

5 Options for Dip Tank Maintenance

Maintaining the optimum reactive level of form release agents in pipe production dip tanks ensures performance and quality.

By Bob Waterloo



Dip tanks are used frequently in the pipe manufacturing industry as an efficient means of coating parts with form release agent.

Dip tanks play a critical role in the dry-cast pipe production process for many manufacturers. The reactive properties of the fatty acids in the form release agent enable the pipe to smoothly release from the pallet/header. Here's the problem. The cement/concrete residue left behind when headers are dipped begins to negate the reactive properties of the fatty acids.

Left unchecked, the form release agent eventually begins to lose its effectiveness, pipes will not pull easily from the headers and quality could suffer. The solution: a regular program of monitoring and maintenance that keeps the form release at the optimum reactive release level and reduces replacement and disposal costs.

BENEFITS OF A DIP TANK

Reactive form release agents are the accepted standard

in today's precast and pipe-forming operations. Fatty acids, which are found in an infinite number of blends, are the most commonly used reactive material. Fatty acids have the unique ability to react with the free lime on the surface of the concrete, which results in a nonviolent chemical reaction. This neutralization (or saponification) forms a metallic soap, allowing the product to easily release.

There are a number of benefits to using a dip tank to apply form release during pipe-forming operations, including complete coverage, proper release and reduced chance of operator error. However, a common occurrence when using this method of manufacturing is increasing difficulty with "pulls" or "tip-outs" during stripping over a period of production time. This is generally the result of decreased reactive material in the dip tank as

contaminants enter the system and negate some of the reactive material.

MAINTAINING THE DIP TANK

Two areas must be addressed in the preventive maintenance program for this type of equipment:

1. **Regular maintenance to remove sludge that accumulates in the bottom of the dip tank**
2. **Regular maintenance of the release agent's reactive levels for effective release**

The sludge generated in the dip tank includes contaminants from previously dipped headers/joint rings. These contaminants negate the reactive portion of the form release. As the reactive portion of the release agent gradually decreases, the possibility of concrete sticking to the headers increases, causing a more difficult release. The rate



of decrease is gradual and depends on a number of factors, including rate of production and amount of contaminants allowed to enter the dip tank.

REMOVING CONTAMINANTS

Rather than disposing of the entire tank of form release, transfer it to a holding tank and shovel out the sludge.

Because the sludge typically contains petroleum hydrocarbons, disposal should be in compliance with local regulations. Then transfer the recovered form release agent back into the dip tank and top it off with fresh release agent.

Remember that by adding fresh release agent to the recovered material, rather than using all new release agent, reactive levels will be reduced and release problems will occur sooner unless the reactive portion is tested and brought back to a normal level. The discoloration of the recovered material from the dip tank is not relevant to the release characteristics, or levels of reactive material.

MAINTAINING REACTIVE RELEASE LEVELS

Maintaining the correct level of reactive agent in the form release is quite simple. Test the recovered material and bring the reactive portion back to optimum levels.

Test a sample from the dip tank (less than one ounce is sufficient) for the reactive level through either titration or infrared analysis. Your release agent supplier should be able to tell you the optimum level of reactive material required, and may be able to run the analysis for you. Once you determine the level of fatty acids, a number of simple calculations determine the amount of pure reactive agent to be added to the dip tank to bring it back to the optimum reactive level.

After adding the recommended amount of reactive material to the dip tank, use an air lance for mixing for a minimum of two minutes, making sure to cover the entire area of the dip tank. Then top off the dip tank with fresh release agent and air lance again for good distribution.

Depending on the amount of contaminants and reduced reactive material, the timeframe between tests will vary. One way to determine the frequency between tests is to establish a baseline. Begin with tests every 30 days, which should be recorded, until a history can be compiled to determine the needed frequency. Normal frequency of adding more reactive ingredients is typically five gallons for every six weeks of normal production.

In many cases, production workers can see the reduced effectiveness of release

Form release in the dip tank will eventually become contaminated, requiring some level of maintenance.

agents. It's important to train them to notify management to add additional reactive material to the dip tank. As usual, science is best, but practical application and analysis are also important.

TOTAL REPLACEMENT OF FORM RELEASE

While removing sludge and maintaining dip tanks by adding new release as needed make sense from an environmental and cost perspective, on occasion you may feel it necessary to clean the entire dip tank to remove all residual sludge and refill the cleaned dip tank with fresh release agent.

COST-EFFECTIVENESS

Dip tank maintenance comes down to five options. Option 1 is the least cost-effective, while Option 5 is the most cost-effective.

Option 1: Drain the dip tank, dispose of the sludge and old release material, then refill only with fresh form release agent.

Option 2: Remove the form release from the dip tank, dispose of the sludge, refill the dip tank with fresh form release, then use the recovered form release to replenish the dip tank as necessary.

Option 3: Remove the form release from the dip tank, dispose of the sludge, refill the tank with recovered form release, then top off with fresh form release.

Option 4: Remove the form release from dip tank, dispose of the sludge, test the recovered form release, add reactive ingredient to bring it back to an optimum level, then top off with fresh form release.

Option 5: If there is not enough sludge to remove but the release is not as good as it should be, test for the reactive level of the release agent in the tank, then add reactive material to return it to an optimum level.

In the long run, a little care and attention to the reactive content level in the dip tank will help to reduce labor costs and maintain or improve casting appearance. **PI**

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The author has summed up the entire problem and solution of dip tank maintenance in poetic fashion.

To read the poem, please visit precast.org/diptank
