XCAC	BR5
X26252	NA	DR4
X26422	50C	CM6
X26432	50CAC	CM6
X26502	NA	DR4
X26602	NA	CL4
X26622	50XAC	CL5
X26672	50X	DR5
X26679	50-X9	DR5
X267713	B9-C23-4	PA5
X26802	NA	BR4



American Bristol Industries - 26 Series (Air Intake)

Item No.	Fits	Rating
AA-262601-PP	22445	20 Micron

CARTRIDGES

X22687	090569A	NG5
X22697	NA	DR4
X22801	NA	BR4



Bauer Compressor - 22 Series (Air Intake)

Item No.	Fits	Rating
AA-222201-PP	N04823	20 Micron
AA-222202-PP	N70	20 Micron
AA-222203-PP	N03029	20 Micron



Bauer Compressor - 22 Series (Coalescor)

Item No.	Fits	Rating
FC-220027-SB	061859	10 Micron
FC-220028-SB	061858	30 Micron
FC-220029-SB	061860	10 & 30 Micron
FC-221020-SB	N02726	20 Micron



Bauer Compressor - 22 Series (Oil)

Item No.	Fits	Rating
FO-220030-PP	N25326	5 Micron



Bauer Compressor - 222 Series (Adsorbent)

Item No.	Fits	Rating
X22229	NA	OD5
X22249	59183	BR5
X22629	57679	CL5
X22679	NA	DR5



Bauer Compressor - 23 Series (Adsorbent)

Item No.	Fits	Rating
X23226	04852	OD5
X23626	NA	CL5
X23629	06961	CL5
X23676	NA	DR4



Bristol Pneumatics - 19 Series (Adsorbent)

Item No.	Fits	Rating
X192214	NA	OD5
X192412	NA	BR5
X192414	Y39390	BR5
X192417	NA	BR5
X196212	YC8974	CL5
X196214	Y38947	CL5
X196217	26485	CL5
X196714	NA	DR5
X196717	NA	DR5



Bristol Pneumatics - 25 Series (Adsorbent)

Item No.	Fits	Rating
X254951	65XCAC	BR5
X255451	65CAC	CM5
X25670	65X-10C	DR5
X25670-A	65X-10CA	DR5
X256751	65X	DR5



Bristol Pneumatics - 28 Series (Adsorbent)

Item No.	Fits	Rating
X282414	52-XCAC	BR5
X282417	42XCAC	BR5
X286717	42-X5A	DR5



Bristol Pneumatics - 29 Series (Adsorbent)

Item No.	Fits	Rating
X29222	NA	OD5
X29242	26450	BR5
X29622	26455	CL5
X29672	NA	DR5



Coltri Sub / Max Air / Nautica - 15 Series (Adsorbent)

Item No.	Fits	Rating
X151217	Aero Sub Purifier	BR4
X152212	NA	OD5
X152412	NA	BR5
X156212	NA	CL5
X156712	NA	DR5
X156717	Aero Sub Dryer	DR5



Coltri Sub / Max Air / Nautica - 15 Series (Air Intake)

Item No.	Fits	Rating
AA-150080-PP	IF-35A	20 Micron
AA-150081-PP	IF-90	20 Micron



Deltech / Del-Monox - 85 Series (Adsorbent)

Item No.	Fits	Rating
X85087	NA	
X854534	BA102	BR5
X856434	NA	BR5
X85647	BA4	BR5
X85677	NA	DR5
X856934	NA	DR4



Deltech / Del-Monox - 86 Series (Adsorbent)

Item No.	Fits	Rating
X863429	BA5	BR5



Deltech / Ingersol Rand - (Indicator)

Item No.	Fits	Rating
GI-851900-PA	Deltech / Ingersol Rand	NA



Eagle Compressor - 33 Series (Adsorbent)

Item No.	Fits	Rating
X33670	50CS01	DR5
X336722	50CM01	DR5
X33677	50CL01	DR5



Eagle Compressor - 34 Series (Adsorbent)

Item No.	Fits	Rating
X34240	50CS03	BR5
X342422	50CM03	BR5
X34247	50CL03	BR5



Eagle Compressor - 36 Series (Adsorbent)

Item No.	Fits	Rating
X36100	50MS-SG	DR3
X36107	50ML-SG	DR3
X36220	50MS-AC	OD5
X36227	50ML-AC	OD5
X36240	50MS03	BR5
X362422	50MM03	BR5
X36247	50ML03	BR5
X36250	50MS-A	DR4
X36257	50ML-A	DR4
X36430	NA	CM6
X36507	NA	DR4
X36620	50MS-XAC	CL5
X36627	50ML-XAC	CL5
X36670	50MS01	DR5
X366722	50MM01	DR5
X36677	50ML01	DR5



Eagle Compressor - 36 Series (Air Intake)

Item No.	Fits	Rating
AA-360101-PP	23-0104	10 Micron
AA-360102-PP	NA	NA
AA-360103-PP	NA	NA
AA-360104-PP	NA	NA
AA-360105-PP	NA	NA
AA-360106-PP	NA	NA



Eagle Compressor - 36 Series (Coalescor)

Item No.	Fits	Rating
FC-365030-SB	50M394	20 Micron



Eagle Compressor - 37 Series (Adsorbent)

Item No.	Fits	Rating
X37220	50RS02	OD5
X37225	50L02	OD5
X37245	50RL03	BR5
X37420	NA	CM6
X37425	NA	CM6
X37435	50RL05	CM6
X37625	50RL04	CL5
X37670	50RS01	DR5
X37675	50RL01	DR5
X37685	NA	ND5

CARTRIDGES



Eagle Compressor - 38 Series (Adsorbent)

Item No.	Fits	Rating
X38220	50-S0AC	OD5
X38230	50-S003	BR6
X38440	50-SCAC	CM6
X38520	50-S002	CL5
X38670	50-S001	DR5



Eagle Compressor - 40 Series (Adsorbent)

Item No.	Fits	Rating
X40490	50PM03	BR5
X404951	50PL03	BR5
X40670	50PM01	DR5
X406751	50PL01	DR5



Eagle Compressor - 41 Series (Adsorbent)

Item No.	Fits	Rating
X414917	NA	BR5
X416717	NA	DR5



Eagle Compressor - 42 Series (Adsorbent)

Item No.	Fits	Rating
X42226	50-4852	OD5
X42249	50-TX03	BR5



Eagle Compressor - 43 Series (Adsorbent)

Item No.	Fits	Rating
X43242	50A003	BR5
X43672	50A001	DR5
X43679	50A0X9	DR5



Eagle Compressor - 64 Series (Adsorbent)

Item No.	Fits	Rating
X64240	50MRS03	BR5
X642422	50MRM03	BR5



Fluid Concepts - 35 Series (Adsorbent)

Item No.	Fits	Rating
X35228	NA	OD5
X35248	A10-005	BR5
X35628	NA	CL5
X35678	A10-010	DR5



Fresh Air - 102 Series (Adsorbent)

Item No.	Fits	Rating
X102-242	Fresh Air - Purifier	BR5
X102-672	Fresh Air MCX5A-12	DR5



Hamworthy England - 13 Series (Adsorbent)

Item No.	Fits	Rating
X13244	Y30304, PAS18	BR5
X13624	Y30299	CL5



Ingersol Rand - 50 Series (Adsorbent)

Item No.	Fits	Rating
X504534	123708TI	BR5
X506434	NA	BR5
X506734	NA	DR5



Innerspace Research - 47 Series (Adsorbent)

Item No.	Fits	Rating
X47220	FC-1201-I	OD5
X47227	FC-1203-I	OD5
X47257	FC-1403-I	DR4
X47500	FC-1501-I	DR4
X47507	FC-1503-I	DR4
X47600	FC-1601-I	CL4
X47607	FC-1603-I	CL4
X47628	FC-1602-I	CL5
X47800	FC-1801-I	BR4
X47807	FC-1803-I	BR4



Innerspace Research - 48 Series (Adsorbent)

Item No.	Fits	Rating
X48240	FC-1801-B	BR5
X48247	FC-1803-B	BR5
X48627	FC-1603-B	CL5
X48677	FC-1503-B	DR5



Jordair - 56 Series (Adsorbent)

Item No.	Fits	Rating
X56220	FC-1001-SS	OD5
X56227	FC-3001-SS	OD5
X56228	FC-2001-SS	OD5
X56240	NA	BR5
X56247	NA	BR5
X56248	NA	BR5
X56250	FC-1003-SS	DR4
X56257	FC-3003-SS	DR4
X56258	FC-2003-SS	DR4
X56430	FC-1006-SS	CM6
X56437	FC-3006-SS	CM6
X56438	FC-2006-SS	CM6
X56500	FC-1002-SS	DR4
X56507	FC-3002-SS	DR4
X56508	FC-2002-SS	DR4
X56620	FC-1005-SS	CL5
X56627	FC-3005-SS	CL5
X56628	FC-2005-SS	CL5
X56670	FC-1004-SS	DR5
X56677	FC-3004-SS	DR5
X56678	FC-2004-SS	DR5
X56790	FC-1007-SS	BR4
X56797	FC-3007-SS	BR4
X56798	FC-2007-SS	BR4



Jordair - 58 Series (Adsorbent)

Item No.	Fits	Rating
X58220	FC-1001-TS	OD5
X58227	FC-3001-TS	OD5
X58228	FC-2001-TS	OD5
X58240	NA	BR5
X58247	NA	BR5
X58248	NA	BR5
X58250	FC-1003-TS	DR4
X58257	FC-3003-TS	DR4
X58258	FC-2003-TS	DR4
X58430	FC-1006-TS	CM6
X58437	FC-3006-TS	CM6
X58438	FC-2006-TS	CM6

