

Kirby Morgan® 77 Diver's Helmet Operations and Maintenance Manual

KMDSI Part #100-085

Patented, patents pending, foreign patents apply



Kirby Morgan Dive Systems, Inc.

1430 Jason Way

Santa Maria, CA 93455, USA

Telephone (805) 928-7772, FAX (805) 928-0342

E-Mail: KMDSI@KirbyMorgan.com, Web Site:www.KirbyMorgan.com

Manual prepared by Marine Marketing and Consulting, Dive Lab, Inc., and KMDSI.

NOTE: This manual is the most current for the Kirby Morgan 77 Helmet. It is page dated June 2011.. Future changes will be shown on page III and the changed pages will carry the date of change. Previous manuals may not reflect these updates.

WARNING

Diving with compressed breathing gas is a hazardous activity. Even if you do everything right there is always the danger that you may be killed or injured. No piece of diving equipment can prevent the possibility that you may be killed or injured any time you enter the water.

The Kirby Morgan 77 diving helmet meets or exceeds all performance and testing requirements of all government and non-government testing agencies throughout the world. It is CE approved.

Kirby Morgan, SuperLite®, BandMask, Band Mask, KMB, KMB-Band Mask, DSI, Diving Systems International, EXO, REX®, SuperFlow® and DECA are all registered trademarks of Kirby Morgan Dive Systems, Inc. **Use of these terms to describe products that are not manufactured by KMDSI is illegal.**

The two dimensional images (such as photographs and illustrations) of our products are © copyrighted and trademarks of Kirby Morgan Dive Systems, Inc. The three dimensional forms of our products are trademark, trade design and trade dress protected.

© Copyright 1970-2011. Kirby Morgan Dive Systems, Inc. All rights reserved. This manual is made available for the express use of the owner of this Kirby Morgan product. No part of this manual may be reproduced, stored in any retrieval system, or transmitted, or used in any form or by any means, whether graphic, electronic, mechanical, photocopy, or otherwise by technology known or unknown, without the prior written permission of Kirby Morgan Dive Systems, Inc.

Warranty Information

Kirby Morgan Dive Systems, Inc. warrants every new mask, helmet, or KMAC Air Control System to be free from defects in workmanship for a period of three hundred sixty five (365) days from date of purchase. This warranty covers all metal, fiberglass, and plastic parts. This warranty does NOT cover rubber parts, communications components, or head cushions. In addition, due to the electrolytic nature of underwater cutting and welding, chrome plating cannot be warranted when the diver engages in these activities.

Should any part become defective, contact the nearest authorized KMDSI dealer. If there is no dealer in your area, contact KMDSI directly at (805) 928-7772. You must have a return authorization from KMDSI prior to the return of any item, Upon approval from KMDSI, return the defective part, freight prepaid, to the KMDSI plant. The part will be repaired or replaced at no charge as deemed necessary by KMDSI.

This warranty becomes null and void if:

- 1) The product is not registered with KMDSI within ten (10) days of purchase.**
- 2) The product has not been properly serviced and/or maintained according to the appropriate KMDSI manual. In addition, the user is responsible to ensure that all product updates as recommended by KMDSI have been performed.**
- 3) Unauthorized modifications have been made to the product.**
- 4) The product has been abused or subjected to conditions which are unusual or exceed the product's intended service.**

NOTE: Be sure to complete the enclosed warranty card and return it to KMDSI immediately. No warranty claims will be honored without a satisfactorily completed warranty card on file at KMDSI.

Record Of Changes

It is the responsibility of the owner of this product to register their ownership with Kirby Morgan Dive Systems, Inc., by sending the warranty card provided. This card is to establish registration for any necessary warranty work and provides a means of communication that allows KMDSI to contact the user regarding this product. The user must notify KMDSI of any change of address by the user or sale of the product.

All changes or revisions to this manual must be recorded in this document to ensure that the manual is up to date. Quantities marked in parenthesis.

