معمل هندسه البيئه

Environmental Engineering Lab

Atomic Absorption Spectroscopy

Is an analytical technique that measures the concentration of an element by measuring the amount of light (intensity of light) that is absorbed, at a characteristic wavelength, when it passes through a cloud of atoms of this element.

As the number of atoms in the light path increases, the amount of light absorbed increases in a predictable way.

Elements like (Fe,Pb,Mn,Cd,Zn,Ca,Al,Mo,Cu,Na,Ni,Sn)

Figure 1-1 Photo of Atomic Absorption spectroscopy

BOD incubator

Incubator for holding BOD samples at 20 ^{O}C is illustrated in Figure (1.2), the temperature measuring range from -20 to 50 ^{O}C, with accuracy of 0.1 ^{O}C.

Figure Error! No text of specified style in document.1-2 Photo of BOD incubator

COD Thermo-reactor

ECO thermo-reactor, VELP scientific instrument with maximum heating capacity of 200 ^{O}C is utilized for COD measurements. Figure 1.3 illustrates the utilized digester.

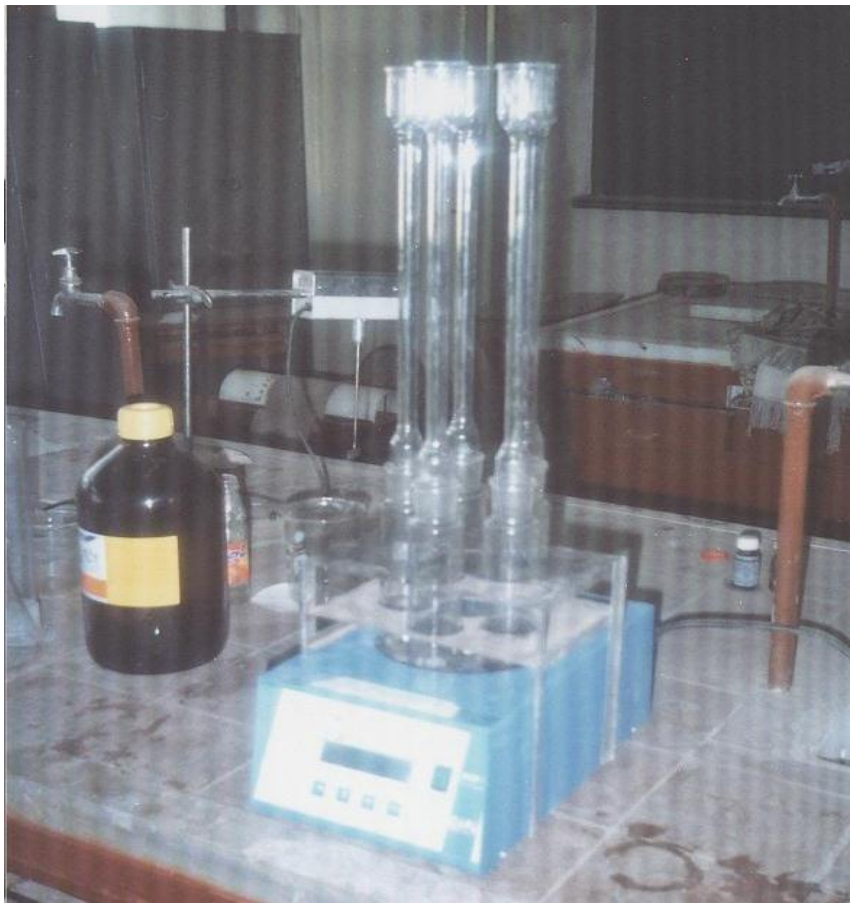


Figure 1-3 Photo of COD digester

Heating furnace (Draying Oven)

A furnace of 110 ^{O}C maximum heating capacity is utilized to determine the TS as well as SS. Figure 1.4 illustrates the utilized oven.

