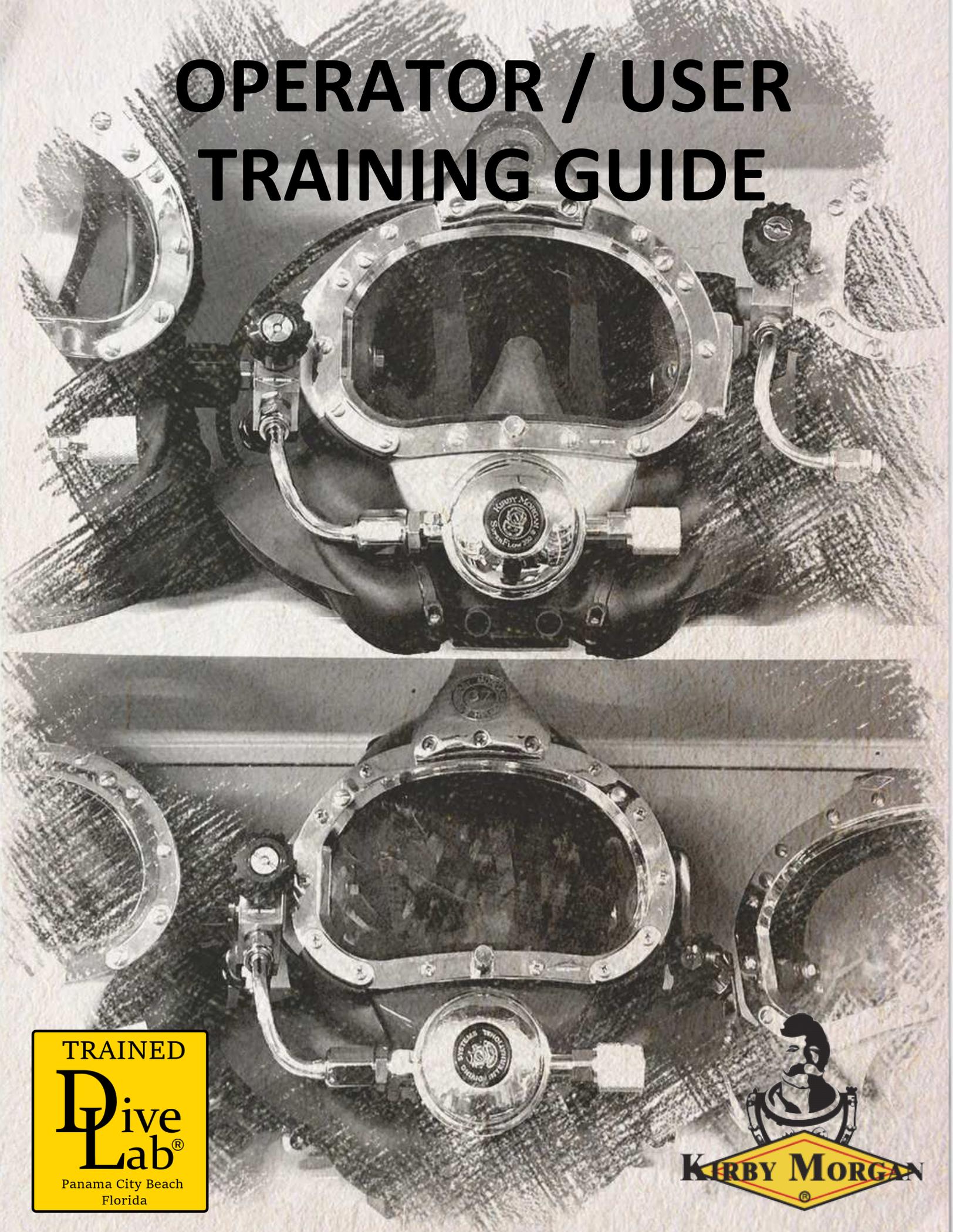


OPERATOR / USER TRAINING GUIDE



TRAINED
Dive
Lab[®]
Panama City Beach
Florida



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SECTION ONE

MAINTENANCE & TRAINING POLICIES

Diving Contractor Maintenance Policies

Most diving contractors are requiring that their divers have their helmets and masks inspected by an authorized KMDSI trained technician, and some even require that only a KMDSI Certified Dealer Technician conduct repairs. KMDSI cannot dictate the maintenance and repair policies set by companies or organizations, but does strongly recommend companies carefully evaluate their policies and incorporate the KMDSI maintenance and repair recommendations to minimize unnecessary and redundant procedures. The KMDSI maintenance checklists represent a reasonable minimum recommended maintenance.

All KMDSI Helmets and Masks are designed with the professional diver in mind. Most maintenance and repairs can be performed by the owner/user using common hand and test tools following the procedures in the appropriate section of KMDSI Operations and Maintenance Manual. The owner can purchase genuine Kirby Morgan parts and components from any Authorized KMDSI Dealer. KMDSI strongly recommends that person(s) electing to do their own maintenance and repairs, to do so only if they have the proper tools, background training and experience. Maintenance and repair training, is available by Dive Lab Inc., as well as other specially authorized KMDSI Dealers. The A2.1 Overhaul, Maintenance, and Inspection Checklist **should be** performed at least annually and as dictated by condition revealed during daily/monthly inspection. The A2.2 Monthly Inspection, and Maintenance Checklist **should be** performed at least once a month, and/or as stated in the procedure. The A2.3 Daily Set-up and Functional Checklist **should be** completed prior to commencement of diving operations. All persons performing repairs should keep good maintenance records and all receipts. Technical questions can be addressed to KMDSI or Dive Lab.

All Helmet and Band Mask Checklists are in a similar fashion. The checklists are kept separate from the operations and maintenance manuals to minimize time required for changes due to procedural or equipment changes. All KMDSI Manuals and checklists are living documents and undergo continuous updating.

Kirby Morgan Maintenance Checklists for All Helmet / Band Mask Models

To print a checklist please visit: <https://www.kirbymorgan.com/support/checklists>
or <https://divelab.com/support/>

Helmet Checklist

- A2.1 Overhaul, Inspection and Maintenance
- A2.2 Monthly Helmet Inspection
- A2.3 Daily Helmet and EGS Set-up and Functional Checklist
- A2.4 Supervisors Equipment Checks (prior to water entry)
- A2.5 Supervisors (in-water checks)
- A2.6 Post Dive Cleaning Maintenance and Inspection

SECTION ONE

MAINTENANCE & TRAINING POLICIES

Band Masks

- A2.1 Overhaul, Inspection and Maintenance
- A2.2 Monthly Band Mask Inspection
- A2.3 Daily Band Mask and EGS Set-up and Functional Checklist
- A2.4 Supervisors Equipment Checks (prior to water entry)
- A2.5 Supervisors (in-water checks)
- A2.6 Post Dive Cleaning Maintenance and Inspection

Maintenance & Inspection Procedures / Policies

The following section describes details and specific maintenance and inspection procedures that are used to complete the daily, monthly, and annual checklists, to ensure optimum reliability and performance. These procedures are used in conjunction with the daily pre and post dive maintenance checklists. The periodicities called out in the appendix section of each checklist are the minimum recommended for Helmets for Bank Masks being used under good conditions. Equipment used in harsh conditions, i.e., contaminated water, welding / burning operations, or jetting, will require more frequent servicing.

The intention of the maintenance checklists is to help maintain all Helmet and Mask components in good working order in accordance with KMDSI factory specifications, and to identify worn or damaged parts and components before they affect safety, performance, and reliability. Whenever the serviceability of a component or part is in question, or any doubt exists, replace it. All components and parts have a service life and will eventually require replacement.

NOTICE

The pipe thread fittings used on the umbilical adapter and the emergency valve on the brass side block are the only fittings that require sealing with Teflon® tape. Liquid Sealant is not recommended for pipe threads. When installing Teflon® tape on pipe threads, 3 mil tape should be used. Apply the tape starting one thread back from the end of the fitting in a clockwise direction under tension. 1- ½ to 2 wraps is all that is needed. The use of more than 2 wraps could cause excess Teflon® tape to travel into the breathing system.

All Helmet and Band Mask Manuals, give guidance on all routine and corrective maintenance and repairs. Disassembly and reassembly of components is explained in a step-by-step manner that may not necessarily call out that all O-rings and normal consumable items will be replaced. The manual is written in this way so that if an assembly, component, or part is being inspected or disturbed between normal overhaul intervals it is acceptable to reuse O-rings and components providing they pass a visual inspection. When conducting scheduled overhauls, all O-rings **should be replaced**. The side block should be removed from the helmet at least every three (3) years so that the stud and securing screw can be inspected. All O-rings should be lubricated with the appropriate lubricant. Christo Lube® or Tribolube® is recommended.

SECTION ONE

MAINTENANCE & TRAINING POLICIES

Lubrication / Cleanliness / Oxygen Compatibility

All new Helmets and Band Masks are lubricated during assembly at KMDSI using Christo Lube®. All Helmets and Band Masks can be used with 100% oxygen from KMDSI. Seasoned Helmets and Band Masks that have previously been used for air diving but are also intended to be used with breathing gas mixtures in excess of 50% oxygen by volume, should be cleaned in accordance with the applicable operations and maintenance manual and lubricated with oxygen compatible lubricants such as Christo-Lube®, Flourolube®, Tribolube® or other oxygen compatible lubricants. All breathing air supply systems must be filtered and must meet the requirements of grade D quality air or better. Helmets and band masks used for air diving or enriched air at 50 % oxygen or less can be lubricated with food grade silicone grease Dow Corning 111® or equivalent. KMDSI uses Christo-Lube® at the factory for lubrication of all gas train components requiring lubrication, and highly recommends its use.

Before 1999, Kirby Morgan Dive Systems, Inc., used Danger and Warning Notices in the helmet and mask owner's manual limiting the breathing gas percentage to less than 23.5 percent oxygen. This was due primarily to cleaning issues in regards to possible fire hazards and was in compliance with the recommendations of the Association of Standard Test Methods (ASTM), National Fire Protection Agency (NFPA), and the Compressed Gas Association (CGA) as well as other industry standards. During the 1990's open circuit SCUBA use of enriched-air (Nitrox) by technical and recreational divers became very popular, and as use increased, so did the number of combustion incidents during the mixing and handling of the breathing mixtures. These combustion incidents brought attention to the dangers and inherent risks associated with oxygen and oxygen enriched gas mixtures.

Regardless of the approved lubricant used, avoid mixing different kinds of lubricants. Persons mixing, handling, and working with oxygen enriched breathing gases should be properly trained in all aspects of gas safety handling and use.

KMDSI cannot dictate or override regulations or recommendations set forth by industry standards or governing bodies pertaining to enriched gas use. However, it is the opinion of KMDSI and Dive Lab that breathing gas mixtures up to 50% oxygen by volume should not pose a significant risk of fire or combustion in Kirby Morgan Helmets and Masks low-pressure components that are cleaned IAW in the Kirby Morgan manuals, and does not warrant the need for the stringent specialized oxygen cleaning and post-sampling particulate analysis normally accomplished for components used in high pressure oxygen valves, regulators, and piping systems.

Lubrication / Cleanliness / Oxygen Compatibility continuation

The decision for using 50% is primarily based on a long history of operational field use of KMDSI helmets and masks, by the US Navy and Commercial Diving Industry over the past 50 years. However, this is not intended to down play the need for cleaning and maintenance. All helmets and masks, as well as gas transporting components should be maintained carefully and cleaned at regular intervals and/or whenever contamination is found or suspected.

SECTION ONE

MAINTENANCE & TRAINING POLICIES

KMDSI feels confident that as long as Kirby Morgan helmets and masks are cleaned and maintained in accordance with the procedures set forth in the applicable maintenance manuals and maintenance checklist procedures, the equipment should not pose a significant increased risk of a fire or ignition originating in the helmet or mask low-pressure <300 psig (<20.7 bar) or less components when used with enriched gases of up to 50% oxygen.

CAUTION

However, **CAUTION** should be exercised any time enriched gases are handled or used.

In general, helmets and masks used primarily for mixed gas use are generally subjected to far less oil and particulate contamination than those used for air diving. For this reason, helmets and masks commonly used with both air and enriched breathing gases should be cleaned and maintained with even greater care and vigilance. It is important that all internal gas-transporting components, i.e., side block, bent tube, and demand regulator assemblies remain clean and free of hydrocarbons, dirt, and particulates.

Whenever the equipment is depressurized, all exposed ports or fittings should be plugged /capped to help maintain foreign material exclusion. Gas train components should be cleaned according to the procedures outlined in the applicable Operations and Maintenance Manual during normal overhauls and whenever contamination is suspected or found. Normal interior and exterior surfaces should be cleaned at least daily at the completion of daily diving operations.

Helmets and masks used in waters contaminated with oils and other petroleum or chemical contaminants will require careful cleaning after each dive.

CAUTION

Do not use lubricants of any kind on the diaphragm or exhaust valves. Use of lubricants on exhaust valves can attract and hold debris that could interfere with the component.

NOTICE

Refer to KMDSI Modular Manuals for removal and disassembly / reassembly procedures.

NOTICE

The helmet weights do not need to be removed from the helmet unless fiberglass damage is present or suspected.

NOTICE

During annual or routine overhauls, all O-rings and soft goods including exhaust valves should be replaced. KMDSI offers standard overhaul kits that have all the necessary parts.

NOTICE

The neck dam rubber need not be replaced as long as inspection reveals no damage, or significant wear and the rubber components are not dried out.

SECTION ONE

MAINTENANCE & TRAINING POLICIES

NOTICE

The oral nasal mask requires replacement only if inspection reveals damage, distortion, or signs of damage. The oral nasal flapper valve should be replaced at least annually.

NOTICE

All threaded fasteners and parts require careful cleaning and inspection, as well as the mating parts. Replace any and all threaded parts or components that show signs of wear or damage.

Kirby Morgan Helmets & Band Mask Checklists/Training

Dive Lab, Inc and KMDSI has developed the pre and post dive maintenance checklists, as well as the other maintenance checklists to assist divers, tenders, and diving supervisors. The checklists are for all KMDSI Helmets and Band Masks and are intended to be used as a guide to help ensure helmets and masks are set-up and maintained properly. In addition, KMDSI has standardized all helmet and band mask manuals for those who use multiple models of KMDSI equipment. KMDSI always welcomes all constructive criticism on the checklists, manuals, and products.

Training Policies and Guidelines

Dive Lab, Inc. oversees all (KMDSI) factory repair and maintenance training for all Kirby Morgan products. Kirby Morgan authorizes selected overseas dealers, depending on experience, knowledge, facility assets, and geographical location to teach KMDSI helmet and band mask technician training. Selected dealers receive additional training to allow them to teach specific equipment only. All KMDSI training certificates are issued by Dive Lab upon review of course completion documentation and verification of the technician trainer certification status.

