General Preventative Maintenance

Contents

1.1 Introduction

This section covers the preventative maintenance necessary for the Kirby Morgan diver's helmet. A helmet that is kept clean and in good repair will offer far better service and safety to the user. These helmets are designed for easy access to all areas for proper inspection and servicing.

1.2 Required Tools, Sealing, Cleaning, Lubrication Agents

All KMDSI helmets and masks are designed with the professional diver in mind. Most maintenance can be performed by the diver using common tools and this manual. There are some repairs however, that must be performed by KMDSI authorized repair facilities only. This includes helmet bottom ring repairs and fiberglass repairs. For technical assistance please telephone your nearest authorized dealer or call KMDSI at (805) 928-7772 or visit www.kirbymorgan.com.

Every diver should carry sufficient tools and spare parts to maintain his or her helmet in top working condition. It is very important to use wrenches of the correct size when possible. The following wrenches and tools are required to maintain Kirby Morgan helmets:

Torque wrench with the following attachments:

- 1 3/8 inch Crows Foot
- 7/16 inch Open End Wrench
- 9/16 inch Open End Wrench
- 5/8 inch Open End Wrench
- 11/16 inch Open End Wrench
- 3/4 inch Open End Wrench
- 13/16 inch Open End Wrench
- 7/8 inch Open End Wrench
- 1 inch Open End Wrench

Torque screwdriver and these attachments:

- 1/8, 1/4, And 3/8 inch Flat Blade Screwdrivers
- #2 Phillips Head Screwdriver
- 7/64 inch Allen Wrench Driver
- 9/64 inch Allen Wrench Driver
- 5/32 inch Allen Wrench Driver
- Open End Wrenches In The Following Sizes:
- 3/8 inch
- 7/16 inch
- 9/16 inch

- ¾ inch
- ⅞ inch
- 1 inch

Two adjustable wrenches, 6 and 8 inches in length.

- ⅜ inch Flat Blade Screwdriver with a Notch in the Center of the Tip.
- ¼ inch Flat Blade Stubby Screwdriver
- #1 Screwdriver
- (2) Needle Nose Pliers
- Diagonal Cutting Pliers
- Slip Joint Pliers
- 3⁄32 inch Punch
- Putty Knife
- O-ring Removal Tool
- SuperFlow® Regulator Tool Kit P/N 525-620
- REX® Regulator Tool Kit Part # 525-768
- Ball Peen Hammer
- Tie Wraps: P/N 520-042
- Silicone Grease
- RTV silicone sealant (Dow Corning® 732, or equivalent recommended).

IMPORTANT

RTV silicone sealant requires 24 hour cure time prior to equipment use.

- Loctite® 248 or an equivalent medium strength thread locker

NOTE

Loctite® requires three hours cure time prior to equipment use

- Clean rags

For Fiberglass Helmets

- #320, 400, 600 wet/dry sandpaper
- Rubbing Compound
- Automotive Wax

For Helmets Equipped with Whisker Clamps

- Whisker Clamp Replacement Kit: Part # 525-032
- Other tools may be required for certain specialized operations.

1.2.1 Component and Parts Cleaning

The helmet and components should only be cleaned using a mild solution of dish washing soap such as JOY® or Dawn® hand dish washing soap.

Parts that have corrosion should be washed and scrubbed with a nylon bristle brush and then soaked in a solution of 50% white vinegar and water for 30-60 minutes followed by a light brushing, then rinse well with fresh water. Head cushions and rubber components should be cleaned using a mild soapy solution, then rinse well and air dry.

DO NOT use hair dryers or high heat to dry the rubber or fabric components. High temperatures will severely reduce their serviceability. To clean parts heavily encrusted with salt, we recommend a dilute solution of white vinegar and a toothbrush.

1.2.2 Component and Parts Lubrication

All helmets are lubricated at KMDSI with Christo-Lube®. Helmets used for air diving or diving with oxygen mixtures containing less than 50% oxygen can be lubricated with food grade silicone such as Molykote® 111 or equivalent.

Do not use aerosol spray or lubricants on plastic parts. Many aerosol propellants will damage plastic. Avoid lubricant contact with plastic parts.

⚠ WARNING

Never use aerosol-propelled sprays near the face port of the helmet or Band-Mask. The propellant used in these aerosols can invisibly damage the face port and cause it to shatter upon impact from any strong blow. If the face port fails underwater, the helmet will flood and drowning may result.

