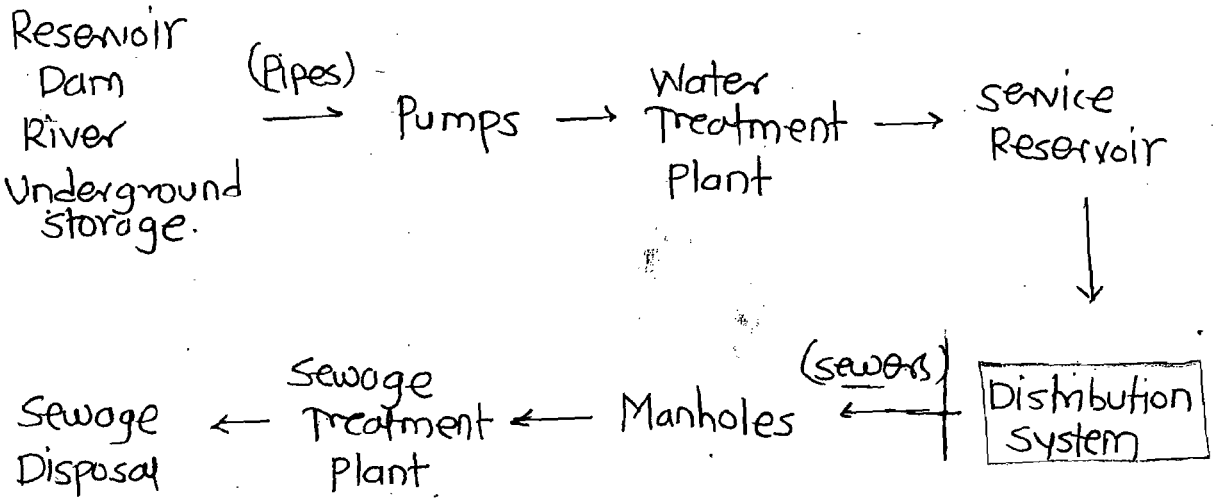
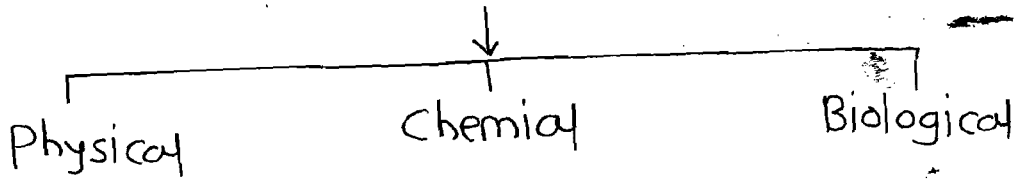
Ref Book :- GOI Manual.

* Water Supply Engineering *



* Water Quality Parameters *



Physical water quality parameter are those felt by our senses. These parameters tells abt physical quality of the water.

1) Suspended Solids :-

It is physical water quality parameter but dissolved solid is chemical water quality parameter.

* Sources :-

Suspended solids comes in water from inorganic particles

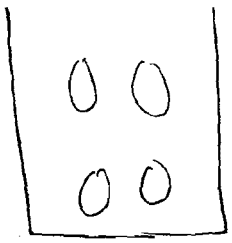
like oils & greese. And it may also come from orgnic partides like plant fibres (& Algae).

* Impacts of suspended solids:-

- It is asthetically displeasing.
- It has a psychological effect.
- S.S. & provides adsorption sites for chemical & biological agents. Hence may interfare with the treatment of water.
- S.S. may be biologically active. Hence may form disease causing organics.

* Measurement of suspended solids:-

- S.S. are measured by Graviometric method (method in which wt. is called).



(S.S)
104-110°c

Ts = SS + D.S.

TS < VS (organic) < SS, DS
TS < nVS (inorganic) < SS, DS

- Suspended & Disolved solids (TS = S.S + D.S)

~~S.S~~ Soli are calculated by evaporating water sample at 104°c.

