



# X SCUBA

## REGULATOR PARTS CLEANING PROCEDURES

**FOR AIR &  
ENRICHED AIR  
(EAN)**





## Introduction

This manual provides factory prescribed procedures for the cleaning of metal and plastic parts of XS Scuba regulators, BC's, hoses, and valves. It is not intended to be used as an instructional manual for untrained personnel. The procedures outlined within this manual are to be performed only by personnel who have received factory authorized training through a Repair Seminar that has been directly sponsored by XS Scuba.

If you do not completely understand all of the procedures outlined in this manual, contact **XS Scuba** to speak directly with a Technical Advisor before proceeding any further.

### Warnings, Cautions, & Notes

Pay special attention to information provided in warnings, cautions, and notes that are accompanied by one of these symbols:



A **WARNING** indicates a procedure or situation that may result in serious injury or death if instructions are not followed correctly.



A **CAUTION** indicates any situation or technique that will result in potential damage to the product, or render the product unsafe if instructions are not followed correctly.



A **NOTE** is used to emphasize important points, tips, and reminders.

### Scheduled Service

Because a SCUBA regulator is considered to be a life-supporting product, it is extremely critical that it receives service according to the procedures outlined in this manual on a regularly scheduled basis; at least once a year with normal or infrequent use.



**NOTE:** A unit that receives heavy or frequent use, such as in rental, instruction, or commercial applications, should be serviced at least twice each year - or more often - depending on the conditions of use and the manner in which it is maintained. (Refer to the care and maintenance procedures outlined in the User's Guide.)

When performing service, whether it is a routine overhaul or a repair of a specific problem, it is important to understand how the regulator is designed and how it operates. If you have any questions, please consult your XS Scuba representative.

### EAN/ Nitrox Service

Newly manufactured XS Scuba regulators are assembled and packaged to be compatible with oxygen enriched air (EAN/ Nitrox), not to exceed 40% oxygen content. If the regulator is going to be used for this application, however, it must be dedicated and clearly labeled as such, in order to prevent any crossover use with standard compressed air. **Refer to the additional cleaning and handling procedures prescribed in this manual.**



**CAUTION:** It is important to avoid using, testing, or otherwise pressurizing a dedicated EAN regulator with standard compressed air, which contains hydrocarbon contaminants.

**SECTION**  
**2****Standard Compressed Air Cleaning Procedures****Acidic Cleaning Procedure****(For Equipment Used With Compressed Air)****Introduction**

This procedure provides complete instructions for cleaning reusable, non-wearing components and parts of regulators and valves used with standard Grade E compressed air. Acidic Cleaning must also be performed as a prerequisite to performing Aqueous Cleaning — an additional procedure that is necessary for cleaning component parts of equipment used with mixtures of oxygen enriched air (EAN/Nitrox) containing more than 24% oxygen.

Acidic cleaning is a five step procedure that includes:

- ▼ *Degreasing and pre-scrub, plastic parts cleaning*
- ▼ *Tap water rinse*
- ▼ *Ultrasonic acid bath*
- ▼ *Sodium bicarbonate neutralizing bath*
- ▼ *Distilled or de-mineralized water rinse*

**Required Equipment**

- ☐ ***Ultrasonic Cleaner*** – Essential to provide the most effective removal of corrosion and scale from metal parts. It is impossible to attain the same level of cleaning with any other method. Preferred features include a built-in timer and a heater.
- ☐ ***Screen Dip Basket*** – Provided with most ultrasonic cleaners, allows the parts to be fully immersed in each solution, and transferred from one container to the next.
- ☐ ***Separate Containers*** – It is important to use four separate containers, including the well of the ultrasonic cleaner, to hold each solution so that the parts can be transferred quickly in the correct sequence and with minimal delay. Each container should be approximately the same shape and size as the well of the ultrasonic cleaner, so that the dip basket fits completely inside.

