Vinyl Ester Resin Measuring and Mixing

Vinyl Ester Resin is a resin which has superior chemical resistance and heat tolerance. It can be used with most diluted strong acids and bases. It can also be used where operating temperatures are in excess of 215°F/ 101°C. The recommended continuous service temperature is 162-165°F. This makes it ideal for commercial drainpipes or pipes where corrosiveness is an issue.

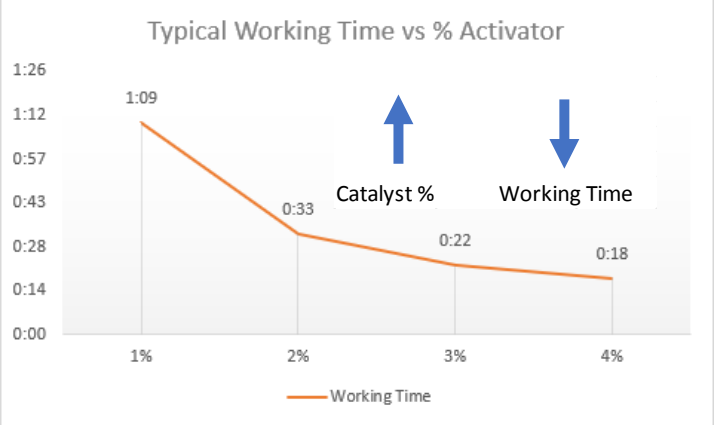
This resin is unlike epoxy because its activator is a powder.
The amount of powder can be adjusted to lengthen or shorten your working and cure times.
Remember, if you shorten your cure time you are also shortening your working time. The cure time of vinyl ester resin is typically between 1-3 hours.

Measuring:
When measuring your resin, you must first determine how much resin your liner needs. Use the same pounds per foot (lbs./ft) multiplier as you would for epoxy resin with the liner type. This number can be found on your field installation sheets/Liner Technical Data Sheets (TDS).

Once you have calculated the total amount of resin needed, you can weigh out the vinyl ester resin. Use the total amount for the base resin. To determine the amount of powder activator, multiply your total amount of resin by 1-4 PERCENT (1% = 0.01, 2% = 0.02, 3% = 0.03, 4% = 0.04) based on the installation needs. The higher the percentage of activator, the faster the reaction, and therefore the lesser amount of working time. **ALWAYS convert the amount of activator to grams** (from pounds) and use a gram scale to measure the powder activator. It is very important to be accurate, as these measurements impact working and cure times. There are 454 grams in 1 pound.

Several factors play a part in the working time and cure time when using the VE resin system. Catalyst percentage, base resin starting temperature, ambient/environment temperature are a few.

At 70°F ambient temperature and starting resin temp of 70°F, Vinyl Ester resin with a 2% CH-50 catalyst would give a working time of about 30 minutes. Higher ambient or resin temperatures would reduce this working time.



Measurement Calculation Example
Example: 4" liner is 100ft long
100 ft X 0.85 lbs./ft (pounds per foot resin ratio for 4" scrim liner) = 85 total pounds of resin.
The total *85 lbs*. will be measured from the bucket of Vinyl Ester Resin.
Find the lbs./ft for liner type and size on corresponding liner TDS.

To determine the amount of activator:

1% Activator	2% Activator	3% Activator	4% Activator
85 lbs. X 0.01 = 0.85 lbs. activator 0.85lbs. X 454 = 385.9 grams	*85 lbs.* X 0.02 = 1.7 lbs. activator 1.7 lbs. X 454 = 771.8 grams	*85 lbs*. X 0.03 = 2.55 lbs. activator 2.55 lbs. X 454 = 1,157.7 grams	*85 lbs*. X 0.04 = 3.4 lbs. activator 3.4 lbs. X 454 = 1,543.6 grams
Most Working Time →			Least Amount of Working Time

Mixing:
The mixing of the vinyl ester resin will be done the same as the epoxy supplied by Perma-Liner Industries.
The vinyl ester resin should be pre-mixed for 3-5 minutes before the CH-50 activator is added. Before adding the activator powder to the resin, make sure that no "chunks" or "clumps" of powder are evident. You want to ensure that the powder is of a sand type consistency because the resin mixing paddles have trouble breaking the "chunks" down. This could lead to an insufficient amount of activator in the resin. Pour the appropriate amount of activator powder into the base resin per the calculations for your install. Apply a mixing paddle attached to a high-speed drill. Mix thoroughly for at least 3-5 minutes. Make sure no swirling of the resin is evident and that the resin is a solid, consistent color. Once mixed, pour into your liner, and saturate according to PLI trained procedures.

Storage and Shelf Life:
Store resin and activator out of direct sunlight. It is recommended not to store at temperatures over 77 F. When properly stored, the shelf life for both the resin and activator will be 6 months. It is good practice to mix the resin prior to use. After extended storage, some drift may occur in gel time and viscosity.

Disposal:
Disposal must adhere to local and state regulations

Handling:
Please refer to the SDS for safe handling of the Vinyl Ester Resin System.

Please refer to the Technical Data Sheet for this resin system for additional information.
If you have any questions, contact the technical assistance team at Perma-Liner Industries (1-727-507-9749).