Field Operations When Running Acid Through Coiled Tubing

Coiled tubing (CT) is a versatile well intervention process utilized for different operations throughout the lifecycle of a well. Acids are often pumped down CT to remediate well issues, including treating the formation or removing scale buildup within the tubulars. While the acid is useful for solving the well's problems, it can negatively affect the string if not delivered properly.

We recommended fine-tuning the following steps to your operational conditions (acid concentration and type, environmental conditions, level of protection desired, etc.) for the best results.

Best practices

- Utilize double inhibited acid at all times, which has two times the corrosion-protection chemicals that are typically required.
- Ensure the acid chemicals are added to the acid as it is being mixed (metered addition method) versus the bulk addition method prior to the raw acid loading. Once acid and chemicals have been added, "roll" the acid tank at the highest rate possible, a minimum of three times the fluid volume, to ensure all chemicals are evenly distributed in the acid blend.
- Verify final acid concentration percentage and chemical volumes for the respective acid blend are correct.
- Create a process of checking for inhibitor efficiency at pre-determined intervals. Add more inhibitor as needed, rolling the tank after addition. The higher the ambient temperature, the more often this needs to be checked (at least once every 24 hours from when the acid is mixed). The most common field method is the "nail test" at the ambient temperature plus 10 to 15°F.
- "Roll" the acid tank at the highest rate possible for a minimum of three times the fluid volume at least once every 24 hours to ensure all chemicals remain properly distributed within the acid mixture. The higher the ambient temperature, the more often it is recommended to roll the tank.
- Pump an acid neutralization fluid as soon as possible after acid is pumped. Ensure that all areas of the CT that were in contact with the acid are treated.
- Utilize OD and ID corrosion mitigation coatings from chemical companies that have specifically studied and developed CT corrosion inhibitors after operations are complete.

Nail test

The nail test is a common and inexpensive method for testing corrosion inhibitor effectiveness. It involves the fluid of concern, a standard carbon steel cleaned nail (typically in the 4 to 16 "penny" range), a test tube with a stopper, and a pre-heated water bath.

NOTE: Utilize proper PPE and ventilation as required by the chemicals you will be working with.

1. Utilizing gloves, clean the standard nail with a de-oiling/greasing cleaner and steel wool to remove all corrosion prevention coatings from manufacturing. It is recommended to clean immediately before use.
2. Wipe nail clean with a residue-free degreasing solution (brake cleaner and clean paper towel)

NOTE: It is recommended to conduct steps 1 and 2 imediately before use.

3. Place the cleaned nail from above into the test tube.
4. Fill the test tube with the fluid of concern, ensuring the nail is completely submerged.
5. Cap test tube.
6. Place test tube upright into a water bath (ensuring the top of the test tube is at least 1 in. above water level) for the desired time and/or until visible corrosion is noticed.
7. Document findings.
8. Repeat steps 1-7 as needed.

Acid and Coiled Tubing Lab Sheet

Customer	
Location	
Well(s)	
Date	
Operation	

Pump Path Transit Time	
Coiled tubing	minutes
Annulus	minutes

It is recommended that the corrosion test time be at least 2X the pump path transit time.

Tube/ Test #	Fluid of Interest	Tank #	Sample Collection Time	Test Temperature	Test Start Time	Test Finish Time	Test Duration	Observations
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								