**STEP 1 – Degrease & Pre-Scrub:**

- ▼ All reusable non-wearing parts, both plastic and metal, should first be soaked and washed in a solution of 1 quart warm (100° F) water mixed with 3-4 tablespoons of household dish soap (Dawn® or Joy® are recommended). This will loosen and help to remove salt deposits and grime from plastic parts, and remove excessive residues of lubricant grease and grime from metal parts. This step will also extend the life of the acid bath solution by reducing the amount of contamination that occurs during cleaning.
- ▼ A nylon brush can be used to scrub stubborn deposits of grime and salt – especially for threaded metal parts and plastic parts.



**CAUTION:** DO NOT use a steel wire brush. Doing so can damage plating, threads, plastic parts, and sealing surfaces.

**STEP 2 – Fresh Water Rinse:**

- ▼ After completing Step 1, it is important to rinse all parts in fresh tap water, in order to prevent the acid bath solution from becoming contaminated with soap residue.
- ▼ Step 2 completes the cleaning of all plastic parts.

**STEP 3 – Ultrasonic Acid Bath:**

**CAUTION:** It is important to carefully read and understand the Material Safety Data Sheet (MSDS) for any cleaning solution before using it, in order to be aware of the possible hazards associated with its use, and the necessary precautions that must be followed to avoid them.

- ▼ XS Scuba recommends Lawrence Factor Wash (LFW™) to be used exclusively for the acid bath cleaning of all non-wearing metal parts. LFW can be used in concentrated form, or can be diluted with up to seven parts distilled water to extend the life of the solution. For best results, LFW can be warmed to a temperature of approximately 120° F. Follow the directions provided on the label.



**CAUTION:** Plastic parts may become damaged if exposed to the acidic cleaning solution, and should not be placed in the acid bath.

- ▼ For best results, soak parts in an ultrasonic cleaner for 5 to 15 minutes (depending on the strength of the solution), unless the finish is chipped or scratched. Parts with damage to their finish should be cleaned separately outside the ultrasonic cleaner to avoid agitation.
- ▼ Be certain to isolate smaller or more delicate parts to prevent metal on metal contact with other parts or the dip basket that can cause damage to sealing surfaces.

- ▼ Use a timer to control the cleaning time, and do not leave parts unattended while they are inside the acid bath.



**CAUTION:** Harsh acids, such as muriatic acid, may cause damage to parts and must be strictly avoided. Undiluted white vinegar, although less effective, is the only recommended substitute for LFW™.

#### **STEP 4 - Neutralizing Bath:**

- ▼ Thoroughly mix 8 cup sodium bicarbonate (baking soda) with one quart fresh tap water in a clean container. Remove the parts from the acid bath, and immerse in this solution for 2-3 minutes.

#### **STEP 5 - Final Rinse:**

- ▼ Use only distilled water, to prevent mineral stains on the plated finish of newly cleaned parts.
- ▼ Agitate lightly, and then allow to soak for at least 15 minutes.
- ▼ Change the rinse often, to maintain a neutral PH.
- ▼ Dry the parts afterward with low pressure (50 psi) filtered air.
- ▼ Closely inspect all parts afterward to ensure they have been properly cleaned and are in like-new condition.

#### **CLEANING TIPS:**

- ▼ The yoke screw threads may be dipped into the acid bath, holding the plastic portion out of the cleaner.
- ▼ Be certain to isolate parts with critical sealing surfaces, including the orifice, to avoid harmful contact with other metal parts.
- ▼ If salt and corrosion buildup is severe around the hose fittings, immerse only the fitting of each hose in the acid bath cleaner, in order to prevent the solution from entering the hose. Rinse thoroughly in fresh water using the same method, and hang the hose to dry suspended in the middle with both ends hanging down. Blow low pressure (50 psi) filtered air through each hose prior to installing it onto the regulator.



**NOTE:** The parts are now clean for use with standard compressed air, not to exceed 24% oxygen content. Proceed directly to **Section 5 – Reassembly Procedures**, or proceed to the following page for additional cleaning instructions if the regulator will be used with EAN/ Nitrox.

