

Appendix IV (C): Chromatography – Gas Chromatography (GC)

GC is a separation technique consisting of gaseous mobile phase and a solid or immobilized liquid stationary phase. The sample is introduced through the sample injection port, heated and vaporized, and carried into the column by a carrier gas. Components of the test sample are separated in the column and pass through the detector in succession, a chromatogram is thus recorded.

- (1) **General requirements of the apparatus** – Unless otherwise specified, nitrogen is employed as a carrier gas. A packed column or a capillary column may be employed for the test. A packed column is made of stainless steel or glass. The stationary phase of the column consists of active adsorbent, porous polymer beads or inert solid supports impregnated with liquid phase. A capillary column is made of glass or quartz with internal diameter of 0.2 or 0.32 mm. The stationary phase may be coated or chemically bonded to the inner surface of a column or supporting materials. The temperature of the sample injection port is usually set at 30-50°C higher than that of the column itself. The volume of solution injected is usually no more than several micro-litres, the smaller the diameter of the column, the smaller the volume of solution is injected. Flame-ionization detector, electron-capture detector and mass spectrometric detector can be used to detect the separated components. The temperature of the detector is higher than that of the column itself, usually set at about 250-350°C, but never below 100°C. This will avoid condensation of the moisture.

Parameters including the type of the detector, stationary phase and the supporting material of the column as specified in the individual monograph should not be varied. Other parameters may be varied to fit for the performance of the system suitability test. These include the internal diameter and the length of the column; the commercial brand and size of the supporting materials; the concentration of the liquid stationary phase; the flow rate of the carrier gas; the temperature of the column; the quantity of the injecting and the sensitivity of the detector, etc.

- (2) **System suitability test** – The criteria for assessing the suitability of the system are the same as those set out in Appendix IV(B).
- (3) **Procedure** – The procedure is the same as those set out in Appendix IV(B). Pay special attention to the effect of the change in room temperature and the injection time.