Change Number	Date	Description of Change
1	06/26/2008	<p>Added CE Certification text on page 23</p> <p>Rearranged chapter 5 into 2 columns, pages 63-64</p> <p>Added part number to KM-77 Tool Kit on page 68</p> <p>Rearranged chapter 3, 3.3-3.6.4 to accommodate Scotch-Brite® text on page 42, section 3.3</p> <p>Rearranged chapter 6, 6.2.3-6.3 to accommodate Scotch-Brite® text on page 70, section 6.3</p> <p>REX®-3™ changed to REX® on page 80</p>
2	09/30/2008	<p>On page number III removed page number column.</p> <p>Renumbered chapter 6 pages and subsequent chapters in table of contents.</p> <p>Added CE Certification text and logos on pages 19, 21 and 22.</p> <p>Moved Tables from pages 23, 25-26 and 28 to Appendix and created Appendix 3.</p> <p>Rearranged and renumbered chapter 2 and subsequent chapters.</p> <p>Updated Images on pages 32-33.</p> <p>Updated Exploded view of REX® regulator on page 34.</p> <p>Updated Image on page 73.</p> <p>Rearranged and Updated Chapter 6, 6.6.1, 6.6.3, on page's 80-83.</p> <p>Rearranged and updated Chapter 7, 7.8.3, 7.10 on page's 106-110 and page's 115-118.</p> <p>Added Appendix A2 page 165.</p> <p>Added Appendix 3 page 167.</p>
3	10/29/2008	<p>Page 18 Image, bottom helmet added D ring</p> <p>Page 28 Text, First paragraph corrected KM27 to read SL27</p> <p>Page 35 Exploded View, added D ring</p> <p>Page 41 Exploded View, added D ring; Section 3.4.1 Removed Warning block.</p> <p>Page 53 Image, added D ring</p> <p>Page 54 Images, added D ring</p> <p>Page 56 Image, added D ring</p> <p>Page 60, Section 6.12.3 added D ring drying feature</p> <p>Page 68 Text, Warning block added to section 6.3; Paragraph pertaining to waxing helmet under 6.3 added.</p> <p>Page 136 Exploded View, added D ring</p> <p>Page 141 Exploded View, added D ring</p> <p>Page 156 added diagram of Waterproof Connector</p> <p>Page 157 Image, updated waterproof connector image</p> <p>Page 163-164 Text, various torque specification changes</p>

4	03/19/2009	<p>Page 23 Section 2.6.2 Paragraph 2: SCFM changed to SLPM</p> <p>Page 82 Section 7.3.2: Picture caption changed from 270 kg.cm to 17 Newton Meters.</p> <p>Page 87 Section 7.4.4 Step 1 and 5: Lacquer Thinner changed to Acetone, changed 50 inch pounds to 35 and 5.65 Newton Meters to 4.</p> <p>Page 107 Section 7.9.1: A few words of caution made into a caution.</p> <p>Page 129 Section 8.4.3 Step 4, 5 and picture captions: changed 12 inch pounds to 15.</p> <p>Page 137 Section 8.6.2 Step 14, 16: and picture caption changed from 14 inch pounds to 10 and 16kg.cm to 1.1 Newton Meters.</p> <p>Page 138 Section 8.6.3 Step 7: Changed 14 inch pounds to 10 and 1.38 Newton Meters to 1.1.</p> <p>Page 139 Section 8.6.3 Step 9: Changed 14 inch pounds to 10 and 16kg.cm to 1.1 Newton Meters.</p> <p>Page 146-147 Section 8.12.2 Step 2 and 6: changed 35 inch pounds to 20 and 27 kg.cm to 2.25 Newton Meters.</p>
5	11/06/2009	Chapter 2 Addition of CE Conforming Criteria.
6	04/28/2010	<p>Updated chapter 1. Separated chapters 4 and 5 and updated.</p> <p>Removed Loctite 262 from pages 51, 53, 79 and 149.</p> <p>Warranty information updated.</p> <p>Updated diagrams.</p>
7	04/13/2011	Updated earphones throughout manual
8	06/07/2011	<p>Updated BlowApart locations in torque specifications</p> <p>Changed 61 meters to 67 meters in Appendix 3 Table 3 Topside High-Pressure Regulator Settings for use with the Kirby Morgan REX® Regulator®</p>
9	10/17/2011	Updated CE Identification Number to 2049 and corrected area code for Santa Maria Office from 850 to 805 in Chapter 2

WARNING

Diving with compressed breathing gas is a hazardous activity. Even if you do everything right there is always the potential for serious injury or death. No one piece of diving equipment can prevent the possibility that you may be injured or killed any time you enter the water. The information in this manual is intended for users of Kirby Morgan helmets and persons that maintain or service Kirby Morgan helmets.