X58500	FC-1002-TS	DR4
X58507	FC-3002-TS	DR4
X58508	FC-2002-TS	DR4
X58620	FC-1005-TS	CL5
X58627	FC-3005-TS	CL5
X58628	FC-2005-TS	CL5
X58670	FC-1004-TS	DR5
X58677	FC-3004-TS	DR5
X58678	FC-2004-TS	DR5
X58790	FC-1007-TS	BR4
X58797	FC-3007-TS	BR4
X58798	FC-2007-TS	BR4



Jordair - 59 Series (Coalescor)

Item No.	Fits	Rating
FC-591012-WF	FC-1008-SE	10 Micron
FC-591017-WF	FC-708-SE	10 Micron



Jordair - 61 Series (Coalescor)

Item No.	Fits	Rating
X61220	FC-1501-NS	OD5
X61227	FC-3501-NS	OD5
X61228	FC-2501-NS	OD5
X61240	NA	BR5
X61247	NA	BR5
X61248	NA	BR5
X61250	FC-1503-NS	DR4
X61257	FC-3503-NS	DR4
X61258	FC-2503-NS	CM6
X61430	FC-1506-NS	CM6
X61437	FC-3506-NS	CM6
X61438	FC-2506-NS	CM6
X61500	FC-1502-NS	DR4
X61507	FC-3502-NS	DR4
X61508	FC-2502-NS	DR4
X61620	FC-1505-NS	CL5
X61627	FC-3505-NS	CL5
X61628	FC-2505-NS	CL5
X61670	FC-1504-NS	DR5
X61677	FC-3504-NS	DR5
X61678	FC-2504-NS	DR5
X61790	FC-1507-NS	BR4
X61797	FC-3507-NS	BR4
X61798	FC-2507-NS	BR4



Jordair - 63 Series (Adsorbent)

Item No.	Fits	Rating
X63790	FC-705-NS	BR5

CARTRIDGES



L-Factor - 101 Series (Adsorbent)

Item No.	Fits	Rating
X101-6246	NA	CL5



L-Factor - 104 Series (Adsorbent)

Item No.	Fits	Rating
X104-2420	NA	BR5



L-Factor - 46 Series (Adsorbent)

Item No.	Fits	Rating
X46220	NA	OD5
X46240	NA	BR5
X46247	NA	BR5
X46677	NA	DR5
X46678	NA	DR5



L-Factor - 52 Series (Adsorbent)

Item No.	Fits	Rating
X52248	NA	BR5
X52678	NA	DR5



L-Factor - 53 Series (Adsorbent)

Item No.	Fits	Rating
X530730	NA	OD6
X53077	NA	OD6
X53078	NA	OD6
X53087	NA	OD6/CM4
X53107	NA	DR3
X53117	NA	BR6
X53120	NA	BR6
X53137	NA	CL7
X53157	NA	CL6
X53167	NA	BR6
X53177	NA	OD6-CL6
X53180	NA	CL6
X53187	NA	CL6
X532055	NA	OD6
X53207	NA	OD6
X53208	NA	OD6
X53220	NA	OD5

X532255	NA	OD5
X53227	NA	OD5
X53228	NA	OD5
X53237	NA	BR6
X532417	NA	BR5
X532419	NA	BR5
X532441	NA	BR5
X532455	NA	BR5
X53247	NA	BR5
X53248	NA	BR5
X53257	NA	DR4
X53267	NA	CL4
X53420	NA	CM6
X53430	NA	CM6
X53437	NA	CM6
X534534	NA	BR5
X53467	NA	BR6
X53477	NA	CM8
X53487	NA	CM5
X53497	NA	BR5
X53500	NA	DR4
X535055	NA	DR4
X53507	NA	DR4
X53537	NA	CM7
X53547	NA	BR5-CM5
X53557	NA	NG8
X53620	NA	CL5
X536255	NA	CL5
X53627	NA	CL5
X53650	NA	NG5
X536554	NA	NG5
X536555	NA	NG5
X53657	NA	NG5
X53667	NA	NG5
X53670	NA	DR5
X536741	NA	DR5
X536755	NA	DR5
X53677	NA	DR5
X53678	NA	DR5
X53687	NA	NG5
X53697	NA	DR4



L-Factor - 53 Series (Coalescor)

Item No.	Fits	Rating
FC-530550-SB	Hanging Mechanical Filter	20 Micron
FC-530551-SB	Standing Mech. Filter	10 Micron
FC-530552-SB	NA	NA
FC-530553-SB	NA	NA
FC-530751-MF	Standing Mech. Filter	2 Micron
FC-532050-MF	Special	0.01 Micron
FC-532051-MF	Special	0.1 Micron



L-Factor - 54 Series (Adsorbent)

Item No.	Fits	Rating
X541115	NA	BR6
X54150	NA	CL6
X541615	NA	BR6
X54167	NA	BR6
X54177	NA	OD6-CL6
X54207	NA	OD6
X542223	NA	OD5
X54227	NA	OD5
X54240	NA	BR5
X54241	NA	BR5
X542414	NA	BR5
X542415	NA	BR5
X542423	NA	BR5
X54247	NA	BR5
X54248	NA	BR5
X54249	NA	BR5
X54257	NA	DR4
X543055	NA	OD6
X54440	NA	CM6
X545015	NA	DR4
X54507	NA	DR4
X54537	NA	CM6
X545555	NA	NG8
X54557	NA	NG8
X546015	NA	CL4
X54620	NA	CL5
X54621	NA	CL5
X546215	NA	CL5
X546223	NA	OD5
X546555	NA	NG5
X54657	NA	NG5
X54670	NA	DR5
X54671	NA	DR5
X546715	NA	DR5
X546723	NA	DR5
X546755	NA	DR5
X54677	NA	DR5
X54678	NA	DR5
X546855	NA	ND5
X54687	NA	ND5
X548015	NA	BR4



L-Factor - 60 Series (Adsorbent)

Item No.	Fits	Rating
X60247	NA	BR5
X60677	NA	DR5



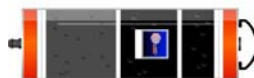
L-Factor - 80 Series (Adsorbent)

Item No.	Fits	Rating
X803011	NA	OD6
X804811	NA	CM5
X806711	NA	DR5
X806911	NA	DR4



L-Factor - 81 Series (Adsorbent)

Item No.	Fits	Rating
X816511	NA	NG5
X816711	NA	DR5
X816811	NA	ND5



L-Factor - 82 Series (Adsorbent)

Item No.	Fits	Rating
X822211	NA	OD5
X822427	NA	BR5
X826227	NA	CL5
X826727	NA	DR5
X827311	NA	OD6
X827327	NA	OD6



L-Factor - 96 Series (Adsorbent)

Item No.	Fits	Rating
X96077	NA	OD7
X96177	NA	OD7
X96318	NA	BR7
X96330	NA	BR7
X96337	NA	BR7
X96338	NA	BR7
X96367	NA	BR6
X96507	NA	DR5
X96657	NA	NG6
X96677	NA	DR6
X96678	NA	DR6
X96687	NA	NG6
X96780	NA	DR9



L-Factor - 97 Series (Adsorbent)

Item No.	Fits	Rating
X97017	NA	DR9

CARTRIDGES

X97027	NA	BR9
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L-Factor - 98 Series (Adsorbent)

Item No.	Fits	Rating
X98027	NA	BR9



L-Factor - X-Cell Series (Adsorbent)

Item No.	Fits	Rating
X-CELL 01	NA	BR4
X-CELL 02	NA	CL4
X-CELL 05	NA	DR4
X-CELL 10	NA	DR4
X-CELL 15	NA	CL4
X-CELL 20	NA	BR4
X-CELL 30	NA	DR4
X-CELL 40	NA	BR4



Mako Compressor / Comp Air - 65 Series (Adsorbent)

Item No.	Fits	Rating
X65100	PC-1101	DR3
X65107	PD-1103	DR3
X65220	PC-1201	OD5
X65226	04852	OD4
X65227	PD-1203	OD5
X65229	06961	OD5
X65237	NA	BR6
X65240	PC-1801	BR5
X65247	PD-1803	BR5
X65248	PD-1802	BR5
X65250	PC-1401	DR4
X65257	PD-1403	DR4
X65430	PC-2001	CM6
X65437	PD-2003	CM6
X65457	NA	BR5
X65500	NA	DR4
X65507	NA	DR4
X65600	NA	CL4
X65607	NA	CL4
X65620	PC-1601	CL5
X65627	PD-1603	CL5
X65629	06961	CL5
X65637	NA	CL5
X65670	PC-1501	DR5
X65677	PD-1503	DR5
X65770	NA	PA5
X65797	NA	BR4
X65800	NA	BR4
X65807	NA	BR4



Mako Compressor / Comp Air - 65 Series (Air Intake)

Item No.	Fits	Rating
AA-656501-PP	98262-1060	10 Micron
AA-656502-PP	X0225	10 Micron
AA-656503-PP	N70	20 Micron



Mako Compressor / Comp Air - 65 Series (Coalescor)

Item No.	Fits	Rating
FC-651060-SB	NA	NA
FC-655063-SB	M212	20 Micron



Mako Compressor / Comp Air - 65 Series (Oil)

Item No.	Fits	Rating
FO-650100-PP	98262-1148	5 Micron



Midland Diving Equipment - 87 Series (Adsorbent)

Item No.	Fits	Rating
X872217	M035055	OD5
X872417	NA	BR5
X874017	M015039	CL6
X874117	M015050	BR6
X876217	NA	CL5



Midland Diving Equipment - 88 Series (Adsorbent)

Item No.	Fits	Rating
X88220	M035730	OD5
X88240	NA	BR5
X88400	M035712	CL6
X88410	M035720	BR6
X88620	NA	CL5



