PVC liners prolong the life of steel and FRP tanks

In 1976, Brenntag Canada Inc. (formerly CIL) in Cornwall, Ontario, had a flexible polyvinyl chloride (PVC) liner installed in a used riveted horizontal steel tank. The tank, which measured 9'-0" diameter x 22'-6" long, was needed to contain aqua ammonia. The PVC liner was purchased to prevent the aqua ammonia from leaking at the riveted seams.

In 2006, Brenntag Canada contacted Kentain Products Ltd. regarding replacement of the aging liner. After 30 years of service, the old liner was removed and it was determined that the tank was in decent shape as the walls had little signs of deterioration.

In the spring of 2007, Brian MacDonald, Site Manager of Brenntag Canada, contacted Kentain to proceed with the replacement of the old liner. They began the design and pre-fabrication of a one piece, 40 mil NSF-61 white liner at their plant in Kitchener, Ontario. Working in conjunction with Brenntag Canada Inc., Kentain provided an installation supervisor and two helpers to assist with the procedure.

The lining of a horizontal tank is a fairly straightforward process. The inside of the tank is first visually inspected by the supervisor to ensure it is smooth and free of any scaling.

Once the tank preparations are complete, the new liner is passed into the tank through the open manway. The flexible PVC liner can then be laid out inside the tank. All fittings are sealed off and secured, making the tank airtight. The liner is then pulled up and fitted to the walls by way of a vacuum. During this process, two Kentain installers remain inside the tank to construct a custom-fit, internal rib-cage out of PVC pipe. Once completed, the vacuum is removed, and the liner becomes freely suspended.

Before the installation is deemed complete, a water test is performed. The liner becomes the main containment, while the tank provides extra security by becoming the secondary containment. A simple leak detection system is added to the tank to ensure early awareness should a problem ever occur with the liner.

Since the flexible PVC liner is custom-made and fabricated in this manner, the entire interior surface of the tank, fittings and manway are lined. This prevents the steel tank from coming in contact with any liquid or fumes from the now-contained solution, in this case, the aqua ammonia. Because the PVC liner is not chemically adhered to the tank's surface, it is not affected by the tank expansions or contractions. With no need to sandblast prior to installation, minimal down time is required. Total installation was completed in just three days.

The one piece construction and excellent chemical resistance make the liner virtually maintenance free.

During the installation of the horizontal tank, Brian MacDonald requested that Kentain also inspect two of their vertical fiberglass reinforced plastic (FRP) tanks - both containing 12% sodium hypochlorite. The discussion arose on how to proceed with the lining of these two tanks. Brenntag wanted both tanks done at the same time to once again minimize down time. It was agreed that the tank drawings would be sent to Kentain Products so the liners could be fabricated. Actual tank drawings are a benefit but not a necessity in manufacturing custom liners.

In November 2007, Kentain began the installation of the two liners in the FRP tanks. One tank measured 8'-0" diameter x 12'-0" deep and the other measured 10'-0" diameter x 12'-0" deep.

The preparations for a vertical tank are the same as those for a horizontal tank. Once the tank is ready, the liner is passed through the manway and unrolled onto the floor of the tank. Instead of an internal rib cage, ropes are attached to the roof of the liner and the liner is lifted and attached to the roof of the tank. Again, no bonding of the liner to the tank is required. The liner becomes freely suspended.

Both of the tanks were installed with new liners and fully water tested in five days.

For more information, contact Glen Lippert, E-mail: glen@kentain.com