

Inspection, Cleaning and Storage Procedures for 3M™ Versaflo™ M-Series Headgear Assemblies

Introduction

The 3M™ Versaflo™ M-Series Headgear are designed to be used with certain 3M breathing tubes and air sources to form a complete respirator system. Occupational use of respirators must be in compliance with applicable health and safety standards. By United States regulation employers must establish a written respirator protection program meeting the requirements of the Occupational Safety and Health Administration (OSHA) Respiratory Protection standard 29 CFR 1910.134 and any applicable OSHA substance specific standards. OSHA 1910.134 states that employers shall ensure that respirators are inspected, cleaned, and properly stored. This Technical Bulletin will review the 3M suggested cleaning procedures as well as inspection and storage guidelines. Refer to the M-Series Headgear *User Instructions* as well as the *User Instructions* for your specific air source for proper assembly, use and limitations of your specific respirator system.

Inspection

The 3M™ M-Series Headgear must be inspected before each use to ensure good operating condition. Inspect entire headgear for signs of damage or wear including dents, rips, cracks, color changes, chalking, fading, flaking and penetration. Carefully inspect all headgear components including the following. If any signs of wear and/or damage are discovered during the inspection, remove the headgear from use and service or replace as appropriate. Failure to do so may affect respirator performance and reduce the degree of protection provided. Consult the M-Series Headgear *User Instructions* for information on available spare parts.

Visor and visor frame

- Look for scratches or other visual distortions that could make it difficult to see through the visor.
- Look for signs that the visor has warped or cracked. A warped visor may not fit properly into the headgear and on the M-400 series may not seal against the jaw.
- Ensure the visor stays firmly in the up (open) and down (closed) positions.
- Ensure visor buttons are present, firmly secured, and flush to the visor frame.
- Examine the visor gasket for tears or other damage. Gasket should be pliable and not brittle.
- Ensure the visor gasket makes contact with the headgear shell when the visor is the closed position.

Head suspension

- Look for cracks, rips, fading, or other damage.
- Ensure head suspension ratchet operates properly.
- Inspect the web straps for rips, tears, fraying, or fading.
- Look for worn stitching.
- Ensure straps are properly attached.

Faceseal or inner/outer shroud

- Look for tears, holes, stretched elastic, gaps in seams, damage to stitching or other damage.
- Examine the gasket for tears or other damage.
- The gasket should be pliable and not brittle.
- Ensure faceseal or inner and outer shroud is securely and properly attached.
- Inspect the zipper of the inner shroud and ensure it is completely attached to the outer shroud.

Headgear shell

- Look for visible damage including dents, cracks, color change, chalking or fading.
- Any M-300/M-400 headgear subjected to severe impact should be removed from service and replaced even if damage is not readily apparent.

Forehead seals

- Ensure they are properly and securely attached and are free from damage including rips, tears, and holes.

Inspect date codes on sticker located inside helmet shell and ensure helmet assembly has not exceeded the recommended maximum life. The “in use” or “operational” life will vary with frequency and conditions of use. Headgear subjected to more wear and tear or use outdoors in direct sunlight may need to be replaced more frequently than headgear used indoors. Any headgear showing signs of damage should be removed from use and serviced or replaced as appropriate. 3M recommends a maximum life of 5 years from the date of manufacture.

Cleaning

The M-series headgear should be cleaned regularly. Follow the hygiene practices established by your employer for the specific contaminants to which the respirator assembly has been exposed.

A clean cloth, sponge or soft brush dampened with a mild solution of soapy water may be used to wipe down the M-series visors, headgear shells, head suspensions (including the webbing), and all other plastic parts. Rinse with clean water. Washing temperature should not exceed 120 °F (49 °C). Air dry all parts inside and out thoroughly before storage or reuse.

The comfort pad/sweat pad (M- 957) may be hand washed or laundered with a solution of soapy water.

Commercial respirator washers and driers

The M-Series Headgear may be washed in a commercial respirator washer and dryer. 3M washed a small number of M-Series samples in a washer (Georgia Steel model GS1200) and dried them in a dryer (Georgia Steel model GS3000).

The wash agents used in the washer were as follows:

- Detergent: FK270-G low foam detergent
- Disinfecting agent: FG350
- Rinse aide: RP355

Samples were partially disassembled for washing. The visor frame and suspensions (including the webbing) were removed and placed separately in the washer and dryer. Faceseals and/or shrouds were removed and were NOT washed and dried as part of this test. See page 5 of this bulletin for information on cleaning faceseals and/or shrouds.