Table Of Contents

Warranty Information	II
Record Of Changes	III
Definition of Signal Words Used in this Manual	XI
Chapter 1 General Information KMDSI Products	1
1.1 Introduction	1
1.2 Full-Face Masks and Manifolds	2
1.3 Kirby Morgan Diving Helmets	4
Chapter 2 Description & Operational Specifications Kirby Morgan 77 ..	9
2.1 CR Marking	9
2.2 CE Certification	9
2.2.1. CE Marking	9
2.2.2. Notified Body	10
2.3 Other Marking	10
2.4 Product Specifications	10
2.5 Regulator Performance	10
2.5.1 REX® Regulator	10
2.5.2 Minimum Operating Temperature	10
2.6 Cage Code	10
2.7 Operational Specifications & Limitations	10
2.7.1 Using the REX® Regulator with a Low Pressure Compressor Supply	10
2.7.2 Using the REX® Regulator Low-Pressure Compressor Supply Pressure Requirements Table	11
2.8 Helmet Features	13
2.9 General Description	14
2.9.1 Helmet Shell	14
2.9.2 Gas Flow Systems	14
2.9.3 Emergency Gas Supply System (EGS)	19
2.9.4 Helmet Attachment to the Diver	20
2.9.5 Sealing Arrangement	22
2.9.6 Reducing Carbon Dioxide	22
2.9.7 Communications	22
2.9.8 Equalizing the Middle Ear	22
2.9.9 Face Port or Viewing Lens	23
2.10 Accessories	23
2.10.1 Eye Protection for Welding	23
2.10.3 Special Regulator Tools for REX® Regulator	24
2.11 Helmet Transport And Storage	24
2.11.1 Helmet Carrying Bag	25
2.12 Use of Kirby Morgan Original Replacement Parts	25
Chapter 3.0 Operating Instructions	27
3.1 Introduction	27
3.2 Design Purpose	27
3.3 First Use of Your Kirby Morgan Diving Helmet	28
3.4 Initial Adjustments to Your Helmet	29
3.4.1 Head Cushion	29
3.4.2 Trimming the Neck Dam	29

3.4.3 Adjusting the Neck Pad	30
3.5 Pre Dress-In Procedure	31
3.5.1 Pre-Dive Visual Inspection	31
3.6 Preparing the Helmet for Diving	32
3.6.1 Clean Face Port	32
3.6.2 Check Moving Parts	32
3.6.3 Check Communications	32
3.6.4 One Way Valve Check	32
3.7 Emergency Gas System (EGS)	33
3.8 Setting Up to Dive	35
3.8.1 Flushing Out the Umbilical	38
3.8.2 Connecting the Umbilical to the Helmet	38
3.8.3 Opening the Breathing Gas Supply to the Helmet	39
3.8.4 Fogging Prevention	39
3.8.5 Donning The Kirby Morgan Helmet	39
3.8.6 Testing the Breathing System	42
3.8.7 Sealing Integrity Check	43
3.8.8 Adjust Regulator for Low Work Rates	43
3.9 Removing the Helmet	44
3.10 Diving Procedures	45
3.10.1 Standing By to Dive	45
3.10.2 Attaching the Umbilical to the Harness	45
3.10.3 Diver Dons Helmet	45
3.10.4 Diver Check Gas Flow Systems	45
3.10.5 Communications Check	45
3.10.6 Diver Ready	45
3.10.7 Water Entry and Descent	45
3.11 Emergency Procedures	46
3.11.1 Flooding	46
3.11.2 Inhalation Resistance	46
3.11.3 Gas Flow Stops	46
3.11.4 Demand Regulator Free Flow	47
3.12 Post Dive Procedures	48
3.12.1 Removing the Equipment	48
3.12.2 Removing the Helmet	48
3.12.3 Storage of the Helmet Between Dives	48
Chapter 4 Troubleshooting	49
4.1 General	49
4.2 Communication Malfunction	49
4.3 One Way Valve Malfunction	49
4.4 Side Valve Malfunction	50
4.5 Water Leakage Into Helmet	50
4.6 Demand Regulator Malfunction	51
4.7 Emergency Gas Supply Valve	51
Chapter 5 Inspection and Maintenance	53
5.1 Routine Maintenance	53
5.1.1 Daily Pre-Dive Maintenance A2.3	53
5.1.2 Daily Post Dive Maintenance A2.6	53

