MUSTANG SURVIVAL BREATHABLE AVIATION RESCUE SWIMMER DRYSUIT MUSTANG MODEL MSD565

DESCRIPTION AND MAINTENANCE INSTRUCTIONS

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TABLE OF CONTENTS

TABLE OF FIGURES

1.0 INTRODUCTION

1.1 GENERAL

1.1.1 This manual provides suit leakage testing and limited repair information on the MSD565 Aviation Rescue Swimmer Drysuit (ARSD).

1.1.2 The suits displayed in the following procedures are **not** the MSD565 Rescue Swimmer's Drysuit, however the procedure is the same.

1.1.3 The following tests use Mustang Survival Corp. equipment. Your equipment may differ and, if so, the tests should be adjusted accordingly. Mustang Survival Corp. offers an opportunity to purchase the neck seal and neck clamp plates, contact us using the information on the cover of this document.

1.2 CONTACT

1.2.1 For further information concerning this manual or the suit, contact:

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1.3 SUIT LEAKAGE TEST

1.3.1 During testing, all components, seams, sealed areas, and attachments shall remain intact and shall not show any sign of separation, leakage, or other damage.

1.3.2 Have a qualified technician test for leaks after suit repairs, on periodic inspection, prior to issue and every six months thereafter, and when a visual inspection raises any doubt about the integrity of the suit's waterproofing.

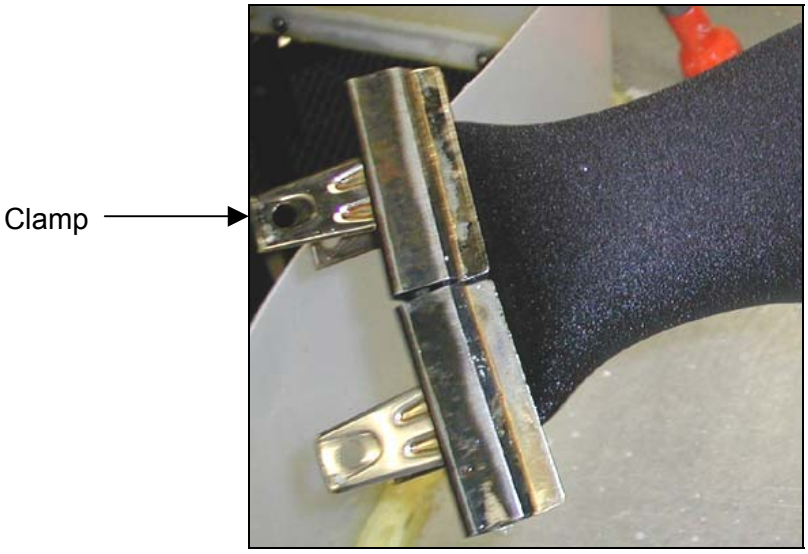
1.3.3 To perform the suit leakage test:

a. Wait a minimum of 24 hours after the last cementing operation in the suit before performing this test. Turn the suit inside out, with the entry zipper and relief slide fastener fully closed.

Figure 1. Step a. Suit Leakage Test

b. Carefully seal the wrists of the suit with suitable clamps.

