TURKISH PHARMACOPOEIA 1974
ETHANOL

Three types of ethanol registered in **Turkish Pharmacopoeia 1974:**

1. **Ethanolum, Ethanol** (which we will analyse)

(95 per cent *V/V* to 96.8 per cent *V/V*
92.5 per cent *m/m* to 95 per cent *m/m*)

2. **Ethanolum Absolutum, Absolute Ethanol:**

(not less than 99 per cent *V/V* of C_2H_6O)

3. **Ethanolum Dilutum, Diluted Ethanol:**

(69.1 per cent *V/V* to 71 per cent *V/V*
61.5 per cent *m/m* to 63.5 per cent *m/m*)

C_2H_6O

- CHARACTERISTICS
- SOLUBILITY
- IDENTITY TEST
- RELATIVE DENSITY
- ALDEHYDES AND OTHER FOREIGN SUBSTANCES
- FURFURAL
- FUSEL OIL AND ALLIED IMPURITIES
- KETONES, ISOPROPANOL AND TERTIARY BUTANOL
- METHANOL
- APPEARANCE
- ACIDITY
- RESIDUE ON EVAPORATION

CHARACTERS

APPEARANCE

- Colourless
- Clear
- Volatile
- Flammable liquid

SOLUBILITY

Miscible with

- Water
- Ether
- Glycerine
- Chloroform
- Acetone

IDENTITY TEST

Ethanol

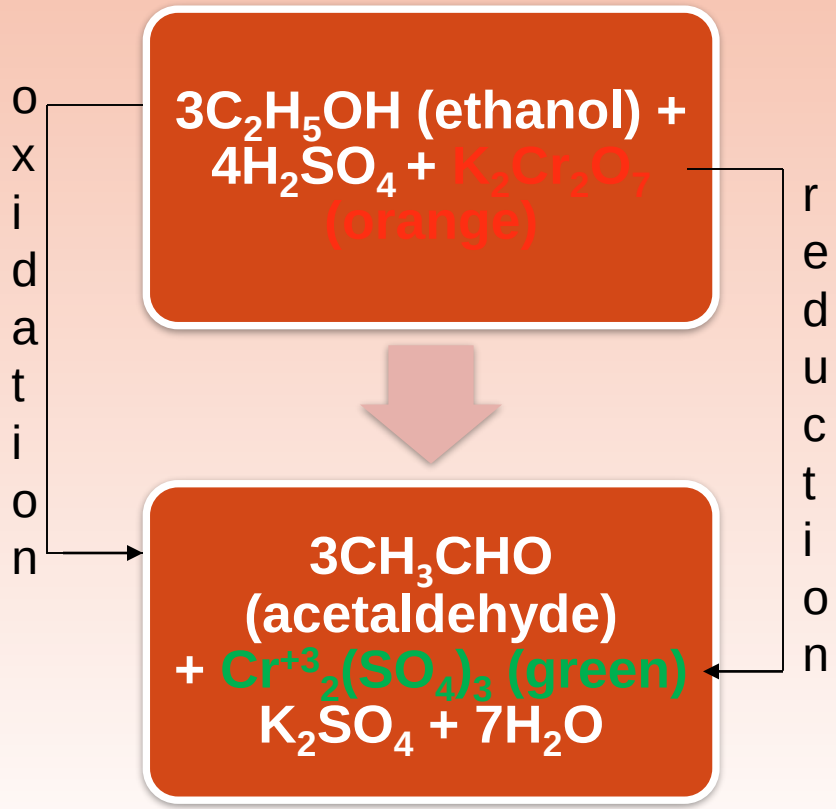
+

Sulfuric Acid R

+

Potassium Dichromate TS

A GREEN colour is produced – An odour of Acetaldehyde is perceptible



WHAT IS DENSITY?

Density can be defined as the ratio of mass to a unit volume of matter. (g/ml)

What is Relative Density?

The relative density of a substance is the ratio of the mass of a certain volume of a substance at a certain temperature to the mass of an equal volume of water at the same temperature.

However, because the density of pure water is so close to 1 (0.9976 grams per cubic centimeter), specific gravity and density are nearly the same value so long as the density is given in g/cc.

How to Measure Relative Density?