5.1.3 Supervisors Equipment Checks A2.4 and A2.5	53
5.2 Monthly Maintenance	53
5.3 Yearly Maintenance	53
5.3.1 Overhaul/Inspection Checklist A2.1	53
Chapter 6.0 General Preventative Maintenance	55
6.1 Introduction	55
6.2 Required tools, Sealing, Cleaning Agents, Lubrication	55
6.2.1 Component and Parts Cleaning	56
6.2.2 Component and Parts Lubrication	56
6.2.3 Teflon® Tape	56
6.2.4 RTV Sealant	56
6.2.5 Thread Locker	56
6.3 General Cleaning & Inspection Procedures	57
6.3.1 O-Ring Removal/Inspection/Cleaning and Lubrication	58
6.3.1.1 O-Ring Removal:	58
6.3.1.2 O-Ring Inspection:	58
6.3.1.3 O-Ring Reuse:	58
6.3.2 General Cleaning Guidelines	58
6.3.2.1 Mild Soap Solution for General Cleaning and Leak Detector Use	61
6.3.2.2 Acidic Cleaning Solution and Procedures	61
6.3.2.3 Germicidal Cleaning Solutions and Procedure	61
6.4 Daily Maintenance	63
6.5 Monthly Maintenance (or between jobs) (See DiveLab Checklist A2.2)	65
6.5.1 Locking Collar Assembly & Helmet Ring	65
6.5.2 Neck Dam Ring Assembly	65
6.5.3 Head Cushion and Chin Cushion	65
6.5.4 Communications Inspection	66
6.5.5 Lubricate Nose Block O-Rings	66
6.6 REX® Demand Regulator & Exhaust System Post Dive Cleaning & Sanitizing	67
6.6.1 Post Dive Disassembly	67
6.6.2 Sanitizing	68
6.6.3 Post Dive Reassembly	69
Chapter 7.0 Breathing System Maintenance and Repairs	71
7.1 Introduction	71
7.2 Torque Values	71
7.3 One Way Valve	72
7.3.1 Disassembly Of The One Way Valve	72
7.3.2 Reassembly of the One Way Valve	73
7.4 Side Block Assembly	73
7.4.1 General	74
7.4.2 Removal of the Bent Tube	74
7.4.3 Separating the Side Block Assembly from the Helmet Shell	75
7.4.4 Side Block Assembly Replacement	77
7.5 Defogger Valve	79
7.5.1 Disassembly of the Defogger Valve	79
7.5.2 Cleaning and Lubricating	81
7.5.3 Reassembly of the Defogger Valve	81
7.6 Emergency Gas System Valve Assembly	83