Midland Diving Equipment - 89 Series (Adsorbent)

Item No.	Fits	Rating
X892251	M036130	OD5
X892451	NA	BR5
X89404	NA	DR6

X894051	M036107	CL6
X89414	NA	BR6
X894151	M036120	BR6
X896251	NA	CL5

X72420	BCD-H1	CM6
X72430	NA	CM6
X72435	SPT-C3	CM6
X72500	NA	DR4
X72505	NA	DR4
X72535	SPT-C5	CM6
X72600	NA	CL4
X72605	NA	CL4
X72620	NA	CL5
X72625	SPT-C2	CL5
X72635	SPT-C4	CL5
X72670	BCD-13X	DR5
X72675	SPT-13X	DR5
X72800	NA	BR4
X72805	NA	BR4



Poseidon Compressor - 30 Series (Adsorbent)

Item No.	Fits	Rating
X302214	NA	OD5
X30229	NA	OD5
X302414	NA	BR5
X30249	NA	BR5
X30439	NA	CM6
X305014	NA	DR4
X30509	NA	DR4
X306014	NA	CL4
X30609	NA	CL4
X306214	NA	CL5
X30629	059085	CL5
X306714	NA	DR5
X30679	NA	DR5
X308014	NA	CR4



Schifauer & Pek - 16 Series (Adsorbent)

Item No.	Fits	Rating
X162418	Schifauer & Pek	BR5
X162419	Schifauer & Pek	BR5



Poseidon Compressor - 30 Series (Air Intake)

Item No.	Fits	Rating
AA-300022-PP	070-0	20 Micron
AA-300023-PP	040-823	20 Micron



Pressure System, Inc. - 12 Series (Adsorbent)

Item No.	Fits	Rating
X12228	NA	OD5
X12248	NA	BR5
X12628	NA	CL5
X12678	NA	DR5



Robbins Aviation - 72 Series (Adsorbent)

Item No.	Fits	Rating
X72180	NA	CL6
X72185	NA	CL6
X72220	BCD-AC	OD5
X72225	SPT-AC	OD5
X72235	NA	BR6
X72240	NA	BR5
X72245	SPT-C1	BR5
X72255	NA	DR4

CARTRIDGES

EXTENSIVE RESEARCH BY THE PURITY MASTERS AT LAWRENCE FACTOR HAS RESULTED IN SOME OF THE FINEST AND MOST POWERFUL PURIFICATION AGENTS AVAILABLE FOR COMPRESSED AIR&GAS SYSTEMS. EACH BEING FORMULATED TO PERFORM AT THE HEIGHTS OF PRESSURE, UNDER THE TOUGHEST CONDITIONS, AND IS PRODUCED USING THE RIGID QUALITY CONTROLS THAT HAVE MADE L-FACTOR THE MOST RESPECTED NAME IN HI-PSI PURIFIED AIR&GAS.

SCUBA TECHS!

Specially formulated for use by breathing apparatus technicians, fast-acting L.F.W. (Lawrence Factor Wash) allows for rapid cleansing of SCUBA regulators, valves, and parts.

Dirt, corrosion, silicone, grease, salt deposits, and a host of other grimy substances are no match for the soil dissolving power of L.F.W. Simply immerse the object to be cleaned in L.F.W., and watch as dirt just flakes right off. Because it will not harm rubber, entire assemblies can be soaked for easy disassembly. L.F.W. performs best when used in an ultrasonic cleaning unit, but also works well by itself or in solution with mild heat.

One pint of L.F.W. will make as many as 300 valve assemblies absolutely gleam. That means they can cost as little as three-cents each to clean. Recommended by AquaLung, Sherwood, and Oceanics



LUBRICATING OILS!

Lawrence Factor lubricating oils have been created expressly for breathing air and gas compression systems. Seco Lube is low foaming, provides excellent separation from air, and has a high flash point. Economically priced to offer you considerable savings in application and installation costs, SecoLube should be at the heart of your purification process.

The pedigree of each L-Factor purity agent stems from the selection of chemistry we employ in our power packed filter cartridges. After the many years of study, the immeasurable hours of performance testing in the real world, and the unmatched expertise of L-Factor that went into developing these agents-you can feel confident that you are choosing a product that's able to perform to your highest standards.

Our adsorbents target and capture specific molecules in a web of atomic magnets, effectively eliminating even the minutest traces of undesired substance from your air&gas stream. Choose from a range of desiccants, catalysts, and carbons each formulated to perform under a specific set of conditions-and all packaged in a variety of sizes with long-term shelf life in mind.

We also offer a selection of lubes and cleansing agents-all designed to work in concert and enhance the performance of your air&gas purification equipment. Naturally, every product coming from L-Factor is of the highest grade and the highest purity.



Adsorbents



ACTIVATED CARBON

For pollution control, this media is your choice for adsorbing both condensable and vaporous hydrocarbons (lubricants). L-Factor carbon is also quite effective in cornering odors, organics, as well as halogenated solvents.

COMPOSITION: 8 x 12 Mesh Granules

TYPICAL APPLICATION: Breathing Air Purification & Gas Sweetening

WARNING: Some of the ingredients in Activated Carbon are harmful and anyone handling this material must take proper measures to protect respiratory systems and avoid immediate contact with skin, eyes, and mouth. MSDS are available on request.

Activated Carbon (Adsorbent)

Item No.	Size	Net. Wt.
CA-252606-GN	Pint	.5 lb.
CA-252612-GN	Quart	1 lb.
CA-252615-GN	Gallon	3.5 lb.
CA-252625-GN	2-1/2 Gallons	8.75 lb.
CA-252650-GN	Gallon Drum	55 lb.
CA-252655-GN	55 Gallon Drum	200 lb.

Catalysts



MONOXYCON™

Where Carbon Monoxide is a concern, Monoxycon™ is the solution. At levels up to 300 ppm, this media will convert "deadly" carbon monoxide to less harmful Carbon Dioxide.

COMPOSITION: 8 x 12 Mesh Granules

TYPICAL APPLICATION: Breathing Air Purification

USUAL CONDITIONS: Gas must be dried to -50°F dewpoint before using Monoxycon™

WARNING: Some of the ingredients in Monoxycon™ are harmful and anyone handling this material must take proper measures to protect respiratory systems and avoid immediate contact with skin, eyes, and mouth. MSDS are available on request.

Monoxycon (Catalysts)

Item No.	Size	Net. Wt.
CH-265706-GN	Pint	1 lb.
CH-265712-GN	Quart	2 lb.
CH-265715-GN	Gallon	8 lb.

Desiccants



MOLECULAR SIEVE 13X - VAPORSHELL™

Vaporshell™ 13x is up to 4 times more powerful than other desiccants - especially at elevated (up to 120°F) temperatures. It can adsorb up to 23% of its own weight in water and reach down to -102°F dewpoint.

COMPOSITION: 1/16" to 1/8" Spheres Typical Application: Breathing Air & Laboratory Gas Dehydration

WARNING: Some of the ingredients in Vaporshell™ are harmful and anyone handling this material must take proper measures to protect respiratory systems and avoid immediate contact with skin, eyes, and mouth. MSDS are available on request.

Molecular Sieve 13X - Vaporshell (Desiccant)

Item No.	Size	Net. Wt.
CF-244206-SR	Pint	0.75 lb.
CF-244212-SR	Quart	1.25 lb.
CF-244215-SR	Gallon	5.5 lb.
CF-244225-SR	2-1/2 Gallons	13.5 lb.
CF-244250-SR	55 lb Sack	55 lb.
CF-244255-SR	55 Gallon Drum	300 lb.



MOLECULAR SIEVE 3A

A highly powerful desiccant - best at adsorbing water vapors and droplets - can soak up 20% of its' own weight in water and reach very low dewpoints with added capacities for hydrocarbons, carbon dioxide, and other organics.

COMPOSITION: 1/8" to 1/4" Spheres

TYPICAL APPLICATION: CNGV, Industrial, & Laboratory Gas Dehydration.

WARNING: Some of the ingredients in Molecular Sieves 3A are harmful and anyone handling this material must take proper measures to protect respiratory systems and avoid immediate contact with skin, eyes, and mouth. MSDS are available on request.

Molecular Sieve 3A (Desiccant)

Item No.	Size	Net. Wt.
CF-244012-PL	Quart	1.25 lb.
CF-244015-PL	Gallon	5.5 lb.
CF-244025-PL	2-1/2 Gallons	13.5 lb.
CF-244055-PL	55 Gallon Drum	300 lb.



MOLECULAR SIEVE 4A

A highly powerful desiccant - best at adsorbing water vapors and droplets - can soak up 20% of its' own weight in water and reach very low dewpoints with added capacities for hydrocarbons, carbon dioxide, and other organics.

COMPOSITION: 1/16" to 1/8" Spheres

TYPICAL APPLICATION: Industrial & Laboratory Gas Dehydration.

WARNING: Some of the ingredients in Molecular Sieves 4a are harmful and anyone handling this material must take proper measures to protect respiratory systems and avoid immediate contact with skin, eyes, and mouth. MSDS are available on request.

Molecular Sieve 4A (Desiccant)

Item No.	Size	Net. Wt.
CF-244112-SR	Quart	1.25 lb.
CF-244115-SR	Gallon	5.5 lb.
CF-244125-SR	2-1/2 Gallons	13.5 lb.
CF-244155-SR	55 Gallon Drum	300 lb.



ACTIVATED ALUMINA

L-Factor Alumina is a mid-strength media best at sponging up water, condensables & vapors. It is good in applications operating at lower pressures & at temperatures below 100°F. Highly durable & resistant to liquid cracking. Preferred for use as a water buffer.

COMPOSITION: 1/8" to 1/4" Spheres Typical Application: Industrial Air/Gas Dehydrating.