NOTE

All parts on the helmet that require lubrication must be lubricated sparingly with the appropriate lubricant.

Silicone grease is not recommended for helmets used with oxygen. (Avoid mixing lubricants to preclude incompatibility).

1.2.3 Teflon® Tape

All pipe thread fittings used on our helmets, masks and components require sealing with Teflon® tape. **DO NOT USE LIQUID SEALANT.** When installing Teflon® tape on pipe threads, apply the tape starting two threads back from the end of the fitting.

Apply the tape in a clockwise direction under tension. Two wraps are all that is needed. Applying more than two wraps of tape is not recommended. The use of more than two wraps could cause excess Teflon® tape to travel into the breathing system.

⚠ WARNING

Do not allow any excess Teflon® tape to cover the end of the pipe thread fittings. Loose pieces of Teflon® tape can interfere with the performance of helmet components and may block the diver's air supply. This could lead to death through suffocation.

⚠ WARNING

Use only thin Teflon® tape to avoid damage to threads.

1.2.4 RTV Sealant

Certain components used in KMDSI helmets and masks use RTV adhesive / sealant to provide bonding and sealing. KMDSI recommends Dow Corning® RTV 732 multi purpose sealant. When sealant is applied, one must use care to ensure excess sealant is wiped clean so as not to interfere with other components. Sealant should be allowed to cure for 24 hours before equipment is used.

1.2.5 Thread Locker

KMDSI recommends Loctite® 248 or an equivalent medium strength thread locker as the type of thread locking compound that should be used on most components that call for a thread locker. Threads should be clean and dry prior to applying thread locker.

Ensure that all excess thread locker has been removed. Also, be sure not to use excessive threadlocker in the port retainer screws, as it is possible to damage the face port if contact is made between thread locker and the port. Loctite® 222 should not be used anywhere near the face port as it can "wick" and spread too close to the face port; always use Loctite® 248 (paste/stick). Allow thread locker to cure for at least three hours prior to using the component.

⚠ WARNING

Avoid any contact between Loctite® and the face port. This can cause the port to fail unexpectedly and drowning could result.

1.3 General Cleaning & Inspection Procedures

All divers must establish their own minimum standards for the care of their helmet. We offer recommendations here with the suggestion that divers establish for themselves what is necessary to provide a properly working, safe unit. Use of the helmet in fresh water will require a timetable for maintenance different from that of a helmet used in salt water.

Using the helmet in sea water while jetting in

sand will necessitate increased maintenance. Use of the helmet in a heavy oil and/or chemical environment may make it necessary to replace rubber parts to ensure proper function. Regardless, all helmets and masks should be disassembled, cleaned and inspected at least once a year. All soft goods should be replaced at least once a year, unless careful inspection by factory qualified personnel determines replacement is not necessary.

⚠ WARNING

DO NOT use car wax on rubber components as the ingredients may cause premature degradation to the rubber resulting in failure of equipment and possible injury or death to personnel.

Kirby Morgan highly recommends rinsing your helmet thoroughly after every dive. Regular polishing and cleaning of the surface can be helpful. For stainless steel helmets, a hand cleaner with pumice such as GOJO® Natural Orange™ Pumice Hand Cleaner—which contains tiny abrasive particles—may also be used. Owners can also put a thin layer of car wax such as Turtlewax® on the helmet shell. Do not wax the rubber components.

FINISH CARE IS A PART OF REGULAR MAINTENANCE.

NOTE

Certain fuel oils and/or chemicals will cause premature degradation of soft goods and seals by making them soften, swell or break down. Upon exiting the contaminant, KMDSI recommends a thorough external decontamination/washing of the helmet/neck dam yoke as soon as feasibly possible, followed by a vigilant inspection of the interior of the helmet to ensure that no contaminant has entered.

Pay particular attention to the following parts prior to re-use; the regulator assembly, demand regulator diaphragm, demand regulator exhaust valve, water dump valve, communications post(s) or communications connector assembly, and neck dam.

⚠ WARNING

If in doubt about the serviceability of a part, repair or replace it immediately. Use only Genuine Kirby Morgan replacement parts. The use of unauthorized parts may result in injury or death to the user.

⚠ WARNING

Do not use solvents or bleach for cleaning. These agents are toxic and use of them may result in injury or death to personnel and damage to equipment.

