

TUFF[®] BASE MURRAY EQUIPMENT BASES



The Case for TuffBase[®]

Oil and gas companies have been depending on above ground storage tanks, or AST's, to store liquids since early discoveries were made. These AST's are commonly made of metal and are subject to corrosive conditions that exist in the environment. Companies are experiencing the most damage to AST's near the bottom where AST's meet the substrate. There are many methods to prevent corrosion including anodes, coatings, and elevating the AST's out of the wet environment. We will focus on the elevation aspect of prevention.

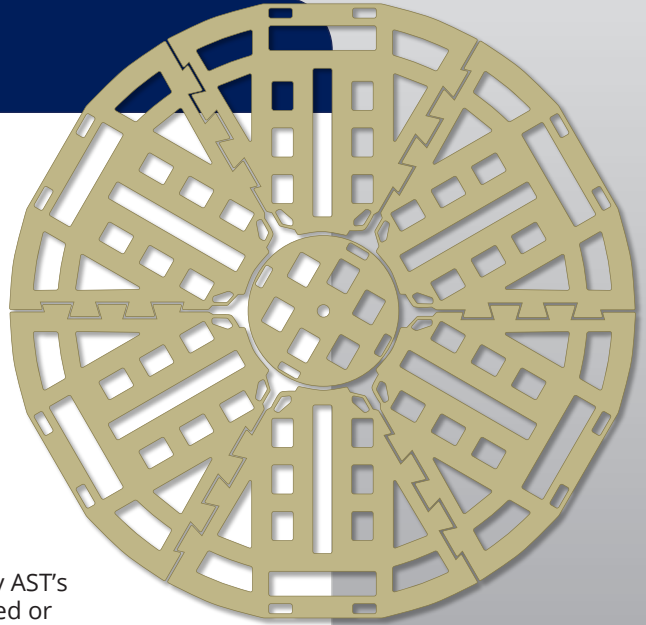
In addition to easy manway access, elevation breaks the cathodic bond between the AST and the ground. Over our 20 years of building secondary containments and prior to the introduction of our patented technology, we have seen elevation achieved with concrete, gravel bands, and coated foam pads.

Concrete pads are very expensive, usually precast, and shipped on the day AST's are being installed to minimize crane costs. When a concrete pad is cracked or damaged it leads to costly down time. Concrete, known to be highly corrosive, is not effective in protecting the AST from corrosion.

Gravel bands may look affordable on the front end, but when shipping truckloads of gravel, backhoe time, and roustabout hours are considered, hidden costs add up. Gravel band installation time can add a day to the construction schedule because every gravel band must be perfectly placed, rounded, and leveled ahead of the AST arrival. In addition, gravel tends to trap moisture from the hydrocarbons and speeds up corrosion. Other factors making the gravel band a poor option include not being modular or reusable, tough to clean after a spill, and wash out risk.

Coated foam pads are reasonably priced; however, they are far from being the best solution. They lack durability and are easily damaged during shipping and construction, resulting in added labor and materials to perform costly coating repairs before setting AST's. The coating on the foam pads can also be damaged or cracked months after proper installation, opening the foam up to risk of soaking up hydrocarbons. This can lead to deflation and often a costly removal and replacement process that can include shutting down oil and gas operations during the repair. Further, it is not wise to stage these pads too far prior to AST installation because of the risk of wind gusts picking them up and blowing them however the wind may choose. This scenario creates a safety risk and most often leaves the pad in a damaged state and in need of repair or replacement. If time is short or the location is remote, the pad might get put back into service without proper repair, which then opens the operator up to the risks discussed above.

The above experiences led us to believe there had to be a better solution for our customers that would reduce man hours involved with setting tanks, aid in the fight against corrosion, and be a lasting solution.



Past Tank Pad Problems Summarized

- **Concrete Pad-** Expensive, crane needed, cracks and minimal cathodic protection
- **Gravel Tank Bands-** Hidden costs, increase in man hours, not modular and traps liquids
- **Foam Pads-** Delicate, subject to wind, outer coating can tear leading to foam saturation



The Best Solution for Elevating a Tank

TuffBase® tank base was invented by Murray because we had a front row seat to the problems our customers were facing inside of their secondary containments.

TuffBase® uses rotationally molded polyethylene to create a nearly indestructible hard shell that is engineered to last and has several problem-solving, user-friendly features. TuffBase is the only walk away solution on the market.



TuffBase® Benefits

- Proven under 10,000 tanks since 2015
- Setup in 1 minute, no extra equipment required
- Engineer tested and approved
- Modular and re-usable
- Multiple sizes available
- Increased air flow and cathodic protection
- Ships nationwide direct to site
- Local authorized dealer network

