

**INSTALLATION PROCEDURES  
FOR PCI'S SURE-HOLD™ BANDS  
TO PROVIDE POST-LOCA PROTECTION  
WITH METAL JACKETED NUKON® INSULATION**

1. Standard NUKON blankets and metal jacketing should be installed by PCI's NUKON Installation Procedures for Piping from the *NUKON Insulation Installation Manual*. Note that the correct overlap of one metal jacketing section to the next should be three (3) inches. Also note that the widest section of metal jacketing will be 36 inches, giving an effective width (covering the NUKON blankets) of 33 inches when accounting for the overlap. However, shorter sections are frequently encountered. At an actual metal jacket width of 22 inches and less, there will be only two (2) latch and strike combinations attached to the jacket along a given lap joint as opposed to three (3) latch and strike combinations.
2. Based on existing Air Jet Impact Tests, conducted in August, 1996 by the BWROG at the Colorado Engineering Experiment Station, Inc., there should be three (3) Sure-Hold Bands per section of NUKON metal jacketing installed on metal jacketing sections with actual widths of 36 inches to 22 inches. At 22 inches and less metal jacketing section widths, only two (2) Sure-Hold Bands are necessary to provide post-LOCA protection.
3. One Sure-Hold Band should be installed over top of every three (3) inch wide jacket to jacket overlap. The second band should be installed near the center of the jacket section, just to the overlapping side of the center latch and strike. The third band should be installed just to the overlapping side of the last latch and strike, where applicable.
4. The Sure-Hold Bands each have an adjustable latch. The catch in the latch is welded to a threaded rod which can be rotated clockwise to make it shorter and counterclockwise to make it longer. The catch should be adjusted, by trial and error, until the band fits snugly. This means that it squeezes the metal jacketing slightly and it is sufficiently tight, that after the latch is closed, that the installer cannot move the band with reasonable effort. If the installer can move the band, then the latch should be adjusted again until it cannot be moved using a reasonable effort.
5. When installation is complete, a visual verification should be performed to determine that there is at least one Sure-Hold Band adjacent to each latch and strike combination. This verification should also include the bands' correct position over the metal jacket overlap, where applicable.

6. Rotational position of the latches and strikes on the bands, relative to the metal jacketing or other frames of reference, is not significant for performance of the Sure-Hold Bands. In general, they should be installed in the manner that provides greatest accessibility to the latches and strikes to allow for ease of installation and removal.

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## Installation Procedures

### Preparations:

To save time and avoid confusion, store all boxes marked for a particular piping system (Feedwater, for example) together in one place as the shipments of NUKON insulation parts arrive. Do *not* open the part boxes until necessary for installation. Open storage of NUKON insulation parts will lead to unacceptable soiling and damaging of materials.

When it is time to unpack NUKON insulation parts and begin installation, Performance Contracting, Inc. Power and Process Division suggests the following method.

1. Decide which piping system to begin with (Main Steam, Feedwater, etc.).
2. Unpack and install only one box at a time from that particular system.
3. Discard the empty boxes immediately to avoid any confusion about where parts are stored.
4. Save the polyethylene bags containing the piping system's parts. As installation proceeds, drape the bags over completed work to protect the NUKON blankets from dust, dirt and/or harmful spills.
5. When the blankets for any given piping system have been completely installed, dispose of the polyethylene bags as installation of the metal jacketing proceeds.

### Installation Sequences:

#### Blankets and Jacketing

In order to maintain the engineered integrity of the NUKON insulation system, care must be taken to avoid exposing the blankets to jagged or sharp edges, or soiling the blankets with grease and/or abrasive chemicals. At the same time, care must be taken to avoid denting or puncturing the protective metal jacketing.

The insulation and jacketing shall be installed in a manner conforming to the code and industry standards of good workmanship. Also, the contractor should install NUKON insulation and jacketing in a systematic manner to minimize field modifications. The sequence or order of piping systems installed is normally decided by the contractor.

