User Information for Zytron® and Frontline® Level A Vapor Protective Garments

Kappler®

Know What You're Getting Into.®

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THIS INFORMATION PACKET MAY NOT BE REMOVED EXCEPT BY THE END USER

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SAFETY CONSIDERATIONS

It is the user's responsibility to read, understand, and follow the information in this manual, Kappler's website, www.kappler.com, and all applicable Federal, state and local occupational safety and health statutes. For users outside the United States, please consult national or other applicable personal protective equipment regulations. Proper use, consistent with NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, and 29 CFR 1910.132 is required.

SAFETY SYMBOLS USED IN THIS MANUAL

While reading this manual, you will find a number of warnings concerning some of the risks and dangers you may face while using the device. These warnings contain "signal" words that will alert you to the degree of hazard you may encounter. These words, and the hazards they describe, are as follows:

WARNING

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

CAUTION

Indicate a potentially hazardous situation which, if not avoided, could result in physical injury or damage to the product. It may also beused to alert against unsafe practices.

NOTICE

Indicates additional information on how to use the device.

WARNINGS AND LIMITATIONS

WARNING

There are uses, environments and chemicals for which these garments are unsuitable. This garment does not provide protection against chemical vapors of any kind. It is the responsibility of the end user to review available data and verify that the garment is appropriate for the intended use and meets all applicable standards.

CAUTION

This garment must be used in combination with additional PPE, which include the following:

Separate full-face respiratory protection such as a positive pressure self-contained breathing apparatus (SCBA), an external breathing air supply (airline system) with escape bottle or a re-breather system certified by NIOSH.

Separate foot and lower leg protection such as chemical protective boots.

Additional Equipment

Additional personal protective equipment that might also be considered includes:

- Head protection.
- Hearing protection may be required due to high levels of external noise or high noise levels generated by supplied air systems.
- Other protective equipment that may be warranted based on the situation.

CAUTION

Wearers Must be Physically Fit

Garments should only be worn by persons who are in good physical condition. In an emergency situation or hot environment, the wearer may experience heat stress. Persons who show symptoms of heat stress such as nausea, dizziness, or excessive heat build-up should leave the work area immediately and get out of the garment as quickly as possible. Persons in doubt about their physical condition should check with a physician before wearing garments.

If any of the following symptoms develop during use of this garment, immediately leave the hot zone, undergo field decontamination (if exposed), and doff the garment;

- *Fever*
- *Difficulty breathing*
- *Nausea*
- *Excessive tiredness*
- *Dizziness*
- *Numbness*
- *Any unusual odor or taste*
- *Eye or skin irritation*
- *Narrowing or dimming of vision*
- *Claustrophobia*
- *Loss of balance or orientation*

Always Use the Buddy System

Never work in this garment alone. A minimum of two people should enter contaminated areas together.

It is important to have someone available to assist in the event of an emergency.

That person will require the same level of protection as the person needing emergency assistance.

Manage and Prevent Heat Stress

This garment interferes with the natural regulation of body temperature. This can lead to a rise in core body temperature and heat stress. The wearer should be aware of the symptoms and treatment of heat stress. The wearer can take several steps to limit and/or prevent heat stress, such as use of a cooling system, and working in

accordance with a conservative work/rest schedule. The maximum time the garment can be worn depends on such variables as the air supply, ambient condition, climate inside the ensemble, physical and psychological condition of the wearer, work rate and work load. The TLV™ pocket guide from the American Conference of Governmental Industrial Hygienists (ACGIH, Cincinnati) provides corrected heat stress limits for totally encapsulating garments. Similar information is available on the federal OSHA website (www.OSHA.gov).

Chemical Permeation Resistance

Before using a garment in a chemical situation, consult the chemical permeation data appropriate to the garment material. This information is to be used as a guide only. The permeation performance of any material depends on a number of factors including chemical concentration, temperature, time and amount of exposure, etc. Due to the large number of variables, it is impossible for all garment materials to be tested against all chemicals, all combinations or mixtures, and all temperatures at which the chemical might be encountered.

Chemical permeation tests are performed under laboratory conditions -- not actual workplace conditions. They address chemical breakthrough characteristics and do not account for physical performance characteristics that affect barrier such as abrasion, flex fatigue, puncture, tear, oxidative degradation, or degraded performance due to previous contamination.

