

# Protect and detect

## TANK LINING

Three years ago Simon Storage was looking at ways to allow it to store hydrochloric acid. Turning to Abfad's double-skin lining system, a trial project proved the viability of this innovative concept

Fuelvac is a double-skin lining system developed and patented by Abfad Ltd that can be applied to both above- and below-ground storage tanks. The system not only protects the tank from any internal corrosion, as steelwork is coated and therefore cannot physically corrode, but also allows for 24/7 vacuum pressure leak detection monitoring.

With today's environmental pollution laws and the protection of valuable assets a major concern, double walled installations and tank monitoring are becoming more and more crucial. If an internal breach does occur in a Fuelvac protected tank then the client is immediately alerted and can plan for an inspection knowing that the stored product is fully contained and safe. In most instances an internal breach of the double skin liner can be fully repaired and operational again with minimal downtime. This

results in no environmental clean-up costs and no expensive tank replacement or repair.

Because the tank is monitored 100 per cent of the time the need for inspections and non-destructive testing (NDT) is reduced, enabling better managed operations running simply, effectively and efficiently at all times.

### Plan of action

When Simon Storage was looking at ways to prepare a storage tank to handle hydrochloric acid, the first obstacle it faced was locating a coating that would be fully resistant to the product. Abfad went to several of its resin suppliers and discussed two potential coatings that would offer suitable protection for the tank. Abfad then made some free film resin samples to be immersed in the acid to physically test the resistance of the selected coating. Both the resin manufacturer and Simon Storage agreed to test the samples over a two-year period, after which it was deemed that the tests had been successful for the chosen coating and it was resistant to the hydrochloric acid. Now the real work could begin.

Abfad was commissioned to review the project and formulate all engineering aspects to be able to double-skin the tank floor areas and - importantly - up to the top of the wall sections. Abfad's research team reviewed all aspects of the project, including the weight of the double-skin materials, and developed a method to ensure that the 13-metre high wall sections would be fully secure during the installation process and after the double skin liner was fully installed.

With all research and planning done the installation process was ready to begin, the client emptied the tank, cleaned and de-gassed it and the structural integrity of the tank was established through NDT. Abfad then arranged scaffolding, which consisted of six lifts and a dance floor at the top of the tank, in order to gain access to blast the underside of the tank lid.

All areas of the tank were blasted clean before an initial single-skin coating was applied. All areas of the tank were then visually inspected and holiday (spark) tested to ensure no pin holes existed in the single skin coating. Any pin holes found were repaired and the coating was successfully commissioned prior to sign-off. Once the single-skin coating was completed and signed off the double-skin application commenced with the side walls first to be done.

### Successful application

Another critical aspect of the project was sectioning the tank into six separate zones, each with its own vacuum monitoring instrument gauge. This was to allow for more precise monitoring of the tank. To enable each area to be lined separately, Abfad overlapped the double-skin system, which it believes to be a first performed in the industry. Once the first wall zone was double-skin lined and terminated back onto the original coating, Abfad's personnel then applied the next wall zone section which was overlapped onto the existing zone double-skin, ensuring each zone remained a separate entity and could be monitored independently with vacuum pressure within each interstice.

The walls of the tank were split into four separate sections in this way, with each zone over-lapping onto the previous zone's double skin. The floor section was split into two zones using the same method as the wall sections. In this way the tank had six separate areas of monitoring, each with its own Endress+Hauser vacuum instrument gauge, which was linked back to the client's control room.

At each stage and with every zone, sign-off was completed only when the zone could hold its vacuum and there was no doubt in regards to pin holes or any defects. Commissioning consisted of visual inspection and holiday detection (spark testing) of every inch of the tank coating onto the original steel and again after the coating was applied to the double skin materials. Testing was performed several times on each zone, before sign off and prior to the tank being handed back to the client.

Due to the highly corrosive nature of the hydrochloric acid all pipe connections to the tank were reviewed and protected and the tank hatch was internally coated to ensure there was

no area of the tank that could potentially be a leak path due to any corrosion of the steel.

The project was a complete success with the tank coming into use and accepting the first batch of product this past August. With no problems reported and all zones monitored within specifications both Abfad and Simon Storage

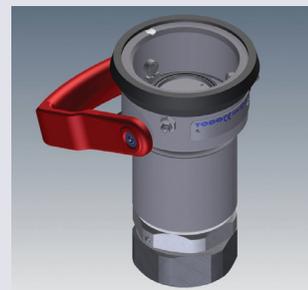
are delighted with the outcome of the project.

Abfad believes this is the first tank used to store hydrochloric acid to be double-skin lined in the UK if not the world. This has also enabled Simon Storage to store hydrochloric acid in the north-east of England for the first time.

[www.abfad.co.uk](http://www.abfad.co.uk)

## Stop thief!

**COUPLINGS** When the Turkish Rail Authority was looking for a way to reduce the theft of fuel from its fleet, it turned to Emco Wheaton and its range of Todo-Matic dry-break couplings



Emco Wheaton engineers responded to a challenging request from the Turkish Rail Authority with an innovative anti-theft solution. The Todo-Matic adaptor, which is mounted on the rail car, incorporates a switch that senses the magnet mounted on both the coupler and the adaptor cap. This connection generates an 'on/off' signal that alerts the locomotive driver if a coupler or cap is disconnected from an adaptor without authority or at the wrong time.

The coupler, cap and adaptor are designed so that when correctly joined the magnet and switch will align. Rob Williams, Emco Wheaton's sales manager for Todo products, explains: "When the cap is removed by an unauthorised person, a magnetic switch fitted on the tank unit immediately sends a signal to a control unit in the driver's cab. By notifying the driver of the unauthorised removal of the cap, it leads to a reduced chance of stolen fuel."

The Turkish Rail Authority saw the value of this solution and, as a result, 1,500 2" units have now been supplied to the Authority.

The Todo-Matic has been used in a number of applications for many years and its performance is being constantly assessed to ensure it is fit for purpose. This evolution of the products is an example of its versatility and the ability of Emco Wheaton engineers to find solutions for the issues its clients face.

### Primed for performance

The standard Todo-Matic tank unit is designed specifically for the safe and spill-free transfer of

aggressive fuels and chemicals. It is available in a range of size and seal variants, all offering the same high quality that the market expects of all Todo products. Offering low pressure drop performance as well as additional security, the tank unit uses flow-optimised internal components with taper valve seating. A piston stem arrangement allows close fitting to associated valves without interference.

Unlike other designs on the market, the piston support structure is fully secured to prevent dislocation in high flow or viscous product transfer, Emco Wheaton says. In sizes from 1" to 6" and a wide range of material options, Todo-Matic couplings offer advanced fluid handling solutions to a diverse range of industries.

Under the Todo brand name, Emco Wheaton manufactures and supplies a wide range of couplings for the safe handling of hazardous fluids and gases. Designed and manufactured to EN ISO 9001:2008, ISO 14001 and OHSAS 18001 accredited procedures, the product range will continue to conform to all relevant international quality, performance and safety standards.

With the Turkish Rail Authority now benefiting from the tank units throughout their rail truck fleet, Emco Wheaton has once again reinforced its ability to develop customised solutions in order to better serve its client's needs to safely transfer their most aggressive or valuable liquids.

[www.todo.se](http://www.todo.se)



Vacuum gauges are installed outside the tank