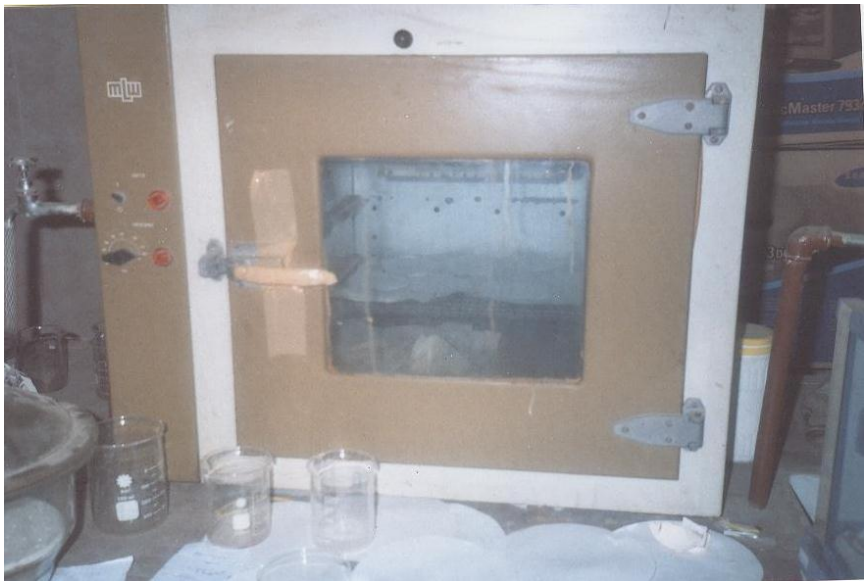


Figure 1-4 Photo of the drying oven

Muffle Furnace (up to 1100 OC)

A muffle furnace of 1100 ^{O}C maximum heating capacity is utilized to determine the volatile solid. Figure 1.5 illustrates the utilized furnace.

Figure 1-5 Photo of the muffle furnace

Digital Balance

SHIMADZU EB-430HU digital balance, with maximum capacity of 430 gm and accuracy of 0.001 gm, has been used. The balance is illustrated in Figure1.6

Figure 1-6 Photo of the digital balance accuracy 0.001

Digital Balance

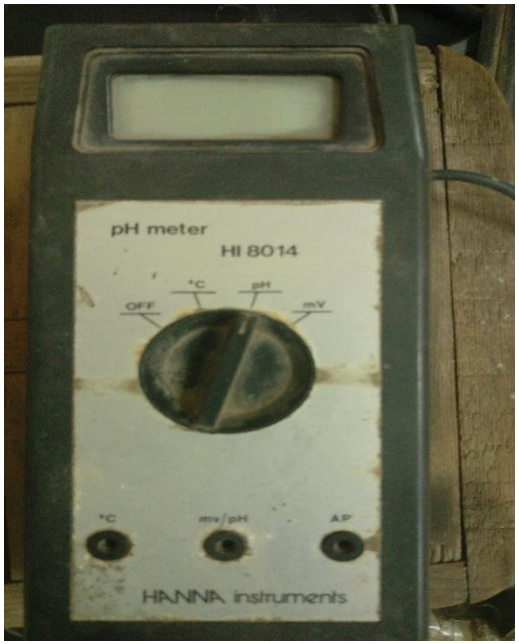
SHIMADZU EB-430HU digital balance, with maximum capacity of 430 gm and accuracy of 0.0001 gm, has been used. The balance is illustrated in Figure 1.7

Figure 1-7 Photo of the digital balance accuracy 0.0001

PH meter

The hydrogen-ion concentration is measured utilizing *HANNA PHEP instrument*, with measuring range from 0 to 14 and accuracy of ±0.1 in Figure (1-8)

Figure 1-8 Photo of PH meter



Another device for PH measuring in Figure (1-9)

Figure 1-9 Photo of PH meter

Distillation unit

Used for distillation of water

2 apparatus used for this purpose

Figure 1-10 Photo of Distillation unit

Kottermann shaking Water Bath

Used laboratory shaking water bath from Kotterman, .

Technical specifications: 220 V, 50 Hz, 1600 W.