No single protective material will protect against all chemicals for all situations. The best course of action is to test the primary garment materials against the specific chemical hazard, at the temperature and in the concentrations to be encountered. Kappler will provide free swatches of primary garment materials for testing and help arrange to have these tests performed.

Static Electricity

Under certain conditions, such as cold and dry weather, it is possible for garments to build and discharge static electricity. Discharges are not normally dangerous except in situations where generation of an electrical spark could ignite a flammable atmosphere. When operating around flammable chemicals, steps to eliminate potential static discharges should be used. In these situations, additional actions can be taken, such as increasing the humidity level of the work area and/or using a commercial anti-static application.

However, in the case of explosive or flammable atmospheres, even if sophisticated and elaborate steps are taken to manage static formation and dissipate static charge, this garment does not provide thermal or flame protection should flash fire or explosion occur. Only garments designed for protection against flame and flash should be worn in such environments.

Avoid Continuous Exposure

This garment should not be immersed in chemicals. This garment should not be exposed to continuous hazardous liquid chemical splash or deluge. Do not wade through liquid pools of hazardous chemicals if not necessary. Direct chemical exposure to the garment should be as limited as possible. If exposed to direct splash or deluge of hazardous chemicals, leave the area immediately and decontaminate.

Supplied Airline Applications

To connect to an external supplied airline system, these garments must be equipped with the appropriate, NIOSH approved garment passthrough. Note that this pass-through connection will NOT serve as an anchor for a tether. Excess stress on this fitting may result in permanent damage to the garment.

WARNING

Avoid Suffocation

Do not wear this garment without supplied breathing air. Vapor protective garments totally enclose the wearer and isolate the wearer from exposure to outside gases and vapors. Air maybe supplied to the wearer by a self-contained breathing apparatus (SCBA) or supplied breathing airline.

Sock Booties

The Sock Booties attached to this garment are designed to be worn inside outer boots. These sock booties do not have sufficient durability or slip resistance to be worn as outer boots.

Provide Hearing Protection

If noise levels inside the garment exceed regulatory noise levels, hearing protection must be provided. Use hearing protection recommended by a safety professional and which does not interfere with the operation or use of the garment.

Communications

A vapor protective garment hampers communication. The use of a personal communication system should be considered. Users should also consider the use of hand signals to communicate during training, work, and for emergency situation.

INSPECTION OF GARMENT

CAUTION

The garment should be pressure tested and undergo a full visual inspection at the following times:

- *Upon receipt to ensure no damage has occurred during shipment.*

OR

- *Prior to first donning of garment*
- *After a garment is worn and before the garment is made available for reuse.*
- *Annually.*

However, most performance properties of a vapor protective ensemble cannot be tested by the user in the field.

FULL VISUAL INSPECTION

To perform a full visual inspection:

- Choose a clean, dry area that is free of potential sources of snags, tears and punctures. Mark suspected defects with colored adhesive tape.
- Check the visor for scratches or flaws.
- Visually inspect seams for tape lift or de-lamination.
- Visually inspect for surface damage or discoloration on material, visor, gloves and closure. Check zipper closure for worn or damaged parts. Run your fingers along the zipper length to feel for imperfections or separations.

- Exhaust valve diaphragms should be visually examined during the pressure test procedure to ensure they are soft, pliable and free of defects.

Garments with visible holes, tears, rips, punctures, serious discoloration or abrasions should not be used.

CAUTION

Zippers, while they may appear to be insignificant, are very intricate parts of a garment. For this reason, special attention and caution should be used when operating a gas tight zipper in Level A Vapor Protection garments. Zipper imperfections or separations may, and do, occur. Always ensure the zipper is as straight as possible when opening and closing the zipper. Always pull the slider parallel to the zipper chain.

Pull the slider slowly in short increments and not the entire length at once. Do not hold or grasp the storm flap when opening and closing the zipper. Do not pull at an angle, but in a straight line with thumb placed on slider to assist movement. If resistance is encountered during opening or closing, do not try to force, but reverse direction and inspect zipper teeth (elements) for potential damage. To inspect teeth (elements) for damage, place your finger and thumb on either side of the zipper teeth and slide from one end of the zipper to the other. If a bump or rough area is felt, this indicates possibly turned or damaged teeth (elements) which could lead to zipper separation. Always store garment with the zipper fully open.

