

Pall Rental Skid allows refinery to produce LPG within specifications



PICSPLEPT4EN

CASE STUDY



Background

The recent energy crisis resulting from the war in Ukraine has forced many European countries to re-evaluate their energy mix. In this context of geopolitical tensions combined with the climate change urgency, different strategies have been deployed to diversify their energy sources: besides renewable energies, Liquid Petroleum Gas (LPG) appears as an interesting solution for many energy-intensive applications and market sectors.

Introduction

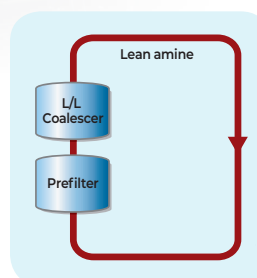
The growing demand for LPG forces the major refineries and Petrochemical companies not only to expand their capabilities but also to upgrade their existing processing plants to meet the global market demand for high quality LPG.

A major refinery in Europe asked Pall to design, manufacture and install a Liquid/Liquid coalescer unit operating on its 10 tph lean amine system. Even if they have been producing LPG for many years, no coalescence system was installed on their lean amine lines – Operators were struggling to meet LPG specifications for hydrocarbon content (HC) of <50 ppm. To meet demand while upgrading its LPG processing lines, the plant management team agreed to rent a stand-alone filtration and separation unit from Pall, allowing time to build, install and commission the new L/L coalescence system. This meant they could keep producing LPG within the <50 ppm HC specifications while validating our final solution.

Problem

The process Engineering team wanted to remove free hydrocarbons from lean amines and continuously meet the < 50 ppm HC specification whatever the inlet conditions (process data monitoring was showing that amine could sometimes be subjected to high peaks of heavy HC concentration).

This L/L coalescence stage is critical as the quality of lean amines impacts directly the overall LPG sweetening process. This is the reason why Process Operators must maintain continuously the hydrocarbon content <50ppm if possible, get HC-free lean amines.

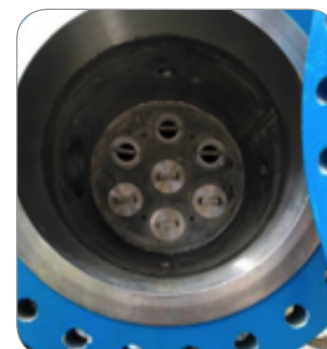


Operating Conditions
 Flowrate: ~10 ton/hr
 Pressure: 25 bar
 Temperature: 55°C

Pall solution

Pall and the Process Engineering team defined the location to install the rental unit on the lean amine processing line. The rental unit was made of a 2-stage assembly:

Function	Pall Product	Goal
Particulate Filtration	Ultipleat® High Flow (10µm)	Protect coalescer elements
Coalescing	PhaseSep® L/L Coalescer	Remove hydrocarbons from amine

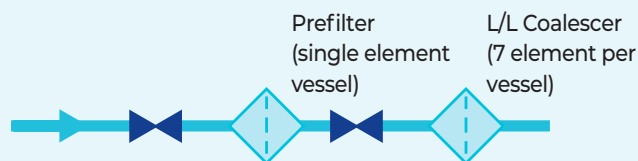


Prefiler and coalescer vessels installed on the rental unit

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Rental Coalescence Unit



To operate the rental unit as quickly as possible, it was decided to prioritize the PhaseSep L/L Coalescer platform available locally in our logistic hub, i.e. standard PhaseSep

versus PhaseSep EL L/L Coalescer for the final designed coalescence unit. Since its installation in July 2022 (9 months so far), the rental unit has been running without issue and has contributed to help the plant to consistently deliver LPG within the < 50 ppm HC specification.



Samples of Lean amine before & after the coalescer unit

Conclusion

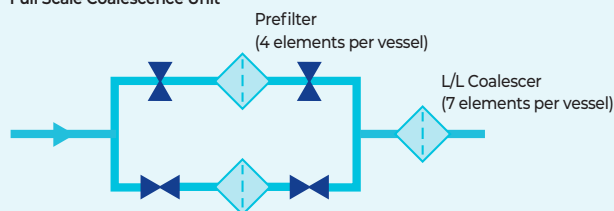
The rental unit fitted with both Pall prefilters and coalescers enabled the customer to maintain LPG production, improving the quality of its lean amine, meeting the 50 ppm HC specification.

When the final coalescence system operates on the lean amine circuit (scheduled in October 2023), the overall design will be improved to not only better protect the coalescer but also reduce the OPEX budget by installing:

- a multi-element prefilter in duplex configuration to ensure a continuous protection of the L/L coalescer during element change-outs while extending the service life of the elements (larger filtration surface area)
- PhaseSep EL elements into the coalescer vessel to extend the service life of the coalescing filter elements.

Based on the improvements achieved in the quality of the LPG itself since the upgrade of the lean amine system, the O&G company is planning to standardize the upgrade of 2 other processing plants using Pall PhaseSep coalescer technology.

Full Scale Coalescence Unit



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