SNS COLLEGE OF TECHNOLOGY

Vazhiamyampalayam,Coimbatore-35

(An Autonomous institution)

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DEPARTMENT OF CHEMISTRY

COURSE NAME : 23CHT102- CHEMISTRY OF ENGINEERING MATERIALS

I YEAR / II SEMESTER

UNIT IV:WATER TECHNOLOGY

TOPIC : 5.INTERNAL CONDITIONING

BRAINSTORMING WITH RECAP

INTERNAL TREATMENT BY BOILER COMPOUNDS

The residual salts that are not removed by external methods can be removed by adding some chemicals directly into the boiler water. These chemicals are known as 'Boiler compounds'. This method is known as 'Internal treatment'.

Eg) Carbonate conditioning, Phosphate conditioning and Calgon conditioning

a) Carbonate conditioning:

Used for low pressure boilers. Here the salts like $CaSO_4$ are converted to easily removable $CaCO_3$. But sometimes it produces NaOH, CO_2 and hence Carbonic acid. So it is less preferred.

$$CaSO_4 + Na_2CO_3 \rightarrow CaCO_3 + Na_2SO_4$$

b) Phosphate conditioning:

Used for high pressure boiler. No risk of CO_2 liberation.

$$3CaSO_4 + 2\ Na_3PO_4 \rightarrow Ca_3(PO_4)_2 + 3\ Na_2SO_4$$

Three types of Phosphate salts are used:

Na_3PO_4 – Tri sodium Phosphate – Used for highly acidic water

Na_2HPO_4 – Disodium hydrogen Phosphate – Used for slightly acidic water

NaH_2PO_4 – Sodium di hydrogen phosphate – Used for alkaline water

c) Calgon conditioning:

Calgon is the trade name of sodium hexa meta phosphate- $Na_2[\ Na_4\ (PO_3)_6]$.

With calcium ions it forms a soluble complex and prevents scale and sludge formation. It is used for high and low pressure boilers.

$$2CaSO_4 + Na_2[\ Na_4\ (PO_3)_6] \rightarrow Na_2\ [Ca_2(PO_3)_6] + 2\ Na_2SO_4$$

SUMMARY

REFERENCES

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4. R. Sivakumar and N Sivakumar, “Engineering Chemistry” Tata McGraw-Hill.Pub.Co.Ltd. New Delhi.2009.

THANK YOU