Note any remarks in the inspection log. If the garment is removed from use due to visual inspection, the garment may be retired for training use after being permanently labeled "For Training Use Only" or disposed of properly.

PRESSURE TESTING THE GARMENT

The steps in this procedure mirror those found in ASTM F1052- 09 “Standard Test Method for Pressure Testing Vapor Protective Ensembles”. A copy of the standard may be obtained for a fee from ASTM (www.ASTM.org).

The Kappler Pressure Test Kit used for pressure testing will contain an airline supply connection. A video of the pressure test is available at kappler.com for training purposes.

CONDUCTING THE TEST

1. Unfold the garment and place face down on a smooth, clean surface where it can be inflated without obstruction.
2. On the inside of the garment, close all valves and pass-throughs (if present) not needed for pressure testing.
3. Working from the outside of the garment, remove the exhalation valves caps and diaphragms from the valves. Firmly push the test kit adapters into the valve openings twisting and locking them into place.
4. Close the zipper securely. Look for zipper separations that may have occurred.

NOTICE

If the adapters are not secured into place, a seal will not occur and the garment will not hold pressure. Important: After completion of the pressure test, the previous two steps should be performed in reverse order.

5. Inflate the garment to a pressure of 5.0 inches of water column (or proceed to other approved test kit instructions).

6. Wait a minimum of three (3) minutes to allow wrinkles to fill out and air temperature to equalize.

7. Reduce the air pressure to 4.0 inches of water column (or according to the test kit instructions) by disconnecting the air supply and slowly opening the valve. Close the valve when the pressure reaches 4.0 inches water column and immediately start the timer.

8. After four (4) minutes, read the air pressure gauge. If the pressure has not dropped below 3.2 inches water column, the garment has passed.

   Note: A pressure reading of 3.2 inches of water column is equivalent to a 20% drop in pressure allowed by the ASTM standard)

9. If the pressure falls below 3.2 inches water column before the end of the four (4) minutes, the garment should be removed from service and checked for leaks. Air leaks often occur at the glove interfaces, at the zipper closure point and around exhaust valves. Inflate the garment to 5.0 inches water column and spray a soapy water solution at various points over the garment to locate leaks. For additional information, contact Kappler.

10. After completion of the pressure test, remove the test kit adapters by twisting and unlocking from valves. Immediately replace diaphragms and valve covers.

NOTICE

- *Always pull the slider in a straight line along the zipper length and do not pull at an angle, which will result in potential damage.*
- *Place thumb on slider while gripping pull strap and use thumb to push slider against top stop of zipper.*
- *Use the same precautions and method for opening zipper as well.*
- *If resistance is encountered during opening or closing, do not try to force, but reverse direction and inspect zipper elements (locks) for damage.*

For additional information on zipper care and maintenance, go to www.kappler.com/resources tab.

RETURNING THE GARMENT

If a garment fails a visual inspection or pressure test, the garment may be returned for inspection and possible replacement. You should contact Kappler, Inc. Customer Service to authorize the return. No contaminated garments will be accepted for repair. Discoloration or odors are evidence of unsatisfactory decontamination. Garments being returned must be accompanied by the usage log and with a letter stating that the garment has not been contaminated. Note: Charges may be incurred. See warranty information.

STORAGE

Storage Life

Kappler Zytron® and Frontline® garments contain materials for which there is no specific storage life data available. Garments may be used as long as they pass the ASTM F1052 pressure test and pass a full visual inspection. It is recommended that garments be labeled and retired to "For Training Use Only" if they do not pass the visual inspection and/or pressure test. The gloves and boots specific to this ensemble have no storage life data currently available.

Storage Conditions

Garments should be stored away from direct sunlight, preferably in a cool, dry location that is not subjected to extreme hot or cold conditions. Garments should be stored in their original boxes, in bags or on hangers.

VISOR ANTIFOG TREATMENT

Kappler vapor protective totally encapsulated garments are now available with a permanently attached layer insider the PVC visor which reduces condensation (fogging).

The antifog treatment is permanent and is not designed to be replenished or replaced.

CLOSURE LUBRICANTS

There are no lubricants recommended for the closure system.

MARKING RECOMMENDATIONS AND RESTRICTIONS

Ensembles may be marked with Kappler ChemTape® for identification. Refer to part number 99415.