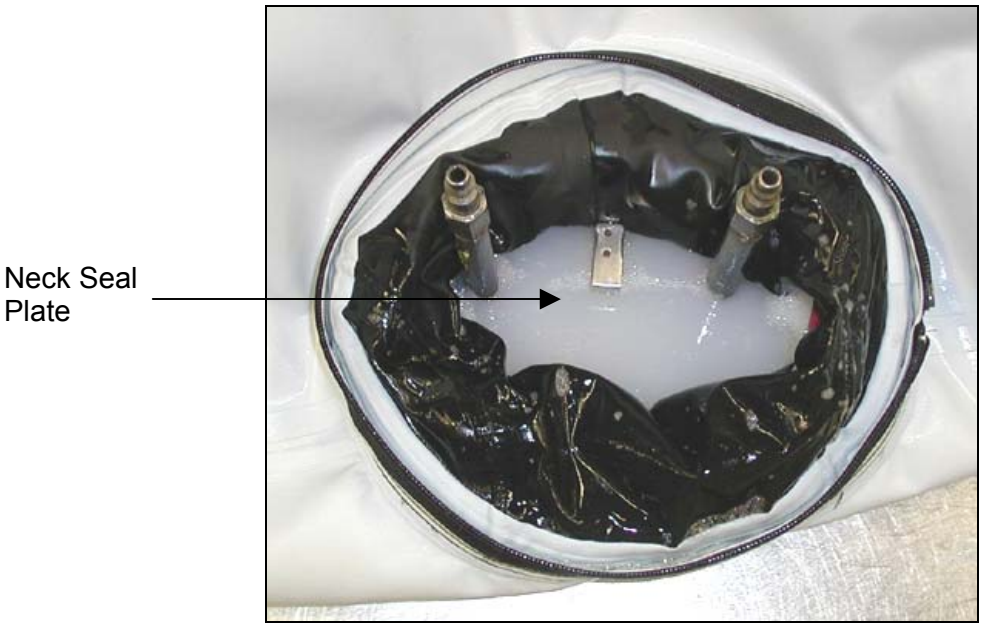
Figure 2. Step b. Suit Leakage Test



c. Insert the neck seal plate through the neck seal opening from underneath the neck opening.

NOTE: If you are using alternative equipment, special care must be taken to prevent damage to the neck and wrist seals.

Figure 3. Step c. Suit Leakage Test

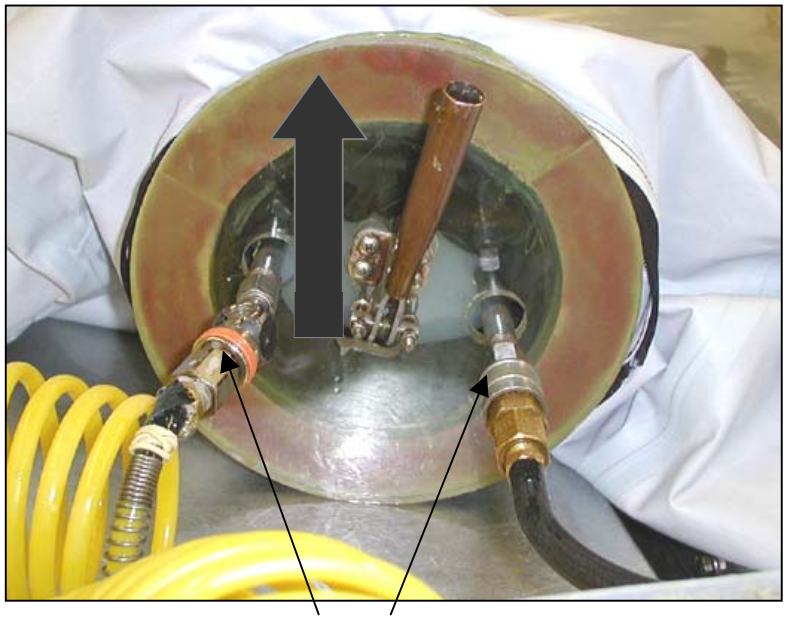


d. Insert a neck clamp plate on top of the neck seal plate, making sure that the pneumatic couplings are lined up with the holes.

Figure 4. Step d. Suit Leakage Test

e. Carefully seal the neck by clamping the plates together, and attach the air hose and pressure gauge hose to the appropriate pneumatic quick connect couplings.

