■Reaction principles and interferences

If sample air contains substances similar to the target substance, they will similary react to the reagent(s) in the detector tube, affecting tube indication. These substances are called interfering substances or interferents. Influences of interferlng substances vary depending on the reaction type of the detector tube. Gastec detector tubes employ three types of reaction principles:

① Direct reaction in which the substance to be measured directly reacts with a detecting reagent.

(Example) No. 1L Carbon Monoxide detector tube :

$5CO + I_2O_5 + H_2S_2O_7 \rightarrow I_2$

② Compound reaction in which the substance instantaneously reacts with several detecting reagents within the analyser layer.

(Example) No. 5Lb Sulphur Dioxide detector tube :

$SO_2 + BaCl_2 + H_2O \rightarrow BaSO_3 + 2HCl$

$HCl + base \rightarrow Chloride + H_2O$

③ Two-step reaction in which the substance is oxidised in the pretreatment layer before reacting with the detecting reagent in the analyser layer.

(Example) No. 11L Nitrogen Oxides detector tube :

$NO + CrO_3 + H_2SO_4 \rightarrow NO_2$

$NO_2 +$ o-Tolidine$\rightarrow$ Nitroso-o-tolidine

• Interferences in direct reaction type detector tubes

① The reagent (s) will also react to interferents, giving a higher indication. An example of such interferent is hydrogen sulphide to the Hydrogen Cyanide detector tube (No.12L).

② If a pH indicator is contained in the tube, acids and bases will react as interferents, giving a higher indication. An example of such interferent is hydrogen chloride to the Hydrogen Cyanide detector tube (No.12L) .

• Interference in compound reaction type detector tubes

If the substance generated by the primary reaction is the same as the target substance to be measured, a higher indication will be given. An example of such interferent is tetrachloroethylene to the Trichloroethylene detector tube (No.132HH).

• Interference in two-step reaction type detector tubes

As the oxidiser (pretreatment reagent) is also consumed by interferents, its ability to oxidise the target substance will be diminished, giving a lower indication. An example of such interferent is aromatic hydrocarbons to the Trichloroethylene detector tube (No.132L).