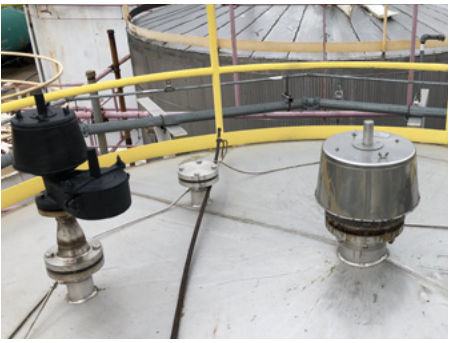
APPLICATION SUCCESS STORIES

PROSHIELD™ Coating for Controlling Unwanted Buildup

PROTECTOSEAL®
Safety Without Compromise

Background



Typical vapor control equipment installation

Widely considered as the building block of the plastics industry, styrene monomers are used in the production of polystyrene plastics, fiberglass, rubber, latex and is the basis for a whole host of finished products that we use on a daily basis. Almost all styrene is now produced by dehydrogenation of ethylbenzene, a compound obtained by reacting ethylene and benzene – both of which are derived from petroleum.

In 2018, there were over 30 million metric tons of styrene produced globally. Major manufacturers of styrene monomer are primarily concentrated in key regions of the world where the polymer industry is expanding at a great pace (i.e. China, USA, etc.).

Application Challenge And Solution

PROSHIELD™ Coated PVRV

Styrene is a volatile, flammable liquid and if not inhibited properly will tend to polymerize. Polymerization is initiated by heat, lack of inhibitor and dissolved oxygen, contacts with peroxides or other initiators (such as free radicals, ions, rust, etc). Polymerization in storage is of great concern to manufacturers. As the process is exothermic, the temperature in the storage tank may rise to a level where the reaction becomes very rapid and self-sustaining (resulting in a runaway polymerization). The temperature may even reach or exceed the boiling point of the styrene. The styrene vapor may erupt violently from the tank vents; if the vents are plugged or too small, it can create enough pressure to rupture the tank. Tanks must be designed according to recognized international standards such as API 650 and API 2000 / ISO 28300. The maximum storage temperature for liquid styrene is 25C.

A leading global manufacturer of resins, gel coats, colorants and additives for composites was facing operational difficulties due to the rapid and frequent polymer buildup on their vapor control equipment. Weekly inspections had to be conducted, with significant maintenance hours expended to ensure that the equipment was cleaned and cleared of the hardened styrene polymer. The time consuming and often, aggressive procedure required for the removal of the buildup sometimes caused damage to components critical to the proper function of their pressure and vacuum relief vents.

Working closely with their engineers, Protectoseal supplied a model 8542 End-of-Line Pressure / Vacuum relief vent offered with our fluoropolymer based PROSHIELD™ coating for testing on their storage tank. This coating, applied to all wetted surfaces was proposed with the primary objective of controlling or reducing polymer formation. By providing a smooth, nonporous, low coefficient of friction surface, retention and attachment of

