Gas Chromatograph -Hydrogen Gas Safety

Gas Chromatograph-GC

The purpose of the Gas Chromatograph (GC) is to analyze samples of chemicals and determine the composition. Units can be installed both on industrial plant and lab facilities. Samples are fed into the Gas Chromatograph using carrier gases including hydrogen and nitrogen. Gas Chromatograph Hydrogen Gas Safety-Hydrogen gas (H2) is used for the flame ionization detector (FID) in gas chromatographs (GC). Hydrogen is a dangerous gas that explodes easily.

Hazards Associated with Gas Chromatograph During Operation

- If hydrogen gas accumulates in the gas chromatograph oven, it could potentially ignite. For example, if hydrogen gas is continuously introduced at room temperature into a 15 L enclosed space at a rate of 40 mL/min (recommended flowrate for FID), it is calculated to reach the explosion limit (4 %) after 15 minutes. However, if the gas concentration inside the space is not uniform, the explosion limit may be reached in a shorter time.
- Hydrogen gas leaking from tubing could potentially ignite.
- If hydrogen gas released from the gas chromatograph accumulates in the room where it is installed, it could potentially ignite.
- If hydrogen gas is discharged from the high-pressure gas cylinder, sudden expansion of the gas could potentially cause it to ignite.

Procedures for operating the gas chromatograph using hydrogen carrier gas are described below.

- ✓ Before starting up the instrument, open the main valve on the carrier gas cylinder to check that carrier gas is being supplied to the gas chromatograph.
- ✓ Check that there are no leaks in the tubing system.
- ✓ Start up the instrument according to the procedure described in the Gas Chromatograph User's Guide.
- ✓ Perform analysis.
- ✓ When shutting down the instrument, perform Shutdown according to the procedure described in the Gas Chromatograph Instruction Manual.
- ✓ Close the main valve on the carrier gas cylinder.

Recommended Emergency Measures

If hydrogen gas has accumulated or if there is a power outage, follow the procedure below to stop the supply of hydrogen gas and eliminate hydrogen gas from the room.

- ✓ Immediately stop the supply of hydrogen gas.
- ✓ Switch OFF power to the gas chromatograph.
- ✓ Open the windows and doors of the room where the instrument is installed to thoroughly ventilate the room.
- ✓ Confirm that there is no ignition source in the room that could ignite the hydrogen gas.
- ✓ Wait until the temperature of all gas chromatograph components has fallen to the ambient temperature (approximately 1 hour).
- ✓ Open the door of the gas chromatograph.
- ✓ Wait until all hydrogen gas is completely expelled from the instrument/column (approximately 30 minutes).

After confirming the items in "Precautions During Installation" and "Precautions When Operating the Instrument," use the standard startup procedure to start the gas chromatograph.

"Inspect the pressure gauge at least once every three months".

Prepared by
SADIK PM