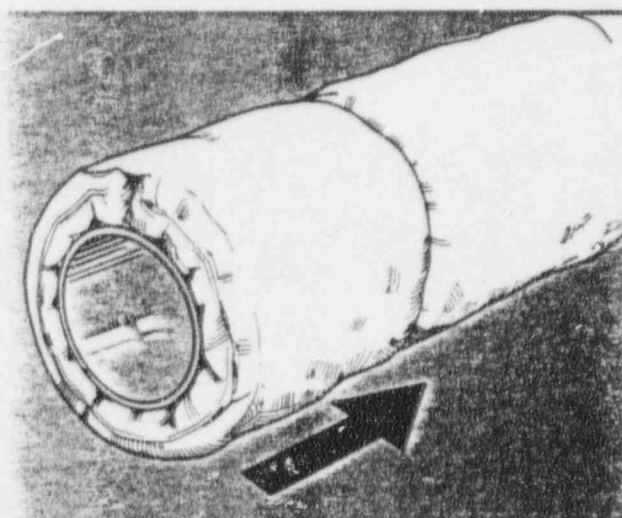
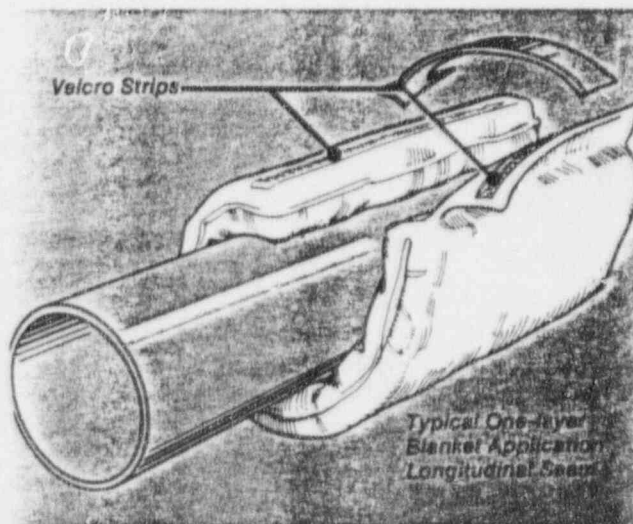
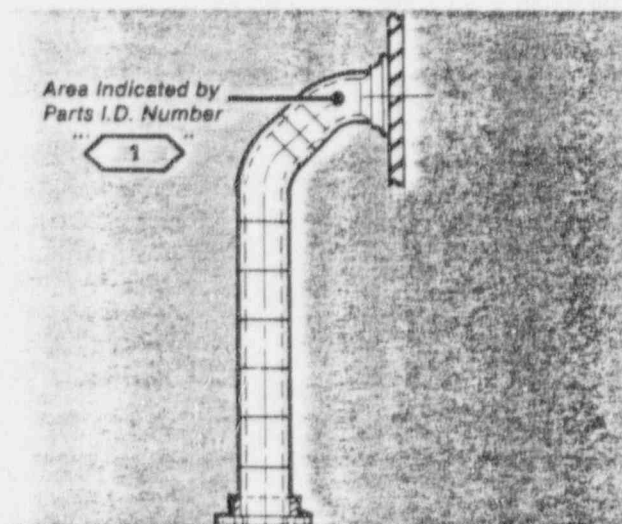
**Blankets:**

The installation sequence for installing a one-layer blanket system is as follows:

1. Remove the first (001) blanket from its container and bag.
2. On the particular piping system drawing, locate the area designated "1". Wrap the NUKON blanket around the pipe at that location.
3. Making sure the blanket is snugly fitted, close the blanket along the full length of its longitudinal seam by mating both sections of the Velcro strips across their full width. (Note: In some instances, it may be helpful to close the Velcro strips partially at first. Then, with the application pressure reduced, the strips can be locally adjusted to their full closure position.)
4. Make sure the first blanket is butted firmly and completely against the surface (nozzle, flued head, etc.) where the piping system begins.
5. Proceed to the installation of the second (002) blanket.
6. Making sure that one end of the blanket 002 butts firmly against the end of blanket 001, install blanket 002, and all subsequent in-line blankets, in the same manner as blanket 001 was installed.