WARNING: Activated Alumina may cause irritation to eyes and upper respiratory tract due to dust exposure. MSDS are available on request.

Activated Alumina (Desiccant)

Item No.	Size	Net. Wt.
CF-242212-SR	Quart	2 lb.
CF-242215-SR	Gallon	8 lb.
CF-242225-SR	2-1/2 Gallons	20 lb.



DESICCANT BLEND

Designed as an economy product, L-Factor has carefully blended Molecular Sieves with Silica Gel desiccant. This results in a media that is excellent at adsorbing water condensables, droplets, and vapors at an economical cost.

COMPOSITION: 1/6" to 1/4" Spheres/Pellets Typical Application: First drying in bed in high velocity & high volume gas processing.

WARNING: Some of the ingredients in Desiccant Blend are harmful and anyone handling this material must take proper measures to protect respiratory systems and avoid immediate contact with skin, eyes, and mouth. MSDS are available on request.

Desiccant Blend (Desiccant)

Item No.	Size	Net. Wt.
CF-245012-SR	Quart	1.25 lb.
CF-245015-SR	Gallon	5.5 lb.
CF-245025-SR	2-1/2 Gallons	13.5 lb.



SILICA GEL

Robust and sturdy - terrific at squeezing water liquids, droplets, and vapors from compressed gases. A workhorse at low temperatures and pressures.

COMPOSITION: 1/6" to 1/8" Spheres

TYPICAL APPLICATION: Industrial Gas Dehydration.

WARNING: Some of the ingredients in Silica Gel are harmful and anyone handling this material must take proper measures to protect respiratory systems and avoid immediate contact with skin, eyes, and mouth. MSDS are available on request.

Silica Gel (Desiccant)

Item No.	Size	Net. Wt.
CF-242512-SR	Quart	2 lb.
CF-242515-SR	Gallon	8 lb.
CF-242525-SR	2-1/2 Gallons	20 lb.

Lubricants & Solvents



AERO LUBE™

Pure and clean - Aero Lube™ is a jelly - like grease which is ideal for lubricating o-rings and threaded parts in sterile or breathing air systems.

COMPOSITION: Silicone Jelly

TYPICAL APPLICATION: Lubrication

Aero Lube (Lubricant)

Item No.	Size	Net. Wt.
CL-581202-PT	2 oz.	2 oz.



OXY LUBE™

Safe with Oxygen or in use with oxygen handling equipment - Oxy Lube™ is a paste like compound which is inert in Oxygen atmospheres. Great for lubricating seals and moving parts such as valve stems.

COMPOSITION: Paste

TYPICAL APPLICATION: O₂ Handling Equipment

Oxy Lube (Lubricant)

Item No.	Size	Net. Wt.
CL-581002-PT	2 oz.	2 oz.

PURITY AGENTS



SECO LUBE™ 500 - Synthetic Lubricant

Provides extended protection against carbonizing & corrosion with excellent separation from air & reduced foaming tendencies. Recommended for demanding use in high pressure air compressors while remaining safe (with proper filtration) for breathing air applications.

COMPOSITION: Di-Ester Liquid

TYPICAL APPLICATION: High Pressure Air Compressors

WARNING: Do Not mix with other oils. Exercise care in use with some hoses, seals, paint, and similar compounds as synthetic oil may not be compatible (incompatible: neoprene, SBR rubber, low nitrile Buna, PVC, and ABS).

Seco Lube 500 - Synthetic Oil (Lubricant)

Item No.	Size	Net. Wt.
CL-581812-LQ	Quart	3 lb.
CL-581815-LQ	Gallon	8 lb.
CL-581825-LQ	2-1/2 Gallons	19 lb.
CL-581855-LQ	55 Gallon	440 lb.



SECO LUBE™ 525 - Blend

Provides extended protection against carbonizing and corrosion with excellent separation from air & reduced foaming tendencies. Recommended for demanding use in high pressure air compressors while remaining safe (with proper filtration) for breathing air applications.

COMPOSITION: Petroleum / Synthetics

TYPICAL APPLICATION: High Pressure Air Compressors

WARNING: Do Not mix with other oils. Exercise care in use with some hoses, seals, paint, and similar compounds as synthetic oil may not be compatible (incompatible: neoprene, SBR rubber, low nitrile Buna, PVC, and ABS).

Seco Lube 525 - Blend (Lubricant)

Item No.	Size	Net. Wt.
CL-581612-LQ	Quart	3 lb.
CL-581615-LQ	Gallon	8 lb.
CL-581655-LQ	55 Gallon	440 lb.



SECO LUBE™ 550 - Natural Lubricant

Protects against carbonizing and corrosion with excellent separation from air - reducing foaming tendencies. Recommended for demanding use in high pressure air compressors while remaining safe (with proper filtration) for breathing air applications.

COMPOSITION: Petroleum Liquid

TYPICAL APPLICATION: High Pressure Air Compressors

WARNING: Do Not mix with other oils.

Seco Lube 550 - Natural Oil (Lubricant)

Item No.	Size	Net. Wt.
CL-581512-LQ	Quart	3 lb.
CL-581515-LQ	Gallon	8 lb.

CL-581525-LQ	2-1/2 Gallon	19 lb.
CL-581555-LQ	55 Gallon	440 lb.



LFW™ CONCENTRATE

Service Solvent - for scuba valves and regulators. Dismantling and cleaning diving apparatus is quite easy with LFW™ It works swiftly and requires little "elbow grease" blasting away dirt, salt deposits, corrosion, silicone grease, and most grimy substances.

WARNING: Do Not use LFW™ with aluminum, plastics, or ferrus materials. Some plastic & aluminum items will deteriorate when exposed to LFW™ This could result in failure of breathing apparatus. Use only with brass, stainless steel, and rubber materials. Professional use by trained technicians only. Contains toxic and acetic ingredients. Not for consumer use. MSDS are available on request.

L.F.W. Concentrate (Cleanser)

Item No.	Size	Net. Wt.
CM-763206-CN	Pint	2 lb.
CM-763212-CN	Quart	3 lb.
CM-763215-CN	Gallon	10 lb.

Particulate Pads



Particulate Pads

Particulate pads prevent passage of large dust and media particles.

COMPOSITION: 40 Micron Polyester Filter Disks - "FF-007706-PE Particle Sheet"

Particulate Pads

Item No.	Size	Net. Wt.
FF-007706-PE	36" x 36"	12 Pack
FF-007725-PE	1.19" x .25"	12 Pack
FF-007744-PE	2.25" x .25"	12 Pack
FF-007745-PE	4.5" x .25"	12 Pack
FF-007746-PE	1.63" x .25"	12 Pack
FF-007756-PE	2.75" x .25"	12 Pack
FF-007766-PE	2.5" x .25"	12 Pack
FF-007795-PE	1" x .25"	12 Pack
FF-007796-PE	2" x .25"	12 Pack
FF-007797-PE	3" x .25"	12 Pack
FF-007798-PE	4" x .25"	12 Pack

GLOSSARY OF BREATHING AIR TERMS

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ABSOLUTE PRESSURE: The atmospheric pressure, at sea level is 14.7 psi (actually 14.69 psi.) A pressure gauge, at sea level, would, of course, read ZERO. There remains this same 14.7 psi difference between *absolute pressure* and *gauge pressure*, at any pressure.

ACFM or ACTUAL CUBIC FEET PER MINUTE: This is the measurement of a compressor's static cfm output, with the back-pressure on the compressor held constant at a certain pressure. When the ACFM is measured with the compressor working against its highest intended working pressure, a true comparison of the compressor's efficiency can be made. Another term used for this measurement is **FREE AIR DELIVERY, (FAD)**, at a stated back-pressure.

ABSORB: This speaks to the property of a media placed in the compressor's purification system. A media which *ABSORBS* a contaminant actually soaks it up and draws it within itself, much as a sponge absorbs water.

ADSORB: This is the property of a material which has the propensity to collect a contaminant by means of causing it to adhere to its outer surface.

ACDS, (AUTOMATIC CONDENSATE DRAIN SYSTEM): By means of an electric timer, a solenoid valve is momentarily energized every 15-18 minutes of operation, and each of the system's separators automatically drained of accumulated liquid. Without this feature, the operator must manually drain the separators four times during each hour of operation. The *ACDS* is a very convenient feature, and also provides assurance that the separators will be drained. The consequences of the failure to timely drain these separators are mechanical damage to the compressor, or the disabling of the system's purification system, through saturation. However, the *ACDS* itself requires regular monitoring and routine maintenance.

ACTIVATED CARBON: Charcoal obtained by the destructive distillation of vegetable matter and important as an adsorbent of gases and vapors.

AFTERCOOLER: Heat exchangers used for the cooling of the air after it leaves the final stage of the compressor. With air-cooled compressors, the aftercooler is usually a length of finned tubing, coiled in the flow of the cooling air.

AIR CONTROL PANEL: May be wall-mounted, but is more typically associated with the fill station. Valves, gauges, and regulators are mounted in the air control panel to regulate and control the flow to and from the storage bank, fill hoses, etc. While extremely elaborate air control panels are often used, it is my opinion that the most "basic" design that will accomplish the need is usually the best approach. Most system operators appreciate an air control system that is straight-forward and easy to think through.

AIR-COOLED COMPRESSORS: This design incorporates a fan or blower which directs a high-flow stream of air over the compressor block, heads, intercoolers, and aftercooler.

AIR FLOW: Usually measured in cubic feet per minute, (CFM), in our applications; generally used to speak of the output of a compressor or the amount of air flowing through a line. It can be measured with a flow meter, or by means of timing the flow of a known quantity of air.

