

PUROLITE

Ion Exchange Resins

Dealkalization

Methods

What is Alkalinity ?

What is Alkalinity ?

Measure of :

Bicarbonate



Carbonate



Hydroxide



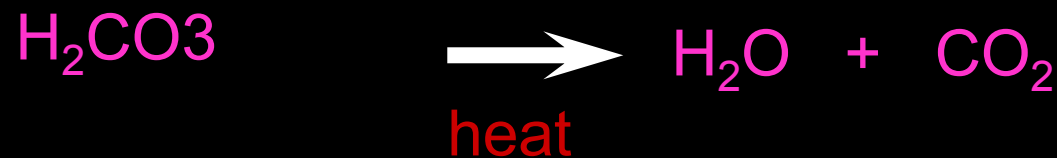
Typical Test: - P & M Alkalinity Titration

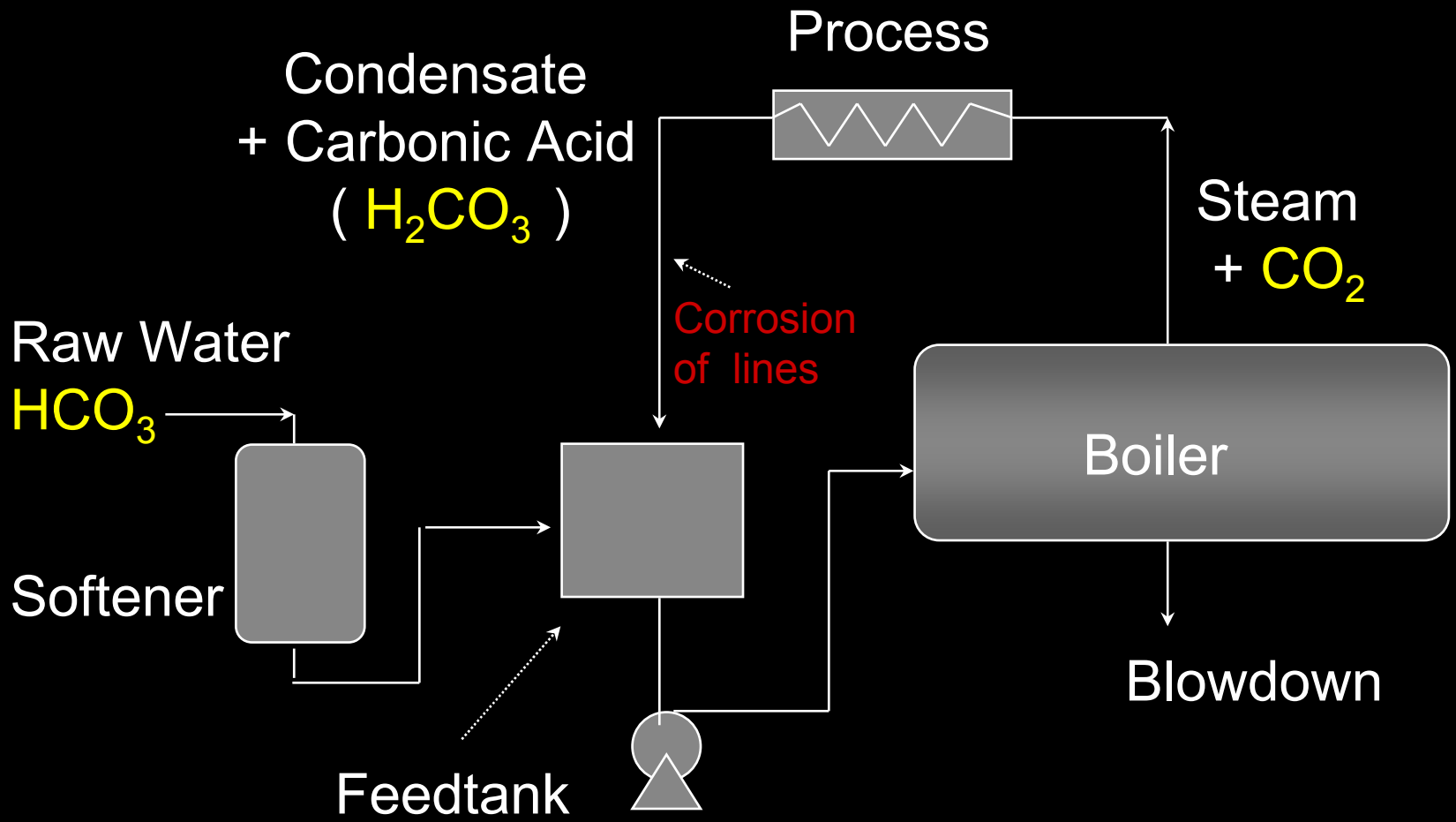
Reported usually as: - ppm as CaCO_3

Why Dealkalize ?