⚠ WARNING

Wear eye protection to prevent cleaning and germicidal cleansing solutions from contacting eyes. If contact occurs, rinse eyes with copious amounts of water and consult medical help immediately.

⚠ WARNING

Cleanliness is imperative in maintaining and handling Kirby Morgan masks and helmets. All tools, parts, and components must be kept free of oil, grease, rust, and other contamination. Foreign substances within an assembly may result in equipment failure and possible injury or death to personnel.

⚠ WARNING

Different brands of grease should never be mixed. Ensure all old grease is removed prior to applying new grease.

1.3.1 O-ring Removal/Inspection/ Cleaning and Lubrication

Strict cleanliness and proper lubrication are extremely important during O-ring installation. Comply with the following instructions to ensure proper removal and installation:

NOTE

Ensure all parts are clean throughout the assembly procedure. Dirt, loose particles or containments left behind in the O-ring groove can cause leaks in the seal and damage to the O-ring, reducing its life. During cleaning of equipment, carefully clean O-ring grooves, using a soft bristle brush and mild soap solution.

O-ring Removal:

Do not use screwdrivers or hard metal picks to remove O-rings. When possible, use only fingers to remove O-rings. If an O-ring fits too tightly in its groove to be removed using the fingers, use the appropriate tool from an O-ring removal kit (brass or plastic pick).

A plastic cable tie or a toothpick makes an effective O-ring removal tool. Use of an appropriate tool helps prevent scratching the O-ring groove, which can cause leakage or premature failure of the seal.

O-ring Inspection:

If during routine corrective maintenance O-rings are to be reused, reuse only O-rings that pass a complete inspection. Inspect for deformities or compression set, hardening or brittleness, nicks or cuts, pits or blisters, or any other signs of damage. Cut and discard damaged O-rings and replace them with new ones.

O-ring Reuse:

All O-rings and soft goods should be replaced whenever scheduled overhauls are being completed, however, during routine repairs or maintenance in between the overhauls, O-rings and soft goods may be reused after cleaning, provided a careful inspection reveals no wear or damage.

Place the O-rings in a cleaning basin, cover with a warm water and mild soap solution, and brush gently with a soft bristle brush to remove all traces of old lubricant and contamination.

Rinse cleaned O-rings with fresh water and wipe clean with lint-free cloths, then allow to air dry, carefully inspect for cracking, cuts, abrasions and deformities. Replace O-rings if any damage is found or suspected.

1.3.2 General Cleaning Guidelines

Cleaning and sanitizing of the helmet should be accomplished upon completion of use, prior to storage, and before use by another person. Clean is defined as free of dirt, rust particles, grease and oil and other contaminants as viewed by the unaided eye.

Sanitizing is defined as eliminating germs and microorganisms.

The Sanitizing Procedure should be accomplished if possible between dives when two or more divers are making consecutive dives with the same helmet

Both the regulator cover and diaphragm should be removed for cleaning and sanitizing. The inside of the regulator and whisker must also be sanitized. For the SuperFlow 350 see “1.1 SuperFlow® 350 Regulator & Exhaust System Post Dive Cleaning & Sanitizing” on page SF350-1, for the 455 Balanced Regulator see “1.4 455 Balanced Regulator Disassembly” on page 455BAL-7 and for the REX regulator see “1.2.1 REX® Exhaust” on page REX-2 for instructions on how to remove and replace these components properly.

See the most up-to-date procedures for cleaning on the Dive Lab website at www.divelab.com.

⚠ WARNING

Always sanitize the helmet prior to use by another person. Failure to do so could result in the transmission of communicable diseases, some of which may cause long term disability or death.

1.3.2.1 Mild Soap Solution for General Cleaning and Leak Detector Use

Maintenance procedures include cleaning with a general-purpose solution of a mild diluted hand dish washing soap such as Joy® or Palmolive®. Cleaning solution is prepared by mixing approximately one teaspoon of soap to ½ gallon of warm fresh water. This solution may also be used as a leak detector solution. Place all parts and components in a clean washbasin or sink and immerse in soap solution.

Use a dilute solution of hand dish washing soap to clean your helmet after each diving day. The oral/nasal mask and regulator must also be sanitized between use by different divers.