Figure 5. Step e. Suit Leakage Test

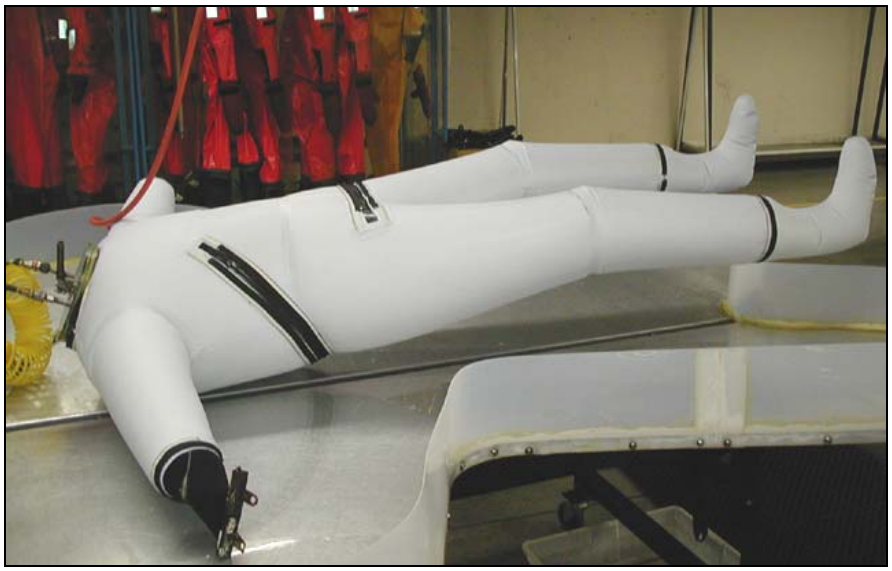


f. Inflate the suit with air that is free of any oil or water.

CAUTION: Do not exceed a pressure of thirteen inches of water column. Exceeding this pressure may overstress the suit, resulting in damage.

You may need to adjust one of the wrist clamps to allow enough escaping air to attain an appropriate level of continuous pressure.

Figure 6. Step f. Suit Leakage Test



g. While inflated, spray the suit section by section, with soapy water (alternatively, immerse it in water) and look for any signs of leakage (bubbles).

h. Mark the general area of any leaks, if required, with a non-damaging marker. Ensure any detected damage is repaired before the suit is put back into service. Examine any area of the suit where bubbles are forming and take action depending on the severity as follows (note that bubbles collecting less than one per second is probably not a leak):

i. Small foamy bubbles collecting slowly on seam: Entrapped air. No leak present, no action required.

ii. Small foamy bubbles collecting quickly on seam: Uncertain. Agitate seam around bubbles to remove any entrapped air. If bubbles persist after 10 minutes then consider it a leak, mark leak area, and document on inspection record.

iii. Steady stream of larger bubbles: Leak. Mark leak area and document on inspection record.

iv. Any other type of bubble formation or any sign of bubbles on a panel shall be treated as a leak.

Figure 7. Step h. Suit Leakage Test

i. Rinse off all soapy residues with water. Do **not** use chlorinated water.

Figure 8. Step i. Suit Leakage Test

j. Hang the suit over a bar or chair, or sturdy wooden hanger, to air dry, and turn the suit right side out after drying, approximately four to six hours. The suit may require flipping and additional drying time to ensure both sides are completely dry.

1.2 REPAIRS

1.2.1 General

1.2.1.1 The protection provided by this dry suit relies very much on its watertight characteristics. It is extremely important that damaged suits are handled in accordance with the following repair requirements.

1.2.1.2 Qualified repair personnel can normally perform minor repairs, with adequate facilities. The manufacturer should do all major repairs. This section provides some information to assist with minor or emergency repairs to the suit and related components.

1.2.2 Leak Repairs

1.2.2.1 Locate the leak (see section 1.3), and assess the reparability of the leak. Use the following Limits of Repair section to make the assessment. In cases of significant damage, the manufacturer should repair the damage.

1.2.3 Limits of Repair

1.2.3.1 It is recommended that the following guidelines be used in determining potential for repair. A qualified technician or Mustang Survival should make all repairs.

a. Patches on the sleeves or legs should not exceed 16 inches^2 (103 cm^2) or 4 inches x 4 inches. Patches on the front or back of the suit should not exceed a 6 inch x 6 inch area (232 cm^2), and the total area of patches should not exceed 10% of the suit. Repair no more than 10% of any one panel.

b. Any repairs beyond 16 inches^2 should be made by cutting out the damaged area and sewing new three-layered GORE® material (suit fabric) using the method in section 1.3.7.

c. Slits, cuts, tears and large holes, no longer than three inches (76 mm), may be patched with fabric by gluing (see section 1.3.7).

d. Pinholes and small slits, cuts and tears may be patched by the heat-sealing method (see section 1.3.8).

e. Do not patch the neck or wrist seals or socks.