**SECTION  
3**

## **EAN/Nitrox Cleaning Procedure (For Equipment Used With Oxygen Enriched Air)**

### **Introduction**

XS Scuba regulators are assembled and packaged to be suitable for use with mixtures of oxygen enriched air (EAN/Nitrox), not exceeding 40% oxygen, provided that they are dedicated for this use exclusively, and are not used, tested, or pressurized with standard compressed air.

XS Scuba parts kits contain O-rings, seats, and washers made of materials that are proven compatible with oxygen enriched air, up to 40% oxygen. It is very important to replace all standard replacement parts during the course of overhaul service, and not to reuse any of them under any circumstances.



**NOTE:** It is important to handle the contents of the first stage parts kit with care, wearing rubber or plastic gloves to prevent contamination with skin oil. In the event that contamination occurs, the parts must be cleaned according to the following procedure.

Prior to reassembly, a regulator designated for use with EAN/ Nitrox must undergo a complete overhaul service that includes special cleaning and parts inspection according to the steps outlined in this procedure. Special cleaning is necessary to remove contaminants from the regulator that may react with oxygen enriched air.

Standard compressed air usually contains a certain level of hydrocarbons, including invisible traces of compressor oil, that are not considered harmful or dangerous when kept within the acceptable limits for Grade E compressed air. When these same levels of hydrocarbons come in contact with oxygen enriched compressed air, however, they can pose a very real hazard that can lead to an oxygen fire or explosion. For this reason, it is important to clean the individual parts and components of any regulator or valve before it can be used with enriched air, in order to remove all traces of hydrocarbon contamination.

Although acidic cleaning is very effective for removing corrosion and scale, it is not sufficient by itself to remove certain sources of contamination. It is therefore necessary to perform an additional cleaning procedure that is specifically formulated to remove all traces of silicone grease, skin oil, compressor oil residue, and other hydrocarbon contamination.

### **EAN/Nitrox Cleaning is a four step procedure that includes:**

- 1 Pre-Cleaning with Ultrasonic Acid Bath*
- 2 Ultrasonic Aqueous Cleaning Bath*
- 3 Distilled or De-mineralized Water Rinse*
- 4 Final Inspection (direct light, ultraviolet, and wipe test)*



**NOTE:** Although second stage components are not usually exposed to high pressure oxygen enriched air, XS Scuba recommends that the same cleaning and assembly procedures be followed for the complete regulator. This prevents the possibility of cross contamination, and guarantees the integrity of the complete system.

### REQUIRED EQUIPMENT:

- ❑ **Dedicated Ultrasonic Cleaner** – To avoid contamination, it is important to use a separate cleaner that is kept dedicated for aqueous cleaning, in addition to one used for acidic cleaning. Preferred features include a built-in timer and a heater.
- ❑ **Screen Dip Basket** – Provided with most ultrasonic cleaners, allows the parts to be fully immersed in each solution, and transferred from one container to the next.
- ❑ **Powderless Latex Gloves** – Skin oil is another source of potential contamination that can react with oxygen enriched air. Once the parts have been cleaned, gloves must be worn at all times to prevent them from becoming contaminated during handling.
- ❑ **Dedicated Rinse Tub** – To avoid recontamination, it is important to use a separate rinse tub that is kept clean and dedicated for aqueous cleaning, in addition to the rinse tub that is used for acidic cleaning.
- ❑ **Incandescent or Fluorescent Lighting** – Required during final inspection to detect more obvious signs of contamination.
- ❑ **Ultraviolet Lighting** – Required during final inspection to detect contamination that is not visible beneath normal lighting.
- ❑ **Lint Free Cotton Wipes** – Required for cleaning and inspection.

### Preparing the Workstation

Enriched air cleaning procedures may be carried out in the same work area that is used for servicing air scuba equipment, provided that it is kept reasonably clean, and airborne pollutants (dust, soot, etc.) are not visibly present on surrounding surfaces. Ventilation ducts and windows should be checked to ensure that airflow will not introduce these contaminants while cleaning and service is in process.

