

What is Quench®?

Quench is a mild oxidizing agent used in the vapor phase to remediate pyrophoric iron sulfide. Quench can be injected with steam or nitrogen immediately following the patented QuikTurn® Vaporganic® process. The reaction between Quench and iron sulfide is complete when a positive result is obtained on the Quench field test strip.

Technical Tuesday

Quench contains two major components in the formulation. The main active component is sodium nitrite (NaNO₂). The other is a field test marker. Quench is buffered to a pH of 9. The following information details the chemistry related to each component:

Sodium Nitrite (NaNO₂)

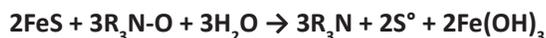
Sodium nitrite is an oxidizing agent that oxidizes iron sulfide into iron oxide. The reaction does not produce heat:



- Sodium nitrite has a molecular weight of 69
- Iron sulfide has a molecular weight of 87.85
- According to the balanced equation above, 69 lbs. of NaNO₂ can oxidize 175.7 lbs. of FeS
- 1 lbs. of NaNO₂ can oxidize 2.55 lbs. of FeS

Field Test Marker*

The field marker is a mild oxidizing agent detectable on the Quench test strip. The field marker oxidizes iron sulfide into iron hydroxide:

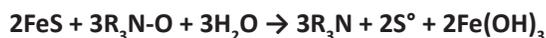


*The field test marker can withstand a maximum temperature of 300°F. If process equipment exceeds 300°F, the marker may not be detected on the test strip.

Quench Test Strip (field test)

The Quench test strip reacts positively with the field test marker. The reaction turns the test strip from red to blue.

However, as the following equation illustrates, when the marker oxidizes FeS, it is reduced into an amine. The amine is not detectable on the test strip.



Quench should be continuously injected into processing equipment until there has been an over treatment of the iron sulfide (as indicated by a positive blue test strip). The positive blue test strip indicates that NaNO₂ and the marker have reacted with all iron sulfide in the equipment and the reaction is complete.

Quench Usage Guidelines

Quench Applications

Quench can be used on a wide variety of equipment fouled with iron sulfide. Examples include:

- Fractionation column overhead exchangers
- Gas plant fractionation towers
- Flare lines
- Overhead accumulators
- Heat exchangers
- Reboilers
- Heavy oil fractionator packed sections prior to rinsing and Permanna® treatment
- Vessels containing demister screens or pads
- Surge drums
- Sour water units
- Amine service equipment

Quench Preferred Applications and Service Conditions

Quench is the preferred pyrophoric treatment product for all fractionation towers in gasoline service or lighter. Examples include FCCU gas plant towers (deethanizer, depropanizer, debutanizer, etc.). The maximum injection temperature is 300°F. One Quench injection point should occur every 30 - 40 trays. Quench injection should always follow QuikTurn injection.

Quench may also be used in unique situations when QuikTurn is not allowed for use due to refinery constraints. The equipment must be in gasoline service or lighter and must be pre-steamed or purged with nitrogen until gas readings for total hydrocarbons (THC) or volatile organic compounds (VOC) are less than 5,000 ppm. Once the gas testing thresholds have been met, Quench can be injected into vessels with steam or nitrogen.