

## APPENDIX B

### Overview of Glovebags and the Glovebag Procedure

## OVERVIEW OF GLOVEBAGS AND THE GLOVEBAG PROCEDURE

### GENERAL DESCRIPTION

A glovebag typically consists of a 3- to 12-mil polyethylene or polychloride (PVC) bag fitted with long latex sleeves and gloves, a tool pouch, and small opening(s) which may be used for insertion of water sprayers and/or HEPA vacuum nozzles. A typical glovebag is approximately 40- to 50-inches wide by 48- to 60-inches long. Glovebags can be obtained in various shapes and sizes. For example, special glovebags are available for work on vertical pipes. Commercially-available glovebags are pre-labeled in accordance with OSHA, EPA and DOT requirements.

Glovebags are good for taking off the insulation around a valve, pipe elbow or pipe. The glovebag is sealed air tight to the pipe to form a containment barrier. One worker keeps the material wet using the spray wand inserted into the bag, while another worker removes the material using the attached glove. Workers wear respirators and disposable clothing while performing glovebag work.

Glovebags can only be used on cool pipes for two reasons. Polyethylene burns at 150°, and use of water on a hot pipe could create steam which might burn the worker or cause the glovebag to rupture. Glovebags can be used on most hot water systems but should not be used on live steam lines.

## OSHA REQUIREMENTS FOR USE

In accordance with OSHA regulations, the procedures which must be followed depend on the amount of material being removed and the nature of the work being done. Small-scale, short-duration maintenance jobs where a small amount of asbestos is removed to repair a valve or a pipe (one glovebag only) do not require the use of a negative pressure enclosure. They are, however, subject to the provisions outlined in Appendix G of the OSHA Construction Industry Standard (29 CFR 1926.58).

These provisions require the employer to establish a written operations plan describing the procedure. Other required procedures include forming an air-tight seal around the pipe; using half mask respirators; wetting the ACM; cleaning the surfaces after ACM is removed; encapsulating exposed ends of remaining insulation; evacuating the glovebag with a HEPA vacuum; and disposing of the glovebag after one use.

The main difference in glovebag procedure for large-scale asbestos abatement operations is the OSHA requirement to establish negative air pressure within the containment area. There are two ways to establish a negative air pressure containment. A variable speed HEPA-filtered vacuum or equivalent can be inserted in the glovebag. Alternately, the room the project is in can be prepped as a containment area and a pressure differential can be obtained using HEPA air filtration units.

The tools and procedures for conducting glovebag removal for small-scale, short-duration projects are described below. If glovebags are used for large-scale abatement, then provisions for establishing a negative pressure enclosure would need to be added to these procedures.

## **MATERIALS**

1. Glovebag (one or more depending on project size) – polyethylene or PVC
2. Pump-up garden sprayer (2-3 gallon size)
3. Amended water (surfactant)
4. Duct tape (3-inch width)
5. Polyethylene disposal bags (6-mil) labeled properly per OSHA, EPA and DOT regulations
6. Smoke tubes with aspirator bulb
7. HEPA-filtered vacuum cleaner
8. Wire saw/"flexi-saw"
9. Utility knife with retractable blade
10. Wire cutters
11. Tin snips (if aluminum jacket is present)
12. Polyethylene plastic (roll of 4 or 6 mil)
13. Dual cartridge respirators with high efficiency cartridges
14. Disposable full body suits with hood and feet covering
15. Small scrub brush (nylon brush)
16. Several rags
17. Wettable cloth or other patching material
18. Asbestos danger signs and labels
19. Reinsulation materials as necessary

## BEFORE STARTING THE PROJECT

Two persons are typically required to perform a glovebag removal project. A third person is often available to assist with supplies, keep unwanted visitors out of area, and possibly to conduct the air monitoring. Each of these team members should have received training on the use and limitations of glovebag removal projects. They should also be included in the respiratory protection program and medical surveillance programs.

Before any work begins, all necessary materials and supplies should be brought into the work area. This work area should be roped off and danger signs posted on the perimeter to minimize the chance of visitors entering this area. Barrier tape (3-inch) with a preprinted asbestos warning works well for this purpose. The HVAC system serving the work area should be shut down, if possible. Employees should be trained in emergency procedures in the event the glovebag ruptures. These emergency procedures usually include wet cleaning and/or HEPA vacuuming procedures and a shower available at a remote location. With this phase completed, the following generic guidelines may be used for most pipe lagging projects. It is important not to attempt to conduct glovebag removal on hot pipes (over 120°F) due to the possibility of the bags melting over the worker's hands and arms. Some manufacturers are currently experimenting with the development of special "high-temperature" glovebags to allow removal from hot surfaces; however, it is still necessary to exercise extreme caution when dealing with these types of situations. (Polyethylene will melt at 150°F.)