1.2.3.2 All minor repairs should be performed using the following sections.

1.3.4 Work Area

1.3.5 The work area where maintenance of the suit is performed should be smooth and flat, where the suit will not snag, tear or otherwise be punctured or damaged and should be clear of all non-essential equipment and materials. The working surface should be free of harmful contaminants such as oil, grease, acids or solvents. Work areas, which are subjected to wide temperature variations, should be avoided.

1.3.6 Repair Materials

1.3.6.1 Suit material is a breathable three-layer fabric GORE-TEX® fabric, BD6.5 GTBD-DS, GORE® PN: WMIX120604D, color black.

1.3.7 Patching Small Holes and Tears

1.3.7.1 Repair small holes, or tears by patching, sewing and heat sealing. If the damage is minimal, the area may be repaired using the technique in section 1.3.8. To apply a patch and seam tape (1" Heat Tape, GORE® PN 6GSAM025) proceed as follows:

NOTE: Ensure that the suit has been thoroughly dried prior to patching.

a. Cut a round or square patch (using GORE® BD6.5) sized to exceed the size of the hole by approximately one inch (25 mm) around the perimeter.

b. Place the patch on the outside of the suit, black side exposed.

c. Single stitch the perimeter of the patch, ensuring a minimum 1-inch (25 mm) distance from the patch stitch line to the hole. This attaches the patch to the suit.

d. Cut a round or square patch (using 12.5 inch GORE® Heat Seam Tape PN 6GSAM318LSVN) sized to exceed the size of the patch ½ inch (12 mm) past the stitch line.

e. Turn the suit inside out; the inner side of the fabric should be facing up. Place the heat tape material (bonding side down) over the hole and stitching, keeping the torn fabric as flat as possible and ensuring no loose threads protruding from under the patch.

f. Centre the area to be patched on the ironing board or heat press, ensuring that only one layer of fabric is on the pad or board and that there are no wrinkles in the fabric.

g. The iron surface temperature should be between 350°F (177°C) and 375°F (190°C).

NOTE: Use an iron that accurately displays temperature to avoid damage to the fabric.

If possible, test the temperature setting by ironing a patch or a piece of heat tape on the inner side of a piece of suit fabric for 25 seconds. If the patch of tape is properly adhered to the fabric, without burning, the temperature setting is acceptable.

h. Iron the heat tape for approximately fifteen seconds and remove the iron.

NOTE: Patches should not be overlapped.

i. Allow the repaired area to stand for a minimum of one hour prior to further handling.

j. Test the suit for leakage (see section 1.3).

1.3.8 Heat Taping Very Small Holes or Damaged Tape

1.3.8.1 Heat is appropriate to repair straight very small holes, or damaged sealing tape. To apply seam tape (1" Heat Tape, Gore PN: 6GSAM025) proceed as follows:

NOTE: Ensure that the suit has been thoroughly dried prior to patching. Ensure that the area to be repaired is tidy and free of loose fabric or threads that will compromise the repair.

a. Cut a length of heat-sealing tape exceeding the area to be covered by approximately 1 inch (25 mm).

b. Round the ends of the tape by trimming with a pair of scissors.

c. Turn the suit inside out; the inner side of the fabric should be facing up. Place the heat tape (bonding side down) over the hole.

d. Centre the area to be patched on the ironing board or heat press, ensuring that only one layer of fabric is on the pad or board and that there are no wrinkles in the fabric.

e. The iron surface temperature should be between 350°F (177°C) and 375°F (190°C).

NOTE: Use an iron that accurately displays temperature to avoid damage to the fabric.

If possible, test the temperature setting by ironing a patch or a piece of heat tape on the inner side of a piece of suit fabric for 25 seconds. If the patch of tape is properly adhered to the fabric, without burning, the temperature setting is acceptable.

f. Iron the heat tape for approximately twenty-five seconds and remove the iron.

NOTE: Patches may be overlapped and shall extend at least $^{1}/_{2}$ inch (12 mm) beyond the damaged area.

g. Allow the repaired area to stand for a minimum 20 minutes prior to further handling.

h. Test the suit for leakage (see section 1.3).

