

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 divelab.com

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

Band Masks

- A2.1 Overhaul, Inspection and Maintenance
- A2.2 Monthly Band Mask Inspection

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- 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.

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

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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.

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.

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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.

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.

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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.

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.

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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.

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.

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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.

KMDSI Helmet and Band Mask Operator/User Course (5-8 hours)

This official standardized 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 applicable KMDSI checklists, Operations and Maintenance Manuals. This course is designed 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.

The Operator/User course is not intended to be a repair technician course and does not qualify person(s) to perform repairs and/or servicing. The course usually takes 5-8 hours and the certificate is valid for four years.

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

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Training schools teach Surface Supplied diving using various models of the Kirby Morgan Helmets & Band Masks.

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.

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