Maximum temperature: 100ºC

Figure 1-11 Photo of kottermann apparatus

Spectrophotometer

The word spectroscopy implies that we will use the electromagnetic spectrum to gain information about organic molecules .the modifier ultraviolet means that the information will come from a specific region of the electromagnetic spectrum called the ultraviolet region (190 to 400 nm U.V Region and 400 to 800 nm Visible Region

Some of applications of Spectrophotometer (SPEKOL UV VIS)

1. Detection of Impurities **2. Structure elucidation of organic compounds.**

3. Quantitative analysis **4. Qualitative analysis**

5. Dissociation constants of acids and bases. **6. Chemical kinetics**

7. Quantitative analysis of pharmaceutical substances

8. Molecular weight determination

Figure 1-12 Photo of spectrophotometer

Jar Test apparatus

The purpose of the laboratory jar test is to select and quantify a treatment program for removal of suspended solids or oil from raw water or a dilute process or waste stream. Jar tests are conducted on a four- or six-place gang stirrer, which can be utilized to simulate mixing and settling conditions in a clarifier. Jars (beakers) with different treatment programs or the same product at different dosages are run side-by-side, and the results compared to an untreated jar, or one treated with the current program.

Figure 1-13 Photo of Jar test apparatus

Microscope

Is an instrument used to see objects that are too small for the naked eye

Figure 1-14 Photo of Microscope

Diesel Smoke Tester

HBN -1500B is capable of measuring Smoke of Diesel vehicle exhaust
Display Method : Digital Display

Measurement range : 0~100%

Minimum scale value : 0.1 %

Figure 1-15 Photo of Diesel smoke tester

DO meter.