Only Dive Lab can conduct KMDSI dealer technician training. Technicians should periodically check the KMDSI website for updates technical bulletins and product changes.

The Dive Lab training policies and guidelines are intended to help persons performing repairs, maintenance and training that have received KMDSI standardized training on the equipment as the manufacture intended. The training also teaches the parameter of intended use and limitations of the equipment. Non KMDSI dealer technicians trained by authorized KMDSI dealers are encouraged to teach the KMDSI operator/user course, however, the course curriculum must be presented within the guidelines set-up in the basic repair technicians guide, Technician Training Guide. There is also a power point presentation on Dive Lab's website to aid in teaching the Operator / User Course.

Only KMDSI dealer technicians are authorized to perform repairs for profit. Non-dealer technicians must limit repairs to their own equipment, company owned equipment, and equipment belonging to company employees as dictated by company policy. Non-dealer technicians performing repairs for profit do so without authorization of KMDSI or Dive Lab.

SECTION ONE

MAINTENANCE & TRAINING POLICIES

KMDSI dealer technicians must document all work performed on all KMDSI helmets, band masks, and KMDSI equipment worked on, and records must be kept. All helmets and band masks should be accompanied by a log book. Dealers receiving helmets or masks for repair or maintenance must have a log book so they can document the work they perform. Dealers working on helmets or masks not accompanied by a log or record of use and maintenance will require at a minimum an inspection IAW appendix A2.1. The A2.1 must be performed at least once every 12 months on helmets and masks in use. Helmets and masks that have been in storage for up to 2 years, which have not been used since the last A2.1 was performed will require a monthly inspection IAW the A2.2, before being placed in service.

Fiberglass & Gel Coat

KMDSI Dealers should not work on helmets or masks that have had fiberglass repairs done by someone other than KMDSI certified repair technicians that are certified to perform fiberglass repairs. Helmets that have been coated with coatings like Rhino Lining® or truck bed urethane should be turned away. Painting of fiberglass helmets is not allowed. Dealers can deny servicing helmets that have been painted, or show signs of repairs completed by non KMDSI trained technicians, or repairs made improperly.

All KMDSI certified technician trainers must certify or assist in certifying at least one technician course per year in order to remain as an active technician trainer. Dealers are required to keep records of repairs and training conducted.

Dealer qualifications are listed on the KMDSI and Dive Lab's web site so that users of KMDSI products can review certification and qualification status. Non-Kirby Morgan dealers and persons not trained by Dive Lab that perform repairs for profit, do so against the recommendation of KMDSI and Dive Lab. Non-KMDSI certified persons that pose as certified KMDSI / Dive Lab trained technicians are a serious safety threat to the diving industry and all users of KMDSI equipment. Dive Lab certified technicians working for diving contractors or as free-lance divers cannot perform repairs for profit, and can only work on their own equipment, company equipment, and equipment belonging to the employees of the company, as dictated by company policy. This is done to prevent persons from becoming back yard helmet mechanics.

All work and repairs must be documented. Any helmets and masks presented for work that do not have a log book showing work history, must be overhauled IAW Appendix A2.1.

The KMDSI training and certification policies have been established to help protect the user, technician, and KMDSI dealers by promoting safety through knowledge, experience, and the proper maintenance of KMDSI products.

KMDSI dealers that have been trained and authorized to teach technician courses must teach the course set-up by Dive Lab. Dealers are not allowed to create their own course curriculum and must teach IAW the training guide and instruction provided by KMDSI and Dive Lab.

SECTION ONE

MAINTENANCE & TRAINING POLICIES

KMDSI technicians can only teach the equipment they were actually trained on as listed on their certification. All the equipment trained on during technician or operator / user training must be listed on a properly filled out course completion form sent to Dive Lab no later than 30 days after completion of training with the certification fee for each certificate.

Dealer technicians that are authorized to teach helmet and band mask technician training must run at least one technician course per year in order to remain on the active instructor list.

Dealer Training

Dealer training is valid for 4 years, as directed by KMDSI providing dealers remain eligible.

Dealer Repairs

Kirby Morgan Dealers that have not received technician training by Dive Lab may not perform repairs or service on KMDSI equipment until training has been completed. Dealers may only perform repairs on the KMDSI equipment for which they have been trained on. Persons working as technicians at a KMDSI dealership that have not received training by Dive Lab, must only work under the supervision of a trained KMDSI dealer technician, and that technician is responsible for signing off all work completed.

Fiberglass Repair

- Face port insert repair, fiberglass, and gel-coat repairs can only be completed by Dive Lab trained and certified dealer technicians that have received fiberglass repair training at Dive Lab.
- Dealers are not allowed to contract out fiberglass, gel-coat or insert repairs made by boat yards or other none Dive Lab/KMDSI trained persons.
- All fiberglass and gel-coat repairs must be documented with before and after pictures of work. The pictures will be available to the customer as well as KMDSI and Dive Lab.
- All equipment repairs by KMDSI dealers must be documented. The dealer must provide customer with a cost estimate prior to start of any work or repairs. All work and repairs are to be clearly documented on a work order. If an overhaul has been completed a customer must receive a copy of the A2.1 Checklist.
- All KMDSI Helmet and Band Mask Technicians that have taken the KMDSI Repair Technicians Course may teach the KMDSI Operator/User Course IAW the guidelines laid out in the Technician Training Guide and Power Point Presentation.
- Dealer Technicians and training school Technicians that are authorized to teach the KMDSI Technician course, **must** also take the time during the course to explain how to teach the Operator User course, so that the new Technicians can teach the Operator User course.

SECTION ONE

MAINTENANCE & TRAINING POLICIES

KMDSI Helmet and Band Mask Operator/User Course (5-7 hours)

The Dive Lab / KMDSI Helmet and Band Mask Operator/User Course is intended to instruct personnel in the KMDSI recommended maintenance and set-up procedures, as well as basic inspection and adjustment procedures. The operator course is not intended to be a repair technician course and does not qualify person(s) to perform repairs or overhauls. The course is intended to teach divers, tenders, and diving supervisors how to make pre-dive assessments as to the condition and serviceability of KMDSI helmets and band masks based on pre-dive visual inspection and functional tests using the applicable KMDSI checklists and Operations and Maintenance Manuals. The course usually takes 5-8 hours. The course certificate is valid for three years initially and four years upon re-certification.

Most of the world-wide Commercial Diver Training Schools have integrated the KMDSI Operator User course into their Surface Supplied Curriculum. This is done because all Commercial Diver Training schools teach Surface Supplied diving using various models of the Kirby Morgan Helmets & Band Masks. The Operator / User course is a standardized course, which results in the student being trained in the standardized maintenance and set up procedures, to ensure the KMDSI Helmets and Band Masks are being used and maintained as the manufacturer intended. This fosters better safety and knowledge in the industry.

KMDSI Maintenance & Repair Technician Course (3 day)

- The Dive Lab / KMDSI Technician Course is intended to instruct technicians and users of KMDSI helmets and band masks how to perform routine and corrective maintenance procedures and equipment overhauls. The course covers demand regulator and side block overhauls, as well as all recommended owner level repairs, including face port insert testing. The course does not include insert repair or fiberglass and gel coat repair.
- All first time students will receive a 3 year certificate and of January 01, 2020 returning students may receive a 4 year certificate only if previous Technician Certificate has not expired.

Certification

Certificates and wallet cards are only issued by Dive Lab, Inc., upon review of course completion paperwork. Any Technician or Operators Courses taught by “Dealer Technician must have each attendee complete a course completion form. The Technician teaching the course should fill out the top portion of the form. All information should be filled out so that future important notices or changes to procedures can be e-mailed. The forms should be sent by the Instructor to Dive Lab, Inc., within 30 days of course completion along with certification fee (for each certificate to be issued). KMDSI / Dive Lab has the right to deny certification to any individuals due to previous unethical or practices not in line with the intent of KMDSI Technician/Operator Courses.

SECTION ONE

MAINTENANCE & TRAINING POLICIES

Responsibility of Trained Personnel

All persons that have received Kirby Morgan training have a responsibility to ensure the helmets and masks they work on are set-up, and adjusted in accordance with the applicable pre-dive checklists and the Operations and Maintenance Manuals. Helmets or masks that fail inspections or tests, as well as those with worn, damaged, or non-approved components that could affect safety or performance, must be repaired prior to use. All scheduled maintenance, as well as daily pre and post dive maintenance, should be documented. Helmets or masks requiring fiberglass or insert repairs, or other repairs outside the scope of basic technician, must be only be repaired by a certified KMDSI repair technician trained and authorized to perform the repairs. Many of the checklists undergo changes from time to time. All Technicians and Operator/Users should periodically check the Dive Lab and KMDSI web page for manual changes and updates. New e-mail addresses should be sent to Dive Lab so files can be updated to ensure important notices and changes can be forwarded. For further information on training contact Dive Lab at divelab@divelab.com

SECTION ONE

OPERATOR/USERS TRAINING ON ALL KM HELMETS

ENABLING OBJECTIVES

Upon completion of the KMDSI Operator / User Course, the trainee will be able to perform the KMDSI recommended pre-dive inspection and maintenance procedures in accordance with the KMDSI Inspection and Maintenance Checklists:

- A2.2 Monthly Maintenance
 - A2.3 Daily Set-Up and Functional Checklist
 - A2.4 Supervisor's Equipment Checks Prior to Entry
 - A2.5 Supervisor's Equipment Checks In-Water
 - A2.6 Post Dive Cleaning
- ✓ State the KMDSI recommended maintenance periodicities and the definitions or guidelines for each.

NECK DAM/RING ASSEMBLY

- ✓ Upon instruction of this section the student will be able to:
- a) Describe/perform a proper inspection of Yoke/Neck Clamp Assemblies on the SL-17 A/B Helmet
 - b) Describe/perform a thorough inspection of the weldment areas of concern.
 - c) Explain and demonstrate the proper adjustment of the Neck Clamp and Latch Catch Mechanisms.
 - d) The areas of inspection and the difference between the Push-Pin Plunger and the new style Pull-Pin Plunger and the reasons for the upgrade.
 - e) Demonstrate proper removal, inspection, cleaning, and lubrication of Helmet/Neck Ring O- ring and state the recommended lubricants.
 - f) Explain the SL 27, KM 37 type Neck Dam with pull pins. How is it different than the SL 17A/B.
 - g) Explain/demonstrate the proper placement of the Safety Pin and Lanyard and the reasons for it (17A/B only).
 - h) Describe/perform a thorough inspection of a Neck Dam, both neoprene and latex. Explain what type of contaminants and environmental conditions will cause deterioration of each.

HELMET ASSEMBLY

- ✓ Upon instruction of this section the student will be able to explain:
- a) How the KMDSI maintenance and inspection procedures and instructions are to be used.
 - b) How the KMDSI maintenance system is structured and where information may be found.
 - c) Explain the responsibilities of a KMDSI Technician and Operator / User.

SECTION ONE

OPERATOR/USERS TRAINING ON ALL KM HELMETS

ENABLING OBJECTIVES

HELMET ASSEMBLY continued

- d) Explain/demonstrate a proper, thorough exterior Helmet Inspection and explain the types of damage that might be found, and areas of concern.
- e) Explain and demonstrate the inspection of the Face Port and related components.
- f) Describe/perform a thorough inspection of the Helmet Locking Collar assembly (KM 37 type).
- g) Describe/perform an inspection of the sealed Pull-Pins and state what they are looking for and how the Pins should be serviced.
- h) Explain/demonstrate a thorough inspection of the Swing Catch Assembly and the Helmet Ring, describing areas of concern (KM 37 type).
- i) State the purpose of the Helmet Liner/Cushion and why it should be maintained in good condition, how it can be tailored to fit.
- j) Describe/perform proper inspection and required maintenance of Communications System.
- k) Explain the proper maintenance and inspection of the Oral/Nasal Mask and Valve Assembly.
- l) Explain the purpose of the Oral/Nasal Mask Valve Assembly.
- m) State the advantages/disadvantages and limitations of the Quad / Tri Valve Exhaust System.
- n) Perform Main Exhaust /Water Dump Valve Inspection, thoroughly describing, "seating surface".

SIDE BLOCK

- ✓ Upon instruction of this section, the student will be able to explain the inspection and operation of the following Side Block Components:
 - a. One-way Valve
 - b. Defogger Valve
 - c. Emergency Gas or (EGS) Valve
 - d. Valve Knob Components

DEMAND REGULATOR

- ✓ Upon instruction of this section, the student will be able to state and demonstrate:
 - a) KMDSI recommended daily and monthly maintenance.
 - b) Properly, clean and inspect using the daily post dive Checklist, reassemble, adjust, fine-tune the Demand Regulator.
 - c) Explain sanitizing procedures of the Demand Regulator and associated components, and what safety precautions must be observed.

SECTION ONE

OPERATOR/USERS TRAINING ON ALL KM HELMETS

ENABLING OBJECTIVES

DEMAND REGULATOR continued

- d) Explain how Helmet parts and components are cleaned and corrosion is removed.
- e) Explain how to perform O-ring inspections and how to lubricate components.

EMERGENCY GAS SUPPLY

- ✓ Upon instruction of this section, the student will be able to:
 - a) State the periodicity for the Hydrostatic and Visual Inspection for the Emergency Gas Cylinder.
 - b) Conduct a thorough visual and functional test and inspection of all EGS components, including the maintenance records to ensure maintenance is in compliance with manufacturers recommendations.
 - c) Demonstrate/perform testing of the First Stage Relief Valve.
 - d) Check/demonstrate/perform the correct recommended setting of the over-bottom of the First Stage Regulator for the Emergency Gas Supply (EGS) Cylinder.
 - e) Explain the hazards involved in not having EGS gas up to the First Stage when diving.

SECTION ONE

OPERATOR / USER TRAINING ON KMB 18/28

ENABLING OBJECTIVES

STUDENT ENABLING OBJECTIVES

- ✓ Perform set-up, adjustment and pre-dive functional inspection procedures for Kirby Morgan Band Masks; KMB 18 and KMB 28 in accordance with the applicable Operations and Maintenance Manuals and the following checklists:
 - A2.2 Monthly Maintenance
 - A2.3 Daily Set-up and Functional Checklist
 - A2.4 Supervisor's Equipment Checks Prior to Entry
 - A2.5 Supervisor's Equipment Checks In-Water
 - A2.6 Post Dive Cleaning

HOOD SPIDER and RETAINING CLAMP

- ✓ Upon instruction of this section the student will be able to:
 - a) Describe/perform a proper inspection of the Hood Assembly.
 - b) Describe/perform a thorough inspection of the Spider Assembly.
 - c) Describe/Perform a though inspection of the Clamp Assembly.
 - d) Explain what conditions will hasten aging of the Hood and Spider rubber components.
 - e) Explain the Band Keeper Kit, which is now standard on all Band Masks. All older Masks must be retrofitted.