All samples were cycled through the washer and then dried (20 min at 120 °F, 49 °C) 52 times. Every 10th cycle the product was reassembled and an inspection and qualitative assessment of general function was performed.

After 52 cycles, the M-Series Headgear was not significantly affected. Users choosing to clean the M-Series Headgear in a respirator washer and dryer should thoroughly inspect the headgear following the cleaning cycle before storage and next use and replace any damaged components. For a listing of available spare parts, consult the M-Series Headgear User Instructions.

Cleaning with solvents

Cleaning with solvents can cause damage to plastic components including cracking, crazing, fogging, fading, and decreased strength and capability to withstand impact and penetration. In order to determine the effect of cleaning with solvents and cleaners on the M-Series Headgear, 3M wiped a small number of visors and M- 300/400 headgear shells with a limited number of materials and examined them for signs of damage and changes in performance.

The materials used are listed in Table 1. Two controls were used in the testing. The first control samples were not wiped with any materials. The second control samples were wiped with soap and water.

Each headgear shell sample was wiped 200 consecutive times in a laboratory fume hood with one of the test materials using a rag dipped in the test material such that it was wet but not dripping. Visors were wiped 100 consecutive times. Minimal force was used during wiping. The samples were allowed to air dry completely after the last wipe.

Wiped samples were visually inspected for signs of damage such as cracking, crazing, fogging, and hazing. Following visual inspection, the capability of the samples to withstand impact and penetration were evaluated by testing them against elements of their relevant performance regulation(s) for eye and face protection or head protection. The objective of this testing was not to show compliance to the regulation, but rather to gauge a significant decrease in performance when compared to the control samples.

The results of the testing are summarized in Table 1.

- M-300/400 Headgear shell: Wiped samples performed similar to the controls in the impact and penetration testing. There was no significant decrease in performance. Two of the chemicals, acetone and methyl ethyl ketone caused a visual color change to the shell.
- Standard visor (M-925): Two of the test materials, acetone and methyl ethyl ketone, caused fogging of the visor. Wiped samples performed similar to the controls in the impact testing. There was no significant decrease in performance.
- Hard coated visor (M- 927): None of the test materials caused any visual damage. Wiped samples performed similar to the controls in the impact testing for most of the substances, however as noted in Table 1, visors wiped with acetone, 3M Citrus Cleaner, and 3M 504 Respirator Wipes exhibited decreased performance. In the case of acetone and the Citrus Cleaner, there was a significant decrease in the ability of the visor to withstand impact. Some samples wiped with the 504 respirator wipes exhibited some minor cracking that did not occur in the control samples.

The preferred method for routine cleaning of the M- Series Headgear is with soap and water followed by a bleach and water wipe down if needed to help sanitize the headgear. If the M-300/400 Headgear shell or M-Series visors become contaminated with dirt, debris, paint overspray, or other substances that cannot be removed with soap and water, Table 1 can be used as a guide for selecting alternate cleaning agents for use on a limited basis. Routine cleaning of plastic components with solvents or more aggressive materials can gradually cause plastics to weaken and lessen its ability to withstand impact. Users should thoroughly inspect the headgear following the cleaning cycle, looking for signs of cracking, fading, fogging, and other visual changes or damage before storage and next use and replace any damaged components.

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To help prevent build-up of paint overspray or other contamination on visors, 3M recommends use of the visor peels offs (M-926 or M-928). To help keep the headgear shell clean, 3M recommends the headgear cover (M-972) or head, neck, and shoulder cover (M-976).