Allow parts/components to soak for at least five minutes, and then scrub using a nylon brush. Carefully brush all surfaces, paying close attention to O-ring grooves and threaded surfaces ensuring all greases are removed. Regardless of the soap used, all components must be thoroughly rinsed post cleaning to remove all traces of soap.

1.3.2.2 Acidic Cleaning Solution and Procedures

Metal parts that have visible corrosion should first be cleaned using the soap solution scrubbed with a nylon bristle brush, then soaked in a solution of 50% white vinegar and water for less than 60 minutes. They may also be placed in a ultrasonic sink followed by a light brushing and thorough rinsing with fresh water and air-dried. If corrosion is such that 50/50 vinegar will not clean components, it will be best to replace the components.

1.3.2.3 Germicidal Cleaning Solutions and Procedure

Sanitizing of the oral-nasal mask/regulator of Kirby Morgan helmets is accomplished using one of three approved germicidal cleansing solutions. There are three examples of solutions shown below, along with the necessary ordering information and mixing instructions.

NOTE

Ensure head and chin cushions are removed prior to sanitizing the oral-nasal mask/regulator.

1. SaniZide Plus® Surface Disinfectant Spray:
Ready to use solution.
Manufacturer - Safetec of America, Inc.

2. MSA Confidence Plus: Concentrate solution, follow manufactures instructions of use.
Manufacturer - MSA Safety Incorporated.

3. Steramine™: Steramine quaternary sanitizing tablets. Follow manufactures instructions for use.
Manufacturer - Edwards-Councilor.

1.3.2.4 Sanitizing Procedure

Unless otherwise directed, use the following procedure to disinfect the oral-nasal mask/regulator:

1. Immerse or wet all components to be sanitized with the germicidal solution. Allow components to stay in contact with the solution for at least 10 minutes.

2. If the solution appears to be drying, apply more solution to keep it wet for the full 10 minutes.

3. After 10 minutes, thoroughly rinse components under running potable water.

NOTE

The purpose of this procedure is to sanitize the components exposed to each of the divers. KMDSI recommends sanitizing be accomplished daily in between use by different divers, after each use, or when future use is anticipated within the mission (job) period. **KMDSI defines "A mission is defined as use of the helmet over a seven-day period."**

⚠ CAUTION

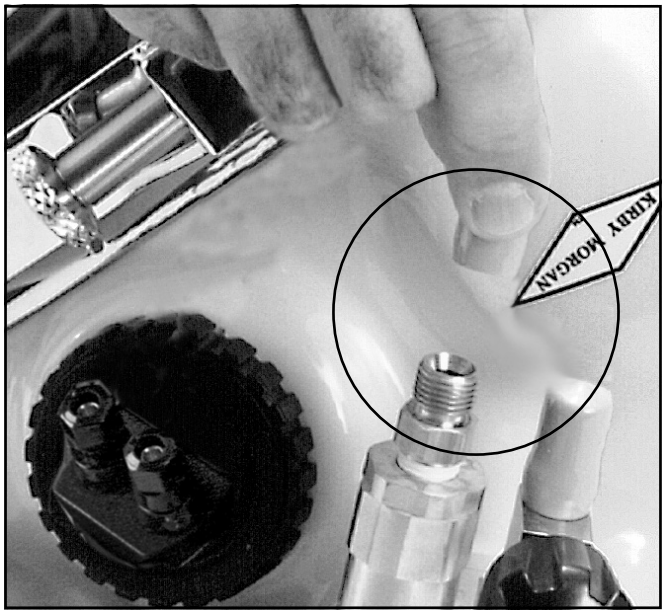
Germicidal cleansing solutions must be carefully diluted if required in accordance with the manufacturer's recommendation. If solution is not of the recommended strength, it will not act as an effective disinfectant. Failure to thoroughly rinse germicidal cleansing solution from diving equipment may result in lung irritation and/or long-term degradation of rubber and silicone components of this equipment.

1.4 Daily Maintenance

Post dive cleaning and inspection should be performed at the end of daily diving operations or at least every 24 hours during continuous diving operation. Follow appendix A2.6.

⚠ WARNING

Never disconnect any hose from the helmet unless all gas has been vented from the hose first. If the hose is disconnected with pressure in the line the fittings may be damaged. In addition, the hose can whip about causing injury to anyone standing nearby.



Cover the air inlet and emergency gas valve openings with dust caps when not in use.