FRAME COMPONENT ASSEMBLY

- ✓ Upon instruction of this section the student will be able to:
 - a) Explain/demonstrate a proper visual inspection of the Frame Assembly.
 - b) Explain the physical and material differences between the KMB 18 and KMB 28.
 - c) Explain the Monthly, and Daily maintenance.
 - d) Explain the purpose of the Oral Nasal Mask and Valve Assembly and the reason a correctly installed Valve is in the sealing surface out position. The student will also be able to elaborate upon the dangers involved with incorrectly installing the Valve, not using genuine KMDSI parts, or just not having an Oral Nasal Mask or Valve installed.
 - e) Demonstrate proper inspection of the Whisker Assembly.
 - f) State the advantages/disadvantages and limitations of the Tri Valve exhaust and the reasons.
 - g) Conduct an inspection on the Defogger and EGS Valves and explain "flats" and be able to point out what to look for regarding the serviceability of the control knobs.
 - h) Perform Main Exhaust/Water Dump Valve inspection, thoroughly describing, "seating surface".
 - i) Describe/perform proper inspection or required maintenance of communications system.

SECTION ONE

OPERATOR / USER TRAINING ON KMB 18/28

ENABLING OBJECTIVES

SIDE BLOCK/DEMAND REGULATOR

- ✓ Upon instruction of this section the student will be able to:
 - a) Demonstrate/perform the two different ways of checking the One-Way Valve and explain which test is the most stringent and why.
 - b) Demonstrate how to remove the Demand Regulator Cover to inspect, clean in accordance with recommended procedure, inspect and re-assemble, adjust, fine tune.
 - c) Demonstrate how to properly perform an inspection on the Demand Regulator Diaphragm and state “satisfactory” criteria.
 - d) Explain the purpose/reason for cleaning Oral Nasal Mask and Demand Regulator components with germicidal cleaning solutions.

EMERGENCY GAS SUPPLY

- ✓ Upon instruction of this section the student will be able to:
 - a) Conduct a thorough inspection of all EGS components including the maintenance records to ensure maintenance is in compliance with manufacturers recommendations.
 - b) Demonstrate/perform both testing and adjusting on the First Stage Over-Pressure Relief Valve.
 - c) Check/demonstrate/perform the correct recommended setting of the Over-Bottom of the First Stage Regulator for the Emergency Gas Supply (EGS) Cylinder.
 - d) Demonstrate/perform proper inspections of Harness Assembly, pointing out trouble areas of high wear.

SECTION TWO

MAINTENANCE LOG (EXAMPLE)

Check all that apply

<input type="checkbox"/> Helmet or Mask Model#	<input type="checkbox"/> Helmet or Mask Model#
<input type="checkbox"/> Serial #	<input type="checkbox"/> Serial #
<input type="checkbox"/> Harness#	<input type="checkbox"/> Harness#
<input type="checkbox"/> Daily Pre-Dive A2.3	<input type="checkbox"/> Daily Pre-Dive A2.3
<input type="checkbox"/> Daily Post Dive A2.6	<input type="checkbox"/> Daily Post Dive A2.6
<input type="checkbox"/> Monthly Inspection/Maintenance A2.2	<input type="checkbox"/> Monthly Inspection/Maintenance A2.2
<input type="checkbox"/> Overhaul/Inspection A2.1	<input type="checkbox"/> Overhaul/Inspection A2.1
Other	Other
Date	Date
Technician (Print)	Technician (Print)
Technician (Sign)	Technician (Sign)
Remarks	Remarks

Check all that apply

<input type="checkbox"/> Helmet or Mask Model#	<input type="checkbox"/> Helmet or Mask Model#
<input type="checkbox"/> Serial #	<input type="checkbox"/> Serial #
<input type="checkbox"/> Harness#	<input type="checkbox"/> Harness#
<input type="checkbox"/> Daily Pre-Dive A2.3	<input type="checkbox"/> Daily Pre-Dive A2.3
<input type="checkbox"/> Daily Post Dive A2.6	<input type="checkbox"/> Daily Post Dive A2.6
<input type="checkbox"/> Monthly Inspection/Maintenance A2.2	<input type="checkbox"/> Monthly Inspection/Maintenance A2.2
<input type="checkbox"/> Overhaul/Inspection A2.1	<input type="checkbox"/> Overhaul/Inspection A2.1
Other	Other
Date	Date
Technician (Print)	Technician (Print)
Technician (Sign)	Technician (Sign)
Remarks	Remarks

BLEED/RELIEF VALVE CLEANING INSPECTION & OVERHAUL PROCEDURES

The bleed/relief valve should be disassembled, cleaned, and inspected at least once a year, and anytime the valve fails monthly lift testing, or fails to maintain a seal when within the specified range. The bleed/relief valve is easily cleaned using a nylon toothbrush and a 50/50 solution of vinegar and fresh water. Cleaning for 15 minutes in an ultrasonic sink, if available, with the 50/50 vinegar solution is highly recommended.

Repair parts are available from Kirby Morgan Dive Systems Inc. (KMDSI). Normal replacement parts include the O-ring, soft seat, spring, and hex nut. The O-ring should be replaced at least annually. The other parts require replacement only if worn or damaged. An exploded view of the valve is located in all KMDSI Helmet and Band Mask Operations and Maintenance Manuals.

CLEANING TOOLS

- 1/2" open-end wrench
- 1/8" Allen wrench
- Nylon toothbrush
- Vinegar
- Fresh water
- Mild dish detergent
- Ultrasonic sink, if available
- Magnifying glass
- New valve body O-ring

WARNING

DO NOT use cleaning solvents (i.e. mineral spirits, bleach, etc.) when cleaning the bleed/relief valve. The use of cleaning solvents may lead to failure of the bleed/relief valve.

1. Secure gas pressure to the first stage regulator, then bleed off.
2. Remove the bleed/relief valve from the regulator body using the 1/2" open-end wrench.
3. Remove, cut, and discard the bleed/relief valve body O-ring.
4. Using the 1/2" open-end wrench to hold the bleed/relief body, use the 1/8" Allen wrench to remove the Allen head adjustment screw. Then, shake out the spring and soft seat.
5. Place all parts in the 50/50 solution of vinegar and water and allow to soak for 15 to 30 minutes. If using an ultrasonic sink, reduce time to 15 minutes.
6. Using the nylon toothbrush, brush all components to remove corrosion and mineral deposits. Then, rinse with fresh water and blow or air dry.

SECTION TWO

BLEED/RELIEF VALVE CLEANING INSPECTION & OVERHAUL PROCEDURES

7. Using the magnifying glass, carefully inspect all components for excessive corrosion and/or damage. Replace the spring and/or adjustment nut, if either part is excessively corroded or shows signs of wear and/or damage. Inspect the soft seat for nicks, cuts, and wear and replace if any damage is found. Replace the entire assembly if any damage to the valve body is present.

NOTICE

A deep groove in the soft seat is normal. Replacement is only necessary if the rubber seat is deteriorated, cut, and/or chipped.

REASSEMBLY

1. After cleaning, inspection and/or parts replacement reassemble the valve by installing the soft seat, spring, and adjustment nut. Screw the adjustment nut down until it is approximately 1/2 thread from being flush with the top of the valve body.
2. Lightly lubricate a new O-ring, then install on the valve body.
3. Test the bleed/relief valve according to the test procedure below.

LIFT CHECK/SETTING THE BLEED/RELIEF VALVE

Tools required:

Adjustable first stage scuba regulator or controlled adjustable pressure source

Intermediate test gauge

1/2" open-end wrench

1/8" Allen wrench

HP air source at least 500 psig (34.4 bar).

Mild dish detergent

The purpose of lift checking the bleed/relief valve is to ensure it operates properly, allowing excess pressure to escape in the event the first stage develops a slight leak. Without the bleed/relief valve, high-pressure gas will continue to increase until the emergency supply hose ruptures, possibly causing injury and a complete loss of the Emergency Gas System (EGS). This procedure explains the steps necessary for readjusting the bleed/relief valve after it is cleaned, overhauled or any time the valve is tested.

CAUTION

Ensure the bleed/relief valve is only installed in a low-pressure port of the first stage regulator.

SECTION TWO

BLEED/RELIEF VALVE CLEANING INSPECTION & OVERHAUL PROCEDURES

DANGER

Do not use oxygen, or mixed gas containing more than 23% oxygen by volume, for lift checking the bleed/relief valve. The use of oxygen, or mixed gas, in a high-pressure supply system not designed and cleaned for oxygen service, can result in a fire or explosion causing serious injury or death.

NOTICE

The bleed/relief valve is lift checked and/or adjusted using an adjustable first stage regulator, equipped with a low-pressure test gauge, which is used for adjusting the intermediate pressure of scuba regulators. The check/adjustment can be performed using a standard scuba test stand, or a gas control console, using air or mixed gas with an oxygen content below 23% by volume. If a first stage scuba regulator is used, it must be able to be adjusted to the desired lifting pressure. The pressure gauge should be compared to a gauge of known accuracy.

1. Install the bleed/relief valve in a low-pressure port on an adjustable first stage regulator, or install on a scuba test stand that has an adjustable pressure supply, then tighten with the 1/2 " open-end wrench.
2. Install an intermediate pressure gauge in one of the low-pressure ports of the first stage regulator.
3. Install the first stage regulator on the cylinder. Ensure the bleed/relief valve and intermediate pressure gauge are attached to low-pressure ports facing up.
4. Wet the bleed/relief valve with soapy water to help indicate when gas flow starts.
5. Slightly crack open the gas supply so a very slight flow of gas is traveling to the first stage, until the intermediate pressure gauge travels no further. Leave the supply valve only slightly cracked open. Most first stage regulators use an intermediate setting between 130 - 150 psig (9.3 – 10.3 bar).
6. Slowly, increase the intermediate setting of the first stage until the pressure gauge indicates 180 psig (12.4 bar). If the bleed/relief valve starts venting before a pressure of 180 psig (12.4 bar) is reached (as indicated by small bubbles forming or by "popping"), turn the adjustment screw in (clockwise) using the 1/8" Allen wrench on the bleed valve hex nut 1/16th -1/8th turn, or until all leakage stops as indicated with the soapy water. If a pressure above 200 psig (13.8 bar) is reached without the bleed/relief valve forming bubbles or popping, slowly back out (counterclockwise) on the adjustment hex nut 1/16th of a turn at a time until bubbles form.

SECTION TWO

BLEED/RELIEF VALVE CLEANING INSPECTION & OVERHAUL PROCEDURES

NOTICE

If the Allen screw on the bleed/relief valve hex nut is rotated too far, too fast, the bleed/relief valve will pop open. This could possibly require the air to be secured at the cylinder to reset the seat before the adjustment can be accomplished.

7. Continue this procedure as necessary until the bleed/relief valve consistently starts to form bubbles at a pressure between 180 and 200 psig (12.4 -13.8 bar). After the valve has been set to just bubble or pop off, back out on the regulator adjustment nut until the pressure is set back to 135 psig (9.3 bar), or at the factory setting of the first stage regulator.
8. Re-wet the bleed/relief valve, and then slowly increase the intermediate pressure on the first stage regulator to recheck the lift pressure once more. The bleed/relief valve should start forming bubbles between 180 - 200 psig (12.4 -13.8 bar). After final adjustment; reset the first stage regulator to 135 psig (9.3 bar), or to the manufacturer's recommended pressure setting. Spray the bleed/relief valve with soapy water and ensure there are no leaks.
9. After a successful leak check, the bleed/relief valve may be reinstalled into the system.

NOTICE

The bleed/relief valve can now be installed in any first stage regulator, providing the first stage has an intermediate setting of 135 - 165 psig (9.3 – 11.4 bar).

TROUBLESHOOTING

Problem

Valve pops open and will not stop flowing.

Check

If while setting the bleed/relief valve the valve pops open and will not stop flowing, secure the air supply valve and allow the valve to reseat. Try the procedure again, ensuring that the supply valve is only **slightly** cracked open, allowing full test pressure but minimizing high flow potential.

Problem

After resetting the first stage to 135 psig (9.3 bar), the valve continues to leak.

Check

This indicates the valve body seating surface or the soft seat is either dirty or damaged. Usually, cleaning both the metal body seating surface in the valve body and the soft seat will fix the problem. If, after cleaning, the problem persists, replace the soft seat and spring and retest the unit. If, after this has been accomplished, the seat continues to leak, then replacement of the complete valve will be necessary.

SECTION TWO

QUICK SANITIZING PROCEDURE

The purpose of this procedure is to sanitize the components directly exposed to each diver's mouth and nose to help eliminate germs. KMDSI recommends sanitizing after each diver when in use by multiple divers, and after each diving day when used by a single diver. To accomplish this properly, all components exposed to the diver's breathing should be sanitized. On the Helmets and KMB Band Masks, this will include the Oral Nasal Mask and internal cavity of the Demand Regulator. For best results, the Demand Regulator Cover and Diaphragm should be removed so the interior surfaces, as well as the Diaphragm, can be properly exposed to the cleaning solution and rinse water.

CAUTION

Carefully dilute germicidal cleansing solutions 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.**

Listed below are four solutions, used by the U.S. Militaries, which have proven to be effective when used in accordance with the manufacturer's recommendations. If no other solutions are available, a solution of mild dish detergent and water and hand scrubbing with a soft brush or rag can be done. Note: to maximize germ killing, solutions should remain in contact with components for a minimum of 10 minutes.

1. **SaniZide Plus:** P/N: 34805 (spray) or 34810 (gallon), Ready to use; do not dilute.

SAFETEC of America, Inc
1055 E. Delavan Ave.
Buffalo, NY 14215 USA
1-800-456-7077

2. **Advance TB_E:** P/N: AD160 (spray) or AD1128 (gallon, Infection Control Technology available): Ready to use.

Infection Control Technology
1751 So. Redwood Rd.
Woodscross, UT 84087 USA
1-800-551-0735

3. **Bi-Arrest 2:** P/N: BP201 (4 ounces) or BP 222 (32 ounces), Infection Control Technology. Mix two pumps of the concentrate with 16 ounces of fresh water.

Infection Control Technology
1751 So. Redwood Rd.
Woodscross, UT 84087 USA
1-800-551-0735

4. **Confidence Plus:** P/N: 10009971 (32 ounces) Mix one ounce of concentrate with one gallon of fresh water.

Mine Safety Appliances
1-800-MSA-2222

SECTION TWO

QUICK SANITIZING PROCEDURE

Sanitizing Procedure

Unless otherwise directed, use the following procedure to disinfect the Oral Nasal Mask and Demand Regulator: For disassembly and reassembly procedures, refer to the appropriate KMDSI Operations and Maintenance Manual.

- 1) Wet or immerse all components to be sanitized. Allow to stay in contact with the solution for at least 10 minutes while lightly scrubbing over the components with a nylon toothbrush or clean dishrag to help remove mucus or saliva build up.
- 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 while brushing or rubbing.
- 4) If the equipment is not being used immediately, allow the components to air dry or pat dry with a clean towel and reassemble.