RECOMMENDED UNDERGARMENTS

The wearer should consider wearing inherently flame resistant, woven clothing, with full sleeves, and trousers under this garment.

RESPIRATOR CONSIDERATION FOR ENSEMBLES

Ensembles must be used with NIOSH CBRN approved self-contained breathing apparatus (SCBA).

SIZING CONSIDERATIONS

The Zytron /Frontline garment sizing chart should be used to determine accurate fit. The correct size garment should be worn.

DONNING THE GARMENT

1. Conduct a brief visual inspection of the garment before beginning donning procedure.
    a. Garment should be free of discoloration or physical damage
    b. Inside and outside of exhaust valves should be free of caps and plugs
    c. Garment should have passed a pressure test and visual inspection prior to use (ASTM F1052-09)
    d. Make sure there are no imperfections or separations along the length of the zipper
2. An assistant should help the wearer don the garment.
3. Remove all jewelry and personal items (pens, key rings, badges, pagers, knife cases, etc.) that might damage the garment.
4. Check function of respirator and place nearby donning location.
5. Visually check size and condition of outer boots and place nearby donning location.
6. Open garment zipper closure completely, ensuring slider is fully open to the stop before donning.
7. Read garment size label to assure proper fit.
8. Remove shoes. The Sock Booties on this garment are worn inside outer chemical boots.
9. While sitting, insert feet into garment legs and down into Sock Booties. Stretch legs out to maximum extension while pulling garment up around hips.

10. Pull boot splash flaps up and don outer boots. Fold splash flaps down over boots as far as possible.

11. While standing, connect and adjust garment waist belt.

12. While standing, with garment at waist level, don respirator harness and back piece.

13. Don respirator face piece and check its function. To conserve SCBA air supply, disconnect the air supply from the face piece, if possible, as long as the wearer retains access to fresh air. In the case of an airline breathing system, complete all connections and adjustments.

14. Place one hand in the sleeve and pull garment sleeve to shoulder. Make sure hand is securely inside the glove.

15. Place other hand in sleeve and glove.

16. Pull the garment over respirator backpack making sure nothing will constrict or hamper air flow.

17. Have assistant slowly close the gas-tight zipper. Special attention and caution should be used when operating the gas tight zipper in Level A Vapor Protective garments. Always ensure the zipper is as straight as possible when opening or closing the zipper. Pull the zipper in short increments and not the entire length at once. Do not hold or grasp the storm flap when opening or closing the zipper. Do not pull at an angle but in straight line with thumb placed on slider to assist movement. If resistance is encountered during opening or closing, do not try to force, but reverse direction and inspect zipper teeth (elements) for potential damage. After checking that the zipper is completely closed, the storm flaps should be closed and sealed over the zipper.

DOFFING THE GARMENT

1. If the garment has been contaminated or suspected of being contaminated, the wearer should continue to use his respirator until the garment has been doffed and removed.

2. An assistant should help the wearer doff the garment after field decontamination. If the garment has been contaminated, the assistant should wear protective clothing and respiratory equipment.

3. While the wearer stands, the assistant should open the closure and peel the garment down and away from the wearer's shoulders. The assistant should help the wearer remove his arms from the sleeves. External airlines should be disconnected from the garment and from the wearer's respirator, while the wearer switches to his escape bottle.

4. Lower the garment below the hips and sit down. Have the assistant remove the boots, pull the garment off the legs and remove the garment to a remote location.

5. Once the garment has been removed, the wearer can doff the respiratory face piece and harness.

DECONTAMINATION AND CLEANING OF CHEMICAL AND BIOLOGICAL CONTAMINATION

Decontamination Solutions

Do not use any oxidative, corrosive or reactive decontamination solutions with this garment. The only decontamination solutions to use with this garment are water and mild, household dishwashing liquid.

Field Decontamination

The purpose of field decontamination is to allow the wearer to doff the garment without being harmed by contaminants on the garment surface. Garments that have been exposed to or that are suspected to have been exposed to chemical or biological contamination should be field decontaminated before doffing. Additional cleaning, decontamination, a full visual inspection and a pressure test are required before a garment may be reused.

1. Leave the hot zone with adequate air supply for decontamination and removal of the garment. The wearer should continue to wear the respirator until the garment has been completely doffed and removed from the area.

