



## Sewing Fire Hose – Hand Nailed Technique

With permission, adapted from instructions by  
Kelli Araujo – Senior Animal Care Specialist, SeaWorld San Diego

This technique is used for environmental enrichment devices (EED) that will go into the water column, for use with animals who should not have access to hardware, and other times use of hardware is not desirable or possible. It can be used to seal in items such as PVC or floatation “noodles”, to attach pieces of fire hose together to add to stability or structural integrity, to add to the design, and much more.



### Safety Concerns

- ⌘ Check with your veterinarians, curators, and supervisors when applying this to be sure they are comfortable with the length of the threads you are using to secure the ends. Do not allow excessive amounts of thread to be available for animals to potentially ingest.
- ⌘ This may NOT be a good technique if your animals have a lot of fingertip dexterity and can untie knots or if they can bite the stitching and break the thread.
- ⌘ For a floating or sinking EED, check the sizing of habitats skimmers, drains, and inflows to ensure that the EED is a proper size to not be sucked or stuffed into the filtration system and damage it.

### Items needed

Aqua Seal, Seal Cement, or Heat gun to seal loose fabric ends  
Clamps  
Nails – larger diameter and at least 2 -2 1/2” long  
Hammer  
Block of wood  
Pliers  
Strong thread (waxed shoe thread works well)  
Large needle



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**STEP 1** Seal the ends of the fire hose. This will make sure that the exposed ends will not unravel. Cut off all the stray ends and then use either of these techniques:

**HEAT** If this EED is for an animal who will try to bite and/or use fingers to manipulate the fire hose, use a heat gun to carefully melt the frayed fabric ends of the fire hose. Holding the fire hose with pliers to keep from burning your fingers, with a warm heat gun slowly and methodically pass the heat gun back and forth about 2 inches above the fire hose until frayed ends have just been melted and will not unravel (too much heat can make the fire hose shrink and change shape). Allow to cool before you sew the fire hose.

**CEMENT** If this EED is for an animal where there is no risk of ingestion, Seal Cement can be applied to the ends. Wear disposable gloves while applying and be sure to cover all the fray ends of the fire hose. Allow the proper amount of time to dry before you sew the fire hose.



End without Seal Cement



End with Seal Cement

**STEP 2** After the ends are sealed and are cool or dry, clamp the fire hose together and place it over the wooden block. Using the pliers to hold the nails use a hammer and place the nails in a strategic pattern. Hammer nails just enough to ensure that they go through all layers of the fire hose that will be stitched.



\*Tip: If the nails are stuck in the wooden block, use the hammer to knock around and move the tops of the nails to loosen them in the block. Check to ensure that the nails have gone through all the layers of fire hose.

Adjust the clamps and move the fire hose around on wooden block to set up the preferred stitch pattern.



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**STEP 3** After all the nails are in place, thread the needle with the desired amount of waxed thread. Carefully remove ONE nail from the fire hose and place the threaded needle in this hole to begin to stitch the fire hose. Be sure to leave about a 2 inch thread “tail” hanging out at the first hole, then come back to this hole to tie off the stitching.

Use the pliers to help push or pull the needle through the holes. Repeat this process only removing one or two nails at a time to ensure that all the holes stay together for easier stitching. It is especially important when stitching together multiple fire hoses. Clamps can be used again to keep holes lined up as the nails are removed. Each time the needle and thread are pulled through the holes, keep the stitches tight and frequently check both sides as you pull the thread through. It is easy to get the thread wrapped around the nails.



**STEP 4** After you have removed all the nails and placed all the stitches, pull the threads down as tightly as possible and tie off the end of the thread to the “tail” you left at your first stitch. Then use multiple square knots to secure the thread back to itself.

### Notes

- ⌘ When nailing the stitching pattern, it is helpful to place an even number of nails to “circle back around” for tying off.
- ⌘ In these instructions, the entire width of fire hose was stitched, side-to-side, with one long piece of thread. However, it could have been stitched together in 4 hole or 6 hole sections, etc. This creates smaller secure individual sections, so if one stitch is broken the entire EED will not fall apart.
- ⌘ Knots can be hidden in between the layers of the fire hose. When pulling the thread through the first nail hole, pull it all the way through one of the two layers, leaving the tail in the middle of the fire hose, making sure that this stitch is closest to the open side of the fire hose. Then stitch back around to the hole that mirrors where the tail is and stitch into the middle. Tie the tail off using the square knots.
- ⌘ Check the stitches and inspect EEDs to ensure that they are safe for your animals. Salt water, sun, and animals rubbing on and playing with EEDs can break down the stitching, requiring that you re-stitch it.