Used to measure the concentration of dissolved oxygen in liquid sample

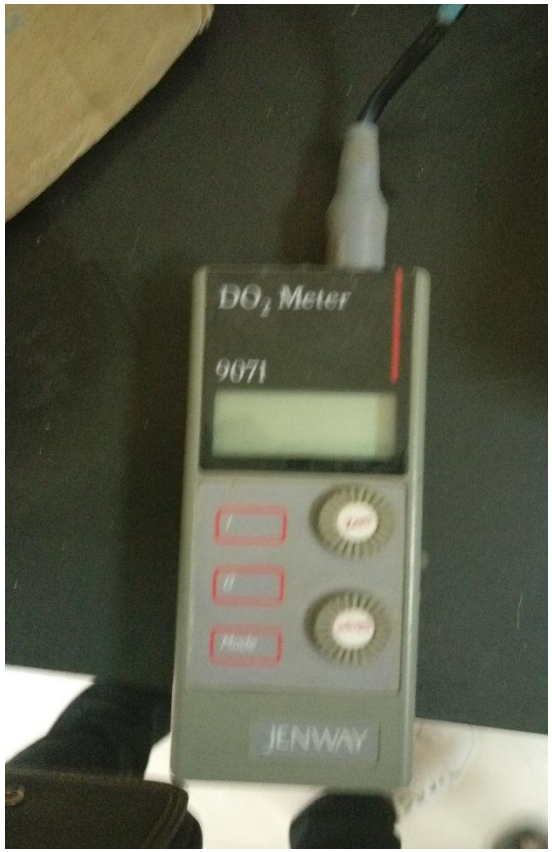


Figure 1-16 Photo of DO meter

Mechanical mixer

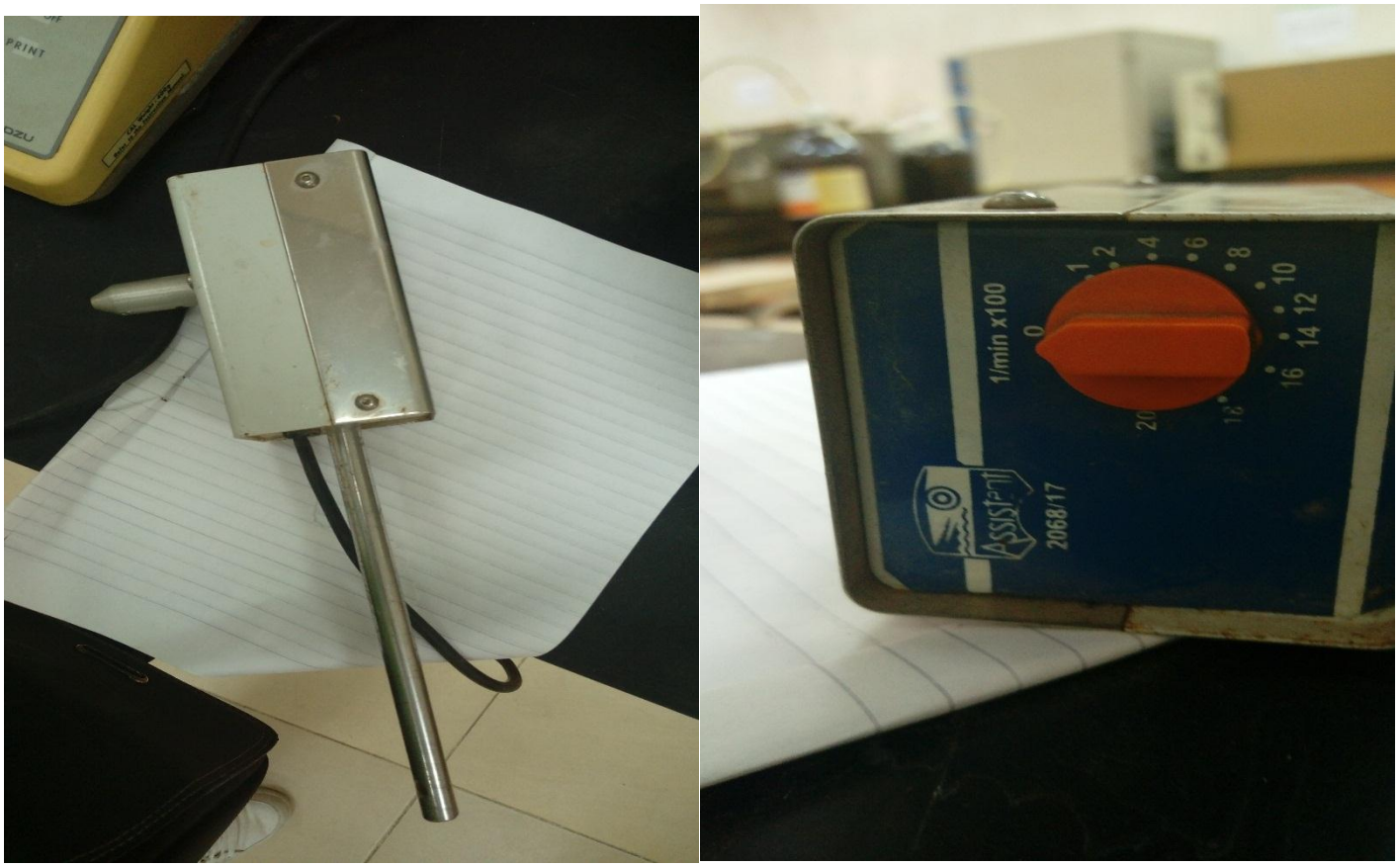


Figure 1-17 Photo of Mechanical mixer

Desiccator

A common use for desiccators is to protect chemicals which are hygroscopic or which react with water from humidity.

Figure 1-18 Photo of Desiccator

Automotive Emission Analyzer (Heshbon HG-520)

- **MEASUREMENT** :
  NDIR(Non-dispersive infrared)and electronical
  -CO (Carbon Monoxide)
  -HC (Hydro Carbons)
  -CO 2 (Carbon Dioxide)
  -O2 (Oxygen)
  -LAMBDA & AFR (Air-Fuel-Ratio)

Figure 1-19 Photo of automotive emission analyzer

Sampler Controller

Applications

- wastewater effluent
- storm water monitoring
- CSO monitoring
- permit compliance
- pretreatment compliance