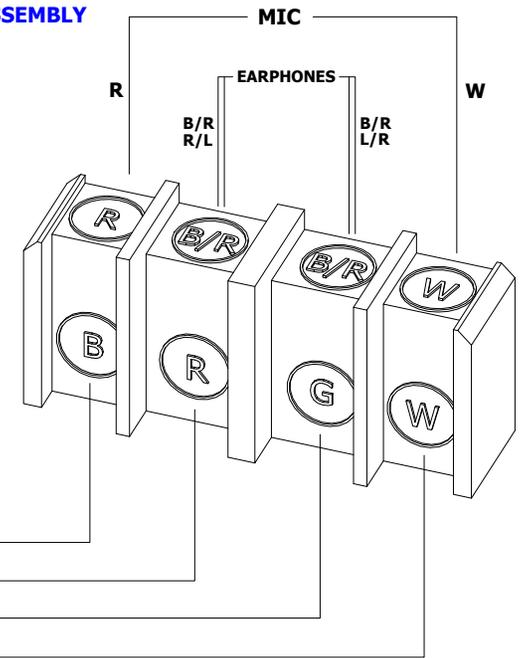
2



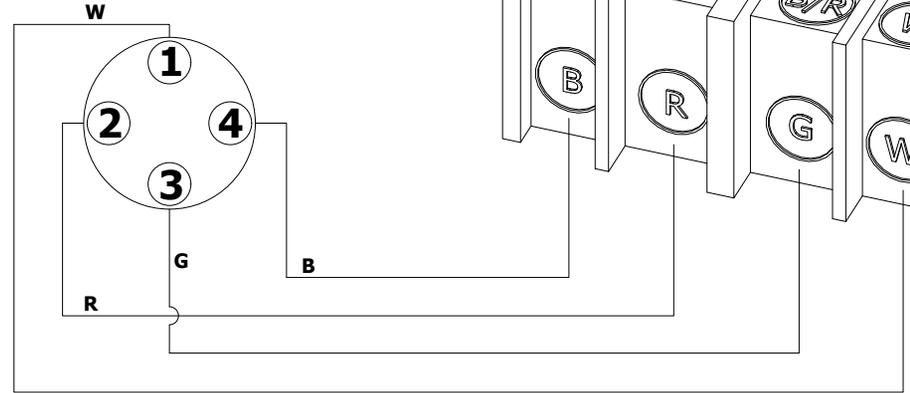
1

1. FOR 4 WIRE COMMS DIVE LAB RECOMMENDS USING KIRBY MORGAN #520-132 OR #515-105 AS THE STANDARD WHEN SETTING UP UMBILICALS FOR 4 WIRE COMMUNICATIONS.
2. INDIVIDUAL WIRE COLORS MAY VARY BETWEEN COMMUNICATION CABLE MANUFACTURERS. IF INDIVIDUAL COLORS DO NOT MATCH A MULTIMETER MUST BE USED TO TRACE WIRES THROUGH THE SYSTEM.
3. THIS DIAGRAM IS INTENDED AS A QUICK REFERENCE GUIDE. REFER TO THE KIRBY MORGAN MODULAR COMMUNICATIONS MANUAL WHEN WIRING COMMUNICATIONS.

KIRBY MORGAN STRIP ASSEMBLY #515-105



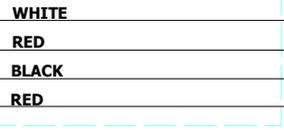
MALE MARSH MARINE 4 PIN PN#RMG-4-MP (HELMET END)



THIS EXAMPLE IS A STANDARD UMBILICALS INTERNATIONAL "B" CONFIGURATION TWISTED UMBILICAL

FEMALE MARSH MARINE 4 PIN PN#RMG-4-FS (UMBILICAL END)

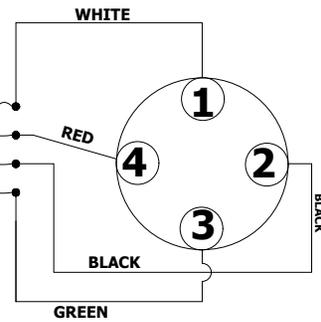
MIC (PAIR) BANANA PLUG



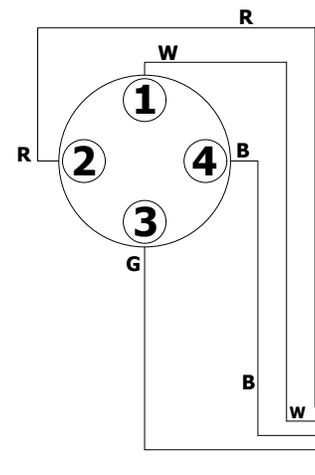
EARS (PAIR) BANANA PLUG



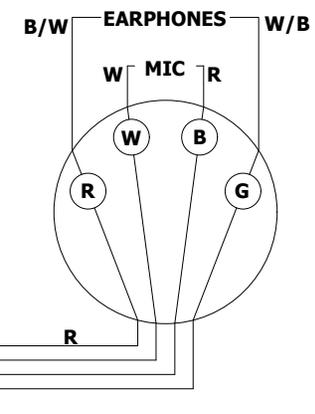
UMBILICAL COMM WIRE
CAUTION: KEEP PAIRS TOGETHER DURING ASSEMBLY



MALE MARSH MARINE 4 PIN PN#RMG-4-MP (HELMET END)



KIRBY MORGAN COMM MODULE #520-132



B

B

A

A

2



1

Kirby Morgan® Deep Sea Diving Helmets

All Models

A2.2

Monthly Inspection And Maintenance Checklist

THIS INSPECTION IS THE MINIMUM RECOMMENDED MAINTENANCE AND **SHOULD BE** PERFORMED AT LEAST **ONCE A MONTH** WITH HELMET(S) IN CONTINUOUS USE (USED FOR MORE THAN 20 DIVING DAYS IN A MONTH) OR AT LEAST EVERY **TWO (2) MONTHS**, WITH HELMET(S) USED LESS THAN 10 DIVING DAYS A MONTH.

This checklist is intended to aid persons performing routine maintenance and inspections of all KMDSI Helmets. This checklist should be used in conjunction with the applicable Operations and Maintenance Manual for the model helmet being serviced and is primarily intended to document the maintenance as it is completed and act as a guide. Specific detailed procedures for each section of this checklist can be found in the Operations and Maintenance Manuals. This checklist when completed should be retained in the equipment maintenance files. This checklist is generic in nature and is intended to be used for all models of KMDSI Diving Helmets.

NOTE: KMDSI strongly recommends that all repairs be performed by trained personnel.

NOTE: Helmets being used in extreme environments will require more frequent inspection.

NOTE: This checklist should be used in conjunction with the most current Operations and Maintenance Manual. For latest Manual revisions please check the KMDSI web page at www.kirbymorgan.com.

NOTE: During removal of components for inspection, O-rings and other consumable items may be reused, providing they are clean and a visual inspection does not reveal any damage or deterioration.

NOTE: Perform the Yoke/Neck Clamp Assembly, Helmet, and Side Block/Demand Regulator inspection procedures with gas supplies not connected to the Side Block. Attach the gas supply at Step 5 of the "Side Block/Demand Regulator" inspection procedure.

Date: _____

Helmet Model: _____

Helmet Serial Number: _____

Associated Equipment Serial #(s): _____

Technician (*print name*): _____

1. SL 17A/B Yoke/Neck Clamp Assembly

NOTE: For SL 17K, SL 17C, SL 27, and KM 37/SS, KM 47, KM 57, KM 77, KM 97, skip to step 1, page 3.

NOTE: KMDSI recommends that Neck Clamps older than five years old be removed from service and replaced. However, neck clamps that show no signs of damage and or deterioration can remain in service if the user/owner elects however, they should be inspected at least weekly I.A.W. Steps 1-6 of this procedure.

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Remove the Yoke/Neck Clamp Assembly from the Helmet. Perform a visual inspection of all components. Ensure the Neck Dam has no holes, tears, and/or damage. The neoprene must be firm. The Neck Dam should fit snug, but should never fit a diver tight enough to cause discomfort. Guidance SL 17A/B Modular O&M Manual.	
2) Visually inspect all metal parts of the Clamp Assembly for damage. Check the Hinge Pins for loose fit, signs of cracking, distortion, and/or any damage. Guidance SL 17A/B Modular O&M Manual.	
3) Visually inspect the Adjustment Stud on the Neck Clamp for signs of cracking, distortion, bending, stripped and/or damaged threads by loosening Nut (3) all the way to the shoulder of the Stud, and manually squeezing the Neck Dam Clamp to expose the portion of the Stud that is normally hidden by the Stud Block. If any damage is present the, Neck Clamp requires replacement. Guidance SL 17A/B Modular O&M Manual.	
4) Visually inspect the Rear Hinge Tab and Hinge for signs of cracking, bending, distortion, and/or loose fasteners. Guidance SL 17A/B Modular O&M Manual.	
5) Check the Latch Catch Assembly for proper operation. Check for worn and/or damaged parts as well as loose and/or missing screws. Ensure the proper Safety Pin is present. Guidance SL 17A/B Modular O&M Manual.	
<p>NOTE: All KMDSI Helmets require an internal Chin Strap Assembly inside the helmet. The purpose of the chin strap is to act as a secondary restraint in the unlikely event of the helmet should become dislodged from the neck Clamp Yoke Assembly or Neck Ring Assembly.</p>	

Procedures	Initials
6) Test mate the Yoke/Neck Clamp to the Helmet. Check for proper Clamp adjustment and smooth operation. When properly adjusted, use a 7/16" open-end wrench on Nut as a back-up wrench and a 7/16" deep well socket with a torque wrench. Ensure Lock Nut is tightened using sound engineering practices. Repair/replace and / or adjust parts as necessary. Guidance 17A/B Modular O&M Manual.	
7) Inspect the internal helmet Chin Strap Assembly on the SL 17 B for signs of wear or damage. Guidance, applicable Modular O&M Manual.	

2. Neck Ring Assembly SL 17C, 17K, 27, KM-37/SS, 47, 57, 77, 97

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Remove the Neck Ring Assembly from the Helmet. Remove and Inspect the O-ring for damage or deterioration, nicks and / or cuts. Clean and inspect the O-ring groove for damage. Lightly lubricate with recommended lubricant and reinstall. Guidance, applicable Modular O&M Manual.	
<p>NOTE: All KMDSI Helmets require an internal Chin Strap Assembly inside the helmet.</p>	
2) Inspect the Chin Strap inside the helmet and the attachment components for signs of wear or damage. Guidance, applicable Modular O&M Manual.	
3) Inspect the Neck Dam material for signs of wear or damage. Ensure the Neck Dam has no holes, tears, and/or damage. The Neck Dam should fit snug, but should never fit a diver tight enough to cause discomfort. Check to ensure it is free of deterioration. Guidance, Modular O&M Manual.	
4) Visually inspect the locking collar for signs of damage. Check to ensure the neck pad can slide to allow for proper adjustment. Check for loose or missing fasteners. Guidance, Modular O&M Manual.	
5) Check the two sealed Pull Pins for smooth operation. Visually inspect for signs of oil leakage. Guidance, applicable Modular O&M Manual.	

⚠ CAUTION

If Sealed Pull Pins do not operate smoothly, or if oil is leaking, from the Pull Pins, the Pull Pins should be serviced.

<p>6) Visually inspect the metal Helmet Ring at the base of the Helmet for signs of damage to the sealing surface. Any damage requires further inspection by an Authorized KMDSI Technician. Guidance Applicable Modular O&M Manual.</p>	
<p>7) If helmet is equipped with Front Stand-offs, inspect for bends, twists, or any obvious damage. Guidance Modular O&M Manual.</p>	
<p>8) Check the Swing Tongue Catch for smooth operation. Check for obvious worn or damaged parts and components. Guidance Modular O&M Manual.</p>	

3. Helmet Shell

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
<p>1) Visually inspect Helmet Shell exterior for loose and/or missing fasteners and obvious signs of fiberglass damage; including cracks, gouges, and/or depressions.</p>	
<p>NOTE: Fiberglass Shells ONLY Any gouges deeper than 1/16" (1.5mm) that shows bare fiberglass should be repaired. Fiberglass and gel coat repairs must be completed by a technician that has received certification for Helmet Shell repairs by KMDSI or Dive Lab, Inc.</p>	
<p>2) Remove and inspect Helmet Liner/Cushion for tears, broken snaps and/or neck strap damage. Lightly lubricate male snaps with silicone 111, Check the condition of the foam. Repair/replace as necessary. Guidance Modular O&M Manual.</p>	
<p>3) Remove the Earphones and Microphones from their holders. Remove the covers from the Earphones and inspect. Remove microphone from Oral Nasal Mask. Clean and repair/replace as necessary. Perform a communications check. Guidance O&M Modular Manual.</p>	

Procedures	Initials
<p>4) Remove the Nose Clearing Device and Oral Nasal Mask. Remove the Oral Nasal Valve body as an assembly. Clean the oral nasal valve and Valve Body as an assembly. Clean the Oral Nasal Mask. Inspect Mask and Valve Assembly for damage and/or deterioration. Replace the Oral Nasal Mask if any damage is found. Replace the Oral Nasal Valve if it appears dried, stiff, or does not lay flat. Clean and inspect the Nose Clearing Pad, Shaft and O-rings for wear. Replace the Pad if deteriorated and/or damaged. Replace O-rings if any signs of wear or damage is present. Lightly lubricate the Shaft O-rings and the Shaft, then reinstall. Reinstall Oral Nasal Mask and Valve Assembly. Guidance Modular O&M Manual.</p>	
<p>5) SL 17A/B ONLY Remove Helmet O-ring at the base of the Helmet. Wipe O-ring and O-ring groove with a clean cloth. Inspect the O-ring groove for damage. Inspect the O-ring for cracking, cuts, and/or signs of damage/deterioration and replace if necessary. Lightly lubricate the Neck Dam O-ring and reinstall on the Helmet. Guidance Modular O&M Manual.</p>	
<p>6) Without air to the Helmet, check the operation of the Steady Flow Valve and Emergency Supply Valve. If the Valves do not operate smoothly they should be disassembled, cleaned, and lubricated. Guidance, applicable Modular O&M manual.</p>	
<p>7) Stainless Steel Helmets ONLY: Inspect dewatering valve, valve cage from inside helmet, Ensure the Valve material is not hardened, distorted, and/or warped. Replace the Valve if questionable. Guidance Modular O&M Manual.</p>	
<p>8) Fiberglass Helmets ONLY: Remove the Main Exhaust Valve Cover (Water Purge Deflector for SL 27) and inspect the Main Exhaust/Dewatering Valve and seating surface for damage and/or contamination. Ensure the Valve material is not hardened, distorted, and/or warped. Replace the Valve if questionable. Reinstall the Cover. Guidance, Modular O&M manual.</p>	

4. Side Block/Demand Regulator

NOTE: Ensure gas supplies **ARE NOT** attached to the Helmet EGS and steady flow valve; remove protective dust caps, **DO NOT** open the Steady Flow/Defogging Valve.