AIR LINE RESPIRATOR: This describes a breathing system in which the user is provided air through an air line, or "umbilical" hose. Most often, the pressure in this hose is no more than 75-125 psi. The air can be supplied with a compressor, or from a bank of storage cylinders, (with the pressure reduced by a regulator to the required line pressure), or a combination of both. For extremely long runs of hose, using these relatively low pressures, larger hose interior diameters must sometimes be used. Consult the hose manufacturer for these recommendations. Air-line respirators differ from **respirators** in that an air supply is involved; generally, the description of a respirator means only a face mask with attached filter canisters.

AIR PURITY ANALYSIS: Usually conducted in a laboratory, where test conditions can be carefully controlled. (The NFPA recommends the use of only accredited laboratories). The laboratory usually provides the apparatus with which the air sample is taken and shipped. Upon completion of the test, the laboratory usually provides a print-out of all of the constituents of the air, and, if it meets all of the standards, a certificate. If the sample fails the analysis, the laboratory sometimes can suggest the means of correcting the situation which caused it. Since **MOISTURE CONTENT** is not a stated factor of most air purity standards, some laboratories will not test for moisture except as an extra cost. Even so, the compressor owner must insist on a moisture measurement. The NFPA currently recommends at least four air purity tests each year.

AMBIENT: Surrounding, encircling, encompassing. The air surrounding you can be called the ambient air. The temperature in a room where a compressor is located can be called the ambient temperature. Humidity and pressure can also be referred to as ambient, at a given location.

BLEEDER VALVE: Usually smaller than a line valve, this valve is most commonly used to bleed the trapped air from a line or vessel. For example, when the supply valve to a pressurized fill line is closed, and the full cylinder's valve is closed, the bleeder valve, positioned between the two, will relieve the pressure from the fill hose, so that an easier disconnection of the filler attachment can be made. Sometimes also referred to as a *PURGE* valve.

BLOCK: Used within the industry to describe the assembly comprised of the compressor crankcase with cylinders, cylinder heads, intercoolers, aftercooler, interstage separators, interstage safety relief valves, and drive pulley attached. With low pressure compressors, this assembly is more often called the **HEAD**.

BOOSTER PUMP: A one or two stage closed-loop mini-compressor which is capable of accepting air at a lower pressure and boosting it to a higher pressure. These are available powered by an electric motor, or powered by 100-150 psi of air pressure. The majority of those in service are of the latter type, utilizing a fraction of the supply air for power, making them completely self-contained.

BURST DISC: This is descriptive of a one-time safety device, typically built into cylinder valves. Instead of a spring-loaded poppet valve, it is a disc of frangible metal, (often copper, or an alloy thereof), held in place over an orifice. The size of this orifice and the strength of the disc are such that the disc will burst, at a certain predetermined pressure. This design burst pressure is usually 5/3, (166%), of the cylinder's working pressure. Once ruptured, the entire burst disc assembly must be replaced. In most modern cylinders, the air escaping from a ruptured burst disc will be directed in two or four opposing directions, so the cylinder will not be "jet propelled" violently. In cylinders that are repeatedly emptied and refilled, the burst disc can sometimes be flexed so often that some fatigue occurs, allowing the disc to eventually rupture at a pressure well below its design pressure. Burst disc assemblies are relatively inexpensive, and should be replaced periodically, if these conditions exist. Some authorities recommend that the burst disc assembly on a cylinder be replaced each time the cylinder is hydrostatically retested.

BURST PRESSURE: All compressor components, pressure vessels, hoses, tubing, etc., are constructed to a design *burst pressure*, meaning that the product can be expected to **FAIL** at that pressure. This has an entirely different meaning than the designed **working pressure** for that product. Depending on the intended **safety ratio**, the stated working pressure of the product will be a fraction of the burst pressure.

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CARBON MONOXIDE INDICATOR: The CO indicator was typically used as an in-line visual check of gross Carbon Monoxide contamination in air. A color-change element was viewed through a transparent port, in which a usually high CO level was expected to change the color of the element from (usually) yellow to gray. The indicator, of course, was incapable of calling attention to itself, and tended to be rather hard to interpret, particularly by those people with some degree of color-blindness.

CARBON MONOXIDE MONITOR: An electronic device with a gas-sensitive electronic sensor. Quite accurate, when calibrated properly, and capable of providing a digital read-out of the exact Carbon Monoxide content of the air, in parts per million (ppm), and, if desired, providing for audible or visual alarms when the CO level exceeds a pre-set level. Most electronic CO monitors can also be used to automatically shut the equipment off, when this threshold is exceeded. The heart of the monitor is the **sensor**. These eventually must be replaced, typically every 2-5 years. One of two different types of sensors is usually used. The **metal oxide** type of sensor requires that the monitor be constantly powered, with a constant flowing air sample. When power or air flow is interrupted, these sensors may take several hours to re-stabilize. **Electro-chemical** sensors, on the other hand, only require about a minute or less to stabilize, when turned on.

COMPRESSOR BLOCK: In industry terminology, the compressor block consists of the compressor crankcase, cylinders, heads, intercoolers, aftercoolers, and inter-stage separators, all as an assembled unit ready to be powered and operated. Also known as a **compressor head**, usually when speaking of lower-pressure compressors.

CAPACITY: Usually a term for the quantity that a container or vessel can hold, this term also is used to describe the volume rate of a compressor's output.

CARBON: In respect to compressors, carbon is a potential service concern; generally caused by a residue of the lubricating oil carbonizing on surfaces that are too hot. When a carbon deposit forms between a head valve and its seat, or a small piece of dislodged carbon lodges in that position, the seal will be lost, and the compressor will malfunction.

CARTRIDGE-IMBEDDED SENSOR SYSTEMS: A component of advanced purification systems, an electronic sensor device placed directly in the final purification cartridge senses when the cartridge is approaching the end of its service life. At this point, a yellow light alarm is provided to the operator. If the operator does not replace this cartridge within the 4 or 5 hours still remaining in its service life, the sensor provides a red light, and shuts down of the compressor system. With this device, the entire service life of the cartridge can be utilized, and, at the same time, it is impossible to operate the air system with a spent cartridge in place.

CARTRIDGE, PURIFICATION: The word **cartridge**, in this application, indicates a pre-packed expendable replacement cartridge intended to be discarded when spent. Depending on its duty function, the purification cartridge will be packed with different materials to perform different functions in the processing of the air. If the purification system incorporates only one cartridge, layers of all of these materials will be packed in that one cartridge. In multi-chamber purification systems, all of the cartridges prior to the final cartridge will usually contain only desiccant materials.

Cartridges should not be reused, dried out, or repacked. All cartridges have an "expiration date", beyond which they should be discarded and not used. When replacing the cartridges in a purification system, the date and hour meter reading should be recorded on the system's maintenance log, and many operators also mark this data on the new cartridge itself.

CASCADE METHOD: This refers to the working of a multi-vessel air storage system utilizing only one vessel at a time, in sequence, and closing the valve on that vessel before using the next. In this respect, the word "cascade" is a verb. When refilling from a multi-vessel storage system into smaller bottles, more small bottles will be completely refilled using this method, than would be affected by opening all of the storage vessels at the same time.

CASCADE SYSTEM: A term still commonly used to describe a multi-vessel air storage system.

CATALYTIC CONVERSION: The process by which the molecules of a gas are converted to a different structure, forming a different gas. In the case of the air system's purification system, this process is functioned by a **catalyst** packed in the final purification cartridge, and converts Carbon Monoxide to Carbon Dioxide. This catalyst will continue to function as long as it is absolutely dry, so the catalyst is always located after the desiccant. This conversion, however, can only process a certain level of Carbon Monoxide content, and if the incoming air contains more than approximately 400 ppm of Carbon Monoxide, the excess will simply pass on through, unconverted.

CFM (Cubic Feet per Minute): A cubic foot, of course, would be the free air in a space measuring 12" X 12" X 12". A telephone booth measuring 4' X 4' X 8' would contain 128 cubic feet. A compressor capable of pumping 10.7 cfm would pump 128 cu. ft. in approximately 12 minutes.

CHARGING RATE: This is the measure of a compressor's output based on its average output over the span of time required to fill a cylinder of a known capacity *from* a certain pressure *to* a certain pressure. To date, however, there exist no industry standards for this measurement, and manufacturers are free to choose the criteria which produce the results most conducive to the desired claims.

CHASSIS: In compressor terms, this is the frame on which the compressor block and the driver are mounted. In most modern units, the purification system will also be mounted on the chassis, along with the electrical control enclosure, the final separator, the gauge panel (if so equipped), and the other accessories that pertain to the operation of the compressor and purification system. Often, the chassis is described as being of *vertical* configuration, with the driver mounted under the compressor, or *horizontal*, meaning that the compressor and the driver are mounted side-by-side.

CHECK VALVE: A valve that automatically permits air flow in one direction only.

CLOSED LOOP: Describes an air flow completely contained in a closed circuit, without the possibility of contamination from air outside of the loop. Usually used to describe the method of *boosting* air pressure from a bank of purified stored air into the cylinders being refilled, thereby eliminating the entry of contaminants into the air stream.

COMPOSITE CYLINDER: A pressure vessel combining a rather thin aluminum alloy "shell", over-wrapped with a resinoid fabric of exceptional strength. The benefit: lighter weight. Composite cylinders are somewhat more subject to damage from exterior abuse, and should be removed from service if the over-wrap shows evidence of undue wear. As of this date, composite cylinders are approved for a maximum service life of 15 years.

COMPRESSIBILITY: A factor which expresses the deviation of a gas from the laws of hydraulics. Gases vary in their compressibility, while most liquids are, for most practical purposes, incompressible.

