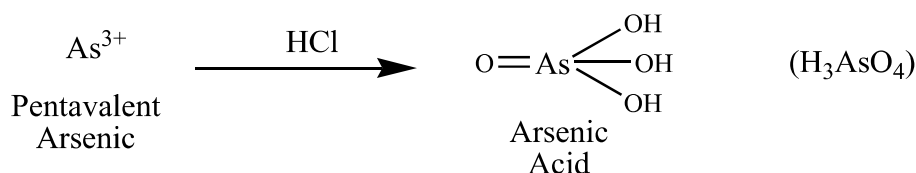
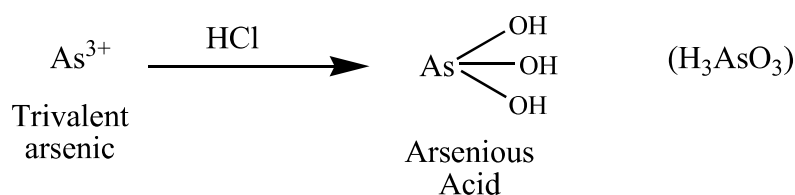


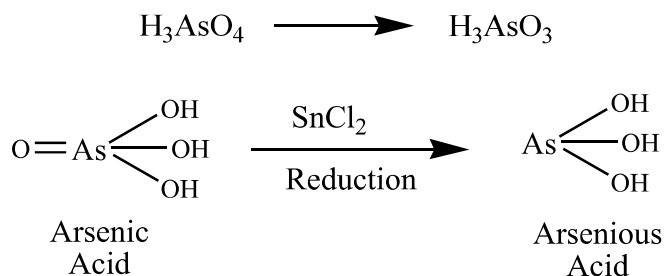
Limit test of Arsenic (Gutzeit Test)

Principle:

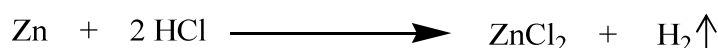
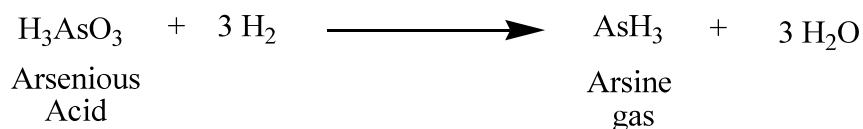
- ❑ Limit Test for Arsenic (As) is based on the fact that Arsenic is easily reduced into Arsine gas (AsH_3), which on mercuric chloride paper gives yellow stain.
- ❑ Arsenic (As) may be present as As^{3+} (Trivalent) or As^{5+} (Pentavalent)



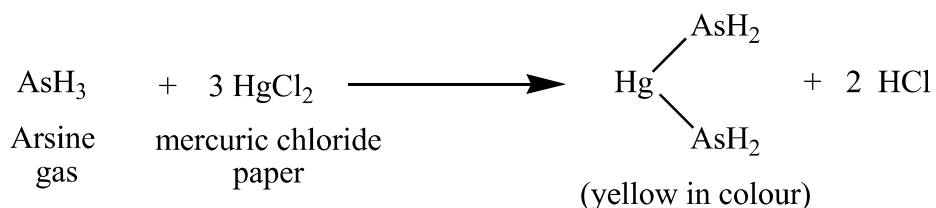
- ❑ The solution is treated with a reducing agent (stannous Chloride) to convert the pentavalent arsenic acid into trivalent arsenious acid.



- ❑ The arsenious acid is then converted into gaseous arsenious hydride (arsine gas) with the help of nascent hydrogen, which is produced by $\text{Zn} + \text{HCl}$.



- ❑ Arsine gas is carried through the tube by the stream of hydrogen and out through the mercuric chloride paper.