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
<p>1) Check the Umbilical Supply One-Way Valve for proper operation by sucking on the Umbilical Adapter with the Emergency Valve or steady flow valve open. No gas should be drawn through the One-Way Valve. Guidance Modular O&M manual.</p>	
<p>2) Remove the Regulator Cover and Diaphragm. Visually inspect the interior of the Regulator Body for corrosion and/or contamination. Clean as necessary. Guidance Modular O&M manual.</p>	
<p>3) Carefully inspect the Diaphragm for cuts, tears, and/or deterioration. If any damage is found, replace the Diaphragm. Reinstall Diaphragm and Regulator Cover. Guidance applicable Modular O&M manual.</p>	
<p>4) Carefully check the Regulator Exhaust Valve for warping, distortion, stiffness, and/or damage. This is checked by pressing on the Flapper Valve from inside the Regulator. Check the Regulator Body Valve Seat Spokes. The Spokes should be flat and even. Straighten if deformed. If the Valve shows signs of damage and/or deterioration, replace the Valve. Guidance Modular O&M manual.</p>	
<p>5) Attach an air supply source to the Umbilical Adapter and set the supply pressure between 135 - 150 psig (10-11bar). Turn the Regulator Adjustment Knob out, until a slight free flow develops, then adjust in until the free flow just stops and check the lever play. Depending on regulator model, there should be between 1/16"-1/4" (1.5-3.2mm) of play in the Lever. Adjust as necessary. Guidance applicable O&M manual.</p>	
<p>6) Install Diaphragm and regulator cover. Depress the purge button. With all regulators depressing the purge more than a 1/4" (3.2mm) should result in a strong flow of gas. If the regulator purge travel is less than or greater than amount specified, re-adjust the lever. Guidance Modular O&M manual.</p>	
<p>7) Check the Steady Flow Valve for proper operation.</p>	
<p>NOTE: The Steady Flow Valve will rotate approximately 1 3/4 revolutions from closed to full open. With the air pressure to the Helmet between 135 - 150 psig (10 - 11 bar), turning the Steady Flow Valve 1/2 turn open should result in a strong flow of gas through the Defogger Train.</p>	
<p>8) Turn off the gas supply, then bleed down and remove the umbilical from the Inlet Adapter.</p>	

Procedures	Initials
<p>9) Attach a regulated gas supply (normally the EGS system), adjusted to between 135 - 150 psig (10 - 11 bar), to the Emergency Valve on the Side Block. On the Side Block, open the Emergency Supply Valve all the way, and then slowly open the regulated gas supply. Check the function of the Regulator Purge, Regulator Adjustment Knob, and the Steady Flow Valve in accordance with previous steps 6 and 7. Check for gas exiting from the One-Way Valve. There should be no gas exiting the Umbilical Adapter.</p>	
<p>NOTE: The Emergency Gas System consists of a good quality First Stage Regulator equipped with, an Over-Pressure Bleed/Relief Valve, and an Emergency Gas Supply Hose that connects to the Emergency Valve on the Helmet Side Block.</p>	

5. Emergency Gas Supply (EGS)

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
<p>1) Check the hydrostatic date and the last visual inspection record (“VIP”) of the cylinder. Ensure the date(s) are within the specified range. The VIP is done at least annually and the hydrostatic test is done at least every five (5) years.</p>	
<p>2) Check the maintenance record of the EGS components to ensure the First Stage Regulator maintenance has been performed in accordance with the manufacturer’s recommendations.</p>	
<p>3) Check all of the Hoses for signs of blisters, cover slippage, cuts, and/or abrasions. Replace any Hose(s) that shows signs of leakage/damage. If a Quick Connect EGS Hose is being used, inspect the quick connect and fittings for signs of wear/damage.</p>	
<p>4) Check the Submersible Pressure Gauge, ensure it has been compared to a gauge of known accuracy and inspect the HP hose for signs of corrosion and damage. Replace the hose if any damage is found.</p>	
<p>5) Test the Bleed/Relief Valve and confirm relief is between 180 - 200 psig (12- 14 bar) when tested. Guidance Modular O & M Manual.</p>	

Procedures	Initials
6) Perform a leak check of all EGS components and fittings using soapy water in a pressurized condition. Repair/replace items as necessary.	
7) Inspect the Harness Assembly for signs of wear or damage. Repair/replace as necessary.	

Recorded service in helmet maintenance log book? Yes No



I _____ hereby certify that I have performed the work required in the A2.2 and that **I AM** a certified KMDSI / Dive Lab technician.

Print Name: _____

Signature: _____ Date: _____

ID #: _____ Date of Certification: _____



I _____ hereby certify that I have performed the work required in the A2.2 and **I AM NOT** a certified KMDSI / Dive Lab technician.

Technician/Owner Print Name: _____

Signature: _____ Date: _____

Kirby Morgan®
 Deep Sea Diving Helmets
 All Models

A2.3
 Helmet and Emergency Gas System Daily
 Set-Up and Functional Checklist

THIS DAILY SET-UP AND FUNCTIONAL CHECKLIST SHOULD BE COMPLETED PRIOR TO COMMENCEMENT OF DAILY DIVING OPERATIONS OR AT LEAST ONCE A DAY IF BEING USED DURING CONTINUOUS DIVING.

NOTE: During removal of components for inspection, O-rings and other consumable items may be reused, providing they are clean and a visual inspection does not reveal any damage or deterioration.

⚠ WARNING
<p>These are recommended minimum checks when using Kirby Morgan Helmets or Masks. Additional checks may be required as dictated by the conditions and tasks being performed. Failure to perform in-water checks may result in serious injury or death.</p>

⚠ CAUTION
<p>All diving conducted using Kirby Morgan Helmets or Band Masks must include the use of a fully functional, properly maintained Emergency Gas System (“EGS”). The EGS should be maintained in accordance with the Modular Operations and Maintenance Manual(s).</p>

NOTE: Steps 3(a)-3(d) use the EGS for setting up and checking the Helmet systems. For a proper check of the Demand Regulator adjustment, the First Stage Regulator must have an intermediate supply pressure output between 135-150 psig (10-11 bar). The First Stage Bleed/Relief Valve should be set between 180-200 psig (12-14 bar). Do not attach the Umbilical until Step 6.

Date: _____

Helmet Model: _____

Helmet Serial Number: _____

Associated Equipment Serial #(s): _____

Technician (*print name*): _____

1. Yoke/Neck Clamp Assembly SL 17 A/B and Neck Dam Ring Assembly SL 17C, 17K, 27, KM-37/SS, 47, 57, 77, 97

NOTE: For SL 17K, SL 17C, SL 27, KM 37/SS, KM 47, KM 57, KM 77, KM 97, skip to step 1.2

⚠ WARNING
Anytime Helmets and Neck Clamps / Yoke Assemblies are mixed, the Neck Clamp must be checked for proper function, fit and adjustment prior to diving.

1.1 Yoke/Neck Clamp Assembly SL 17 A/B

Helmet Attachment Components

NOTE: Applicable to SL-17 A/B ONLY. For all other helmet models skip to step 1.2

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Visually inspect the Neck Clamp/Yoke Assembly for signs of damage. Check the Neck Dam for tears, holes, and/or cuts. Ensure the Neck Dam is of the proper size and fit.	
2) Test-mate the Yoke Assembly to the Helmet and check for proper Neck Clamp adjustment. If adjustment is necessary, use a 7/16" open-end wrench on Nut (4) as a back-up wrench and a 7/16" deep well socket with a torque wrench and ensure Lock Nut (5) is tightened using sound engineering practices. Repair/replace and/or adjust parts as necessary. Guidance Modular O&M Manual.	
3) Ensure the Latch Catch Assembly works properly, is not bent or deformed. Also check that the Safety Pin is present and attached with lanyard. Guidance Modular O&M Manual.	
NOTE: All Kirby Morgan helmet models, must be equipped with an internal chin strap. This internal neck strap is intended as a secondary helmet retainer in an unlikely event the helmet should separate from the neck ring/clamp assembly.	
4) Visually inspect the helmet Chin Strap and fasteners. Clean as necessary. Inspect for signs of wear or damage. Replace if any damage is found. Guidance, Modular O&M Manual.	

1.2 Neck Dam Ring Assembly SL 17C, 17K, 27, KM-37/SS, 47, 57, 77, 97

NOTE: Applicable to SL-17 A/B ONLY. For all other helmet models skip to step 1.2

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Visually inspect the Neck Dam Ring Assemble for signs of damage. Check the Neck Dam for tears, holes, and/or cuts. Ensure the Neck Dam is of the proper size and fit.	
2) Lightly lubricate the Neck Ring O-ring if the O-ring appears dry.	
3) Test-mate the Neck Dam Ring Assembly to the Helmet and check for proper adjustment.	
4) Ensure Adjustable Neck Pad is set to correct position for diver.	
5) Ensure the sealed Pull Pins work properly.	

2. Visually Inspect the Helmet

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Visually inspect Helmet Shell interior (all models) and exterior for damage and/or contamination. Check that the Oral Nasal Valve is correctly installed and the Oral Nasal Mask is installed on the Regulator Mount Nut. Ensure the internal Chin Strap Assembly is intact, has no signs of wear or damage and is fully functional. Ensure the Nose Clearing Device operates smoothly. Lubricate as necessary. Guidance Modular O&M Manual.	
2) Ensure the Earphones and Microphones are installed correctly. Guidance Modular Modular O&M Manual.	

Procedures	Initials
3) Inspect the Head Cushion for proper fit, broken snaps, tears, and/or rips. Lightly lubricate male snaps with silicone 111. Guidance Modular Modular O&M Manual.	
4) Check the O-ring at the base of the Helmet for signs of damage. Ensure the O-ring is lightly lubricated (SL-17 A/B only).	

3. EGS Inspection

NOTE: The EGS being used must be properly maintained and fully functional.

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Visually inspect all EGS Hoses for signs of damage.	
2) Check the hydro date and ensure the cylinder is within the VIP and the hydrostatic date. Visually inspect the cylinder and valve for obvious signs of damage.	
3) Ensure the First Stage Regulator pressure and the Over-Pressure Bleed/Relief Valve settings have been checked within the past month.	
4) Inspect the Safety Harness and Cylinder Retainer for wear and/or damage. Repair/replace as necessary.	

4. Check the Helmet EGS

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
<p>1) Orally check the One-Way Valve. With the steady flow valve open, orally blow air thru the one-way valve. Air should pass freely. Next suck back on the umbilical adapter, no air should pass back thru the one way valve and umbilical adapter. If air can be drawn back thru the one way valve, the one way valve will require overhaul or replacement.</p>	
<p>2) Connect the First Stage Regulator to the EGS Cylinder and the Helmet Emergency Supply Valve. With the cylinder turned OFF, open and close the Side Block Emergency Valve to check for smooth operation. Then open and close the Steady Flow/Defogger Valve to verify smooth operation.</p>	
<p>3) Rotate the Regulator Adjustment Knob in fully (clockwise), then rotate out (counterclockwise) 3 - 4 rotations to check for smooth operation.</p>	
<p>4) Open the EGS Supply Valve on the cylinder. Log the pressure _____ psig. Next open the Emergency Supply Valve on the Side Block.</p>	
<p>5) Momentarily open the helmet steady flow 3/4 to 1 full turn. Check for a strong flow of gas out of the defogging train, and then close.</p>	
<p>6) Check for gas escaping from the One-Way Valve. If any gas flow is detected the One-Way valve should be overhauled or replaced.</p>	

5. Check the Demand Regulator Adjustment

NOTE: If the Purge Button travels further than 1/4” before gas starts flowing, or has a weak flow of gas when fully depressed, the adjustment of the Regulator is necessary. Guidance Modular O&M Manual.

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Rotate the Demand Regulator Adjustment Knob out (counterclockwise) until a slight free flow develops. Next rotate in (clockwise) until the free flow stops.	
2) For helmets with the SuperFlow or SF 350 regulators. Slowly depress the purge button to check for too little travel or excessive travel. The purge button should travel no less than 1/16” and no more than 1/8” (1.5-3.0mm) before gas flow is heard. For the 450 and 455 regulators the flexible cover should travel 1/4” (6mm) before gas starts to flow.	
3) Fully depress the purge button on the SuperFlow regulators all the way and verify a strong surge of gas. For the 450, 455, and REX regulators pressing in beyond 1/4” (6mm) should result in a strong flow.	
4) Ensure the Side Block Emergency Valve is shut and the Bail Out Cylinder Valve is open. Log the cylinder pressure _____ psig.	

6. Attach the Umbilical

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) TENDER: Blow down the Umbilical and attach it to the Umbilical Adapter on the One-Way Valve.	

7. Check the Communications

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) DIVER: Perform communications check.	

8. Check the Hot Water Supply (If Applicable)

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check hot water supply connections if applicable.	

9. Check the Dry Suit Inflation Hose (If Applicable)

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) TENDER: Check the dry suit Inflation Hose Connection. Ensure the dry suit Inflation Valve and Exhaust Valve function properly.	

10. Tender-Check the Entire Rig

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) TENDER: Soap and leak check the Helmet/Mask gas fittings and connections including the EGS.	

11. Neck Clamp Pin 17A/B ONLY

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Neck Clamp properly adjusted and Safety Locking Pin present.	
2) Diver's Safety Harness is properly rigged and in good condition.	
3) Umbilical Strain Release.	
4) EGS Hose Quick Disconnect in good working order.	
5) Boots, gloves, knife, and other accessories.	

12. Tender

Procedures	Initials
1) Note comments or discrepancies below in the comments section. Log maintenance in the applicable maintenance log.	

Technician Signature: _____ Date: _____

Comments: _____

KMDSI strongly recommends that a certified KMDSI Repair Technician make all repairs and that only genuine KMDSI repair and replacement parts be used. Owners of KMDSI products that elect to do their own repairs and inspections should only do so if they possess the knowledge and experience. All inspections, maintenance, and repairs should be completed using the appropriate KMDSI user guide and Operations and Maintenance Manual(s). Persons performing repairs should retain all replacement component receipts for additional proof of maintenance history. Should any questions on procedures, components, or repairs arise, please contact Kirby Morgan Dive Systems, Inc., by telephone at (805) 928-7772 or via e-mail at kmdsi@kirbymorgan.com, or contact Dive Lab, Inc., by telephone at (850) 235-2715 or via e-mail at divelab@divelab.com.

NOTE: The Maintenance Log, Appendix 3, found in the Misc. Appendices checklists on the Kirby Morgan website, may be used as a template to create blank pages to record all the maintenance performed.