7.6.1 Disassembly of the Emergency Valve	83
7.6.2 Cleaning and Lubricating	84
7.6.3 Reassembly of Emergency Valve	84
7.7 Bent Tube Assembly	86
7.7.1 General	87
7.7.2 Removal of the Bent Tube Assembly	87
7.7.3 Inspection of Bent Tube Assembly	87
7.7.4 Reinstallation of the Bent Tube Assembly	88
7.8 Demand Regulator & Exhaust System Overhaul	89
7.8.1 Pod System and Regulator Removal	89
7.8.2 Removal of Regulator Alone	92
7.8.3 Regulator Disassembly	93
7.9 Cleaning REX® Regulator Parts	98
7.9.1 Precautions for Cleaning	98
7.9.2 Cleaning Instructions	98
7.10 REX® Regulator Re-Assembly	99
7.11 Testing the REX® Demand Regulator for Proper Adjustment	106
7.11.1 REX® Adjustment Troubleshooting	107
7.12 Oral/Nasal Mask	108
7.12.1 Oral/Nasal Removal	108
7.12.2 Inspection of Oral/Nasal	108
7.12.3 Oral/Nasal Replacement	108
7.13 Reinstalling the Pod on the Helmet	109
7.14 Reinstalling the Regulator on the Helmet	111
7.15 Overpressure Relief / Bleed Valve Overhaul Procedures	113
7.15.1 Overpressure Relief Valve	113
7.15.2 Overpressure Relief Valve Disassembly and Cleaning	113
7.15.3 Overpressure Relief Valve Reassembly	114
7.15.4 Overpressure Relief Valve Lift Check/Setting	114
Chapter 8 Mechanical System Maintenance	117
8.1 General	117
8.2 Helmet Shell Inspection	117
8.3 Nose Block Assembly	118
8.3.1 Nose Block Assembly Removal	118
8.3.2 Nose Block Device Replacement	119
8.4 Handle	120
8.4.1 Handle Removal	120
8.4.2 Handle Grip Rubber	121
8.4.2.1 Handle Grip Rubber Removal	121
8.4.2.2 Handle Grip Rubber Replacement	121
8.4.3 Handle Replacement	121
8.5 Face Port	122
8.5.1 General	122
8.5.2 Face Port, Port Retainer, and Nose Block Device Removal	122
8.5.3 Face Port, Port Retainer and Nose Block Replacement	124
8.5.4 Special Note Regarding Ports	126
8.5.5 Port Retainer	126
8.6 Neck Dam	127

8.6.1 Removal of the Neck Dam	127
8.6.2 Neoprene Neck Dam Replacement	127
8.6.3 Latex Neck Dam Replacement	130
8.6.4 Trimming a Latex Neck Seal	131
8.7 Neck Dam Pull Strap	132
8.7.1 Neck Dam Pull Strap Removal	132
8.7.2 Neck Dam Pull Strap Replacement	132
8.8 Snap Tabs, Chin Strap, and Earphone Retainers	133
8.8.1 Snap Tab Removal	133
8.8.2 Snap Tab Replacement	133
8.8.3 Chin Strap Removal	134
8.8.4 Chin Strap Replacement	134
8.9 O-Ring Seal Replacement	135
8.10 Helmet Ring	135
8.10.1 Helmet Ring Repairs	135
8.11 Sealed Pull Pins	135
8.11.1 Removal of Sealed Pull Pins	135
8.11.2 Replacement of Sealed Pull Pins	135
8.12 Swing Tongue Catch	137
8.12.1 Disassembly of the Swing Tongue Catch	137
8.12.2 Reassembly of the Swing Tongue Catch	138
8.13 Locking Collar	140
8.13.1 Locking Collar Removal	140
8.13.2 Locking Collar Disassembly	141
8.13.3 Locking Collar Reassembly	142
8.14 Head Cushion and Chin Cushion	143
8.14.1 Head Cushion Foam	143
8.14.2 Chin Cushion Foam	143
8.15 Communications System	144
8.15.1 General	144
8.15.2 Earphone Inspection	144
8.15.3 Removal of Communications Assembly	145
8.15.4 Replacement of Communications Assembly	146
8.15.5 Microphone Replacement	147
8.15.6 Earphone And Wire Assembly Replacement	147
8.15.7 Waterproof Connector	148
8.15.7.1 Connector Removal	148
8.15.7.2 Connector Replacement	148
8.15.8 Terminal Connections in the Waterproof Connector	149
8.15.9 Communications Posts	151
8.15.9.1 Communications Post Removal	151
8.15.9.2 Communications Post Replacement	151
Chapter 9.0 Accessories for the Kirby Morgan 77	153
9.1 Introduction	153
9.2 Low Pressure Inflator Hose	153
9.2.1 Installation of the Low Pressure Inflator Hose	153
9.3 Weld Lens Assembly	154
9.3.1 Weld Lens Assembly Installation	154