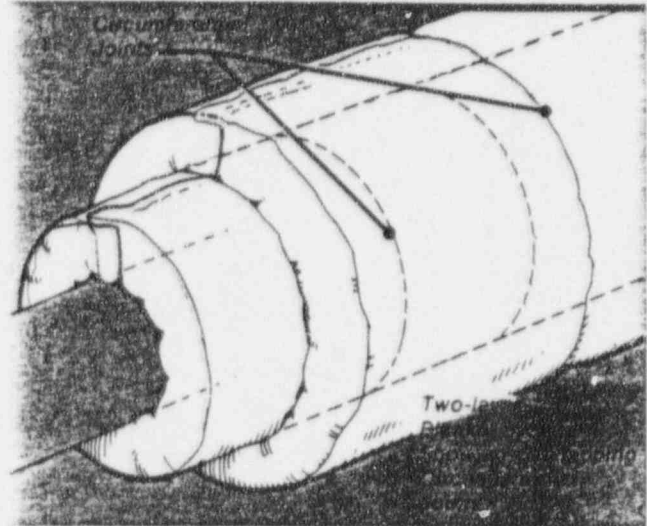
Two-layer blanket systems occur infrequently, but when they do, it is important to know that the Inner Layer of blankets is distinguished from the Outer Layer of blankets by the abbreviations I/L and O/L following the sequence number on the blanket I.D. tag. For example, MS-A-EL-18-001 I/L would distinguish the first Inner Layer blanket from MS-A-EL-18-001 O/L which would be the first blanket in the Outer Layer series.

It is also important to note that blankets for an Outer Layer series may be wider or narrower than their corresponding blankets from the Inner Layer. Consequently, the joints where the Outer Layer blankets meet circumferentially may not lie exactly over the circumferential joints of the Inner Layer blankets. In this event, a staggered joint effect will be achieved which enhances the thermal performance.



The installation of the Outer Layer blankets should proceed after installation of the Inner Layer blankets is complete. Once this has been accomplished, the Outer Layer blankets can be installed in the following manner:

1. Locate and unpack Outer Layer blanket-001 O/L.
2. On the particular Outer Layer piping system drawing, locate the area designated "1". Wrap the Outer Layer blanket around the Inner Layer blanket or blankets at that area, making sure the Outer Layer blanket fits snugly.
3. Close the Outer Layer blanket along the full length of its longitudinal seam by mating both sections of the Velcro strips across their full width.
4. Make sure the Outer Layer blanket is butted firmly against the metal fitting where the piping system begins.
5. Proceed to the installation of the second (-002 O/L) blanket.
6. Install blanket -002 O/L making sure that it is butted firmly against the first Outer Layer blanket. Install all subsequent Outer Layer blankets in the same manner as the first Outer Layer blanket was installed. (Note: Since Outer Layer blankets are wrapped over the Inner Layer, they will not slide easily. Therefore, it is important Outer Layer blankets be initially installed to form the tightest possible fit with the adjacent blanket.)
7. Locate metal jacketing identified for installation on this particular line of piping insulation.





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### Jacketing (Lagging)

