Conserving Resources,
Preserving the Future.

THERMAX

Remove Heat Stable Salt from Lean Amine Solution Using Tulsion® Resin

Introduction

Amine solutions are used in refineries for the absorption of acidic gases like carbon dioxide (CO_2) and hydrogen sulphides (H_2S) from natural gas. The amine is then used in loop of two units; one is gas absorption unit and another is amine regenerator unit. Used amine from regenerator is called as lean amine which is further treated with **Tulsion®** resin to remove heat stable salt.

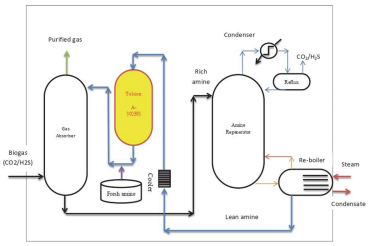
Objective

The formation of HSS in natural gas sweetening unit causes many problems such as corrosion, foaming and fouling of the equipment. It also reduces the acid gas carrying capacity which results in less amine present in usable absorptive state. Thus, it is required to add more or top up amine every time. Heat stable salt is resistant to heat; therefore it cannot be removed from the solvent by simple heating in the regenerator and thereby demanding new approaches for HSS removal from aqueous solution of lean amine (methyl-diethanolamine) solvent. We identified that Ion Exchange Resin is a suitable technology to remove heat stable salt from amine solvent.

Approach

Basically, amine solvent is used to remove acidic hydrogen sulphides and carbon dioxide gas from feed gas of refineries and natural gas plants. Heat stable amine salts is formed with acidic components other than H_2S and CO_2. Acidic components include acids which form salts with chloride, sulphate, formate, oxalate, cyanide, thiocyanide and thiosulphate. Tulsion® resin will help in removing these acidic components from amine solution. Heat stable salt removal plant is installed at one of the customer in Satara by using **Tulsion® A-302 HS** resin which is efficiently running and getting desired outlet quality and output.

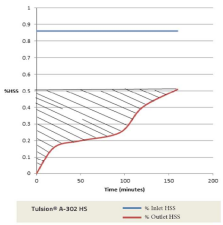
Tulsion Resin Column installed with Biogas Lean Amine Loop



Plant Details

Resin Used	Tulsion® A-302 HS	
Flow rate	300	lit/hr
Ionic Load	8000	ppm
Resin volume	400	litres
Output	1.8	m^3
Service hours	5	hrs
Outlet HSS	<0.5	%
Regeneration Level	115	g/l
Regenerant	NaOH	

Graphical Results of Resin Outlet Leakage for % HSS



Results Achieved

Tulsion® resin A-302 HS used in one of the customer site has shown significant achievement in removing HSS % from lean amine solution.

Inlet HSS %	0.87%
Average Outlet HSS %	<0.3%

Key Benefits of Heat Stable Salt Removal Plant

- Improve the performance of amine solvent in reduction of acidic gases.
- Reduce the fresh amine addition in lean amine, thereby reduce further cost.
- Decreases foaming & corrosion which leads to decrease in operation and maintenance cost.
- Reduction in filter replacement frequency.
- Reduction in addition of antifoam and corrosion product usage.
- Increase the life of equipment due to lower corrosion rate.

Our Offerings

Product Name	Matrix	Functional Group	TEC (meq/ml)	Size (mm)	Function
Tulsion® A-302 HS	Polystyrene	Quaternary ammonium	1.3	0.3-1.2	Remove acidic ions
Tulsion® FSMP 32	Polystyrene	Quaternary ammonium	1.3	0.15-0.25	Remove acidic ions
Tulsion® A-74 MP	Polystyrene	Quaternary ammonium	1	0.3-1.2	Remove acidic ions

Industries Served

- Oil and gas refinery
- Biogas industry
- Sugar mills having biogas generator unit

Air Pollution Control
Boiler and Heater
Build-Own -Operate
Chemical
Cooling
Projects and Energy Solutions
Process Heating
Renewable Energy
Water and Waste Solutions

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