9.4 Weld Shield Assembly	154
9.4.1 Weld Shield Assembly Installation	155
9.5 Use of Quick Disconnect	155
Appendix 1: Torque Specifications	158
Torque Table #1 - KM77 Side Block Torque Specifications.....	158
Torque Table #2 - KM77 Helmet Shell & Neck Ring Torque Specifications	158
Torque Table #3 - KM77 Regulator Torque Specifications.....	159
Torque Table #4 - KM77 Communications Torque Specifications	159
Checklist, Maintenance, and Pre-Dive Inspections	159
Appendix A2 Maintenance and Inspection Procedures	160
Appendix 3 Supply Pressure Requirements & Tables	162
Appendix 3 Table 1 Work Rate Expressed as Respiratory Minute Volume (RMV)*	163
Appendix 3 Table 2 REX® Regulator® Low-Pressure Compressor Supply Pressure Requirements Table*	163
Appendix 3 Table 3 Topside High-Pressure Regulator Settings for use with the Kirby Morgan REX® Regulator®	165

Definition of Signal Words Used in this Manual

For your protection, pay particular attention to items identified by signal words in this manual. These terms are identified as, CAUTION, WARNING AND DANGER. It is especially important for you to read and understand these sections.

DANGER

This word indicates an imminently hazardous situation, which if not avoided, could result in death or serious injury.

WARNING

This word indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

CAUTION

This word indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

If English is not your native language and you have any difficulty understanding the language of any warnings as they appear in the manual, please have them translated.

WARNING

Este é um aviso importante. Queira mandá-lo traduzir.

WARNING

Este es un aviso importante. Sirvase mandarlo traducir.

WARNING

Quest è un avviso importante. Tradurlo.

WARNING

Ceci est important. Veuillez traduire.

WARNING

Diese Mitteilung ist wichtig. Bitte übersetzen lassen.

If you have any questions concerning this manual or the operation of your helmet, contact KMDSI (805) 928-7772 or by Email at kmdsi@kirbymorgan.com or Dive Lab Inc. (850) 235-2715 or at divelab@divelab.com

IMPORTANT: A word about this manual. We have tried to make this manual as comprehensive and factual as possible. We reserve the right, however, to make changes at any time, without notice, in prices, colors, materials, equipment, specifications, models and availability. Since some information may have been updated since the time of printing, please contact your local KMDSI dealer if you have any questions. Periodically KMDSI Operations and Maintenance Manuals are reviewed. Any updates/changes will be posted on the KMDSI website and may be downloaded for insertion/correction.

Important Safety Information: This Kirby Morgan 77 diving helmet is intended for use by trained divers who have successfully completed a recognized training course in surface supplied diving

 **WARNING**

Follow all the instructions in this manual carefully and heed all safety precautions. Improper use of this diving helmet could result in serious injury or death.

 **WARNING**

Kirby Morgan Dive Systems, Inc. (KMDSI) warns all divers who use Kirby Morgan diving helmets or masks to be sure to use only KMDSI original parts from a KMDSI authorized dealer. Although other parts, O-rings and fittings may appear to fit your Kirby Morgan diving helmet or mask, they may not be manufactured to the same standards maintained by KMDSI. The use of any parts other than KMDSI original parts may lead to equipment failure and accidents.

 **WARNING**

Diving in waters that are chemically, biologically, or radiologically contaminated is extremely hazardous. Although Kirby Morgan diving helmets may be adapted for use in some contaminated environments, special training, equipment, and procedures are necessary. Do not dive in a contaminated environment unless you have been thoroughly trained and equipped for this type of diving.

Read this manual before using or maintaining the helmet, even if you have experience with other diving helmets. **If you have purchased the helmet new from a dealer, be sure to send in the warranty registration card so we may keep you informed of any safety notices that affect this product.** If you resell or loan this helmet to another diver, be sure this manual accompanies the helmet and that the person reads and understands the manual. In addition to the manual a log book should be used to log all repairs, maintenance and use.