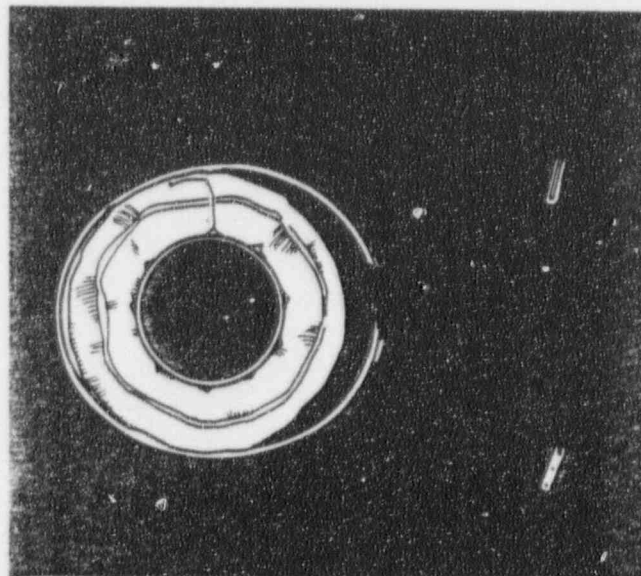
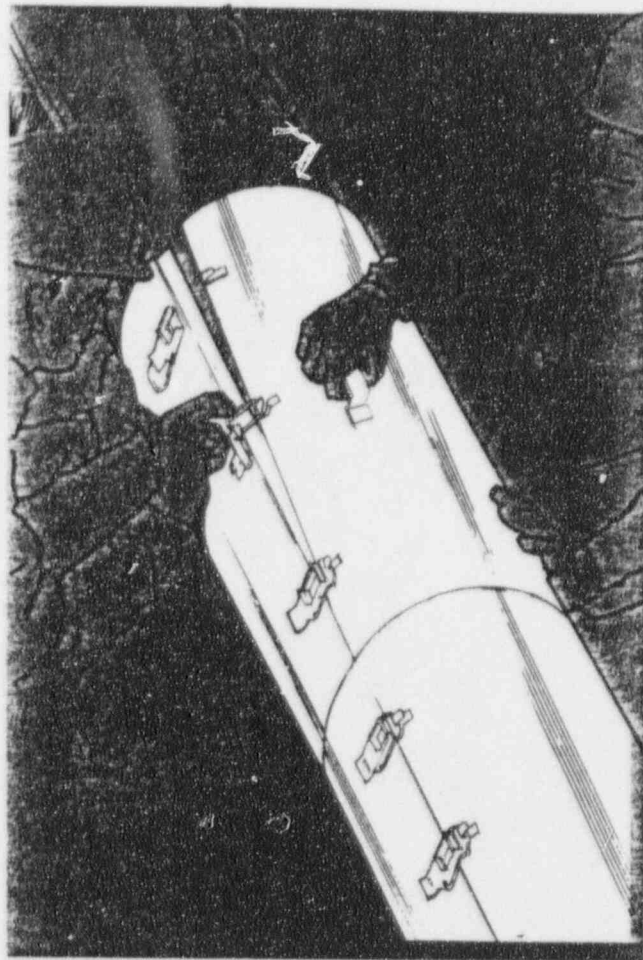
Jacketing will be installed over the blankets as the final step in installing the system. All jacketing must be installed so that it sheds water. When installing any of the metal jacketing, workers should be reminded to wear protective gloves for personal safety.

For installing one-piece rolled jacketing, the following procedures are suggested:

1. Once the metal jacketing for a specific line has been located, unpack the jacketing one box at a time and discard any waste materials immediately.
2. On the particular piping system jacketing drawing, locate the area designated "1".
3. Using two crewmen when necessary, spread the first (001) section of jacketing open wide enough to place it over the blankets.
4. Secure the section by closing the longitudinal gap to a point where the latches can be fastened. Fasten all latches to secure section. (Note: All latches are spring-loaded for seismic requirements. When properly closed, the spring catch will be engaged.)
5. Locate section -002 of jacketing.
6. Again, spread the longitudinal gap in section two (002) open wide enough to place it over the blankets on the pipe.
7. Before securing, position the second section so that it laps the first by approximately 3 inches to maintain watershedding requirements.

Note: This installation step may vary for vertical pipe. Make sure watershedding requirements for the system are maintained.

8. Secure the second section by fastening all the latches.
9. This same procedure will be repeated for each overlapping one-piece section of metal jacketing on any specified section of pipe.



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For installing metal jacketing that has been formed and manufactured in two pieces, the following procedures are suggested:

1. The two sections of jacketing that make up the one-piece can be differentiated from each other by noting the two parts of the fastening apparatus. One section of jacketing will have *strikes* attached to it, and the other will have *latches* attached to it. Locate the half section of jacketing with *strikes* attached to it and prepare to place it on the insulation.
2. Place the two sections on the pipe in a watershedding orientation at the *longitudinal lap*. (This applies to horizontal piping; on vertical piping it makes little difference.)
3. Position the section so that it overlaps the previous section of jacketing by approximately three (3) inches.

Note: This installation step may vary for vertical pipe. Make sure watershedding requirements for the system are maintained.

4. Fasten one entire side of the strike and latch system.
5. Draw the two sections together on the opposite side and fasten that side completely, securing the two-piece section in position.

