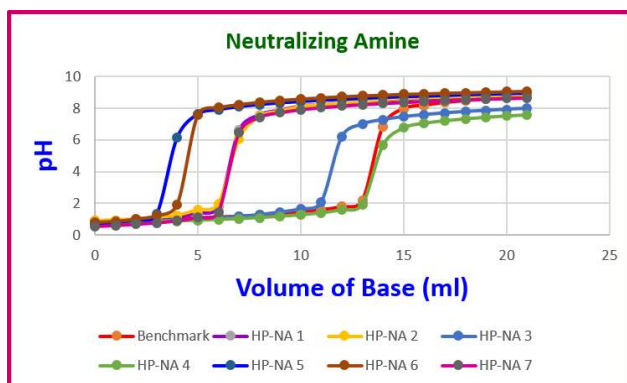


HPNEUTMAX

A Novel Neutralizing Amine Formulations for Overhead Corrosion

Corrosion in the overhead system of the crude distillation unit is caused by hydrogen chloride produced by the hydrolysis of chloride salts found in crude oil. Crude oils contain salts dissolved in water entrained from the production well and from saltwater picked up during tanker shipment. Generally, the chloride salts are sodium chloride, magnesium chloride, and calcium chloride. Depending on the source of the saltwater, the amount of each salt in the crude can vary considerably. The desalter unit in the refineries typically removes salts and the escaped salts are hydrolyzed to produce the corrosive HCl gas. Sodium chloride is stable and does not hydrolyze significantly, whereas $MgCl_2$ and $CaCl_2$ are hydrolyzed by water to form the HCl gas. To mitigate the corrosion caused by HCl gas, neutralizing amines are dosed at the overhead section of the crude unit.

HPGRDC developed a novel cost effective neutralizing amine formulations by keeping the key parameters in view such as, (i) Neutralizing ability, (ii) Solubility and (iii) Corrosion rate. A series of amine formulations were synthesized and the performance was evaluated at high temperature, pH, solubility and accelerated corrosion rate by using high temperature and high pressure rotating cage experiments. The in-house developed formulations exhibited superior performance in comparison with the commercial additive.



Based on the lab data, the best formulations were scaled up (10 ton) for field trails at CDU and VDU of VR. The novel proton sponge concept has been used for developed for the neutralizing amine formulations. Small percentage of suitably chosen di/tri-amine may act as a Promoter for neutralizing activity through proton sponge mechanism.

Trial Comparison for a period of 3 months at HPCL Vishak Refinery			
Neutralizing Amine	Avg. Dosage Rate (ppm)	Average pH KPI(5.5 to 6.5)	Average Fe KPI(0.3ppm)
Reference	6.5	6.56	0.21
HP-NeutMax	5	6.83	0.21

The field trails were completed. The HP Neutmax additive exhibited better performance at lower dosages (~23 % reduction).