Pre-Cured UV GRP vs. Wet-Applied UV GRP

Oil majors specify pre-cured GRP in their requirements due to issues caused by large scale application of wet-applied GRP. We will look at the pros and cons of each and provide evidence of the impracticality of wet-applied GRP on large projects.

Let's begin with the economic impact of wet-applied GRP. While the per roll price of GRP is lower than pre-cured GRP fittings, the training time required to become proficient in installing it causes the price to increase significantly. Most installers can be trained in a day to install pre-cured pieces as it is similar to other jacketing options. Using pre-cured pieces can save up to 30% on labor expenses.

Environmental factors also play a huge role in the time required to install uncured GRP. Uncured GRP must be protected from light and moisture until the curing process is ready to begin. Exposure to light can cause premature curing and precipitation can inhibit the curing process permanently. Extra expense is incurred in providing shelter to protect the uncured product until it has fully cured.

Shelter required to protect uncured GRP during application and curing phase.

Poor adhesion of wet-applied GRP. Removal of this piece may result in damage to the underlying insulation. A new piece of uncured GRP is also required.

Applying uncured GRP to large areas of piping creates a rigid system with little to no flexibility. The expansion/contraction characteristics are greatly reduced in the wet applied system; which leads to cracking of the jacketing. Precured systems employ an elastomeric adhesive at the joints which allow for system movement but still maintains the watertight seal. Wet applied GRP will also bind directly to the insulation and adjoining pieces of GRP. In the event damage takes place, it is virtually impossible to remove wet-applied GRP in such a manner as to reuse. Pre-cured pieces are joined to each other using an elastomeric adhesive specifically designed by the manufacturer. The pre-cured pieces don't adhere to the insulation. Therefore, there is flexibility and expansion/contraction opportunity as required due to temperature fluctuations. If pieces need to be removed

for inspection of the underlying insulation, the adhesive can be removed and the piece reapplied when work is complete.

Lamps needed for curing wet-applied GRP on site.

Curing wet-applied GRP can be tricky, time-consuming and costly. Lamps need to be positioned in such a manner as to reach all portions of the uncured product. This can be difficult on curved areas and repositioning is almost always required. At least 30 minutes of exposure is necessary to ensure complete curing. Application cannot proceed at a rate faster than curing in order to protect the uncured product. Oftentimes over 100 lamps will be required to get the proper exposure and curing times required for an on-time completion. Factoring in the additional time required and the expense of lamps (at least $150.00 for a 400 watt lamp) , it's easy to see how quickly costs can rise using uncured GRP. Using pre-cured GRP eliminates the need for lamps and curing time. Work can proceed as the adhesive is curing.

Uncured GRP has a finite shelf life. This can be problematic on a job site where delays are inevitable. If there is a substantial delay, some product may become unusable. Storage may also be an issue as uncured GRP needs to be protected from environmental exposure. High temperatures or humid conditions accelerate deterioration. Pre-cured GRP has an unlimited shelf life and requires no special storage, which eliminates having to throw product away.

A roll of uncured GRP must be protected from light and moisture until fully cured.

Pre-cured GRP fittings conform to ASTM C585 to ensure standard sizing. Pre-cured fittings also ensure all quality control standards have been met during the fabrication process. Treatment with a UV resistant coating extends the life of the fittings and ensures no color loss while the parts are awaiting application. As a result, application is much quicker and smoother and can proceed as with any other metal jacketing system.

A pre-cured fitting treated with a UV resistant coating.

It is difficult to ensure compliance with sizing standards when using uncured GRP fitted on-site, as the fit is dependent on the skill level of the installer. "Wrinkles" can also be an issue with on-site wet installation as the uncured GRP will take on the appearance and shape of the insulation product underneath. Time constraints, weather conditions and skill level all factor into the finished product.

Tank head applied uncured on site.

Tank head installation with pre-cured pieces.

When the pre-cured system is utilized the GRP finish will be significantly better than that of a wet-applied UV-GRP system. There will be no wrinkles as the material is pre-cured to a smooth finish. The pre-cured GRP also covers any imperfections of the insulation or vapor barrier and it will also give a level finish to a flexible insulation material such as fiber or aerogel blankets. It is still highly recommended to use qualified insulation contractors, but the pre-cured material is more forgiving during the installation process. The pre-cured system is finished off using the manufacturers adhesive. Training and practice ensure an aesthetically pleasing final product regardless of the skill level of the insulation contractor.

Tank with pre-cured panels.

In conclusion, the advantages of pre-cured GRP fittings over uncured GRP are significant:

- Ease and pace of application
- Reduced training time
- Lower application cost
- Superior finished product
- Ability to remove and reapply pieces for maintenance