- ▼ To ensure cleanliness, the work surface should be covered with a clean sheet of butcher paper or plastic sheeting.
- ▼ The technician must wear clean, non-powdered latex or plastic gloves whenever handling cleaned parts (including upgrade parts kit), in order to prevent contamination with skin oil.



**NOTE:** All tools and fixtures, including the ultrasonic cleaner well, must be kept completely clean of any contaminants. For this reason, a separate set of clean tools should be used for the reassembly of enriched air equipment, different from those used for normal air equipment.

## ACIDIC PRE-CLEANING

Before performing aqueous cleaning, all metal parts must first be cleaned with the acidic cleaning procedure outlined on pages 16-17 to ensure the complete removal of any corrosion or scale. Final drying, however, is not necessary.



**NOTE:** Use only LFW™ cleaning solution, which contains an additional degreasing agent, for the acidic pre-cleaning of metal parts. White vinegar is not an acceptable cleaning agent for EAN/ Nitrox pre-cleaning.

## ULTRASONIC AQUEOUS BATH



**CAUTION:** It is important to carefully read and understand the Material Safety Data Sheet (MSDS) for any cleaning solution before using it, in order to understand the possible hazards associated with its use, and the necessary precautions that must be followed in order to avoid them.

### General Guidelines

- ▼ *It is important to select an aqueous cleaning solution that is non-carcinogenic, non-toxic, and biodegradable, so that it can be safely disposed of by emptying it into a sewer system that is connected to a waste treatment facility. It must also be non-damaging to the materials of soft wearing parts, including seats, O-rings, washers, and gaskets. Last, it must be easily rinsed away so that it leaves no residue. Refer to Table 1 on Page 4, which lists the aqueous cleaning solution that XS Scuba has currently approved.*
- ▼ *The aqueous cleaning solution must be diluted only with distilled water, according to the ratio specified by the manufacturer.*
- ▼ *It is important to pre-heat the aqueous cleaning solution to approximately 130° F.*
- ▼ *The aqueous cleaning solution can be reused at least once, but will eventually require replacement as more contaminants and particulate matter are held in suspension. Frequently examine the appearance of the previously used solution in a clear beaker, and compare it alongside another beaker containing fresh solution in good lighting (diluted with the same ratio of demineralized water). When the appearance begins to vary between fresh and used, or when contaminants can be visually detected, the solution should be disposed of and replaced. Whenever in doubt, dispose of the solution and replace with fresh.*



1. Place the parts inside a clean dip basket and lower the basket into the tank of a separate ultrasonic cleaner which contains an approved aqueous cleaning solution. (Refer to Table 1 for an approved and recommended solution, and follow the manufacturer's instructions for dilution rates and recommended working temperatures.) Be certain to isolate more delicate parts, such as orifice cones, to prevent metal on metal contact with other parts or the dip basket that can cause damage to sealing surfaces.
2. Before removing the parts, it is important to don clean powderless latex gloves in order to prevent any subsequent contamination with skin oils. Avoid touching the external surface of the gloves with bare fingers in the process of donning. Without this barrier present, parts will become contaminated with skin oil.



**NOTE:** It is important to avoid handling clean parts with bare hands while performing the rinsing, inspection, and reassembly procedures. Doing so will re-contaminate the parts with skin oil, and require them to be cleaned again prior to reassembly.

3. With a small, nylon brush and lint-free swabs, scrub all surfaces of each part, and allow to soak for an additional 5-10 minutes before removing from the ultrasonic cleaner. Certain parts with complex features may require more attention - especially those which contain closed recesses and chambers. It is important to ensure that these are thoroughly flushed with solution, and that contaminant residue is not trapped inside.

### **Demineralized or Distilled Water Rinse:**



**NOTE:** Tap water drawn from the faucet often contains high levels of minerals, and is considered unsuitable for use with aqueous cleaning, either as a diluent or final rinse. Inexpensive filtration systems may be used which easily filter out most minerals, rendering the water "demineralized." For high volume operations, this is a less expensive alternative to bottled distilled water.

