



API 653 good practices for insulated storage tanks

NISTM
National Institute For Storage Tank Management

API 653 standards have been adopted since the early 1990s and stemmed from tank failures that may have contributed to environmental damages. The 653 codes have created many challenges for terminal operators striving to keep their storage tanks compliant with today's standards. The cost for out-of-service tank inspections, including cleaning and loss of utilization, can be astronomical and that's before repair costs are factored into the equation.

Did you know monthly inspections are recommended under API 653 in addition to the required five-year, in-service external inspection and the 10-year internal inspection? Monthly inspections performed by the site owner/operator must be conducted by a knowledgeable person; however, that person doesn't need to be certified. A record of these monthly inspections is to be maintained by the owner for the regulators to review.

When a heated storage tank is insulated, inspection of the tank becomes a real challenge because of what may be hidden under the metal jacketing and insulation. There are documented cases where five- and 10-year inspections have missed significant corrosion

problems that later resulted in tank failure. In one instance, an owner's tank started to leak just three months after its 10-year out-of-service inspection. The leak occurred in an unseen area behind the horizontal insulation panels. This situation created a monumental expense because the tank had been put back into service just after it was cleaned and the 10-year inspection completed. An insulation specialist was able to identify the source of water intrusion that had caused the external tank corrosion and subsequent leak behind the insulation. Once the problem was identified, a long-term solution was presented and adopted by the owner.

Many tank inspectors agree good practices adhering to API 653 should be adopted into the customer's insulation program. One such practice is to expose the tank corner weld where the tank shell meets the tank chime or floor. By "raising" the tank insulation, constant visual inspection of an area inspectors call the most critical weld of the tank's construction is viable. In addition, this exposed area will allow the owner to observe any moisture that may be seeping from the bottom of the tank insulation.

Insulation solutions for API 653 inspection

Insulation support systems are available that will provide a solid foundation for the insulation panels to rest upon. Support systems can be adapted to go around the tank's apertures and will be wide enough to accommodate the current thickness of the existing insulation panels. The solution is provided by a simple weld procedure that attaches angle clips to the tank. Care must be taken because the support system is rigid and will not allow flex or sag. Issues have arisen when this system was installed utilizing flat steel that flexed and crushed the shell jacketing due to the down forces and weight of the insulation.



Insulation support system.



Vertical panel insulation system.

work permit that allows hand or electric tool utilization for cutting the existing shell panels. The support system is then bolted together as it is installed around the tank base. It is fast, simple and no welding is required.

Tank in service? No problem!

A nonwelding version of the insulation support system that enables the tank to stay in service is also available. Installation of this system can be completed with a low-risk hot

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