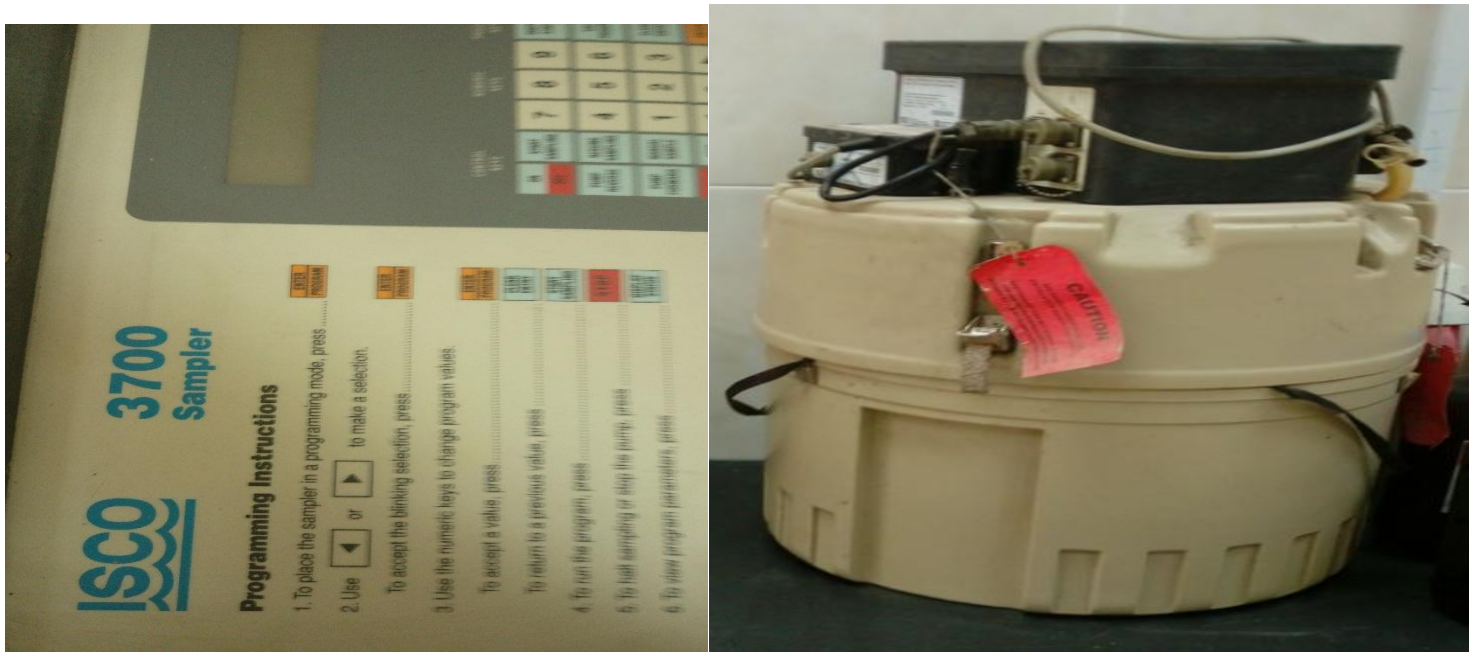


Figure 1-20 Photo of Sampler controller

Pump

Used to withdraw samples with head

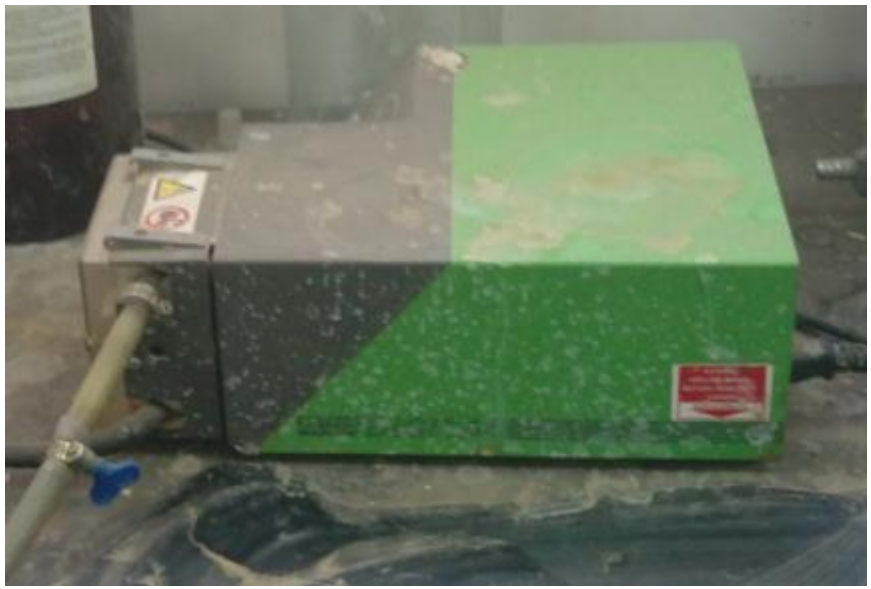


Figure 1-21 Photo of Pump