Sample	M-300/400 Headgear Shells	M-300/400 Headgear Shells	M-925 Standard Polycarbonate Visor	M-925 Standard Polycarbonate Visor	M-927 Hard Coated Polycarbonate Visor	M-927 Hard Coated Polycarbonate Visor
Test Material	Visual Change	Impact/Penetration Testing	Visual Change	Impact/Penetration Testing	Visual Change	Impact/Penetration Testing
Acetone	Color change	No significant effect on performance	Fogging	No significant effect on performance	None detected*	Decrease in performance**
Ethanol	None detected	No significant effect on performance	None detected	No significant effect on performance	None detected	No significant effect on performance
Isopropyl Alcohol	None detected	No significant effect on performance	None detected*	No significant effect on performance	None detected*	No significant effect on performance
Methyl Ethyl Ketone	Color change	No significant effect on performance	Fogging	No significant effect on performance	None detected*	No significant effect on performance
Mineral Spirits	None detected	No significant effect on performance	None detected	No significant effect on performance	None detected	No significant effect on performance
3M 504 Respirator Wipes	None detected	No significant effect on performance	None detected	No significant effect on performance	None detected	Decrease in performance*
3M Citrus Cleaner	None detected*	No significant effect on performance	None detected*	No significant effect on performance	None detected*	Decrease in performance**
Bleach (0.5%)	None detected	No significant effect on performance	None detected	No significant effect on performance	None detected	No significant effect on performance
Soap and Water (control)	None detected	No significant effect on performance	None detected	No significant effect on performance	None detected	No significant effect on performance

*While no damage was observed, the test material did leave a residue.

**Minor cracking exhibited in some samples that did not occur in control samples.

***Significant decrease in performance and capability of the visor wo withstand impact.

Cleaning fabric components

Certain faceseals, headgear cover, and head neck and shoulder cover are intended to be disposable. Cleaning the flame resistant faceseal (M- 937) or Headgear Cover (M- 972) may result in a loss of flame resistant properties. The recommendation for cleaning other faceseals and shrouds depends on the specific faceseal or shroud being used.

- M-935 Standard Faceseal: This faceseal is generally considered to be disposable and should be replaced when worn, damaged or soiled. A clean cloth or sponge dampened with a mild solution of water and liquid household soap may be used to gently wipe down the surface and the shroud gasket. Thoroughly air dry before storage. Inspect closely before reuse.
- M-936 Comfort Faceseal: A clean cloth or sponge dampened with a mild solution of water and liquid household soap may be used to gently wipe down the surface and the shroud gasket. Do not use chlorine bleach or fabric conditioners. Thoroughly air dry before storage. Inspect closely before reuse. Dispose of when worn or damaged.
- M-445 Standard Outer Shroud: This shroud is generally considered to be disposable and should be replaced when worn, damaged or soiled. A clean cloth or sponge dampened with a mild solution of water and liquid household soap may be used to gently wipe down the outer surfaces and the shroud gasket. Thoroughly air dry before storage. Inspect closely before reuse.
- M-446 Comfort Outer Shroud: A clean cloth or sponge dampened with a mild solution of water and liquid household soap may be used to gently wipe down the outer surface and the shroud gasket. Shroud may also be gently hand washed or laundered at low temperature with mild detergent. Do not use chlorine bleach or fabric conditioners. Washing temperature should not exceed 104 °F (40 °C). Thoroughly air dry before storage. Inspect closely before reuse. Dispose of when worn or damaged.
- M-447 Flame Resistant Outer Shroud: This shroud is made from Nomex® IIIA fabric which is inherently flame resistant. It may be hand washed or laundered in warm water with a mild detergent. Wash shroud separately from any other fabrics to prevent contamination with lint from flammable fibers. Do not use chlorine bleach or soaps. Soap scum may be flammable and could adversely affect the thermal protective performance of the material. Thoroughly air dry or dry on low setting before storage. Inspect closely before reuse. Dispose of when worn or damaged.
- M-448 High Durability Outer Shroud: This shroud is made from Cordura® Nylon. It may be hand washed or laundered at low temperature with mild detergent. Do not use chlorine bleach. Thoroughly air dry or dry on low setting before storage. Inspect closely before reuse. Dispose of when worn or damaged.
- M-449 Leather Shroud: A soft bristled brush may be used to wipe off any debris on the outer surface. Shroud may be wiped down with a damp cloth. Inspect closely before reuse. Dispose of when worn or damaged.
- M-444 Inner Collar: Hand wash or launder at low temperature with mild detergent. Washing temperature should not exceed 104 °F (40 °C). Do not use chlorine bleach or fabric conditioners. Thoroughly air dry before storage. Inspect closely before reuse. Dispose of when worn or damaged.

Storage/Disposal

Store headgear in a clean area that is protected from contamination, damage, dirt, debris, product distortion, and direct sunlight or other sources of ultra-violet (UV) light. Do not store next to furnaces, ovens, or other sources of high heat. Do not store outside the recommended storage temperature conditions (see *Specifications Section*) or above 90% humidity. Dispose of product according to local regulations. Prior to first use the product should be stored unopened in its original package in accordance with the recommended storage conditions.

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