COMPRESSION RATIO: The ratio of the absolute discharge pressure to the absolute inlet pressure. Absolute pressure at the inlet of a compressor, at sea level, would be 14.7 psi. (**Gauge** pressure would be zero.) If the outlet pressure at the discharge side of a compressor's first stage was 88 psi (absolute), this would be said to be a 6 to 1 (6:1) compression ratio. Remember, however, that 88 psi absolute pressure would be read on a gauge as about 73 psi.

CONDENSATE: The liquid which accumulates in the separators, and which must be drained regularly. In an oil-lubricated compressor, this liquid will usually be the color of skim milk, though it may be somewhat dark during the compressor's break-in period. After the compressor is broken in, if this condensate liquid turns quite dark or exceptionally oily, this condition may be a first indication that a problem could exist with the compressor.

CONDENSATE TRAP, CONDENSATE DRAIN: (See **SEPARATOR**) The condensate drain is the outlet at the lowest point of the separator, from which the accumulated liquid can be drained. On units not equipped with an automatic drain system, a petcock will be located at this point. (This petcock is to be opened momentarily for draining while the chamber is pressurized, and should never be left in an effort to provide constant draining.)

CONTAMINANTS: Any element in the breathing air than is potentially harmful to the breather of the air. Carbon Monoxide and oil droplets or oil vapor are two of the contaminants of the greatest concern.

CRANKSHAFT THROW: The point on the crankshaft to which the connecting rods are attached. Unlike automobile engines, most multi-stage air compressors have only one throw, to which all of the connecting rods are attached. The measurement by which the center line of the throw is different from the center line of the crankshaft determines half the **stroke** of the piston.

CYLINDER: Two definitions: A cylinder is a container or vessel in which a pressurized gas is stored. (always cylindrical) On a compressor or engine, the *cylinder* is the bore through which the piston moves.

CYLINDER HEAD: The compression cylinder is closed on top with a removable *head*, into which are usually built the intake and outlet valves for that cylinder. In the case of air-cooled compressors, the cylinder head is usually finned, to help transfer heat away.

DEALER: A seller of equipment, usually working through a manufacturer's regional distributor. There are some dealers who can provide field service, either limited or full-scale, while others may rely on the distributor to provide this; Responsive, capable dealer sale able to provide pre-specification consultation, budget estimates, and application expertise.

DEFLECTOR TUBE: A part of the **Fill Station**, the deflector tube accepts the bottle to be filled and holds it in place during the refilling process. In most fill stations, the deflector tube(s) are circular, and constructed of thick-walled metal, to help contain the fragments of a rupturing cylinder.

DESICCANT: A drying agent or media, as used as the first element in a modern purification cartridge.

DISPLACEMENT: The displacement of a compressor is the volume swept by the piston per unit of time. Usually expressed as cubic feet per minute. This is not a direct measurement of a compressor's output, however, as compressors vary greatly in their air leakage and valve efficiency.

DISTRIBUTOR: Most major manufacturers have established a network of servicing distributors. To qualify, the distributor must stock systems and parts, maintain a full-scale repair shop staffed with factory-certified technicians, and provide field service. Distributors, in turn, usually establish a network of regional dealers within their marketing area, and provide end-user service for those dealers without this capability. In those regions in which a dealer is not established, the distributor may sell directly to the end users.

DOOR INTERLOCK: Usually denotes the device installed on a Class 2 fill station which precludes the filling of cylinders if the protective door is left open. May also describe micro switches which are sometimes installed on room or compartment doors for the purpose of causing the door to be opened (for ventilation), before the compressor can be operated.

DOUBLE-ACTING PISTON: The double-acting piston is designed to compress the air in more than one stage at a time, either by "stacking" one cylinder or stage on top of another, or by compressing air in separate chambers on both the "up" and the "down" stroke. Thus, one connecting rod is used to compress air in two chambers. It is more difficult to carry away the added heat that this method produces.

DRAIN CYCLE: Refers to the interval between the recommended manual draining of the separator chambers, or between the automatic drain system's activation. In general, it is suggested that the drain cycle interval be shortened, somewhat, under unusually high ambient humidity conditions.

EFFICIENCY, VOLUMETRIC: Ratio of actual capacity (output) to the piston **displacement**, stated as a percentage. In high pressure multi-stage compressors, one design may have an efficiency rate of only around 60%, while another may achieve 75%, or more.

EXTENDED WARRANTY: A contract with the supplier in which the original factory warranty is extended, for an annual fee. With the extended warranty, some suppliers also include routine scheduled on-site maintenance service calls, and perform any needed interim service on-site, at the compressor's location. Others may provide no field service at all, and perform any needed warranty work in their own shop, or at the factory, with the owner paying for the transportation to the shop. Most extended warranties provided by compressor suppliers do not cover electric motors or fueled engines.

FABRICATOR: Commonly used to describe a manufacturer who utilizes various other brands of "off-the-shelf" components to construct a finished assembly, usually sold under the fabricator's own brand name. Oddly, this same description is also used to describe an **O.E.M.** (Original Equipment Manufacturer.)

FAD, (FREE AIR DELIVERY): See **ACFM**

FILL HOSE: This usually describes the flexible line which is connected to the valve of the small cylinder for refilling. The fill hose should be as short as is practical, to minimize the effects of "whipping"; should the hose ever rupture. It should be replaced whenever any signs of wear become apparent.

FILL RATE: Refers to the time required to refill a cylinder. Sometimes stated in terms of cfm, but if only one size of smaller bottles is usually being refilled, the *fill rate* is often spoken of in terms of minutes required to fill a cylinder of that size.

For example; an empty "30-minute" SCBA cylinder refilled in less than about four minutes, will have enough of a temperature rise that it will only contain 80-85% of its intended capacity when it cools back down to room temperature. To provide the next user with its intended duration, it will then have to be "topped-off" after it cools down (be re-connected to the air system to bring the pressure back up to the cylinder's working pressure.)

In some situations, taking four minutes to refill each small cylinder will seem time-consuming. In this case, if a means is available to connect and fill two cylinders at once, the recommended rate of four minutes will hold the temperatures down, but still result in an AVERAGE fill time of two minutes per cylinder. If the air source is adequate, even more cylinders can be refilled simultaneously, even further reducing the average fill time.

FILL STATION: Technically, the fill station is the protective device into which small cylinders are placed for the refilling process. However, the entire breathing air production system is also still sometimes referred to as a "fill station".

FILTERS: Today, this usually refers to the pre-inlet devices that separate and remove dust and dirt before it enters the first stage of the compressor. In the past, the media through which the compressed air was flowed after compression was also known as a *filter* system, but modern systems which better improve the quality of the air are known as *purification* systems.

FLOATING PISTON: Used in the final stage of certain compressors, the floating piston is not secured to the connecting rod, but is moved with a non-compressing "push piston" that is so

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attached. Once this stage is pressurized by the intermediate pressure being supplied by the previous stage, the floating piston is held in contact with the push piston on the down stroke. By design, the floating piston can be ringless. Its seal on the cylinder walls is made with a thin film of oil between the two precision-machined surfaces. This creates less heat, less friction, better compression, and longer service life. It also tends to require less start-up torque.

FLOW METER: A device, usually hand-held, with which the CFM flow of air can be measured. Flow meters are available in a number of cfm ranges, typically 0-15 cfm, 0-30 cfm, etc. (The narrower the range, the more accurately they can be read.) While in-line flow meters for permanent installation are available, they are cost-prohibitive for pressures above 1000 psi. The flow meter is one of the primary diagnostic tools used by the compressor technician.

FLOW RESTRICTOR: To avoid harmful high-velocity air flows, or to limit the fill rate of small cylinders to a rate which will not create too much heat, the concept of a *flow restrictor* at first seems like good logic. Flow restrictors are available, and all operate on the principle of creating a restricted orifice through which only a limited amount of air can flow.

However, in the act of refilling small cylinders, we are dealing with ever-increasing pressures on the downstream side of the restrictor valve, as the small cylinder progresses from empty to full. A restricted orifice will allow more air to pass through it when the pressure differential is the greatest. An orifice about the size of the period at the end of this sentence, for example, might allow an air flow of 10 cfm, when the upstream pressure is 5000 psi, and the downstream pressure is zero. However, when the downstream pressure climbs to 2500 psi, the flow would only be about 5 cfm. When the back-pressure reaches around 4000 psi, the flow would be even further reduced.

The end result, using a fixed orifice, is that we would have a too-high air flow at the start of a refill, and such a small trickle of air as the refill neared completion that it would take 15-20 minutes to finish. While fixed orifice flow restrictors are useful for certain applications, they work poorly (or too well) for slowing down the refill procedure. Perhaps an "automatically variable orifice" flow restrictor will someday be developed.

FLUIDICS: The general subject of instruments and controls that are dependent upon low rate air flow of air or gas at low pressure as the operating medium.

FREE AIR: Free air is defined as air at atmospheric conditions at any specific location; also often referred to ambient air.

GAS: From a physics point of view, the form of air is that of a gas, as one of the three basic phases of matter. However, in pneumatics, a special meaning is assigned to air, and the term gas refers to any gas *other* than air. Air is actually composed of a number of gases, most notably Oxygen (19-23%), and Nitrogen (77-81%).

GAUGE: The device by which pressure is indicated. In general, pressure gauges should not be used for pressures greater than approximately 75% of their maximum face pressure. It is generally recommended that one should face the gauge away from himself when it is pressurized.

GAUGE PRESSURE: (See **ABSOLUTE PRESSURE**).

HEAD: In compressor terminology, especially in lower-pressure compressors, the assembled compressor unit is known as the head. With high pressure units, the assembly is more often referred to as the **block**. See **CYLINDER HEAD** for more common usage.

HEAT, HIGH TEMPERATURES: Unduly high temperatures are probably the single most destructive element regarding compressor service life and air quality. The air compressor used for the production of breathing air must be designed for the coolest operation possible, and the installation of the air system must provide for an adequate and unrestricted flow of cooling air. The compressor and all of its cooling coils must be kept free of dirt accumulation at all times.