- S.S. are calculated first by passing the water through a filter & heating residue on the filter at 104° c.

- D.S = T.S − S.S.
- Organic content (Both suspended & dissolved) ~~means~~ Vola can be measured by firing the residue at 550°c to 600°c. Under these conditions organic matter gets converted into water vapour, carbon dioxide & other gases. Remaining solids are inorganic solids or fixed solids.

* Permissible limits :−

- For Total solids :− (As per G.O.I manual) :−

	Acceptable limit	Cause for Rejection Value.
T.S.	500 mg/l	2000 mg/l.

Note :−

S.S. smaller than the size of filter ~~coarse~~ pores will be measured as Dissolved solids.

Hence to avoid this we classify the solids as filterable solids & Nonfilteroble solids.

Filterable solids can be filtered by filters.

Hence filterable solids corresponds to D.S.

& Non filterable solids corresponds to S.S.

2) Turbidity :-

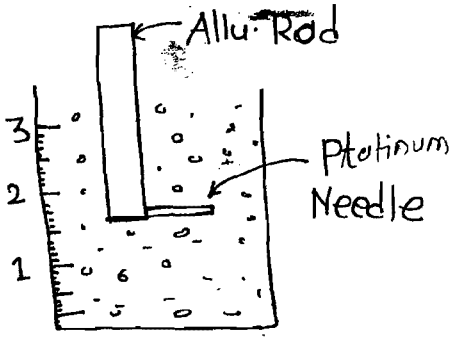
- Is the measure of extend to which light is either absorbed or scattered by the water sample.
- S.S. can not be quantitatively measured by turbidity. Means it will only represents the quality.
- More s.s more turbidity.

* Impacts :-

- Turbid water is difficult to Disinfect due to the presence of suspended solids which may partially shield the micro-organisms from disinfectants.
- In natural water body turbidity interferes with the penetration of ~~life~~ light & hence retard photosynthesis reaction.

* Measurement of Turbidity :-

1) Turbidity Rod Method :-



- In this method an alluminium rod having platinum needle at its tip is inserted inside the water sample & the depth at which needle becomes invisible is noted which further gives turbidity of soln - mg/lit (ppm).
- Turbidity is expressed with the standard unit which is obtained by 1 mg of finely divided silica (SiO_2). Which is also known as Fuller's Earth. In 1 lit of pure water.
- This method is a field method.

2) Jackson Turbid Meter :-

In this method the level of water is raised inside a metalic container having glass base. till the image of the flame placed at the bottom of container ceases to be seen. & the depth of water indicates the turbidity meter.

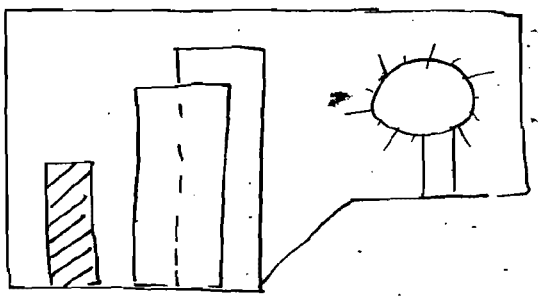
Note :- This method can be used only when turbidity of water is greater than 25 ppm. (Hence this method is not used in treatment of raw water.)

- This method is a laboratory method & it is used to measure turbidity of natural water body.
- In both the above test principle involved is same. i.e. the longer is the light path, smaller is the turbidity.

1 JTU :- 1 mg of finely divide silical (SiO_2) in 1 litre of pure water.

3) Baylis Turbidmeter / Nephlometer :-

- Both these methods are based upon color matching techniques.
- These methods can measure turbidity < 1 Unit.



- Hence, these methods are widely used ~~for~~ to measure turbidity of domestic water sample.