FOR BOILERS:

- Carbonic Acid Corrosion of Condensate Pipework





Why Dealkalize ?

FOR DYE HOUSES:

- Dyeing of fibers needs controlled pH or controlled alkalinity

FOR BEVERAGE INDUSTRY:

- Excessive Alkalinity causes flat taste
 - typical control < 50 ppm as CaCO_3

How ?

- A. - Sodium SAC Softener followed by acid feed
- B. - Hydrogen SAC followed by caustic feed
- C. - Sodium SAC Softener / Chloride Dealkalizer
- D. - Split Stream (SAC).
- E. - Hydrogen WAC Dealkalizer/ Sodium Softener
- F. - Layered Bed WAC Dealkalizer/SAC Softeners

CaHCO_3
 MgCl_2
 Na_2SO_4

Raw
Water



NaHCO_3
 NaCl
 Na_2SO_4

Soft Water

CO_2



Acid Feed

Dealkalized
& Softened
Water

Sodium Cycle Softener + Acid Feed

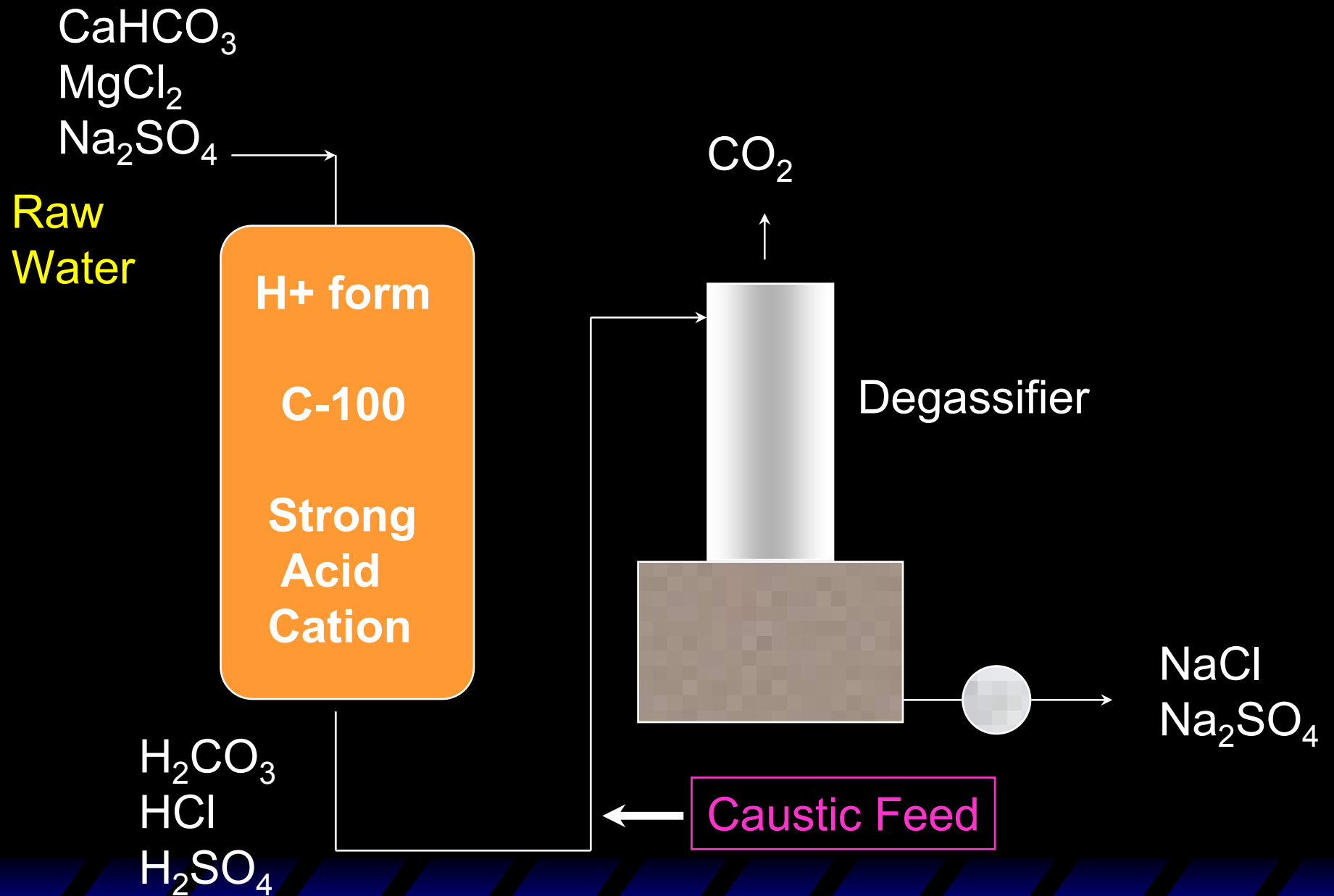
Sodium Cycle Softening + Acid Feed

SOFTENER:



ACID FEED:





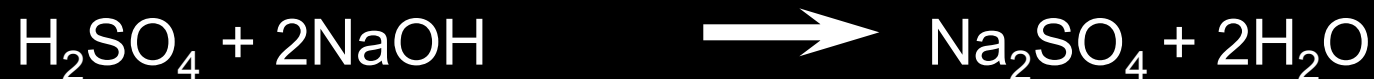
Hydrogen Cycle Decationizer + Caustic Feed

Hydrogen Cycle Decationization + Caustic Feed

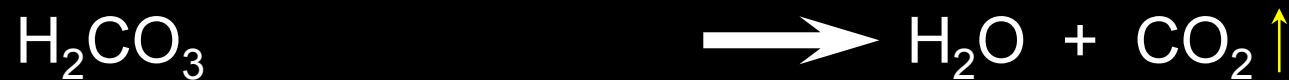
DECATIONIZER:



CAUSTIC NEUTRALIZATION:



DEGASSIFIER:



CaHCO₃
MgCl₂
Na₂SO₄

Raw
Water

Na⁺ form

C-100

Strong
Acid
Cation

NaHCO₃
NaCl
Na₂SO₄

Cl⁻ form

A-300

Strong
Base
Anion

NaCl

Soft Water

Dealkalized Water

Softener + Chloride Cycle Dealkalizer

Softener + Chloride Dealkalizer

SOFTENER:

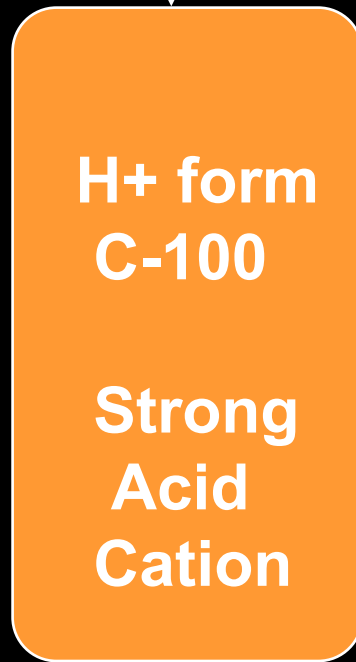
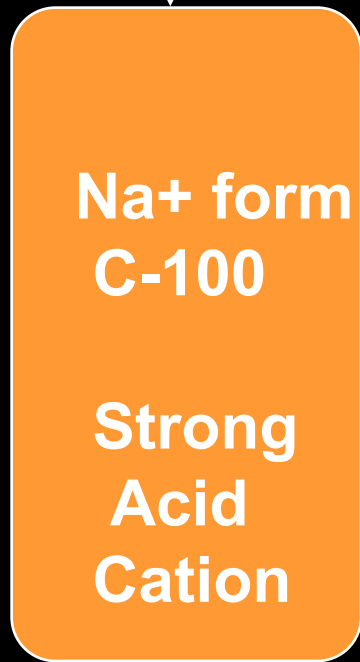


CHLORIDE DEALKALIZER:



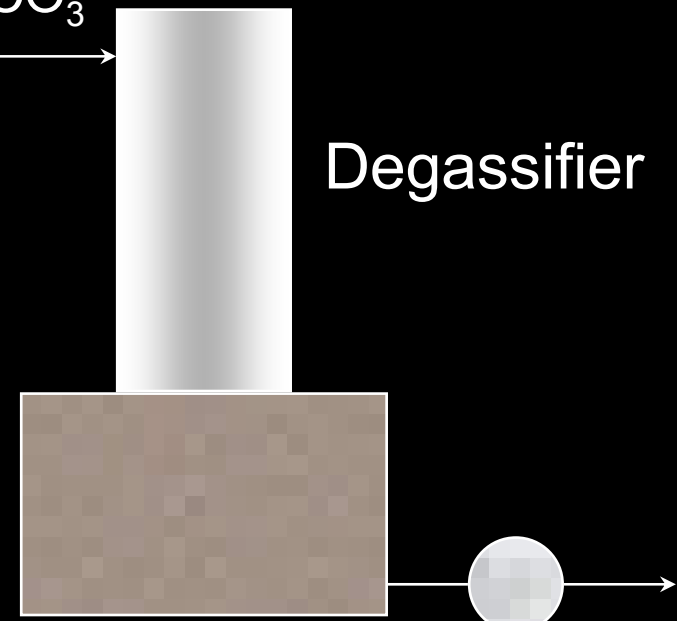
CaHCO₃
MgCl₂
Na₂SO₄

Raw Water



NaHCO₃
NaCl
Na₂SO₄
H₂CO₃

CO₂



Soft Water

NaHCO₃
NaCl
Na₂SO₄

H₂CO₃
HCl
H₂SO₄

**Mixture of Soft &
Decationized Water**

Split Stream (SAC) Dealkalizer

Split Stream Dealkalizer

SOFTENER:



DECATIONIZER:

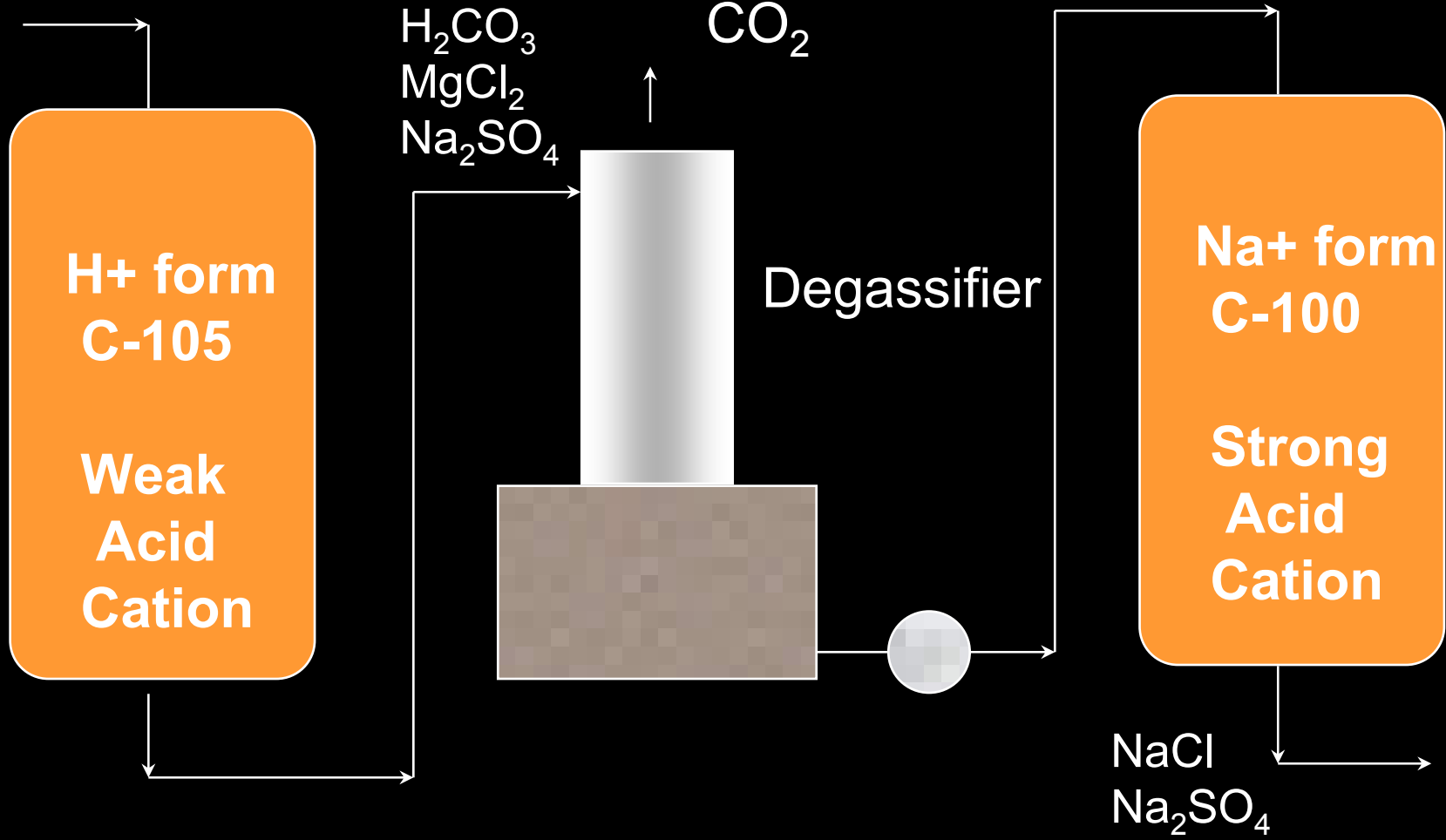


BLENDED:



Purolite Ion Exchange Resins

CaHCO₃
MgCl₂
Na₂SO₄ **Raw Water**



Hydrogen WAC Dealkalizer + Sodium SAC Softener

Hydrogen WAC Dealkalizer + Sodium SAC Softener

WEAK ACID CATION UNIT:



SOFTENER:



CaHCO_3 Raw

MgCl_2 Water

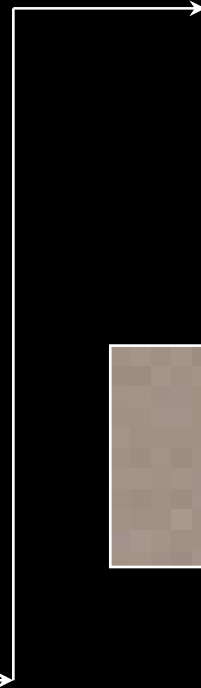
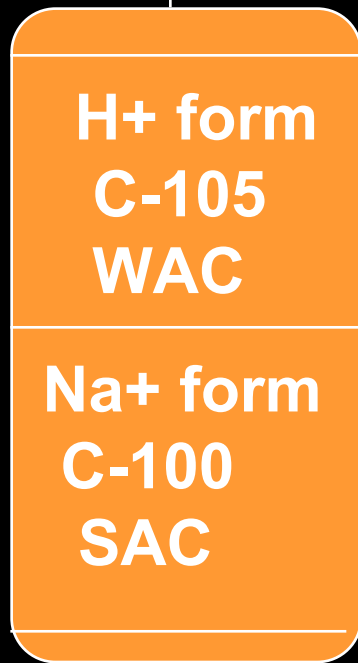
Na_2SO_4

H_2CO_3

NaCl

Na_2SO_4

CO_2



NaCl
 Na_2SO_4

Layered bed Hydrogen WAC Dealcalizer
+ Sodium SAC Softener

Hydrogen WAC Dealkalizer + Sodium SAC Softener

WEAK ACID CATION UNIT:

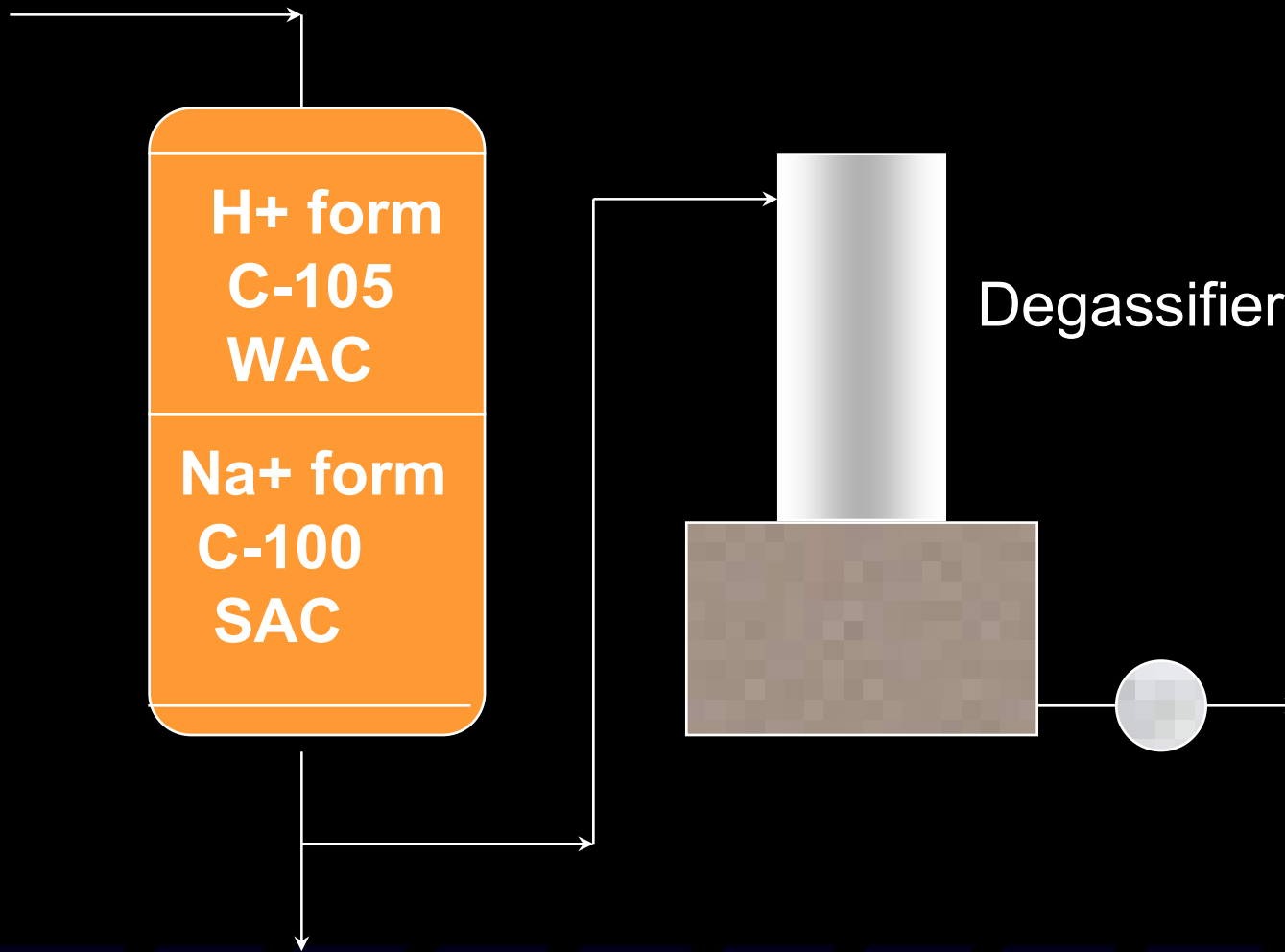


SOFTENER:



Regeneration

HCl
then
NaCl



to drain

Layered bed Hydrogen WAC Dealcalizer
+ Sodium SAC Softener

Which Method ?

- A. - Sodium SAC Softener followed by acid feed
- B. - Hydrogen SAC followed by caustic feed
- C. - Sodium SAC Softener / Chloride Dealkalizer
- D. - Split Stream (SAC).
- E. - Hydrogen WAC Dealkalizer/ Sodium Softener
- F. - Layered Bed WAC Dealkalizer/SAC Softeners

Which Method ?

FOR BOILERS:

~~A. - Sodium SAC Softener followed by acid feed~~

~~B. - Hydrogen SAC followed by caustic feed~~

➔ C. - Sodium SAC Softener / Chloride Dealkalizer

~~D. - Split Stream (SAC).~~

➔ E. - Hydrogen WAC Dealkalizer/ Sodium Softener

➔ F. - Layered Bed WAC Dealkalizer/SAC Softeners

Which Resins ?

C-100 Strong Acid cation

C-105 Weak Acid Cation

A-300 Type II Strong Base Anion

Dealkalization

END

Purolite
Ion Exchange Resins