 **WARNING**

This helmet was completely checked and should be ready to dive as it was shipped from the factory. However, it is always the diver's responsibility to check all the components of the helmet prior to diving. Use Dive Lab checklist A2.3 found on the web at www.dive-lab.com.

 **WARNING**

Diving is a life threatening occupation. Even if you do everything right you can still be killed or injured. None of the models of Kirby Morgan helmets or masks can prevent accidents, injuries or death due to improper training, poor-health, improper supervision, improper job requirements, improper maintenance or acts of God.

This manual is supplied to the original purchaser of this helmet. If you have any questions about the use of the helmet or you need another copy of this manual, contact KMDSI or your nearest KMDSI dealer. It may also be downloaded free from the KMDSI website at www.KirbyMorgan.com.

If you have any questions regarding the use, maintenance, or operation of this helmet, contact KMDSI at (805) 928-7772, fax: (805) 928-0342, or e-mail: info@kirbymorgan.com.

! WARNING

KMDSI helmets and masks are intended for underwater use only and should only be used by qualified divers that have received proper training in the use of this type of equipment. KMDSI helmets and masks should not be used or worn without the appropriate life support systems, such as air or gas supplies and support personnel as described in this manual.

! WARNING

KMDSI helmets and masks should never be used for motor sport racing, aviation / space craft use, or for chemical warfare use. The helmet must never be used by persons in poor physical condition, by persons with previous head, neck, or back injuries which could be aggravated by its use. The helmet should not be used by persons under the influence of drugs or alcohol. Furthermore, infants, children, or persons under the age of 18 should never wear KMDSI helmets and masks. Failure to pay heed to the above could result in serious injury or death.

! WARNING

Do not use KMDSI masks or helmets in currents exceeding 3.0 knots. Use in currents greater than 3 knots may allow water to enter the exhaust valve, possibly causing regulator flooding. This could lead to drowning.

! WARNING

Surface-supplied diving can be a strenuous activity. The Kirby Morgan 77 weighs approximately 30 lbs. KMDSI recommends that persons with a previous neck or back injury seek professional medical approval prior to engaging in surface supplied diving operations using the Kirby Morgan 77. Use of the Kirby Morgan 77 with a pre-existing physical/ medical condition may result in death or serious injury.

Components requiring lubrication, should only be lubricated with oxygen compatible lubricants such as Christo-Lube®, Fluorolube®, or Krytox®. Lubricants must be used sparingly and should not be mixed with other lubricants.

The information contained in this manual is intended to aid the user in optimizing the performance of this helmet. The application of some of this information will depend on the diving situation and the use of associated equipment. Many countries have specific laws and rules regarding commercial diving. It is important for the user to understand the rules, regulations, and philosophy imposed by the governing, regulating bodies whenever using commercial diving equipment.

Whenever KMDSI helmets or masks are used in European Countries, which have adopted the C.E. certification programs, they must only be used with C.E. certified components. Diving operations should only be conducted within

 **WARNING**

Never use the helmet without first completing all pre-dive maintenance and set up procedures. Failure to complete all pre-dive checks could result in helmet failure due to problems with the incorrect set-up of the equipment. This could lead to serious personal injury or death.

 **WARNING**

Always read the Material Safety Data Sheet (MSDS) for any chemical - adhesive, cleaning agent, or lubricant - used on your Kirby Morgan helmet. Some of these chemicals may cause serious bodily injury or death if used improperly or without the proper personal protective equipment.

the limits of the operational specifications, and in accordance with the rules and regulations established by the governing authority in the specific country or geographical location where the diving operations are being conducted. If you have any questions concerning this manual or the operation of your helmet, contact KMDSI (805) 928-7772 or at KMDSI@KirbyMorgan.com or Dive Lab Inc. (850) 235-2715 or at Divelab@aol.com

 **WARNING**

Some of the procedures shown in this manual are for illustration purposes only. When using chemicals or materials that require the use of hand or eye protection, always wear the appropriate personnel protective equipment. Failure to use personnel protective gear may result in serious personal injury.