HIGH PRESSURE: Always a relative term, with no fixed description. For example, one might own some cylinders rated for 2400 psi, and some rated for 4500 psi, and speak of them as "low pressure" and "high pressure". A compressor manufacturer might make "low pressure" compressors which produce 100-150 psi, and "high pressure" compressors rated to 6000 psi. A plumber might consider 300 psi fittings to be "high pressure", and anything lower than that to be "low pressure". In other words, never accept anyone else's terminology of either description.

HORSEPOWER, BRAKE: This is the horsepower input to the compressor shaft, or more generally, to any driven machine shaft.

HOURLY METER: As used in breathing air compressor applications, the hour meter is usually of the "accumulative, non-resettable" type. That is, like an automobile odometer, the hour meter will always show the total number of operating hours on the compressor. Hour meters are available in any voltage or even in a "vibration" mode for engine-powered units with no electrical system. (Vibration-type hour meters, however, when mounted on a compressor system installed in a vehicle, sometimes log the vehicle's operation, even when the compressor is not operating.) For proper maintenance, of both the compressor and the purification system, ALL compressors used in our applications should be equipped with recording hour meters.

HUMIDITY, SPECIFIC: Specific humidity is the weight of water vapor in an air vapor mixture per pound of dry air.

HUMIDITY, RELATIVE: The relative humidity of an air mixture is the ratio of the partial pressure of the vapor to the vapor saturation pressure at the dry bulb temperature of the mixture.

HYDROSTATIC TEST: The means of measuring the elasticity of a high pressure cylinder. This is done by pressurizing the cylinder to a prescribed pressure higher than its working pressure, and measuring the temporary expansion of its dimensions, and the permanent expansion, if any, that remains when it is de-pressurized.

INTERCOOLERS: These are heat exchangers used for removing some of the heat of compression from the air between the stages of a compressor. These also serve to help remove a considerable amount of moisture, as well. In an air-cooled compressor, the intercoolers are usually seen in the form of lengths of finned tubing positioned in the flow of cooling air.

LOW PRESSURE: (See **HIGH PRESSURE**)

MAINTENANCE CONTRACT: An arrangement in which the supplier's technician, on a prescribed schedule, visits the air system to perform operational checks and routine maintenance, leaving a copy of his checklist for the owner's records. If such contracts are available from different sources, they may have different inclusions and exclusions, and the compressor owner will do well to have a complete understanding of the terms. Typically, the Maintenance Contract does not include the cost of any needed emergency service calls that come up between scheduled visits.

MAINTENANCE COORDINATOR: This is the individual assigned to be responsible for the air system's maintenance, and the permanent recording of all maintenance procedures performed. In some cases, he may also serve as the **Operations Coordinator**.

MAINTENANCE PROCEDURES: Usually drafted by the Maintenance Coordinator, in conjunction with the supplier and the equipment manuals, this is a printed schedule of the routine maintenance to be performed on the air system. Often in the form of a working chart, on which all routine service intervals are listed, then logged on completion.

MAINTENANCE TIMER: A resettable timer clock, which provides a visual or audible alarm, or a compressor shut-down, after a pre-determined number of hours or minutes. The concept is that the operator will therefore be reminded that a certain maintenance procedure is due. However, since various maintenance procedures are performed at different intervals, a single maintenance

timer serves only to call attention to one operation.

MOBILE AIR SYSTEM: Generally describes an air refill system, or air-line respirator system, which is transported to the scene-of-the-need for operation. While the mobile air system can include a compressor, the recent trend is more towards the transportation of a quantity of stored air which has been processed by a stationary compressor located away from the scene-of-the-need.

MODULAR AIR SYSTEM: (See **UNITIZED** air system)

MOISTURE INDICATOR: (See **CARBON MONOXIDE MONITOR**) In-line color-change moisture indicators are also available, but are incapable of drawing attention to an alarm situation.

MOISTURE MONITORS: These are electronic devices which, by means of an electronic sensor, or humidistat, are capable of alarming the operator when a pre-set moisture level is exceeded. Those which function with a sensing of the *relative humidity* are considered somewhat inaccurate, but can usually sense a gross moisture condition. (See **CARTRIDGE-IMBEDDED SENSOR SYSTEMS**)

MOLECULAR SIEVE: A media commonly used in modern purification cartridges, primarily as a desiccant (drying agent).

MUFFLER, SILENCER: For fueled engines, this is the device used to silence the exhaust. On compressors, it refers to the device, usually resembling a filter element that is in place to muffle the sound of the exhausting of the automatic condensate drain system.

MULTI-STAGE COMPRESSORS: These are compressors employing two or more stages.

MURPHY'S LAW: Yes, it's in the dictionary, and it belongs here. It is the principle that whatever can go wrong will (and usually at exactly the worst possible time). This is the rule that causes the electrical power to fail just when the air system operator has a stack of empty cylinders that need refilled quickly. It is the recognition of Murphy's Law that makes it practical, in this example, for emergency personnel to have an ample air storage system fully pressurized.

NEEDLE VALVE: A line valve in which the flow of the media is metered by the controlled insertion of a tapered shaft through an orifice of fixed size. When used for complete shut-off, the tapered shaft completely closes off the orifice, creating a metal-to-metal seal. With most such designs, it is difficult to attain a bubble-tight shut-off of high pressure air, so this is not a popular design for most air system applications.

ON-SITE START-UP: With the installation of a new air system, the buyer should insist that the supplier provide the services of a factory-certified delivery technician. The technician shall make a post-delivery integrity check of the entire system, check for correct installation and wiring, calibrate the system to the buyer's exact application needs, perform a thorough operational check of the entire system, and train the personnel who will be operating and maintaining the system. The buyer should beware of sellers who promise an "on-site start-up", but are actually capable of little more than having a representative present at the time the system is turned on.

OPERATIONS COORDINATOR: The person assigned to develop the *operating procedures* for the air system. The drafting of these procedures is often done in consultation with the supplier, and the **Maintenance Coordinator**. The Operations Coordinator is responsible for seeing that the system is operated in accordance with these procedures. If other personnel are to be involved in the operation of the system, the coordinator is responsible for training these people and enforcing the correct procedures. In some cases, the Operations Coordinator may also serve as the Maintenance Coordinator.

OPERATING PROCEDURES: A written set of instructions for the correct and safe operation of the system. Usually separate from the **MAINTENANCE PROCEDURES**. All personnel who are authorized to operate the system are to be made thoroughly familiar with these procedures, and the key features of the procedures are to be prominently displayed in the vicinity of the air system. Since air systems are comprised of several components, and since applications can vary, the Operating Procedures must be exactly tailored to the individual system and the applications.

OXIDATION: The process or state of undergoing combination with Oxygen. In our applications, this usually translates to rust or corrosion.

OXYGEN CLEAN: Applies to fittings, hoses, regulators, etc. that are intended for use with pure Oxygen. For this application, all equipment must be chemically cleaned to remove all traces of any type of oil or oil residue. Such equipment, when new, is usually individually packaged, and labeled OXYGEN CLEAN.

PHASING: Electric-driven compressors will be equipped with either a *single-phase* motor, or *three-phase*. The electrical supply must match the type of motor. Some older three-phase supplies involve one phase (wire), which is of higher voltage than the other two. This is known as the "wild leg", and must be connected to the proper terminal in the compressor's electrical enclosure, as per the manufacturer's instructions. Motor rotation of a three-phase motor can be reversed by switching any two of the three power leads. Thus, rotation of the motor must be checked upon installation, and any time thereafter when any wiring changes are made in the building. Though most compressors will pump air and seem to be functioning when the motor rotation is incorrect, damage and high operating temperatures will soon occur.

PIGTAIL: The most common use of this term, in our applications, is to describe the connections between the cylinders in a multi-cylinder air storage system. Usually "looped", to provide some protection against vibration or movement of the cylinders, the pigtail may be made of hose or of tubing.

POD: This generally refers to a cluster of storage vessels contained in a mounting rack which can be lifted (with a crane or fork-lift), and transported as a single unit.

PLUG VALVE: In the field of high pressure air control it describes a valve design which incorporates a fixed orifice, and onto this a seal element is forced by a clock-wise torque of a threaded stem, for shut-off. A complete bubble-tight shut-off is easily achieved. The seal element most used is of dense nylon, or similar.

When the valve handle is turned counter-clockwise, the seal element is lifted from the orifice in tiny increments, and a metered air flow is readily controllable. In most designs, the usual air flow is intended to be through the orifice TOWARD the seal element. Virtually all cylinder valves are of this design, as are the majority of line valves and control panel valves in use. This is also known as the globe style.

PPM: Parts Per Million.

PRESSURE, DISCHARGE: Discharge pressure is the absolute total pressure at the discharge outlet of a compressor. Compressors are rated at a maximum design discharge pressure, and should not be operated at pressures greater than that, even if they are mechanically capable of generating higher pressures.

PRESSURE LUBRICATION: A feature in which oil pressure from an oil pump is directed to the internal points of the compressor which require absolute lubrication. Typically, in a high pressure compressor, the working oil pressure may be 800-1200 psi. Pressure lubrication is often combined with "splash" and "mist" lubrication for various other points within the crankcase. Without

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pressure lubrication, though, it is difficult for the lubricant to travel into the upper cylinder wall area of the high pressure stages.

PSI (Pounds Per Square Inch): The amount of pressure exerted on one square inch of surface; often stated as **PSIA**, or **PSIG**, signifying ABSOLUTE or GAUGE pressure.