1. When immersion in the aqueous cleaner has been completed, it is extremely important to transfer all parts into a clean container filled with fresh distilled or demineralized water that is heated to approximately 140° F, to facilitate faster drying. Rinse each part thoroughly with mild agitation to ensure thorough rinsing and the complete removal of cleaning solution. Parts with more complex features will require additional attention to ensure complete rinsing of threads, crevices, and recesses.
2. Dry immediately afterward, using only low pressure (50 psi), hydrocarbon-free gas (Nitrogen or EAN).
3. When drying is completed, set the parts aside on a clean, lint-free surface covered with butcher paper or cellophane.

**Final Inspection:**

When each part has been completely cleaned and dried, it must be closely inspected to ensure the total absence of contamination or cleaner residue. In the event that contamination is still found during inspection, it may be necessary to re-clean the part. Inspection is a critical procedure that must be performed in three consecutive steps.

1. Gently wipe all surfaces of each part with a clean, lint-free wipe, and closely inspect both the wipe and part under strong fluorescent or incandescent light to check for any signs of scale, corrosion, damaged plating, burrs, filings, grease, fingerprints, oil, or other contamination. If contamination is found, repeat the above cleaning procedure or replace the part as needed.
2. Assuming no contamination is found, immediately inspect the same part and wipe under ultraviolet light to check for any signs of oils, grease, or fine particulate matter which will fluoresce (glow) if present. If found, repeat the aqueous cleaning procedure.



**NOTE:** Isolated particles of dust may be eliminated with low pressure, hydrocarbon-free gas.

3. Wrap or cover all metal parts with cellophane or other plastic until ready to begin reassembly.



**NOTE:** Before proceeding, clean fingertips of latex gloves with isopropyl alcohol to remove any contamination.

4. Examine each replacement parts kit to determine that it has not been previously opened, and that the individual parts have not been exposed to possible contamination, including handling with bare fingers.



**WARNING:** Do not attempt to use individually ordered spare parts as a substitute for those packaged in kit form directly from XS Scuba. Doing so will render the product incompatible for use with enriched air, and may seriously jeopardize the safety of the diver.

5. Closely inspect all new replacement parts for both the first and second stage, including O-rings, seats, filters, and gaskets, under fluorescent and ultraviolet light as prescribed above. Examine the condition of the O-rings to ensure they are in new condition, and do not show any signs of decay. If contamination is found, it will be necessary to re-clean the parts, following the procedures outlined above.

## LOW PRESSURE HOSE ASSEMBLIES

1. Ultrasonically clean both hose fittings by dipping only the hose ends in the LFW™ acid bath, and rinse thoroughly in distilled water.
2. Inspect each fitting to ensure that all scale and corrosion is removed, and re-clean if necessary, using a small nylon brush.
3. Run aqueous cleaning solution through the hose in both directions, checking to ensure that no foreign matter or loose material exits the hose when it is drained. If evidence of internal decay is visible, discard the hose and replace with new.
4. Don clean, powderless latex gloves in order to prevent any subsequent contamination with skin oils. Avoid touching the external surface of the gloves with bare fingers in the process of donning. If contamination of a glove does occur, it can be cleaned with isopropyl alcohol.
5. Ultrasonically clean both fittings inside and out with aqueous cleaning solution, using a soft nylon brush and lint-free swabs to clean all surfaces, including threads, crevices, and recesses.
6. Thoroughly rinse the hose inside and out with heated, demineralized water, to completely remove all traces of aqueous cleaning solution.
7. Direct hydrocarbon-free gas through the hose until it is completely dry inside and out.
8. Inspect the hose according to the inspection procedure outlined in these instructions.
9. Set the hose aside on clean surface, and wrap both fittings with cellophane until it is ready for reassembly onto first and second stages.

## HIGH PRESSURE HOSE ASSEMBLY

1. While holding the retaining nut secure at the base of the submersible pressure gauge module with a b" open end wrench, apply a separate b" open end wrench to turn the hose fitting below it counter-clockwise to loosen and remove the hose.