Kirby Morgan®
 Deep Sea Diving Helmets
 Helmet Model SL 17A/B

A2.4.1

Supervisors Equipment Checks Prior to Entry Into Water

NOTE: This checklist is intended to be used with both KMDSI SuperLite® 17A and B

NOTE: Helmet(s) being used in polluted waters, or extreme environments, will require inspection that is more frequent.

⚠ CAUTION

KMDSI strongly recommends the use of a Tender to assist the diver when “dressing-in”. The Tender should ensure the Helmet Liner is fastened to the Helmet Shell and the Chinstrap is properly fastened under the diver’s chin, once the Helmet is donned. After closing the Yoke/Neck Clamp Assembly, ensure that the safety pin is installed.

⚠ WARNING

These are recommended minimum checks when using Kirby Morgan Helmets or Masks. Additional checks may be required as dictated by the conditions and tasks being performed. Failure to perform in-water checks may result in serious injury or death.

⚠ CAUTION

All surface supplied diving with Kirby Morgan Helmets must include a fully functional, properly maintained Emergency Gas System (“EGS”). The EGS should be maintained in accordance with the applicable Modular Operations and Maintenance Manual(s).

Date: _____

Helmet Serial Number: _____

Associated Equipment Serial #(s): _____

Supervisor (*print name*): _____

1. Supply Gas

SUPERVISOR - CHECK THE FOLLOWING:

Procedures	Initials
1) SUPERVISOR: Ensure gas to the diver.	

2. Check Breathing System

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Open and close the Steady-Flow Valve to ensure proper operation.	
2) Check breathing resistance. Set Demand Regulator Adjustment Knob for minimum inhalation effort.	
3) Press Purge Button to check gas purge function.	
4) Ensure Nose Block Device slides freely.	
5) Ensure Emergency Valve opens and closes properly. Then, ensure Emergency Valve is closed and the Bail Out Cylinder Valve is open.	

3. Check Communications

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Perform communications check.	

4. Check Hot Water Supply (If Applicable)

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check hot water supply connections. Ensure topside hot water supply has been switched to diver and verify flow to hot water shroud and suit (if used).	

5. Check the Dry Suit Inflation Hose (If Applicable)

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check dry suit Inflation Hose Connection. Ensure dry suit Inflation Valve and Exhaust Valve function properly.	

6. Check Entire Rig

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Soap and leak check Helmet/Mask gas fittings and connections, including Emergency Gas System.	

7. Check Diver's Entire Rig

NOTE: On the SL-17A/B, this procedure will ensure the Neck Clamp w/Yoke Assembly is properly adjusted prior to descent.

NOTE: All equipment must be adjusted properly and functioning correctly. The Helmet/Mask must be breathing easily and properly.

SUPERVISOR/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) On SuperLite 17 A/B, ensure the Rear Hinge Tab is fully engaged on the Alignment Sleeve. Using thumb on the bottom of Regulator Body, and middle finger on Neck Clamp, attempt to “pop” Neck Clamp w/Yoke Assembly from bottom rim of Helmet. This will confirm proper mating of the Neck Clamp/Yoke to helmet.	
2) Ensure Safety Pin is secured properly through the Pull Pin Latch Catch Assembly.	
3) Diver’s Safety Harness.	
4) Umbilical strain release.	
5) EGS Hose Quick Disconnect.	
6) Boots, gloves, knife, and other accessories.	
7) Helmet supply pressure, minimum 115 psig (8 bar).	

8. Check Breathing

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check to ensure helmet is breathing properly.	

NOTE: All equipment must be adjusted properly and functioning correctly. The Helmet/Mask must be breathing easily and properly.

Kirby Morgan® Deep Sea Diving Helmets

SL 17C, 17K, 27, KM 37/SS, 47, 57, 77, 97

A2.4.2

Supervisors Equipment Checks Prior to Entry Into Water

NOTE: This checklist is intended to be used with KMDSI SuperLite 17C, 17K, 27 and KM 37/SS, 47, 57, 77, 97. The diving supervisor or person appointed by the diving supervisor should use this checklist as a minimum prior to deploying divers.

NOTE: Helmet(s) being used in polluted waters, or extreme environments, will require inspection that is more frequent.

⚠ CAUTION

KMDSI strongly recommends the use of a Tender to assist the diver when “dressing-in”. The Tender should ensure the Helmet Liner is fastened to the Helmet Shell and the Chin Strap is properly fastened under the diver’s chin, once the Helmet is donned.

⚠ WARNING

These are recommended minimum checks when using Kirby Morgan Helmets or Masks. Additional checks may be required as dictated by the conditions and tasks being performed. Failure to perform in-water checks may result in serious injury or death.

⚠ CAUTION

All surface supplied diving with Kirby Morgan Helmets must include a fully functional, properly maintained Emergency Gas System (“EGS”). The EGS should be maintained in accordance with the applicable Modular Operations and Maintenance Manual(s).

Date: _____

Helmet Model: _____

Helmet Serial Number: _____

Associated Equipment Serial #(s): _____

Supervisor (*print name*): _____

1. Supply Gas

SUPERVISOR - CHECK THE FOLLOWING:

Procedures	Initials
1) SUPERVISOR: Ensure gas to the diver.	
2) Log the EGS cylinder pressure _____ psig.	

2. Check Breathing System

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Open and close the Steady-Flow Valve to ensure proper operation.	
2) Check breathing resistance. Set Demand Regulator Adjustment Knob for minimum inhalation effort.	
3) Press Purge Button to check gas purge function.	
4) Ensure Nose Block Device slides freely.	
5) Ensure Emergency Valve opens and closes properly. Then, ensure Emergency Valve is closed and the Bail Out Cylinder Valve is open.	

3. Check Communications

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Perform communications check.	

4. Check Hot Water Supply *(If Applicable)*

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check hot water supply connections. Ensure topside hot water supply has been switched to diver and verify flow to hot water shroud and suit (if used).	

5. Check the Dry Suit Inflation Hose *(If Applicable)*

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check dry suit Inflation Hose Connection. Ensure dry suit Inflation Valve and Exhaust Valve function properly.	

6. Check Entire Rig

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Soap and leak check Helmet/Mask gas fittings and connections, including Emergency Gas System.	

7. Check Diver's Entire Rig

WARNING

Both Pull Pins must engage correctly or the Neck Dam Ring Assembly could flood, drowning may result.

ATTEMPT TO ROTATE PULL PINS, IF PIN ROTATES THIS IS AN INDICATION THAT PIN IS NOT CORRECTLY ENGAGED..

SUPERVISOR/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Ensure the sealed Pull Pins are fully engaged on the base of the Helmet Ring into the Locking Collar/Neck Pad Assembly	
2) Diver's Safety Harness.	
3) Umbilical strain release.	
4) EGS Hose Quick Disconnect is in locked position.	
5) Boots, gloves, knife, and other accessories.	
6) Helmet supply pressure, minimum 115 psig (8 bar).	

8. Check Breathing

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check to ensure helmet is breathing properly.	

NOTE: All equipment must be adjusted properly and functioning correctly. The Helmet/Mask must be breathing easily and properly.

Kirby Morgan®
Deep Sea Diving Helmets
All Models

A2.5
Supervisors In-Water Checklist

⚠ WARNING

These are recommended minimum checks when using Kirby Morgan Helmets or Band Masks®. Additional checks may be required as dictated by the conditions and tasks being performed. Failure to perform in-water checks may result in serious injury or death. See Modular Operations and Maintenance Manual for air supply requirements.

⚠ CAUTION

Diving with Kirby Morgan Helmets must include a fully functional, properly maintained Emergency Gas System (“EGS”). The EGS should be maintained in accordance with the Modular Operations and Maintenance Manual(s).

⚠ WARNING

If diving is conducted with less than the minimum recommended supply pressure, the diver must tailor the work to prevent over breathing the system, resulting in exhaustion.

Date: _____

Helmet Model: _____

Helmet Serial Number: _____

Associated Equipment Serial #(s): _____

Supervisor (*print name*): _____

1. Check Breathing

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) DIVER: Ensure Helmet is breathing properly. Set the Demand Regulator Adjustment Knob for minimum inhalation effort. Report: Breathing OK	

2. Check Helmet/Equipment For Leaks

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) DIVER: Ensure Helmet is watertight. NOTE: If the diver is wearing a dry suit, diver reports that a proper seal has been made after checking for water leakage, gas inflation and exhaust working properly.	

3. Maintain Gas Supply Over-Bottom Pressure

NOTE: If the recommended above over-bottom pressure cannot be supplied, the diver will have to tailor his workload to avoid exhaustion.

NOTE: All KMDSI Demand Regulator models and Side Block Assemblies have a maximum design pressure of 250 psig (17 bar) over-bottom.

CONSOLE OPERATOR - CHECK THE FOLLOWING:

Procedures	Initials
CONSOLE OPERATOR: Maintain minimum over-bottom gas supply pressure for depth, in accordance with the Modular O & M Manual for the type of demand regulator in use and supply system.	

Kirby Morgan®

Deep Sea Diving Helmets

SL 17 A/B, 17C, 17K, 27, KM 37/SS, 47, 57, 77, 97

A2.6

Post Dive Cleaning, Maintenance, and Inspection Checklist

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.

NOTE: Helmets being used in extreme environments will require more frequent inspection.

NOTE: During removal of components for inspection, O-rings and other consumable items may be reused, providing they are clean and a visual inspection does not reveal any damage or deterioration.

NOTE: This cleaning and maintenance schedule is recommended for all Kirby Morgan Diving Helmets and should be performed at least on a **DAILY** basis.

NOTE: Detailed instructions are located in the Modular O & M Manual.

Date: _____

Helmet Model: _____

Helmet Serial Number: _____

Associated Equipment Serial #(s): _____

Technician (*print name*): _____

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Secure and bleed down gas supplies.	
2) Disconnect and cap or tape the Helmet Gas Connections and disconnect the communication wires. Cap or tape the Umbilical End.	
3) Wash the exterior surface of the Helmet with a solution of mild detergent and fresh water, then rinse. Inspect for signs of damage.	
4) Remove the Head Cushion Assembly. Inspect for damage. If the Head Cushion has gotten wet with perspiration or water, clean and hang-up for drying or airing.	
5) Remove the Demand Regulator Clamp, Cover, and Diaphragm Assembly. Wash the interior of the Demand Regulator with mild detergent and fresh water, then rinse thoroughly.	
6) Dislodge the earphones. If the interior of the Helmet and Liner has gotten wet, remove the earphone protective covers, wash with mild detergent solution, rinse with fresh water and allow to dry.	
7) Remove the microphone from the Oral Nasal Mask. Wash with a mild detergent solution and rinse with fresh water.	
8) Wipe interior of the Helmet, including the Oral Nasal Mask. Wash with a mild detergent solution and rinse with fresh water. For sanitizing procedures, refer to "Appendix 5: Quick Sanitizing Procedure."	
9) Rotate the Regulator Adjustment Knob fully out (counter clockwise). Close the Emergency Supply and Steady Flow Valves.	
10) Clean the Neck Dam and Neck Clamp and Latch Catch (SL-17A/B Assembly with a mild detergent solution. Operate the Neck Clamp and Latch Catch (SL-17A/B), rinse with fresh water. Clean the Neck Ring, and Pull Pin Assemblies (SL17K, 17C, 27, KM-37/SS, 47, 57, 77, 97) with mild detergent solution, thoroughly rinse with fresh water.	

Procedures	Initials
11) Wipe all surfaces with a clean, dry towel to remove water droplets. Allow to air dry.	
12) Cap or tape the Emergency Gas Whip on the First Stage Regulator. Wash the exterior of all EGS components, the First Stage Regulator, the Gas Cylinder, the Submersible Pressure Gauge, and the Harness Assembly with a mild detergent solution and rinse with fresh water.	
13) Note any damage or discrepancies found during cleaning.	

Technician Signature: _____ Date: _____

Comments: _____

KMDSI strongly recommends that a certified KMDSI Repair Technician make all repairs and that only genuine KMDSI repair and replacement parts be used. Owners of KMDSI products that elect to do their own repairs and inspections should only do so if they possess the knowledge and experience. All inspections, maintenance, and repairs should be completed using the appropriate KMDSI user guide and Operations and Maintenance Manual(s). Persons performing repairs should retain all replacement component receipts

for additional proof of maintenance history. Should any questions on procedures, components, or repairs arise, please contact Kirby Morgan Dive Systems, Inc., by telephone at (805) 928-7772 or via e-mail at kmdsi@kirbymorgan.com, or contact Dive Lab, Inc., by telephone at (850) 235-2715 or via e-mail at divelab@divelab.com.

NOTE: The Maintenance Log, Appendix 3, found in the Misc. Appendices checklists on the Kirby Morgan website, may be used as a template to create blank pages to record all the maintenance performed.

Kirby Morgan®
KMB 18/28 BandMask®

A2.2

Monthly Inspection And Maintenance Checklist

THIS INSPECTION IS THE MINIMUM RECOMMENDED MAINTENANCE AND **SHOULD BE** PERFORMED AT LEAST **ONCE A MONTH** WITH MASK(S) IN CONTINUOUS USE (USED FOR MORE THAN 20 DIVING DAYS IN A MONTH) OR AT LEAST EVERY **TWO (2) MONTHS**, WITH MASK(S) USED LESS THAN 10 DIVING DAYS A MONTH.

This checklist is intended to aid persons performing routine maintenance and inspections of the KMB 18/28 Band Masks. This checklist should be used in conjunction with the Modular Operations and Maintenance Manual for the Band Mask model being serviced, and is primarily intended to be used as a guide and to document the maintenance as it is completed. Specific detailed procedures for each section of this checklist can be found in the Modular Operations and Maintenance Manuals. This checklist when completed should be retained in the equipment maintenance files. This checklist is generic in nature and is intended to be used for all models of KMDSI Band Masks

NOTE: Mask(s) being used in extreme environments will require more frequent inspection.

NOTE: During removal of components for inspection, O-rings and other consumable items may be reused, providing they are clean and a visual inspection does not reveal any damage or deterioration.

NOTE: Perform the Side Block/Demand Regulator inspection procedures with gas supplies not connected to the Side Block. Attach the gas supply at Step 5 of the "Side Block/Demand Regulator" inspection procedure.

Date: _____

Mask Serial Number _____

Associated Equipment Serial #(s): _____

Technician (*print name*): _____

1. Hood Assembly

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Remove Head Harness (Spider) and inspect for signs of tearing, deterioration, and/or damage. Ensure all five legs of the Head Harness are present. Guidance Modular O & M Manual.	
2) Remove the Earphones from their pockets in the Hood. Remove the Hood from the Mask. Perform a visual inspection of all components. Guidance Modular O & M Manual.	
3) Visually inspect the Hood for signs of damage and/or deterioration. Guidance Modular O & M Manual.	
4) Visually inspect all metal parts of the Band Assembly, Band Keeper, components, including the Band Screws, for damage. Replace if necessary. Guidance Modular O & M Manual.	

