

### Lecture 3: Standard Methods for Assessment of Reproductive Hazards in Work Environment

As previously mentioned, reproductive hazards in workplace may result from chemical, biological or physical agents.

#### 1. Assessment of Chemical Hazards

Industrial hygienists are responsible for the evaluation and control of employee exposure to occupational health hazards. For the evaluation and control of inhalation hazards, hygienists typically compare the measured concentration of an airborne chemical to a recognized occupational exposure limit (OEL). Standardized methods for the collection of air samples have been developed to ensure that accurate and meaningful information is collected. Hazardous gases, vapors, and particulate matters are all air pollutants, when inhaled, and they are included in the chemical hazards class.

#### 2. Types of Air Sampling

##### 2.1. Personal Versus Area Sampling

2.1.1. **Personal air sampling** is the preferred method of evaluating worker exposure to airborne chemicals. Is placed as close as possible to the breathing zone of the worker. The data collected closely approximate the concentration inhaled. (*Concentration is equal to the mass of the contaminant collected divided by the volume of air passed through the collection device*).

2.1.2. **Area air sampling** can be used to evaluate background concentrations, locate sources of exposure, or evaluate the effectiveness of control measures. The sampling device is strategically placed in a fixed location in the area of interest. In general, this type of sampling is not used to provide an estimate of worker exposure because conditions at the fixed location may not be the same as those experienced by the worker.

##### 2.1.3. Grab Versus Integrated Sampling

2.1.3.1. **Grab samples** are taken to measure the airborne concentration of a substance over a short time period (*usually less than 5 min*). Personal or area grab samples are used to identify peak or ceiling concentrations. Grab samples alone are rarely used to estimate an employee's eight-hour time-weighted average exposure. This is because they do not account for the time between samples. However, they can be used as a screening method to determine whether more extensive sampling is needed.

2.1.3.2. **Integrated air sampling** is used to estimate a worker's 8-h or 15-min exposure to a particular substance by collecting one or more personal air samples for the duration of a particular task or work-shift. It is called integrated sampling because the result integrates all of the various concentrations to which the worker

has been exposed during the sampling period. The resulting concentration represents an average exposure over the sampling period, also known as a time-weighted average (TWA).

## 2.2. Air-Sampling Instruments

There are two categories of air-sampling equipment:

- i) Direct-reading instruments, and
- ii) Sample collection devices.

Direct-reading instruments provide an immediate measurement of concentration. Sample collection devices collect a sample of air that is subsequently analyzed or weighed at a laboratory. These devices are the focus of this chapter.

### 2.2.1. Sampling Train

Air-sample collection devices are made of five basic components: **1)** an air inlet orifice, **2)** a collection device, **3)** an airflow meter, **4)** a flow-rate control valve, and **5)** a suction pump (see Figure 1).

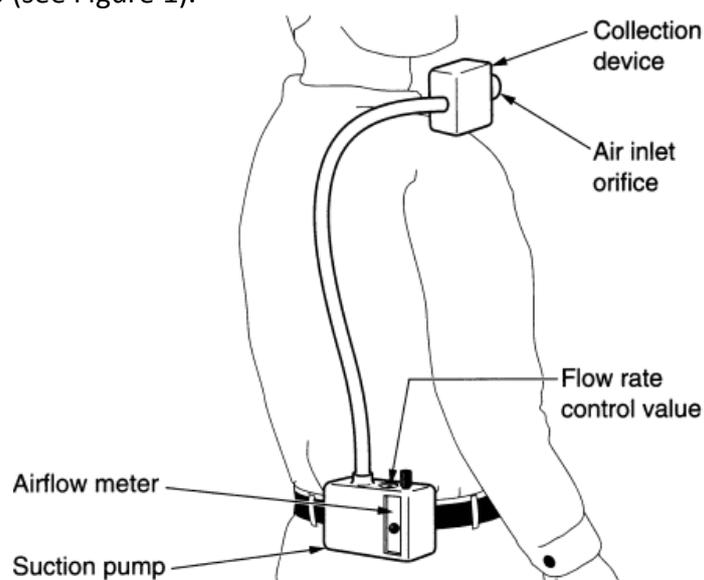


Fig. (1): Components of a typical air-sampling train used to collect airborne particulates.