2. If the garment has been exposed or is suspected to have been exposed, thoroughly scrub the garment using mild household dishwashing liquid and soft scrub brushes, followed by a thorough rinsing in water.

3. If possible, the excess rinse water should be removed from the garment by individuals wearing gloves, liquid-splash protective clothing and respiratory protection. At a minimum, the rinse water on and near the Zipper closure assembly should be removed.

CAUTION

This garment is designed for multiple use, single exposure. It is priced to make disposal after use economically justified when the effectiveness of decontamination is in question. This garment is not designed for multiple exposures and multiple decontaminations.

DECONTAMINATION BEFORE REUSE

It is the responsibility of the safety professional having jurisdiction over usage of the garment to determine whether the garment has been adequately decontaminated and can be safely re-used.

A decontamination procedure for each of the chemicals the garment has been exposed to should be developed and implemented by a qualified individual and with complete information on the type of contaminant, as well as the level of contamination involved.

Contaminated garments should be discarded. Contaminated garments are not suitable for training purposes.

Cleaning

No reactive or corrosive decontamination solutions should be used with this garment. Only water and mild, household dishwashing liquid should be used as decontamination liquids.

Only garments that have been thoroughly cleaned and dried may be considered for use. Water and mild, household dishwashing liquid should be used to clean this garment. This garment may be scrubbed with a soft brush or hand towel, thoroughly rinsed with clean, fresh water and airdried. Do not use any oxidative, corrosive or reactive decontamination solutions with this garment. Do not dry-clean this garment. Do not use hot air or a tumbling air dryer to dry this garment. Make sure no zipper separations occur during cleaning.

CAUTION

It is recommended this garment be retired from service if any of the following criteria are met:

- *Garment fails to pass the positive pressure test (ASTM F1052-09)*
- *Garment is abraded, cut, torn, punctured, or otherwise in anyway breached.*
- *Garment has received an exposure to a toxic chemical.*
- *Zipper has separated or imperfections are noted.*

RETIREMENT CONSIDERATIONS

Retired garments that are not contaminated maybe labeled and used “For Training Use Only”. The labeling should be done with a permanent marker.

DISPOSAL

This garment may be safely disposed of in a facility capable of handling plastic items containing polyolefin, polyester and vinyl plastics. Severely contaminated garments may need to be treated as, and disposed of as, hazardous wastes.

WARRANTY INFORMATION

It is the responsibility of the user to select garments which are appropriate for each intended use and which meet all specified government and industry standards.