PURGE VALVE: (See **BLEEDER VALVE**)

PURIFICATION SYSTEM: This is a chamber or series of chambers, in which various media are packed (usually in disposable cartridges), through which the compressed air flows after it has passed through the final moisture separator. On most models of newer compressors, the purification system is mounted directly on the chassis with the compressor. Unlike earlier "filter" systems, which removed only certain contaminants, the modern purification system actually improves the quality of the air by changing some of its constituents (mainly, Carbon Monoxide molecules are converted to Carbon Dioxide molecules, by catalytic conversion.) On a stand-alone purification system, as for retrofit with an older compressor, a final separator chamber is also usually included.

QUARTER-TURN VALVE: A line valve that is FULLY-OPEN, or FULLY-CLOSED, with only a 90° rotation. This is an appealing concept, since such valves can quickly be seen to be open or closed. However, most quarter-turn valves do not lend themselves well to the act of *metering* the flow of air, which is a very common need in handling high pressure air. In fact, most quarter-turn valves will perform poorly when used for metering air flow, and will often fail prematurely. The quarter-turn valve should be used generally in an application where the air flow is to be only 100% ON or 100% OFF; also known as the ball valve.

RADIAL BLOCK: This term has to do with the positioning of the compression cylinders on the compressor's crankcase. In the *radial* design 4-stage unit, the stages are lined up 90° from each other. As a piston is on its up-stroke in one cylinder, it is one the down-stroke in the cylinder exactly opposite. The radial configuration tends to provide better balance of the moving parts, and is more effectively cooled.

RECEIVERS: Tanks or vessels used for the storage of air discharged from compressors. They also serve to dampen discharge line pulsations.

RECIPROCATING COMPRESSORS: The reciprocating compressor's element is a piston, or pistons, having a reciprocating motion inside a cylinder (as opposed to rotary or screw-type compressors, which are seldom used in high pressure breathing air applications).

REGULATOR: Usually adjustable, the regulator reduces a higher pressure to a lower pressure. Most regulators incorporate an IN pressure gauge (indicating the supply pressure), and an OUT pressure gauge (indicating the adjusted/regulated pressure).

All regulators are designed for a certain MAXIMUM inlet pressure, and a certain range of adjustable outlet pressure. Simply substituting higher or lower pressure gauges in the regulator will not change its performance characteristics or design safety!

In general, the higher the inlet pressure rating of the regulator, the higher its cost. FIXED RATIO non-adjustable regulators are also available, for certain applications. These reduce the supply pressure to a certain percentage; regulated pressure therefore varies with the supply pressure.

REMOTE INTAKE: This refers to the extension of the compressor's intake port to another area. Before modern purification systems were developed, this practice was rather common, by running the extension to outside of the building.

Today, the concept is that the compressor should not be installed in a location in which the quality of the ambient air would be hazardous to the health of the operator. If the ambient air at the compressor's location is good enough for the operator to breathe safely, then the compressor's purification system can readily improve this to Grade "E" air.

When unusual circumstances dictate the need for a remote intake, the compressor manufacturer's literature should be consulted for the appropriate dimensions of the extension. An extension of the wrong design or dimensions can very easily "choke" the intake air, and cause reduced output and high operating temperatures.

SAFETY RELIEF VALVE: This describes a spring loaded valve which is normally in the CLOSED position, and which releases air when the upstream pressure is greater than the pre-selected relief pressure. Most such valves will re-close, when the upstream pressure is reduced. Safety valves are available in a wide range of pressure ratings, are usually adjustable for the exact desired relief pressure within that range, and should never be used to control a pressure other than the prescribed range.

A second factor pertaining to safety valves is the rated *flow rate* of the valve, meaning the maximum amount of air that can flow through the valve, at its rated pressure. For example, a safety valve that could only flow a maximum of 15 cfm, when opened, would be absolutely inappropriate for use in conjunction with a 20 cfm compressor! One-time **BURST DISCS**, which are used with cylinder valves and certain other applications, are sometimes referred to as safety valves, but they technically are not.

SCBA: An acronym for Self-Contained Breathing Apparatus. Usually descriptive of the unit consisting of the high pressure cylinder, the regulator(s), the connecting hoses, the wearer's face mask assembly, and the harness used to don the apparatus. SCBA units are to NEVER be used as SCUBA (underwater).

SCUBA: An acronym for Self-Contained Underwater Breathing Apparatus. SCUBA usually describes the high pressure cylinder, the diver's regulator and mouthpiece, and the back-pack or assembly used for attaching the unit to the diver.

SEPARATOR: Also known as a condensate trap. A chamber in which moisture is removed from the air, by impingement, coalescence, expansion, temperature change, or any of a number of other mechanical means. In the typical high pressure compressor used for breathing air applications, separator chambers are usually used between each of the stages of compression, and another **final separator** is used just prior to the air's entry into the purification system. All separator collection chambers must be emptied of their accumulated moisture regularly, without fail!

SERVICE CONTRACT: Unlike the less expensive Maintenance Contract, the service contract includes the cost of any and all needed emergency service calls. Most suppliers incorporate regularly scheduled routine maintenance visits as part of the service contract.

SINGLE-ACTING PISTON: The single-acting piston compresses air only in one chamber, on only one stroke (usually the "up" stroke). A **double-acting** piston, on the other hand, compresses air in more than one chamber (as in stacked cylinders), some on the same stroke, and some on both the up and down stroke. The single-acting piston tends to create less heat, but does require a separate connecting rod for each stage of compression.

SOLENOID VALVE: A valve, of any pressure, activated by an electrical surge from a remote source. Most automatic condensate drain systems incorporate one or more solenoid valves; can be thought of as serving the same purpose as a relay in an electrical circuit.

SPECIFIC GRAVITY: This property is the ratio of the specific weight of a gas to that of dry air at the same pressure and gravity. The specific gravity of dry air is 1.0, or the "benchmark" for the other gases. The specific gravity of some other gases are: Oxygen 1.105; Nitrogen .9672; Carbon Dioxide 1.529; Carbon Monoxide .9672; Helium .1381.

SPEED: (or *RPM*). The speed of a compressor refers to the revolutions per minute of the compressor shaft.

SPLASH LUBRICATION: A method of lubrication in which moving parts “dip” into the reservoir of oil in the crankcase, causing droplets to be thrown around the interior of the crankcase.

STACKED CYLINDERS OR STACKED STAGES: In this design, unlike the “radial” block design, one cylinder/stage is located on top of another, both compressed with one piston, and one connecting rod. While less costly than providing a separate rod and piston for each stage of compression, this design tends to make it difficult to carry away the heat of compression as efficiently.

STAGES: Stages are the steps of compression of a gas. Each stage usually requires a separate cylinder, and the air is compressed by the stages in succession.

STANDARD AIR: Defined as air at a temperature of 68°F, a pressure of 14.7 psi, and a relative humidity of 36%.

SUPPLIER/SOURCE: Generally considered to be the party who is paid for the purchased equipment. A supplier may be the manufacturer of the equipment; a distributor serving as the manufacturer’s service and distribution point; a dealer who represents either a manufacturer or a distributor; or a broker, who usually has no service capability. In general, the buyer will obtain the best long-term value by choosing a source capable of providing expert ready field service. Most manufacturers will not sell directly to end users because the factories are not well positioned to provide end user field service.

TEMPERATURE, DISCHARGE: This is the total temperature at the discharge outlet of the compressor. In our applications, this more often refers to the temperature of the air at the outlet of the aftercooler. Well designed compressors will usually affect an (aftercooler) discharge temperature of no more than 15-17° over the compressor’s inlet (ambient) temperature.

TWO-WAY VALVE: This is a line valve which is used to send the air flow in one direction or another. As an example, a two-way valve on an air control panel might be used to send the air to a high pressure circuit, when in one position, or to a lower-pressure circuit when in the other position. Like quarter-turn valves, however, the two-way valve is not intended for the metering of the air flow. Three-way valves are also available.

UNITIZED AIR SYSTEM: Also sometimes referred to as the **MODULAR** air system. A relatively recent development, the unitized air system incorporates the compressor, the driver, the purification system, the air storage system, the air control panel, the electronic monitors, and the fill station all in one cabinet. Unitized systems tend to have a neat appearance, sometimes can cost slightly less than the components purchased separately, and, in some cases, require less total floor space for installation.

VALVES, HEAD: These valves, usually metal-to-metal, control the flow of air into and out of each of the compression cylinders of the compressor. Except for extremely large compressors, these valves are not mechanically opened and closed, but are simply spring-loaded “check valves”, in effect. The head valve is one of the more critical parts of the compressor, and, especially on the higher-pressure stages, must be made of extremely durable metals, and machined to exacting close tolerances. Over a span of operation, the high pressure compressor’s head valves are likely to require the most service.

VALVES, CONTROL: Line-mounted or panel mounted, the control valve regulates the flow of air, and are usually manually operated by the system operator.

VALVES, SOLENOID: Solenoid valves are usually actuated by electrical pulse or pneumatic flow or pressure differentials, and are used to function controls such as the automatic condensate drain system, automatic storage system sequential refilling systems, and some of the other automated devices.

“VEE” BLOCK: This refers to the design of the placement of the compression cylinders on the compressor’s crankcase. The VEE block, when viewed from the front or back, resembles the letter “V”. If the compressor is of 3 or 4 stages, one or more of the stages will be “stacked” on top of another.

WATER BATH: This usually refers to the practice of immersing the small cylinders to be refilled into a container of cool water, to limit the temperature rise that will result from the compressing of the air. This is **not recommended** for composite cylinders.

WORKING PRESSURE: According to the desired **SAFETY RATIO**, a product’s design working pressure will be a fraction of the product’s design burst pressure. Some products are marked with their working pressure, while others aren’t. If in doubt about an unmarked product’s intended working pressure, the manufacturer’s charts must be consulted. Never pressure any component beyond its rated working pressure.