2. Mask Assembly

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Visually inspect the Mask exterior for loose and/or missing fasteners and obvious signs of fiberglass (KMB18) or thermoplastic (KMB28) damage; including cracks, gouges or depressions. NOTE: KMB 18 Fiberglass Mask Frames Only: Any gouges into the gelcoat that goes thru the gel coat and into the fiberglass should be repaired as soon as possible by a KMDSI Dealer Technician that has received certification for Helmet Shell repairs by KMDSI or Dive Lab, Inc, should only accomplish fiberglass and gel coat repairs. Only an Authorized KMDSI Repair Facility should repair any cracks, depressions and/or fractures.	
2) Remove the Covers and Protectors from the Earphones. Remove Microphone from Oral Nasal Mask. Inspect and repair or replace as necessary. Perform a complete communications check. Guidance Modular O & M Manual.	

⚠ CAUTION

If Sealed Pull Pins do not operate smoothly, or if oil is leaking, from the Pull Pins, the Pull Pins should be serviced.

<p>3) Remove the Nose Clearing Device. Clean and inspect the Nose Clearing Pad, Shaft and O-Rings. If O-Rings show signs of damage replace. Guidance Modular O & M Manual.</p>	
<p>4) Remove the Oral Nasal Mask and Oral Nasal Valve as an assembly. Clean and inspect Mask and Valve Assembly for damage. Replace the Oral Nasal Mask if any damage is found. Replace the Valve if it appears dried, stiff, and/or does not lay flat or if parts show sign of damage. Reinstall Valve Assembly into Oral Nasal Mask. Guidance Modular O & M Manual.</p>	
<p>5) Clean and inspect the Nose Clearing Pad, Shaft and O-rings for wear. Replace the Pad if deteriorated or damaged. Replace O-rings if worn. Lightly lubricate O-rings and Shaft then reinstall. Guidance Modular O & M Manual.</p>	
<p>6) Reinstall Oral Nasal Mask with Valve Assembly back onto Regulator Mount Nut. Guidance Modular O & M Manual.</p>	
<p>7) Remove the Comfort Insert [KMB 18 only]. Clean and inspect the Comfort Insert and its fasteners for damage and/or deterioration. Mark N/A for KMB 28. Reinstall. Guidance Modular O & M Manual.</p>	
<p>8) Without air to the Side Block, check the operation of the Defogger/Steady Flow Valve and EGS Valve. If the Valves do not operate smoothly, they must be overhauled or replaced. Guidance Modular O & M Manual.</p>	
<p>9) Remove the Cover, Water Dump. Inspect the Main Exhaust/Dewatering Valve and Seat for damage and/or contamination. Ensure the Valve material is not hardened, distorted, and/or warped. Replace the Valve if questionable. Reinstall the Cover.</p>	

3. Side Block/Demand Regulator

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
<p>1) Check the Umbilical Supply One-Way Valve for proper operation by sucking on the Umbilical Adapter with the Emergency Valve or steady flow valve open. No gas should be drawn through the One-Way Valve. Guidance Modular O&M manual.</p>	
<p>2) Remove the Regulator Cover Clamp, Cover, and Diaphragm. Visually inspect the interior of the Regulator Body for corrosion and/or contamination. Clean as necessary. Guidance Modular O & M Manual.</p>	
<p>3) Carefully inspect the Diaphragm for cuts, tears, and/or deterioration. If any damage is found, replace the Diaphragm. Reinstall Diaphragm and Regulator Cover. Guidance applicable Modular O&M manual.</p>	
<p>4) Carefully check the Regulator Exhaust Valve for warping, distortion, stiffness, and/or damage. This is checked by pressing on the Flapper Valve from inside the Regulator. Check the Regulator Body Valve Seat Spokes. The Spokes should be flat and even. Straighten if deformed. If the Valve shows signs of damage and/or deterioration, replace the Valve. Guidance Modular O & M Manual.</p>	
<p>5) Attach an air supply source to the Umbilical Adapter and set the supply pressure between 135-150 psig (10-11 bar). Turn the Regulator Adjustment Knob out, until a slight free flow develops, then turn in until the free flow just stops and check the lever play. Depending on regulator model, there should be between 1/6"–1/4" (1.5-6 mm) of play in the Lever. Adjust as necessary. Guidance applicable O&M manual.</p>	
<p>6) Install Diaphragm and regulator cover. Depress the purge button. With all regulators depressing the purge more than a 1/4" (6 mm) should result in a strong flow of gas. If the regulator purge travel is less than or greater than amount specified, re-adjust the lever. Guidance Modular O&M manual.</p>	
<p>7) Check the Steady Flow Valve for proper operation.</p> <p>NOTE: The Defogger/Steady Flow Valve will rotate approximately two complete revolutions from closed to full open. With the air pressure to the Mask between 135-150 psig (10-11 bar), turning the Defogger/Steady Flow Valve one full rotation should result in a strong flow of gas through the Defogger Train.</p>	
<p>8) Turn off the gas supply, then bleed down and remove the gas supply from the Umbilical Adapter.</p>	

Procedures	Initials
<p>9) Attach a regulated gas supply (normally the EGS system), adjusted to between 135-150 psig (10-11 bar), to the Emergency Valve on the Side Block. On the Side Block, open the Emergency Supply Valve all the way, and then slowly open the regulated gas supply. Check the function of the Regulator Purge, regulator Adjustment Knob, and the Defogger/Steady Flow Valve in accordance with previous steps 6 and 7. Check for gas exiting from the One Way Valve. There should be no gas exiting the Umbilical Adapter.</p>	

4. Emergency Gas Supply (EGS)

NOTE: The Emergency Gas System consists of a good quality First Stage Regulator equipped with a submersible pressure gauge, an Over Pressure Bleed/Relief Valve, and an Emergency Gas Supply Hose that connects to the Emergency Valve on the Mask Side Block.

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
<p>1) Check the hydrostatic date and last visual inspection record (“VIP”) of the cylinder. Ensure date(s) are within the specified range. The VIP is done at least annually and the hydrostatic test is done at least every five years.</p>	
<p>2) Check the maintenance record of the EGS components to ensure the First Stage Regulator’s maintenance has been performed in accordance with the manufacturer’s recommendations.</p>	
<p>3) Check all Hoses for signs of blisters, cover slippage, cuts, and/or abrasions. Replace any Hose(s) that show signs of leakage/damage. If a Quick Connect EGS hose is being used, inspect quick connect and fittings for signs of wear/damage.</p>	
<p>4) Check the Submersible Pressure Gauge, ensure it has been compared to a gauge of known accuracy and inspect the HP hose for signs of corrosion and damage. Replace the hose if any damage is found.</p>	
<p>5) Test the Bleed/Relief Valve and confirm relief is between 180-200 psig (12-14 bar) when tested. Guidance Modular O & M Manual.</p>	

Procedures	Initials
<p>6) Log the lifting pressure _____ psig.</p> <p>NOTE: An adjustable First Stage Regulator and a Gas Cylinder with a minimum of 500 psig (35 bar) available are required for this step.</p> <p>NOTE: The Bleed/Relief Valve should be adjusted to start relieve between 180-200 psig (12-14 bar) when tested.</p>	
<p>7) Check the over-bottom setting of the First Stage Regulator to ensure it is within the manufacturer’s specified pressure range. For KMDSI Helmets and Masks, the minimum over-bottom for the emergency supply is 135 psig (9 bar) and the maximum 165 psig (11 bar). Log the intermediate pressure.</p>	
<p>8) Perform a leak check of all EGS components and fittings using soapy water in a pressurized condition. Repair/replace items as necessary.</p>	
<p>9) Inspect the Harness Assembly for signs of wear and/or damage. Repair/replace as necessary.</p>	

Recorded service in helmet maintenance log book? Yes No



I _____ hereby certify that I have performed the work required in the A2.2 and that **I AM** a certified KMDSI / Dive Lab technician.

Print Name: _____

Signature: _____ Date: _____

ID #: _____ Date of Certification: _____



I _____ hereby certify that I have performed the work required in the A2.2 and **I AM NOT** a certified KMDSI / Dive Lab technician.

Technician/Owner Print Name: _____

Signature: _____ Date: _____

Comments: _____

KMDSI strongly recommends that a certified KMDSI Repair Technician make all repairs and that only genuine KMDSI repair and replacement parts be used. Owners of KMDSI products that elect to do their own repairs and inspections should only do so if they possess the knowledge and experience. All inspections, maintenance, and repairs should be completed using the appropriate KMDSI user guide and Operations and Maintenance Manual(s). Persons performing repairs should retain all replacement component receipts for additional proof of maintenance history. Should any questions on procedures, components, or repairs arise, please contact Kirby Morgan Dive Systems, Inc., by telephone at (805) 928-7772 or via e-mail at kmdsi@kirbymorgan.com, or contact Dive Lab, Inc., by telephone at (850) 235-2715 or via e-mail at divelab@divelab.com.

NOTE: The Maintenance Log, Appendix 3, found in the Misc. Appendices checklists on the Kirby Morgan website, may be used as a template to create blank pages to record all the maintenance performed.

Kirby Morgan®
KMB 18/28 BandMask®

A2.3
BandMask® and Emergency Gas System
Daily Set-Up and Functional Checklist

THIS DAILY SET-UP AND FUNCTIONAL CHECKLIST SHOULD BE COMPLETED PRIOR TO COMMENCEMENT OF DAILY DIVING OPERATIONS AND AT LEAST EVERY 24 HOURS IF IN CONTINUOUS USE.

⚠ WARNING

These are recommended minimum checks when using Kirby Morgan KMB 18/28 Band Masks. Additional checks may be required as dictated by the conditions and tasks being performed. Failure to perform in-water checks may result in serious injury or death

NOTE: Mask(s) being used in extreme environments will require more frequent inspection.

NOTE: During removal of components for inspection, O-rings and other consumable items may be reused, providing they are clean and a visual inspection does not reveal any damage or deterioration.

NOTE: Perform the Side Block/Demand Regulator inspection procedures with gas supplies not connected to the Side Block. Attach the gas supply at Step 5 of the “Side Block/Demand Regulator” inspection procedure.

NOTE: Steps 3(a)–3(e) use the EGS for setting up and checking the Mask’s systems. For a proper check of the Demand Regulator adjustment, the First Stage Regulator must have an intermediate supply pressure output between 135–150 psig (10–11 bar). The First Stage Bleed/Relief Valve should be set between 180–200 psig (12.4–13.8 bar). Do not attach the Umbilical until Step 6.

Date: _____

Mask Serial Number _____

Associated Equipment Serial #(s): _____

Technician (*print name*): _____

1. Hood and Band Assembly

NOTE: When the screws that hold the Bands in position are properly torque, the Hood and Face Seal cannot be removed from frame.

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Visually inspect the Hood and Face Seal for signs of damage. Check the Hood for tears, holes, and/or cuts. Ensure the Face Seal is properly glued to the Hood.	
2) Check the screws that hold the Bands in position. They must be properly torque to 26 inch pounds (28 kg cm). Guidance Modular O & M Manual.	

⚠ WARNING
If the Bands become loose, the Hood and Face Seal could separate from the Mask. This would cause the Mask to flood, which could cause drowning.

3) Inspect the Head Harness/Spider to ensure there are no tears and/or cracks in the material. Ensure all five legs are present. If it is worn and/or cracked, it must be replaced.	
4) Ensure band keepers are installed and properly torqued, Guidance Modular O & M Manual.	

2. Visually Inspect Mask

NOTE: KMDSI recommends replacement of the Hose Assembly (117a) on the KMB-18A every 2-years, regardless of condition.

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Visually inspect the interior/exterior of the Band Mask for any obvious signs of damage. Check to make sure the Oral Nasal Valve is correctly installed and the Oral Nasal Mask is installed on the Regulator Mount Nut properly. Ensure the Nose Clearing Device operates smoothly. Lubricate as necessary. Guidance Modular O & M Manual.	

Procedures	Initials
2) Ensure the Earphones and the Microphone are installed correctly. Check the Wire Lugs to ensure they are not touching each other. Guidance Modular O & M Manual.	
3) Ensure the Demand Regulator Cover is not excessively dented, with dents deeper than ¼ inch (6 mm).	
4) Inspect the Regulator Hose Assembly on the KMB-18A. The Hose(s) and fittings must be in good shape, no bulges cuts cracking or deterioration of the fittings. On the KMB-18B, The Bent Tube must not have any dents and/or compressed areas exceeding ⅛" (3 mm)	
5) Check all moving parts to ensure smooth and proper operation. <ul style="list-style-type: none"> a) Defogger/Steady Flow Control Knob b) EGS Valve c) Nose Block Device d) Regulator Adjustment Knob 	
6) Ensure the One Way Valve is operational	
 WARNING	
<p>The One Way Valve must be tested daily prior to commencing diving operations. DO NOT DIVE THE MASK if the One Way Valve is not operating properly. If the Hose parts near the surface, serious injury could result to the divers' lungs and/or eyes. In extreme cases, this could be fatal.</p>	
7) Connect the First Stage Regulator to the EGS Cylinder and the Mask Emergency Supply Valve. With the Cylinder turned OFF, open and close the Side Block Auxiliary Valve (EGS) to check for smooth operation. Then open and close the Defogger/Steady Flow Valve to check for smooth operation. Guidance O&M Manual.	

3. EGS Inspection

NOTE: The EGS being used must be properly maintained and fully functional.

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Visually inspect all EGS hoses for signs of damage.	
2) Check to ensure the cylinder is within the VIP and the hydro dates.	
3) Ensure the First Stage Regulator pressure setting and the Over Pressure Bleed/Relief Valve settings have been checked within the past month. (Maintenance Log).	
4) Inspect the Safety Harness and Cylinder Retainer for wear and damage. Repair/replace as necessary	
5) Document inspection/maintenance in Maintenance Log (Appendix 3).	

4. Check the Mask

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Rotate the Regulator Adjustment Knob in fully (clockwise), then rotate out (counterclockwise) 3-4 rotations to check for smooth operation.	
2) Open the EGS Supply Valve on the cylinder. Log the pressure _____ psig. Then open the Emergency Supply Valve on the Side Block.	
3) Momentarily open the Mask Defogger/Steady Flow Valve $\frac{3}{4}$ to one full turn. Check for a strong flow of gas out of the Defogging Train, and then close.	

Procedures	Initials
4) Check for gas escaping from the One Way Valve.	

5. Attach the Umbilical

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Blow down the Umbilical and attach it to the Umbilical Adapter on the One Way Valve.	

6. Check the Demand Regulator Adjustment

NOTE: If the Purge Button travels further than ¼" before gas starts flowing, or has a weak flow of gas when fully depressed, the adjustment of the Regulator is necessary. Guidance Modular O&M Manual.