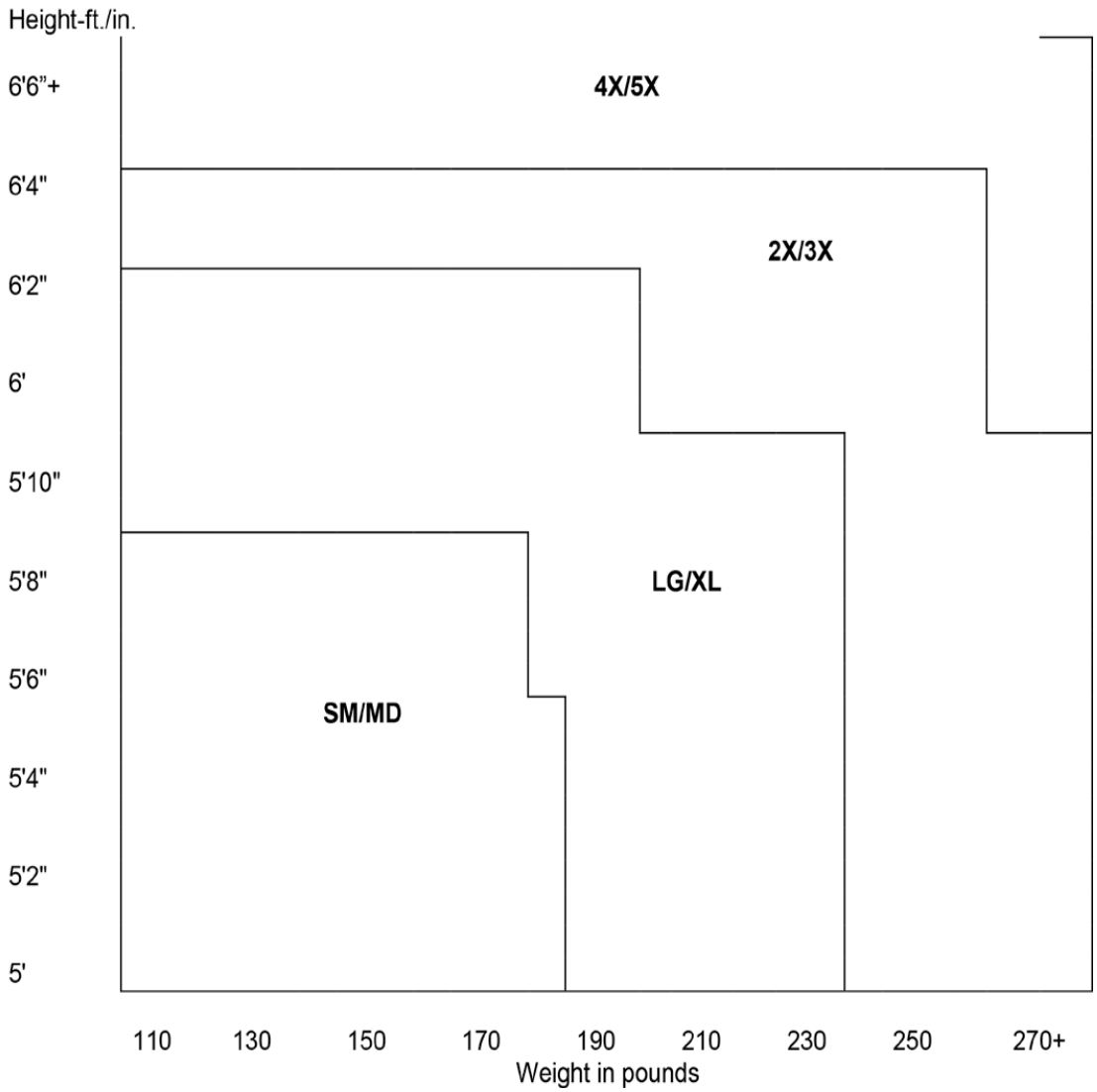
Kappler Zytron® and Frontline® garments are designed for multiple use, single exposure. It is the responsibility of the wearer to inspect garments periodically to ensure that all components, including fabric, valves, visors, gloves, zippers, seams, and interfaces are in good working condition, and provide adequate protection for the operation and chemicals to be encountered. Failure to fully inspect garments may result in serious injury or death to the wearer. Never wear garments that have not been fully inspected and pressure tested prior to use. Any garment which does not pass the visual inspection or pressure test should be removed from service immediately.

Kappler warrants for a period of 90 days after the delivery of a Zytron® or Frontline® garment that the garment is free from defects in materials and workmanship when used in accordance with the instructions contained in this care and use manual. NO OTHER EXPRESSED OR IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE IS MADE. Purchaser and all garment users shall promptly notify Kappler of any claim, whether based on contract, negligence, strict liability or otherwise.

The sole and exclusive remedy of the purchaser and all end users and the limit of liability of Kappler for any and all losses, injuries or damages shall be the refund of the purchase price or the replacement or repair of any product found to be defective within 90 days after the product is delivered. In no event shall Kappler be liable for any special, incidental or consequential damages, whether in contract of in tort, arising out of any warranties, representations, instructions, or defects from any cause in connection with the Zytron® or Frontline® series garment, or the sale thereof.

Purchaser and all users are responsible for inspection and proper care of this product as described in this care and use manual and are responsible for all loss or damages from use or handling which results from conditions beyond the control of the manufacturer.

APPENDIX A – ZYTRON® AND FRONTLINE® 500 SIZING CHART



Please Note: This chart is based on individuals wearing S.C.B.A., safety helmet and suggested underclothing (see recommended undergarments.)

APPENDIX B – 2N1™ GLOVE SIZING CHART

Glove Size	Hand Circumference (in)	Hand Length (in)	Garment Size Option
Extra Small	7	6-3/4	XS
Small	7	6-3/4	Small
Medium	8	7-3/16	Medium
Large	9	7-9/16	LG/XL
X-Large	10	8-1/16	LG/XL
2X-Large	11	8-7/16	2X/3X, 4X, 5X

APPENDIX C - KAPPLER INSPECTION TEST LOG

Serial # _____

DATE	INSPECTOR	REMARKS	TEST RESULTS