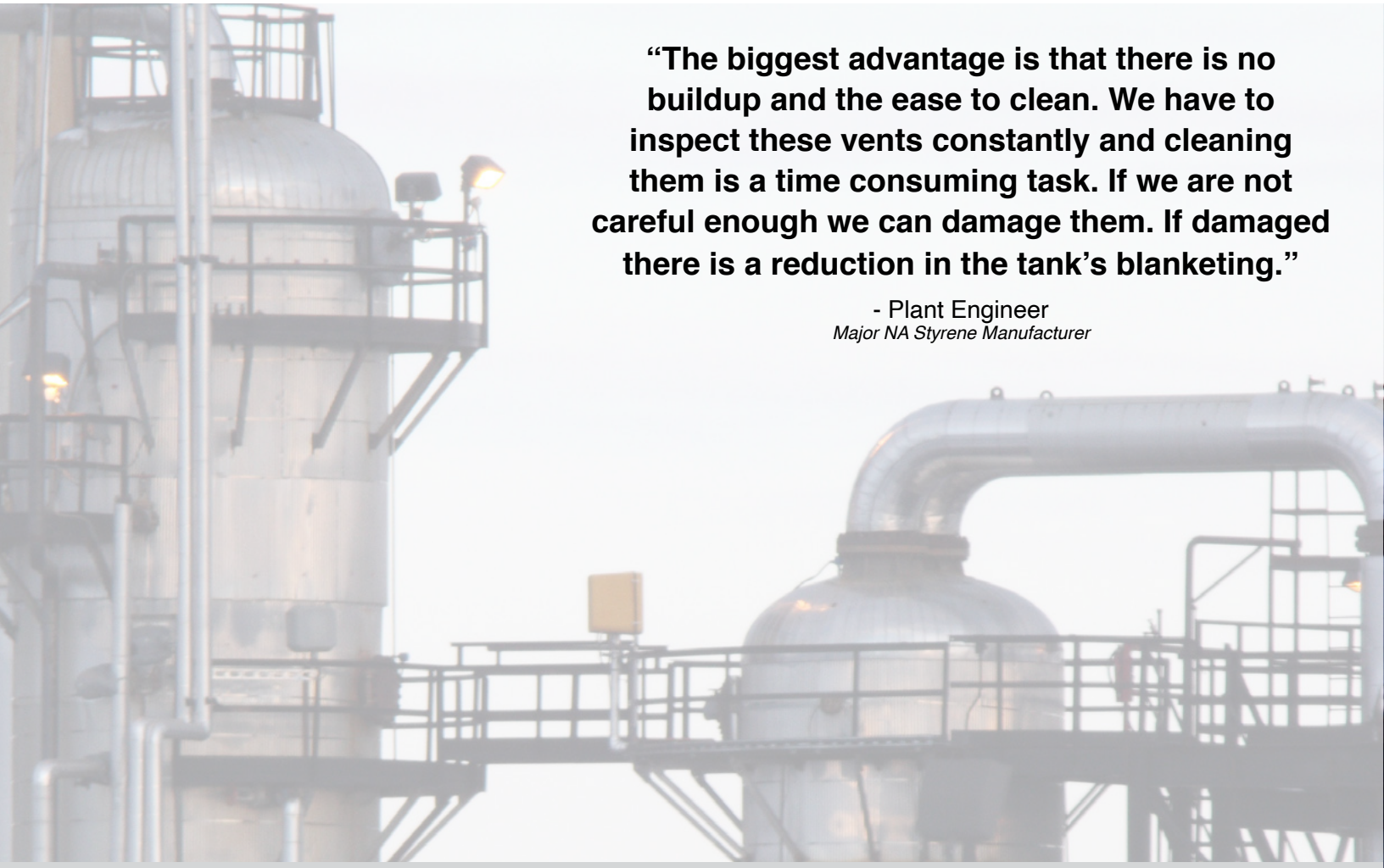
Uncoated vent after 2 weeks

the condensed uninhibited monomer droplets should be minimized. The droplets on the surface of the coated vent would be allowed to rapidly drain back into the inhibited liquid monomer before polymerization can take place. The trial unit successfully field tested for over 10 months exhibited little to no buildup during that period. The Protectoseal solution resulted in significant reduction in maintenance and replacement cost for this customer. Their weekly inspections are now done quarterly, more consistent with best industry practices.

PROSHEILD™ coated vent showing no signs of build-up after 10 months

Contact Us To See If PROSHIELD™ Is Right For You.

For other innovative flame and vapor control solutions visit the custom engineering solutions section of our website.



“The biggest advantage is that there is no buildup and the ease to clean. We have to inspect these vents constantly and cleaning them is a time consuming task. If we are not careful enough we can damage them. If damaged there is a reduction in the tank’s blanketing.”

- Plant Engineer
Major NA Styrene Manufacturer