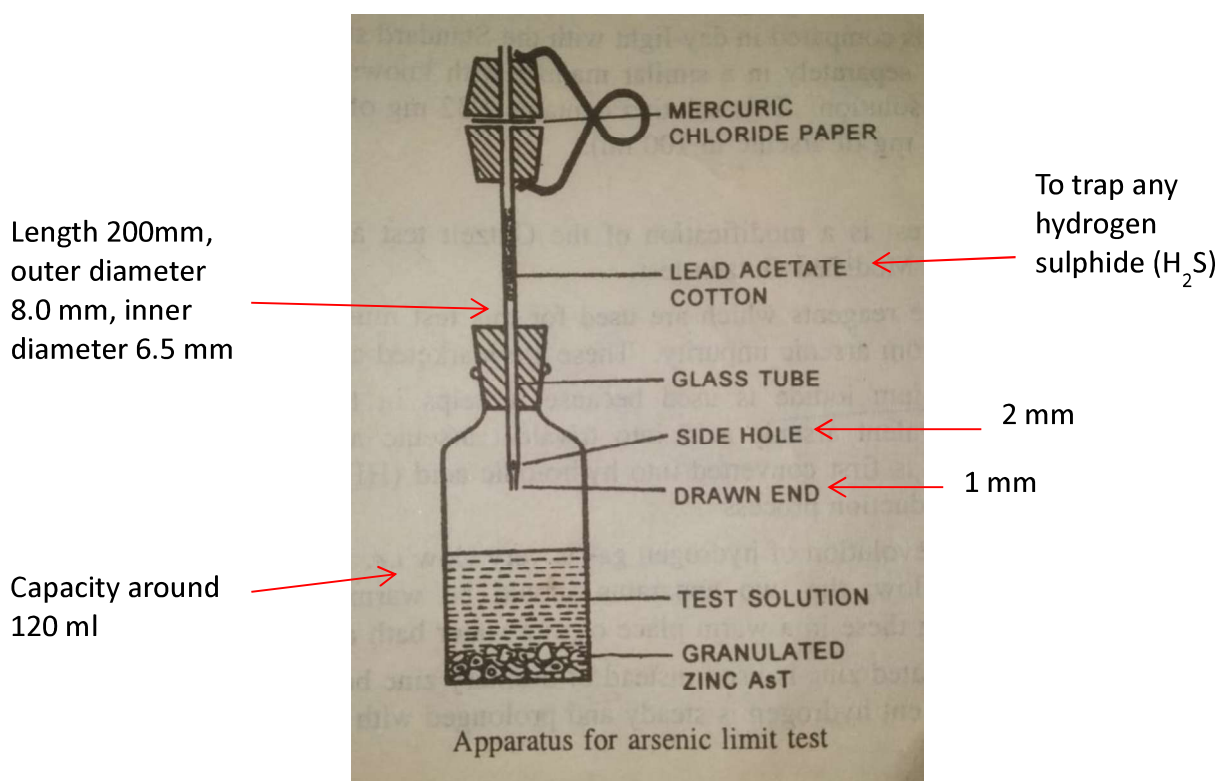


This results in the formation of yellow or brown stain on the mercuric chloride paper. The intensity of the colour is proportional to the quantity of arsenic.

- ❑ In the same manner a standard stain is separately produced for the permissible limit of arsenic.

The intensity of the two stains is compared. If the intensity of stain in the case of 'Test' (sample) is more than that of the 'standard' then the sample contain more arsenic than the limit.

Apparatus: (Gutzeit Apparatus or Arsenic test apparatus)



Procedure:

- ❑ The solution of Test (sample) is prepared in the acid (HCl) and stannous chloride as specified in I.P. and is placed in wide mouthed bottle.
- ❑ To this is added 1 gm of potassium iodide AsT and 10 gm of Granulated Zinc AsT. The glass tube with its outer fitting is placed quickly, Kept solution aside for 40 minutes.
- ❑ The yellow stain is produced on the mercuric chloride paper if arsenic is present.
- ❑ It is compared in day light with the standard stain produced by doing the test separately in a similar manner with known quantity of dilute arsenic solution. The solution contains 1.32 mg of arsenic trioxide in 100 ml water.

Notes:

- ❑ All reagent used must be completely free from arsenic impurity. Marked as 'AsT'.
- ❑ Potassium iodide is used because it helps in the reduction of pentavalent arsenic acid into trivalent arsenic acid.