

Vacuum Insulated Tubing



In order to produce adequate volumes of oil from heavy oil formations, it will require a means of lowering the viscosity of the oil in order to pump the fluid to surface. One of the methods to lower the viscosity of the oil is to introduce heat to the oil. The injection of steam into the heavy oil formations is a widely used method. The thermal injection of steam can cause problems to the well. Thermal expansion of materials can create mechanical failures to equipment. If the steam quality is low, it will affect the steam oil ratio and become inefficient. There may also be areas of the well that heat is not desirable, like freshwater aquifers.

In most thermal injection wells, the steam is delivered to the formations via tubular and casing. This distance can exceed 1000 meters and as a result, will reduce the steam temperature. Insulating the tubing that delivers the steam to the formation will maintain the quality of the steam.

The Vacuum Insulated Tubing (VIT) is manufactured by installing an inner tube inside an outer tube. The annular between the two tubes is filled with a getter and then sealed on both ends. The tube is then heated to a controlled temperature to create a chemical creation of the getter. After the tube is cooled, the annular space becomes a vacuum. These vacuum (K-Values – BTU/h. • ft. • F) are then measured and rated into five different categories, (A-E) dependent on their insulation values:

“A” = 0.035 – 0.046, “B” = 0.023 – 0.035, “C” = 0.012 – 0.023, “D” = 0.0035 – 0.0116, “E” = 0.0012 – 0.0035

The K-value (insulating quality measurement) of the VIT outperforms most other insulation products used in the industry. Core Design only accepts VIT rated in the “D” and “E” categories, however, the other categories are available upon request.

The VIT manufacturing sizes can range from 2 7/8” to 7”. Vacuum Insulated Casings (VIC) can also be manufactured in sizes larger than 7” diameter. The Grade of tubing and casing used for manufacturing the VIT typically range from J55, K55, L80 and P110, but can also be custom built. All welds are heat treated to API specification and are x-rayed for quality assurance. The VIT connections can either be placed on the inner tube or on the outer tube. Connections are typically BTC and premium connections. Connections be manufactured on the inner tube or the outer tube. The VIT connections also contain insulation sleeves that are installed to the connection during makeup in the field. These thermal sleeves protect this portion of the VIT connection (non-vacuum area) from thermal heat loss. The VIT is manufactured to API casing and tubing specifications and can be run in conjunction with other tubular in the well.

APPLICATION

- Steam Assisted Gravity Drainage type wells (SAGD).
- Cyclic Steam Stimulation type wells (CSS).
- Offshore and onshore oil production.
- Wells susceptible to paraffin deposits.
- Wells in environmentally sensitive areas.

FEATURES

- Enclosed, welded double wall tubing with excellent heat insulation.
- Reduction of energy loss caused by heat transfer, convection and radiation.
- Extremely low thermal conductivity (K and U Value).

BENEFITS

- Reduced heat loss.
- Shortened steam injection cycle.
- Maximized steam quality of steam to the oil formation.
- Increased steam oil ratio (SOR).
- Protect cemented casings and cement bonds
- Mitigating paraffin deposition by maintaining produced fluid temperatures.



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