**CAUTION:** Do not attempt to loosen the hose fitting without holding the retaining jam nut secure, or otherwise attempt to remove the nut. Doing so may result in irreparable damage to the pressure gauge, causing it to flood, and will render its warranty null and void.

2. Carefully remove the high pressure airspool from inside either the HP hose fitting or the retaining nut of the pressure gauge, and set it aside.
3. Closely inspect the gauge module to ensure that the relief plug is present and intact, and that the retaining nut fitting has not been loosened or removed.

4. Gently insert a clean cotton swab into the airspool recesses of both the hose and gauge fittings to wipe out any grease or other deposits.
5. Using either a brass or plastic O-ring tool, remove both O-rings from the airspool, and discard. Closely inspect the airspool under strong magnification to check for any signs of wear or damage, including chrome loss, scratches, nicks, or cracking—especially on or near the O-ring sealing surfaces. If damage is found, discard the airspool and do not attempt to reuse. Otherwise, the airspool may be cleaned by following the procedure used for regulator and valve components, and reassembled with new oxygen compatible O-rings.
6. To ultrasonically pre-clean the pressure gauge fitting, hold the gauge module upright while dipping the fitting in the acid bath for at least 2-5 minutes. Use caution to avoid immersing any portion of the gauge above the fitting, and prevent the gauge from falling into the ultrasonic cleaner.
7. Rinse the gauge fitting in the same manner with distilled or demineralized water, and inspect closely to ensure that all scale and corrosion is removed. Re-clean if necessary.
8. Ultrasonically clean the gauge fitting in the aqueous cleaner as before with the acid bath, using the same caution to avoid immersing any portion of the module above the fitting.
9. Rinse thoroughly by dipping the fitting into distilled or demineralized water, and shake off excess moisture.



**CAUTION:** Hold the gauge only by the plastic module to avoid touching the fitting with bare fingers.

10. Blow the gauge fitting completely dry, inside and out, with low pressure (50 psi), hydrocarbon-free gas, and set the gauge module aside on a clean surface.
11. Ultrasonically pre-clean both hose fittings by soaking the hose ends in the LFW™ acid bath for 2-5 minutes, depending on the strength of the solution.
12. Dip the hose fittings in distilled or demineralized water, and inspect each fitting closely to ensure that all scale and corrosion is removed. Re-clean if necessary, using a small nylon brush.
13. When the hose fittings have been thoroughly cleaned of scale and corrosion, rinse them thoroughly by swishing in demineralized or distilled water.
14. Using a large syringe or cooking baster, slowly inject aqueous cleaning solution (diluted per manufacturer's recommendations) into the female hose fitting. Refill the syringe or baster and repeat as needed until the hose is full, evidenced by solution exiting through the small orifice on the opposite end. Lay the hose inside the ultrasonic aqueous cleaner to soak for 10-15 minutes.

15. Don clean, powderless latex gloves in order to prevent any subsequent contamination with skin oils. Avoid touching the external surface of the gloves with bare fingers in the process of donning. If contamination of a glove does occur, it can be cleaned with isopropyl alcohol.
16. Remove the hose from the cleaner, and drain the aqueous cleaning solution from the female fitting. Using a clean syringe, fill the hose completely with distilled water and immerse the entire hose assembly inside a clean container of distilled or demineralized water that is heated to 140-160 °F. Allow to soak for 15-30 minutes.
17. Remove the hose from the final rinse, and allow to drain. Fill with heated, distilled water until completely full, and allow to drain again. Repeat this several times until the water that drains from the hose contains no residue of the aqueous cleaning solution (i.e., no foam, scent, or color).
18. Shake off any excess moisture, and dry the hose fittings with low pressure (50 psi), hydrocarbon-free gas.
19. Inspect the hose according to the inspection procedure outlined in these instructions.
20. Dress the hose O-ring with clean Christo-Lube®, and install oxygen compatible O-rings onto the male first stage fitting, at the base of the threads. Install the male fitting into the high pressure port of a clean and compatible EAN first-stage regulator (with a second stage connected to serve as a relief valve).
21. Connect the first-stage to a clean cylinder that contains no more than 2,500 psi of hydrocarbon-free gas.
22. While holding the open female fitting of the high pressure hose secure, slowly open the cylinder valve to pressurize the first stage. Allow a steady stream of gas to run through the hose, until no signs of moisture can be seen exiting. Close the cylinder valve, and wrap the open female fitting with a lint free wipe. Re-pressurize, and check the lint free wipe for any traces of moisture. Repeat until no moisture is present.