1.3.9 **Replacement of Components**

1.3.9.1 When damaged, the following components should be replaced and not repaired.

1.3.10 **Immersion Socks**

1.3.10.1 Replace the socks as follows:

a. Remove the old seam tape using a heat gun or iron.

b. Pick the sock seam stitching that attaches to the suit leg.

c. Remove the old socks.

d. Fit the replacement sock sub-assembly to the MSD565. Turn the legs of the MSD565 inside out.

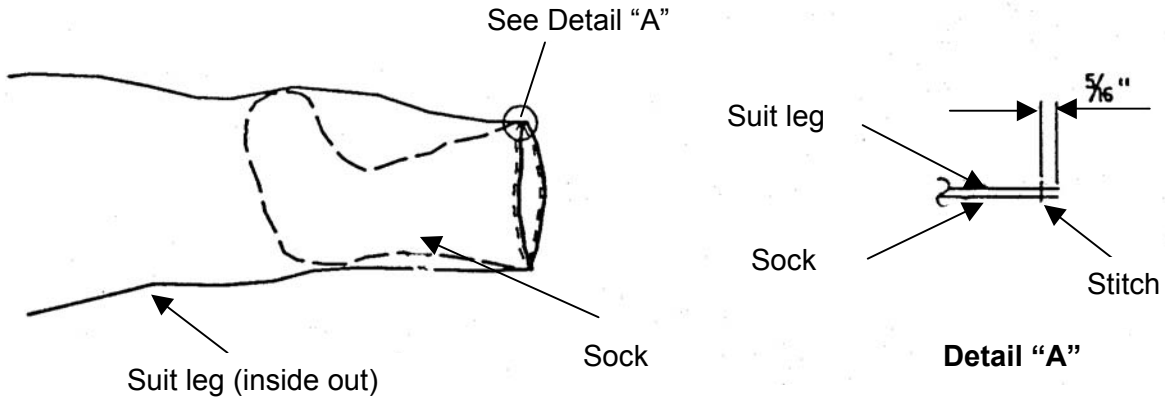
NOTE: Due to slight differences in circumference of suit leg and sock opening, it is recommended that alignment marks be added to both items before sewing.

Make marks at the front, back, and both sides, equally spaced around the circumference of both openings.

It may be necessary to manually induce an uneven feeding of materials into the sewing machine in order to compensate for differences in sock and suit leg circumferences, minimizing pleats or puckers.

e. Ensure the suit is positioned with its back portion laying on the working surface. Insert the sock into the leg opening with the toe section pointing upwards toward the front of the knee (see figure 9).

Figure 9. Steps a. and b. Fitting of Immersion Socks

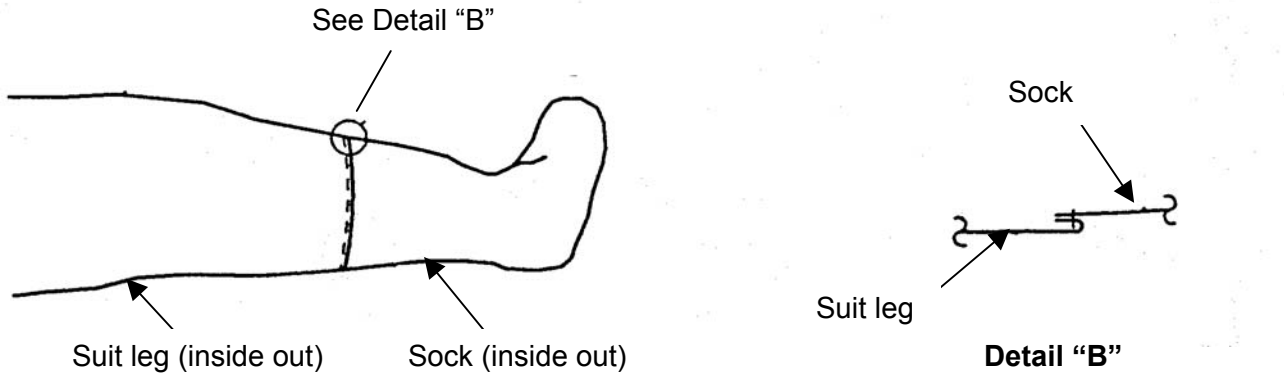


f. With the leg and sock alignment marks matched and the edges of the opening aligned, attach the sock with one row of stitches $^{5}/_{16}$ inch (8 mm) from the edges using a single needle lockstitch, eight to ten stitches per inch. Securely backstitch the end of the stitching not less than $^{1}/_{2}$ inch (12 mm).