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Rotate out (counterclockwise) on the Demand Regulator Adjustment Knob until a slight free flow develops. Then rotate in (clockwise) until the free flow stops.	
2) For masks equipped with a SuperFlow or SuperFlow 350 regulator, slowly depress the purge button to check for excessive travel. The purge button should travel in no less that ¼" and out no more than ⅛" (1.5-3 mm) before gas flow is heard. For masks equipped with a 450 or 455 balanced regulator depressing the flexible cover the cover should travel approximately ¼" (6 mm) before gas starts to flow.	
3) Depress the Purge Button all the way, verify a strong surge of gas. Pressing the flexible cover of the 450 and 455 further than ¼" (6mm) should result in a strong flow of gas.	

Procedures	Initials
4) Ensure the Side Block Emergency Valve is closed , and the Bail Out Cylinder Valve is open . Log the cylinder pressure _____ psig.	

7. Check the Communications

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Perform communications check.	

8. Check the Hot Water Supply (If Applicable)

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check the hot water supply connections. Ensure topside supply has been switched to the diver and verify flow to hot water shroud and suit (if used).	

9. Check the Dry Suit Inflation Hose (If Applicable)

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check the dry suit Inflation Hose Connection. Ensure the dry suit Inflation Valve and Exhaust Valve function properly.	

10. Check the Entire Rig

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Soap and leak check the Mask gas fittings and connections including the EGS.	

11. Check the Diver's Entire Rig

SUPERVISOR/TENDER - CHECK ADJUSTMENT/FIT OF THE ENTIRE RIG, INCLUDING THE FOLLOWING

Procedures	Initials
1) Diver's Safety Harness	
2) Umbilical Strain Release	
3) EGS Hose Quick Disconnect	
4) Boots, gloves, knife, and other accessories	
NOTE: All equipment must be adjusted properly and functioning correctly.	

12. Check Breathing

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
Check to ensure the Mask is breathing easily NOTE: The Mask must be breathing easily and properly.	

13. Diver(s) is/are Ready

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Report when you are ready to enter the water.	

Technician Signature: _____ Date: _____

Comments: _____

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NOTE: The Maintenance Log, Appendix 3, found in the Misc. Appendices checklists on the Kirby Morgan website, may be used as a template to create blank pages to record all the maintenance performed.

Kirby Morgan® KMB 18/28 BandMask®

A2.4

Supervisors Equipment Checks Prior to Entry Into Water

NOTE: This checklist is intended to be used with KMB 18/28 BandMasks®. The diving supervisor or person appointed by the diving supervisor should use this checklist as a minimum prior to deploying divers.

NOTE: Mask(s) being used in polluted waters, or extreme environments, will require inspection that is more frequent.

⚠ CAUTION

KMDSI strongly recommends the use of a Tender to assist the diver when “dressing-in”. The Tender should ensure the Helmet Liner is fastened to the Helmet Shell and the Chin Strap is properly fastened under the diver’s chin, once the Helmet is donned.

⚠ WARNING

These are recommended minimum checks when using Kirby Morgan BandMasks. Additional checks may be required as dictated by the conditions and tasks being performed. Failure to perform in-water checks may result in serious injury or death.

⚠ CAUTION

All surface supplied diving with Kirby Morgan BandMasks® must include a fully functional, properly maintained Emergency Gas System (“EGS”). The EGS should be maintained in accordance with the applicable Modular Operations and Maintenance Manual(s).

Date: _____

Mask Serial Number _____

Associated Equipment Serial #(s): _____

1. Supply Gas

SUPERVISOR - CHECK THE FOLLOWING:

Procedures	Initials
1) SUPERVISOR: Ensure gas to the diver.	
2) Log the EGS cylinder pressure psig.	

2. Check Breathing System

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Open and close Defogger/Steady Flow Valve to ensure proper operation.	
2) Check breathing resistance, adjust Demand Regulator Adjustment Knob for minimum inhalation effort.	
3) Press Purge Button to check gas purge function.	
4) Ensure Nose Block Device slides freely.	
5) Ensure Emergency Valve opens and closes properly, then verify Emergency Valve is shut and the Bail Out Cylinder Valve is open.	

3. Check Communications

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Perform communications check.	

4. Check Hot Water Supply *(If Applicable)*

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check hot water supply connections. Ensure topside hot water supply has been switched to diver and verify flow to hot water shroud and suit (if used).	

5. Check the Dry Suit Inflation Hose *(If Applicable)*

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check dry suit Inflation Hose Connection. Ensure dry suit Inflation Valve and Exhaust Valve function properly.	

6. Check Entire Rig

TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Soap and leak check Mask gas fittings and connections, including Emergency Gas System.	

7. Check Diver's Entire Rig

NOTE: All equipment must be adjusted properly and functioning correctly.

SUPERVISOR/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Ensure Mask is properly fitted to diver.	
2) Diver's Safety Harness.	
3) Umbilical strain release.	
4) EGS Hose Quick Disconnect is in locked position.	
5) Boots, gloves, knife, and other accessories.	
6) Mask supply pressure, minimum 115 psig (8 Bar).	

8. Check Breathing

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) Check to ensure Mask is breathing properly. NOTE: The Mask must be breathing easily and properly.	

Kirby Morgan®
KMB 18/28 BandMasks®

A2.5
Supervisors In-Water Checklist

⚠ WARNING

These are recommended minimum checks when using Kirby Morgan Band Masks®. Additional checks may be required as dictated by the conditions and tasks being performed. Failure to perform in-water checks may result in serious injury or death. See Modular Operations and Maintenance Manual for air supply requirements.

⚠ CAUTION

Diving with Kirby Morgan BandMasks® must include a fully functional, properly maintained Emergency Gas System (“EGS”). The EGS should be maintained in accordance with the Modular Operations and Maintenance Manual(s).

⚠ WARNING

If diving is conducted with less than the minimum recommended supply pressure, the diver must tailor the work to prevent over breathing the system, resulting in exhaustion.

Date: _____

Mask Serial Number _____

Associated Equipment Serial #(s): _____

Technician (*print name*): _____

1. Check Breathing

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) DIVER: Ensure Mask is breathing properly. Set the Demand Regulator Adjustment Knob for minimum inhalation effort. Report: Breathing OK	

2. Check Mask/Equipment For Leaks

DIVER - CHECK THE FOLLOWING:

Procedures	Initials
1) DIVER: Ensure Mask is watertight. NOTE: If the diver is wearing a dry suit, diver reports that a proper seal has been made after checking for water leakage, gas inflation and exhaust working properly.	

3. Maintain Gas Supply Over-Bottom Pressure

NOTE: If the recommended above over-bottom pressure cannot be supplied, the diver will have to tailor his workload to avoid exhaustion.

NOTE: All KMDSI Demand Regulator models and Side Block Assemblies have a maximum design pressure of 250 psig (17 bar) over-bottom.

CONSOLE OPERATOR - CHECK THE FOLLOWING:

Procedures	Initials
CONSOLE OPERATOR: Maintain minimum over-bottom gas supply pressure for depth, in accordance with the Modular O & M Manual for the type of demand regulator in use and supply system.	

Kirby Morgan®
KMB 18/28 BandMask®

A2.6

Post Dive Cleaning, Maintenance, and Inspection Checklist

POST DIVING CLEANING AND INSPECTION SHOULD BE PERFORMED AT END OF DAILY DIVING OPERATIONS OR AT LEAST EVERY 24 HOURS IF IN CONTINUOUS USE.

NOTE: Mask(s) being used in extreme environments, will require more frequent inspection.

NOTE: During removal of components for inspection, O-rings and other consumable items may be reused, providing they are clean and a visual inspection does not reveal any damage or deterioration.

NOTE: This cleaning and maintenance schedule is recommended to be performed on a **DAILY** basis.

NOTE: Detailed instructions for removing and installing the Hood can be found in HBNK (BandMask Hood, Face Seal, Band Keepers and Head Harness) module.

Date: _____

Mask Serial Number _____

Associated Equipment Serial #(s): _____

Technician (*print name*): _____

DIVER/TENDER - CHECK THE FOLLOWING:

Procedures	Initials
1) Secure and bleed down gas supplies.	
2) Disconnect and cap (or bag and tape) the Mask Gas Connections and disconnect the communication wires. Cap (or bag and tape) the Umbilical End.	
3) Wash the exterior surface of the Mask with a solution of mild detergent and fresh water, then rinse. Inspect for signs of damage.	
4) Remove the Earphones from their pockets in the Hood. Remove the Earphone protective covers, clean and rinse to allow to dry.	
5) Clean Hood Assembly. Remove hood from mask frame, rinse with fresh water and inspect for damage. Hang-up for drying or airing.	
<p>6) Remove the Demand Regulator Cover, and Diaphragm Assembly. Wash the interior of the Demand Regulator with mild detergent and fresh water, then rinse thoroughly.</p> <p>NOTE: While rinsing the interior of the Demand Regulator DO NOT depress the Purge Button lever. This action will introduce foreign matter into the Inlet Valve and Seat.</p>	
7) Remove the Microphone from the Oral Nasal Mask.	
8) Wipe interior of the Mask, including the Oral Nasal Mask. Wash with a mild detergent solution and rinse with fresh water. For sanitizing procedures, refer to "Appendix 5: Quick Sanitizing Procedure."	
9) Rotate the Regulator Adjustment Knob fully out (counter clockwise). Close the Emergency Supply and Steady Flow Valves.	
10) Wipe all surfaces with a clean dry towel to remove water droplets. Allow to air dry.	

Procedures	Initials
11) Cap (or bag and tape) the Emergency Gas Whip on the First Stage Regulator. Wash the exterior of all EGS components, the First Stage Regulator, the Gas Cylinder, the submersible pressure gauge, and the Harness Assembly with a mild detergent solution and rinse with fresh water. Hang-up Harness Assembly for drying or airing.	
12) Note any damage or discrepancies found during cleaning.	

Technician Signature: _____ Date: _____

Comments: _____

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NOTE: The Maintenance Log, Appendix 3, found in the Misc. Appendices checklists on the Kirby Morgan website, may be used as a template to create blank pages to record all the maintenance performed.



SECTION FOUR

Emergency Procedures

For all Kirby Morgan Helmets and KMB 18/28 Band Masks
Complete Support & Testing of Underwater Diving Equipment

The emergency procedures listed are primarily intended as the diver's first response to a situation or event that could be life threatening if swift immediate action is not taken. All emergency procedures assume that the helmet is being dived with two independent breathing supplies to the diver umbilical so that one is in use, and one is in standby. In addition it is also assumed that the helmet is being used with a fully functional emergency gas supply that is lined up to the side block so that **only the side block emergency valve needs to be opened** to supply gas to the side block. Surface supply systems must be capable of delivering the required pressure and volume to satisfy the diver respiratory requirements. All users of KMDSI Helmets and Full-Face masks should be professionally trained in the helmets use, set-up, adjustment procedures, as well as all applicable user level maintenance. All persons involved in the diving operations should memorize the emergency procedures and protocol. All topside support personnel should be trained and qualified to perform the duties for which they are being employed. These emergency procedures list only what the diver should do. Each organization / company should develop policy, emergency, and operational procedures in accordance with (IAW) governing regulations and / or industry standards and consensus and the guidelines given by the manufacturer of the equipment.

The guidelines that dictate when or how a diver should abort a dive must be established by the organization /company. These guidelines need to be based on governing regulations, industry and consensus guidelines. In some cases, the diver may be the one making the decision to abort and in other cases, (i.e. deep air, mixed gas, decompression obligation) the decision might be made by the topside supervisor. Regardless, all users must have a plan and protocol, and all members of the dive team must know the plan and protocol. The overall responsibility rests with the Diving Supervisor.

1. LOSS OF COMMUNICATIONS

a. Revert to line-pull signals and abort the dive when directed by topside or in accordance with (IAW) organizational / company protocol.

2. LOSS OF UMBILICAL GAS SUPPLY

a. Diver shifts to the man worn emergency gas system (EGS), notify topside of gas loss if communications are still functional or use line pull signals.

b. Diver checks umbilical clear, surface slowly if ascent line is available or standby to surface (IAW) organizational or company protocol.

c. If surface supply is restored, the diver should shift back to the primary source by closing the EGS valve on the side block, then notify topside and abort as directed.

3. SEVERED OR DAMAGED GAS SUPPLY UMBILICAL

a. Diver open EGS valve on the helmet side block.

b. If communications are functional, notify topside.

c. Check umbilical clear and abort dive when directed from topside or IAW organizational or company protocol.



SECTION FOUR

Emergency Procedures

For all Kirby Morgan Helmets and KMB 18/28 Band Masks
Complete Support & Testing of Underwater Diving Equipment

4. DEMAND REGULATOR FAILS (NO DEMAND FUNCTION)

- a. Crack open steady flow defogger valve 1/4 -1/2 turn, if still no air, diver opens EGS valve then and open and close steady flow as necessary, notify topside.
- b. Back out counter clockwise 1-2 turns on regulator adjustment knob, if demand function resumes, notify topside then try the normal demand supply by securing the EGS valve and steady flow. If normal demand mode function does not function, go back on the EGS check the umbilical clear and stand by to abort. Abort IAW instructions from topside.

NOTICE

If the diver has to stay on the EGS while using the steady flow, the diver should open steady flow during inhalation only and close during exhalation to conserve air. Keep in mind in this situation the diver stops everything and just concentrates on getting to a place where normal breathing can be restored.

5. SEVERE DEMAND REGULATOR FREE FLOW

- a. Diver adjusts regulator adjustment knob in (clockwise) until free flow stops or diminishes.
- b. If free flow does not stop, diver adjusts regulator in fully to lessen severity and augments supply as necessary using the steady flow defogger valve.
- a. Notify topside, check umbilical clear and abort dive (IAW) organizational or company protocol and stand by to abort dive.

6. MAJOR WATER LEAKAGE INTO THE HELMET

- a. For all KMDSI Helmets and Band Masks except the SL-27helmet, maintain the helmet in a face forward slight down position and use the steady flow defogger ¼- 1/2 turn as necessary to dewater the helmet.
- b. The SL-27 helmet has the dewatering valve on the lower left side of the helmet, the diver should tilt the his head so the left side of the helmet is lower allowing all water to pool in the lower left side, then use the steady flow defogger ¼ to ½ turn open to dewater the helmet.
- c. Notify topside, check umbilical clear and abort dive (IAW) organizational or company protocol and stand by to abort dive.

WARNING

All surface supply systems must be capable of supplying at least two different sources of breathing gas to the diver. In addition, the diver must always have a fully functional man worn EGS system that can get the diver to the surface or to a point were breathing supply can be re-established. In cases where the hazard of the dive is such that the umbilical might become entangled or pinned, a spare umbilical and the proper wrenches must be available for emergency replacement by the standby diver.