**NOTE:** Before proceeding remove gloves and replace with new, or clean fingertips of gloves with isopropyl alcohol.

23. Dress the airspool O-rings with clean Christo-Lube®. Carefully install the O-rings onto the airspool, using caution to avoid damaging each O-ring while passing it over either end.
24. Gently install the airspool into the retaining nut fitting of the pressure gauge by inserting it into the recess.
25. Mate the hose swivel fitting over the airspool and onto the male threads of the gauge retaining nut. Turn the hose fitting clockwise to engage the threads, and turn by hand until snug.

26. While holding the retaining nut secure with a b" open-end wrench, apply a torque wrench with b" crow-foot to tighten the hose fitting to 50 inch pounds ( $\pm 5$ ).



**CAUTION:** Do not attempt to use silicone grease, regardless of grade or manufacturer. Silicone grease is unsuitable for use with enriched air mixtures, and will contaminate the system, rendering it non-compatible with enriched air.

27. Set the high pressure hose with pressure gauge aside on clean surface, and wrap the male fitting with cellophane until it is ready for reassembly onto the first stage.

### **LUBRICATION & DRESSING:**

Perhaps the most critical component of any equipment used with oxygen enriched air is the lubricant grease. Regardless of the application, XS Scuba recommends Christo-Lube<sup>®</sup> MCG-111 (PN MS150) to be used exclusively for the lubrication and dressing of all O-rings and other internal parts. Christo-Lube<sup>®</sup> provides superior lubrication and protection to that of silicone grease, especially in high pressure (DIN) systems greater than 3,000 psi, and extreme temperature conditions.



**CAUTION:** Do not attempt to use silicone grease on any component, regardless of grade or manufacturer. Silicone grease is not suitable for use with oxygen enriched air, and will contaminate the entire system, rendering it non-compatible with EAN/ Nitrox.

- ▼ *Wear clean, powderless latex gloves at all times while handling new O-rings and other parts, to avoid contaminating the parts with skin oil.*
- ▼ *Dress all O-rings with a visible film of Christo-Lube, but avoid applying excessive amounts, as this may attract particulate matter that can cause accelerated wear or damage to the O-ring.*
- ▼ *Set the O-rings aside on a perfectly clean surface that is covered with cellophane. Do not use lubricant that appears to be contaminated with any particulate matter or other foreign debris.*



**CAUTION:** The use of aerosol spray or petroleum based lubricants must be strictly avoided. The propellant gas or petroleum base may attack or weaken plastic or rubber parts, and is not compatible with enriched air.

### Final Adjustment & Flow Testing

When the equipment has been cleaned and reassembled, it is very important to avoid contact with standard compressed air, to prevent any possibility of hydrocarbon contamination. It is therefore extremely important to pressurize only with hydrocarbon-free gas for the purposes of final adjustment and flow testing. As a less expensive alternative to EAN, compressed Nitrogen may be used, purchased from a reputable gas supplier that can certify the gas as being hydrocarbon-free.



**CAUTION:** Do not connect the regulator to any cylinder or air supply that cannot be verified as containing hydrocarbon-free gas. If the regulator is pressurized with standard compressed air, which contains hydrocarbons, it will be rendered incompatible with enriched air mixtures above 24% oxygen until the above cleaning procedure has been repeated.

### Labeling & Packaging

After performing the EAN/ Nitrox cleaning and service procedures, it is extremely important to ensure that each piece of equipment serviced is clearly labeled and identified for dedicated use with EAN/ Nitrox. This will help to prevent any crossover use with normal compressed air, and will also help to prevent any accidental use by untrained users.