

# Case Study/Improving Propylene Recovery and Compressor Reliability in a Polypropylene Unit



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## Background

A polypropylene unit within a Refinery + Petrochemical complex, utilizing a major licensor's technology, faced significant operational challenges. As refineries globally are expanding their operations to include petrochemical units within their complexes, optimizing the efficiency and reliability of these units has become paramount.

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## Problem

The customer experienced substantial propylene losses due to the inefficiency of the existing liquid gas coalescer. This equipment, supplied by another vendor, was inadequately removing contaminants such as oil and TEAL (a liquid catalyst triethylaluminum used for polymerization reactions) from the propylene gas. Consequently, the frequent shutdowns of the compressor led to significant operational and financial losses.

The system operating parameters were:

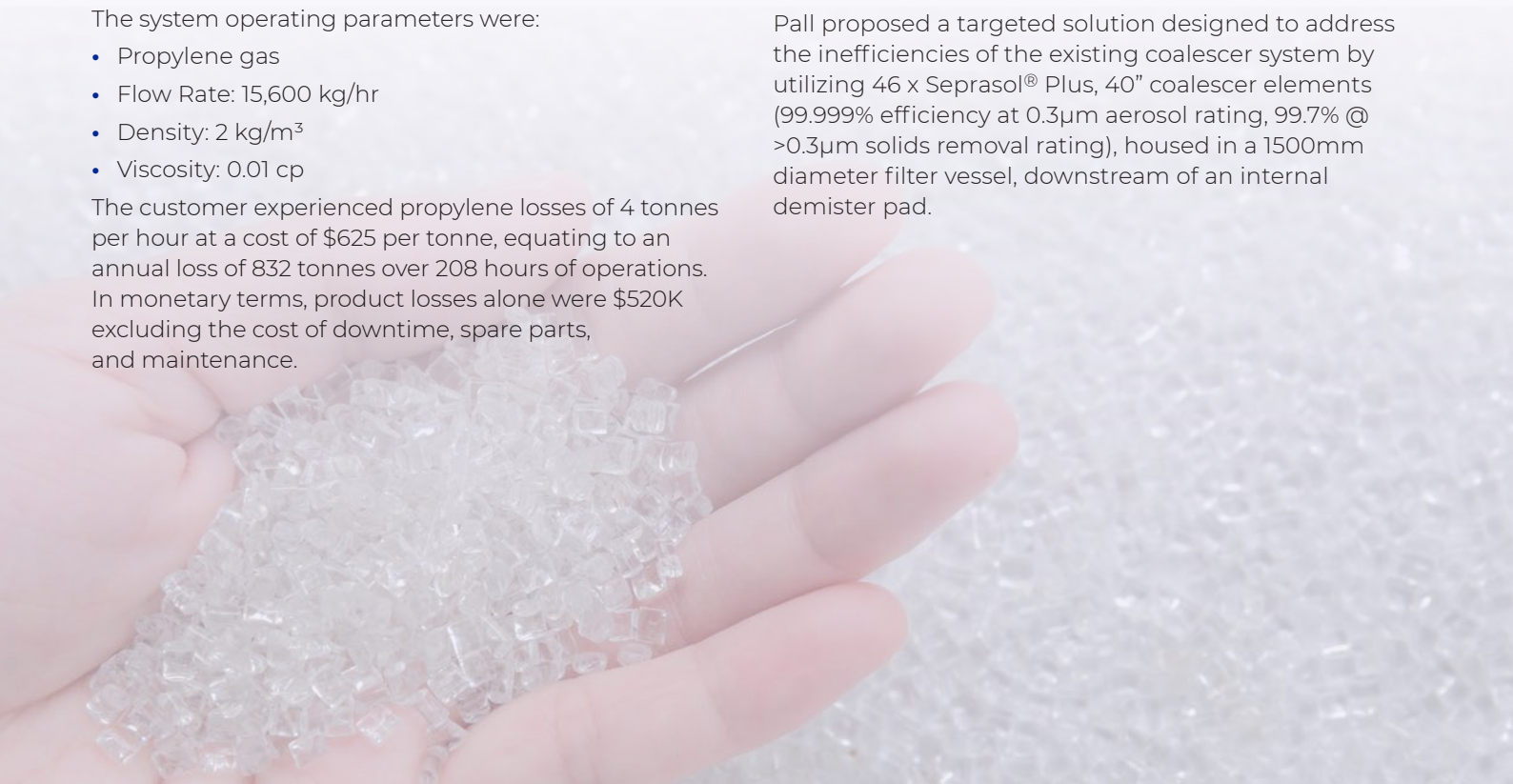
- Propylene gas
- Flow Rate: 15,600 kg/hr
- Density: 2 kg/m<sup>3</sup>
- Viscosity: 0.01 cp