Relative density is measured using a density bottle **(pycnometer)**

The pycnometer is a glass flask with a close-fitting ground glass stopper with a capillary hole through it.

Pycnometer

RELATIVE DENSITY (SPESIFIC GRAVITY)

MEASUREMENT OF RELATIVE DENSITY

- The weight of empty pycnometer = M_1
- Pycnometer with ethanol = M_2
- Rinse the pycnometer with distilled water and fill it with water = M_3

M_1= The weight of pycnometer

M2= Ethanol + Pycnometer

M3= Water + Pycnometer

Relative Density of Ethanol = (M2-M1) / (M3-M1) =

$$\frac{\text{The weight of ethanol}}{\text{The weight of water}}$$

Relavite Density of Ethanol must be 0,805-0,812

Points to Consider

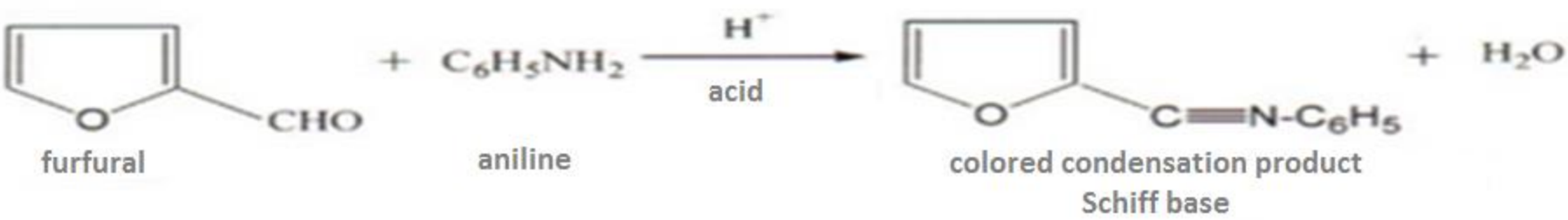
Use **precision scale** and **4 digits after decimal point**.

- The pycnometer should be completely dry when empty.
- Add water such that pycnometer as well as capillary hole in the stopper is filled with liquid.
- The capillary hole releases a spare liquid after closing a top-filled pycnometer and allows for obtaining a given volume of measured and/or working liquid with a high accuracy.
- Dry the spare water that leaks through the capillary hole with a filter paper.

ALDEHYDES AND OTHER FOREIGN SUBSTANCES

Ethanol is made from glucose (hexose). If it is made from pentose, the furfural is formed as a degradation product.

FURFURAL



FUSEL OIL AND ALLIED IMPURITIES

Allow an amount of ethanol to evaporate spontaneously from a filter paper, until the surface of the paper is barely moist; no foreign odour is perceptible.

On the addition of a few drops of sulfuric acid R, no red or brown colour develops.

Ethanol + Water + Mercuric Sulphate (Hg_2SO_4) $\xrightarrow{\text{Heat in a water bath}}$ It should not produce a PRECIPITATE

KETONES, ISOPROPANOL AND TERTIARY BUTANOL

Ethanol

+

Water : Potassium Permanganate R : Phosphoric Acid R

↓ Allow to stand for 10 minutes

Oxalic Acid R : Sulphuric Acid R : Water

+

Fuchsine TS

↓ After standing for 30 minutes

NO COLOUR appears

METHANOL

Dilute 1 mL to 20 mL with water. After standing for 5 min, the dilution remains clear.

APPEARANCE

Ethanol + Phenolphtalein TS

0,02 M NaOH

(PINK)

PHENOLPHTALEIN TS; 1% m/V solution of Phenolphtalein R in

Ethanol R (%95) Ph= 8.2-10.0

PHENOLPHTHALEIN is an indicator of acids (COLORLESS) and bases (PINK).

ACIDITY

Evaporate 5 mL to dryness on a water-bath and dry at 100-105°C for 1 h. The residue weighs a maximum of 0.005% m/V.

RESIDUE ON EVAPORATION

RESIDUE ON EVAPORATION

The weight of evaporating dish = X g
The weight after ethanol evaporation= Y g

Y-X = Residue on Evaporation (R g)

In 5 ml Ethanol	R g residue
In 100 ml	X

X = % residue on evaporation m/V

The residue should weigh a maximum of 0.005% m/V.