NOTE: The thread used should conform to the Commercial Item Description A-A-50195. Match the thread colour to the suit colour.

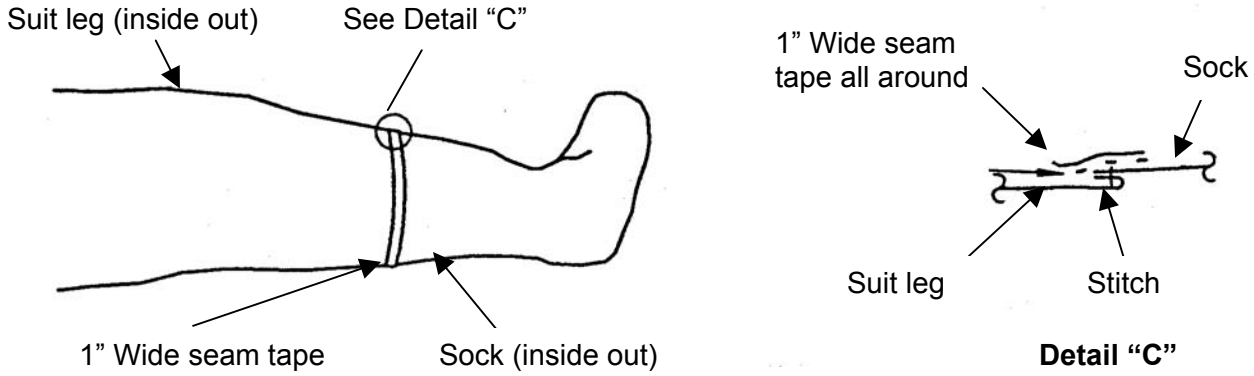
g. Pull the sock inside out (see figure 10) and ensure the sock and leg cut edges are pointing towards the upper part of the suit (see detail “B” of figure 10).

Figure 10. Steps c and d. Fitting of Immersion Socks



h. Heat tape the joint.

Figure 11. Step e. Fitting of Immersion Socks



1.3.11 **Wrist Seals**

1.3.11.1 Replace the wrist seals as follows:

a. Remove the old seam tape and damaged latex cuff using a heat gun or iron.

NOTE: Take care not to damage the suit.

b. Carefully abrade ½ inch (12 mm) of the latex wrist seal (on both sides) where it will meet the fabric sleeve.

c. Sew cuff assemblies to sleeves using a single needle with a $^{3}/_{8}$" seam allowance, making sure cuff flap is to top of cuff, aligning cuff seams with sleeve seams (stitch type 301, 8-10 stitches per inch). Use black nylon thread, in accordance with V-T-295 Type II, size E. The cuff is inverted into the suit, similar to the sock (see section 1.3.10).

d. Apply a coat of adhesive (Clifton Adhesive Inc. (NJ), PN: LA6115) around the inside of the cuff (½ inch of the latex seal).

e. Allow the glue to completely dry and then heat seal the tape (1inch Heat Tape, Gore PN: 6GSAM025).

1.3.12 **Exhaust Valve Replacement**

1.3.12.1 The exhaust valves (A.P. Valves (UK), Kwik Vent Exhaust Valve PN: AP470) are designed to be easily replaceable. They may be unscrewed and removed with little difficulty. Use the following procedure:

a. Unscrew the top of the valve housing and remove the blue silicone valve flapper.

Figure 12. Step a. Exhaust Valve Replacement

b. Use large pliers to remove the valve. Thread damage as a result of removal is not a concern because the valve is to be discarded.

c. Unscrew the valve body from its core and remove it from the suit.

d. Remove the rubber washers; set all valve parts aside.

e. Place a new valve into the hole, with the suit material between the rubber washers, and screw it together. Ensure that replacement washers are included in the replacement valve. Hand-tighten only (Reverse the sequence of removal).

f. Perform a leak test to ensure the suit is watertight (see section 1.3).