

APPLICATION NEWS



CARBON DISULPHIDE STORAGE

Measurement for CS₂ in India

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Carbon disulphide (CS₂) is heavy colourless liquid with an offensive odour, capable of ignition. Its low flash point (-43 °C), its wide explosive range in air (1.3 to 50%), boiling point is 46 °C & its ignition temperature is about 102 °C make it a particularly explosive & hazardous substance. It is volatile at ordinary temperature. It is however inert to most of the metals, ceramics, glass & it is completely stable in steel vessels.

The instrumentation task for NIVELCO Instruments India Pvt. Ltd. was Interface Level Measurement for CS₂ storage tank at Grasim Sellulosic Division (Aditya Birla Group), Vilayat, Gujarat; India. Requirement from the client was for Level Transmitter for 2 storage tanks of CS₂ and the height of each tank was 9450 mm (31 ft).

Storage of CS₂

Carbon disulphide is generally stored under water in tanks, as it is heavier than water [density: 1.539 g/cm³ (-186 °C), 1.2927 g/cm³ (0 °C), 1.266 g/cm³ (25 °C)] as well as insoluble in water at normal temperature. It is insensitive to the shock so long as no oxygen is present, Vapors are readily ignited, and the heat of a common light bulb may suffice. Therefore, except when in original containers in small quantities, it should be kept blanketed with inert gas or water at all the times for the storage of large quantities in vessels or tanks.

Criticality in Level Measurement

CS₂ is so reactive that it has to be stored under a layer of water to prevent it from igniting, and the level of the interface between the water and carbon disulphide requires constant monitoring. The conventional level instruments cannot be considered for this application as it is interface level measurement.

Generally for interface level measurement conventionally Displacer Type Level Transmitter, Capacitance Level Transmitter (limited use) were used or lately Guided Wave Radars (GWR) are used. But all these transmitters could not be applied for various reasons. E.g. Displacer type could not be considered due to tank height as well as practical difficulty in the installation. Capacitance could not be considered because it was difficult to follow calibration procedure practically. While in case of GWR, the application was tricky as the water dielectric constant is approx. 80 while that of CS₂ is about only 2.6. Hence for top mounting installations GWR is not suitable for this application as water is on top of carbon disulphide.

NIVOTRACK with cable extended probe

The Magnetostrictive Level Transmitter is most suitable instrument in this application as the density difference of both the liquids is considerable to calculate the desired weight of the float to pass through upper layer of water and float on CS₂. The client was using similar instrument, but was facing problems as that instrument was supplied with rigid electrode of 9.5 meters of the length and practically was very difficult to install on the tank from the top.

Hence we suggested **NIVOTRACK MBK-595-B Ex** level transmitter with 0.1 mm accuracy option, with cable extended probe and flameproof (Ex d) aluminium housing.

The instruments are working fine and reliably to the satisfaction of the client.