- In this method light is incident on sample as well as standard solution & the flow of current produced in the photometer placed behind the sample is noted.
- Turbidity of sample is same as that of standard solution if the same current flow is noted in both the photometer.
- In Bayli's turbidmeter the light intensity is measured in the direction of incident (adsorption). Whereas in Nephelometer light intensity is measured at right angle to the incident plane (scattering). (Hence Bayli's method is based upon adsorption principle & Nephlometer is based upon scattering principal.
- Baylis Turbid Meter measure of turbidity → JTU
  But in Nephlometer turbidity measure in → NTU
  Where 1 NTU = Turbidity produced by 1 mg of Formazine (silica) in 1 ltr of pure water.
- There is no direct relationship beth JTU & NTU.
  We can not convert JTU & in NTU.

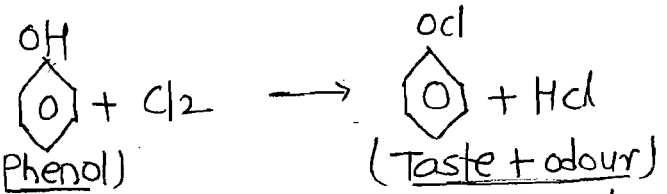
* Acceptable limit for Turbidity = 1 NTU
  Cause for Rejection = 10 NTU

3) Colour:-

Colour - [Appearant (S.S + D.S)
         [True (D.S)

*Effects of colour in water:-

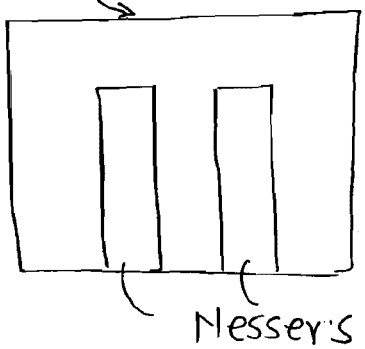
- Color is objectionable as it may spoil the clothes which are washed by it.
- It is objectionable from asthetic & psychological point of view.
- Coloured water is not used for dying purpose.
- Colour causing compounds may exert chlorine demand hence reduces the efficiency of chlorination.



- Colour causing compound with chlorine may form carcinogenic compounds (which may cause cancer).
- Phendic compounds with chlorine produces bad taste & odour.

*Measurement of Colour:-

- Colour is measured by colour matching technique & instrument is used is Tintometer
- The Result is expresed in std unit is known as TCU (True color unit)
- 1 T.C.U = color produced by 1mg of Platinum as chloride



Chloro platinate ion in 1 ltr of pure water.

The above method is used only if color of the water sample is yellow-brown.

If color other than yellow-brown is to be measured then 'Spectro photometry' technique is used.

* Acceptable unit = 5 TCU
  & cause for Rejection = 25 TCU

4) Taste & odour :-

*Sources :-

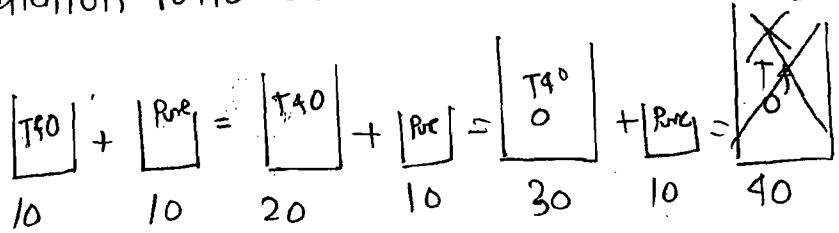
- Taste & odour comes from dissolved organic matter, inorganic salts & dissolved gases.
- H_2S gives rotten eggs smell
- Alge is (organic matter) releases oil like substance which may impart taste & odour in water.
- Inorganic salts-

*Impact :-

- Taste & odour components may be so carsenogenic.

* Measurement :-

- Osmoscope is instrument used for measure taste & odour.
- In routine taste & odour is measured by TON (Threshold odour No) which represents the dilution ratio at which odour is hardly detectable.



TON = 4