The customer experienced propylene losses of 4 tonnes per hour at a cost of \$625 per tonne, equating to an annual loss of 832 tonnes over 208 hours of operations. In monetary terms, product losses alone were \$520K excluding the cost of downtime, spare parts, and maintenance.



## The Pall Solution

Pall proposed a targeted solution designed to address the inefficiencies of the existing coalescer system by utilizing 46 x Seprazol® Plus, 40" coalescer elements (99.999% efficiency at 0.3µm aerosol rating, 99.7% @ >0.3µm solids removal rating), housed in a 1500mm diameter filter vessel, downstream of an internal demister pad.



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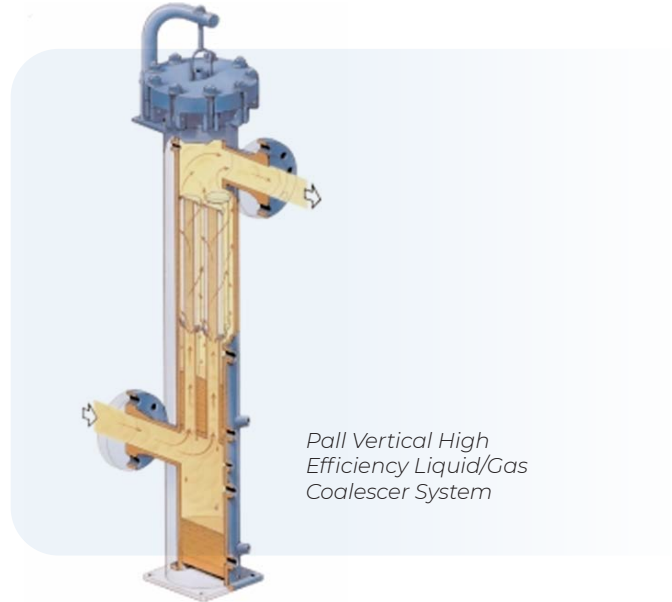


## Results

Upon installation of the replacement Pall liquid/gas coalescer system, the customer experienced immediate improvements:

- **Operational Stability:** The system effectively eliminated shutdown issues, ensuring consistent production of clean propylene gas, free from oil and solid particles.
- **Compressor Reliability:** The reliability of the compressor significantly improved, reducing the frequency of maintenance and downtime.

Initial expectations estimated the lifetime of elements to be around 3 months, given the clean differential pressure (DP) of 300 mbar. However, actual performance has shown a longer run length of 6 to 9 months, further enhancing the value of the solution. The solution provided a payback period of less than 6 months.



*Pall Vertical High Efficiency Liquid/Gas Coalescer System*



## Conclusion

There are two refinery + petrochemical complexes in India that have successfully implemented this system, with the potential for global replication. The customer also placed an additional order for a standby vessel, an uncommon practice for liquid gas coalescers, indicating high satisfaction.

Pall Corporation's innovative coalescer solution not only resolved the immediate operational issues but also delivered substantial financial benefits and improved system reliability. This case study underscores the importance of tailored solutions in complex refinery and petrochemical operations and demonstrates the potential for significant operational improvements and cost savings.



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