## REMOVAL PROCEDURES

1. Following the manufacturer's directions, mix the surfactant with water in the garden sprayer.
2. Have each employee put on a high efficiency cartridge respirator approved for use against asbestos and check the face fit.
3. Have each employee put on a disposable full body suit. Remember, the hood goes over the respirator straps.
4. Check the pipe where the work will be performed. If it is damaged (broken lagging, hanging, etc.), wrap the entire length of the pipe in polyethylene plastic and "candy stripe" it with duct tape. A common error when doing glovebag work is forgetting that loose pipe lagging several feet or even several yards away from the glovebag work may be jarred loose by the removal activity. This is one of the common causes of high airborne fiber concentrations during glovebag work. Another problem is failure to clean up debris on the floor and other surfaces which has accumulated and contains asbestos. If the pipe is undamaged, it is still necessary to place one layer of duct tape around the pipe at each location where the glovebag will be attached. This serves two purposes. First, it gives a good surface on which to seal the ends of the glovebag. Second, it minimizes the chance of releasing fibers when the tape at the ends of the glovebag is peeled off at the completion of the job.
5. Open the top of the glovebag and cut down the sides to accommodate the size of the pipe (about two inches longer than the pipe diameter). Some bags have zippers or

two-sided tape on top and straps at each end facilitating easier installation of the bag on the pipe.

6. Place the necessary tools into the pouch located inside the glovebag. This will usually include the flexi-saw, utility knife, rags, scrub brush, wire cutters, tin snips and wettable cloth. Cut out a donut shape with the inner diameter one-half inch smaller than the diameter of the pipe beneath the insulation. The outer diameter of the donut should be three inches longer than the diameter of the pipe insulation being removed. Finally, cut a slit in each of the two donuts so they can be slipped around the pipe. (Putting the wettable cloth in a small air-tight ziploc bag may make it easier to handle.)
7. Place one strip of duct tape along the edge of the open top slit of the glovebag for reinforcement.
8. Place the glovebag around the section of pipe to be worked on. If the bag has double sided tape at the top, a preliminary seal can be made at this point. Next, fold the flap back and tape it down with a strip of duct tape. This should provide an adequate seal along the top. Next, duct tape the ends of the glovebag to the pipe itself, previously covered with plastic or duct tape.
9. Using the smoke tube and aspirator bulb, place the tube into the water porthole (two-inch opening to glovebag). By squeezing the bulb, fill the bag with visible smoke. Remove the smoke tube and twist the water porthole closed. While holding the water porthole tightly, gently squeeze the glovebag and look for smoke leaking out,

especially at the top and ends of the glovebag. If leaks are found, they should be taped closed using duct tape and the bag should be retested with smoke.

10. Insert the wand from the water sprayer through the water porthole. Using duct tape, tape the water porthole tightly around the wand to prevent air leakage.
11. One person places his hands into the long-sleeved gloves while the second person directs the water spray at the work.
12. If the section of pipe is covered with an aluminum jacket, this is removed first using the wire cutters to cut any bands and the tin snips to remove the aluminum. It is important to fold the sharp edges in to prevent cutting the bag when it is placed in the bottom. Use caution to prevent cuts – these edges are sharp!
13. With the insulation exposed, use the flexi-saw to cut the insulation at each end of the section to be removed inside the glovebag. (Note: A flexi-saw is a serrated heavy-gauge wire with ring-type handles at each end.) Throughout this process, water is sprayed on the cutting area to keep dust to a minimum.
14. Once the ends are cut, the section of insulation should be slit from end to end using the utility knife. The cut should be made along the top of the pipe and water continuously supplied. Again, care should be taken when using the knife not to puncture the bag. Some insulation may have wire to be clipped as well.
15. Spray all tools with water inside the bag and place back into pouch.



16. The insulation can now be lifted off the pipe and gently placed in the bottom of the bag.
17. Using the scrub brush, rags and water, scrub and wipe down the exposed pipe inside the glovebag. (Note: Inexpensive horse rub-down mittens work well for this.)
18. Wet the donut-shaped pieces of wettable cloth over the exposed ends of insulation remaining on the pipe. Wettable cloth is a plaster impregnated fiberglass webbing available at many hardware and/or plumbing supply stores.
19. Remove the water wand from the water porthole and attach the small nozzle from the HEPA-filtered vacuum. Turn on the vacuum only briefly to collapse the bag.
20. Remove the vacuum nozzle and twist the water porthole closed and seal with duct tape.
21. From outside the bag, pull the tools through the glove and away from the bag and twist it to separate it from the bag. Place duct tape over the twisted portion and then cut the glove from the glovebag, cutting through the twisted/taped section. In this manner, the contaminated tools may be placed directly into the next glovebag without cleaning. Alternatively, the glove with the tools can be placed in a bucket of water, opened underwater, and the tools cleaned and dried without releasing asbestos into the air. (Note: Rags and the scrub brush cannot be cleaned in this manner and should be discarded with the asbestos waste.)

22. With the removed insulation in the bottom of the bag, twist the bag several times and tape it to keep the material in the bottom during removal of the glovebag from the pipe. (A HEPA vacuum may help suction air out of the glovebag.)
23. Slip a 6-mil disposal bag over the glovebag (still attached to the pipe). Remove the tape and open the top of the glovebag and fold it down into the disposal bag.
24. Remove the disposable suits and place these into the bag with the waste.
25. Twist the top of the bag closed, fold this over ("gooseneck" style), and seal with duct tape. Ensure that the outermost bag is appropriately labeled per OSHA, EPA and DOT regulations.
26. Using a clean damp rag, wipe the exterior of the respirator and leave the work area. Remove the respirator.
27. Asbestos-containing material must be disposed of at an approved landfill in accordance with EPA regulations.
28. Air sampling should be conducted during and after completion of glovebag projects to determine if undetected leakage occurred. Sampling should be done by qualified persons. Once a good visual inspection has been conducted, it will be possible for reentry by unprotected personnel. Reinsulation may also occur at this point.