Optimization of Diesel Hydrotreating Unit

Elevator Pitch

Our innovative unit revolutionizes diesel treatment by combining desulfurization, denitrogenation, and demetallization in a single step, setting it apart from traditional Ultra Low Sulfur Diesel (ULSD) units. Not only does it streamline the process, but it also ensures the lowest operational costs.

OBJECTIVE

Hydrotreating units are crucial in oil refineries as they remove impurities like Nitrogen, Sulfur, and Metals from oil, preventing environmental harm and catalyst deactivation. These units facilitate reactions between crude oil components and hydrogen gas to produce purer components while reducing impurities. Professionals in the oil refinery sector continuously strive to improve hydrotreating processes for Gasoline, Vegetable Oil, and Diesel.

PROBLEM STATEMENT

The current scenario is marked by a significant demand for Ultra Low Sulfur Diesel (ULSD) coupled with high operational costs for its production and operation. Existing diesel units generate a product with elevated sulfur content, leading to harmful sulfur emissions upon combustion. These emissions contribute to acid rain formation and pose a serious environmental threat, highlighting the urgent need for a more efficient and eco-friendly solution in the diesel production sector.

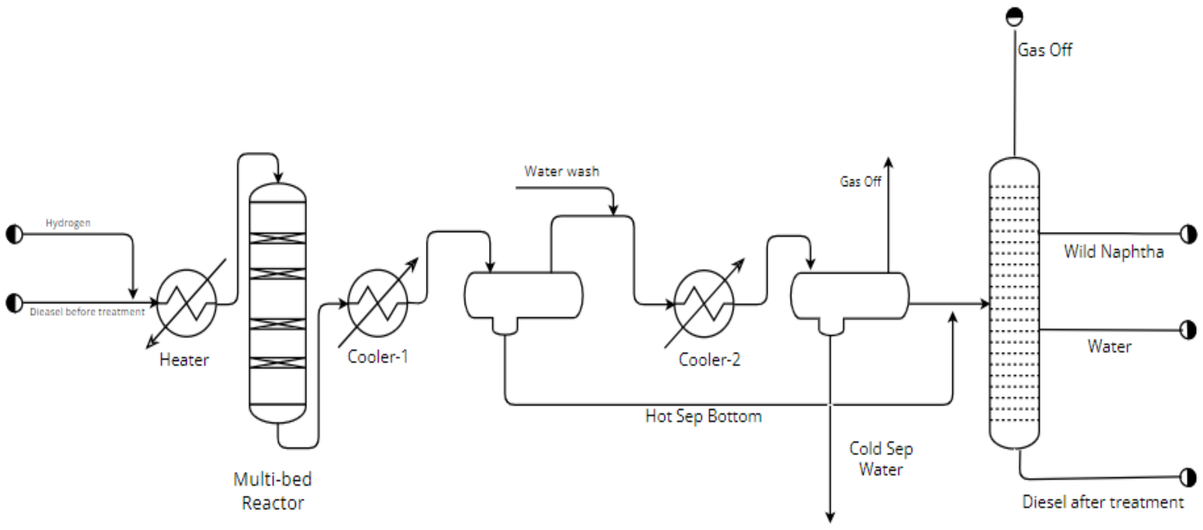
TARGET SPECIFICATIONS

Sulfur emissions < 10 ppm	Conversion > 90%
Temperature << 450 °C	Pressure << 150 bar

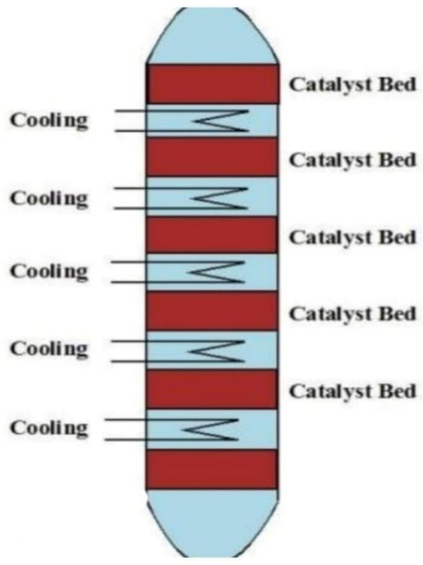
CONSTRAINTS

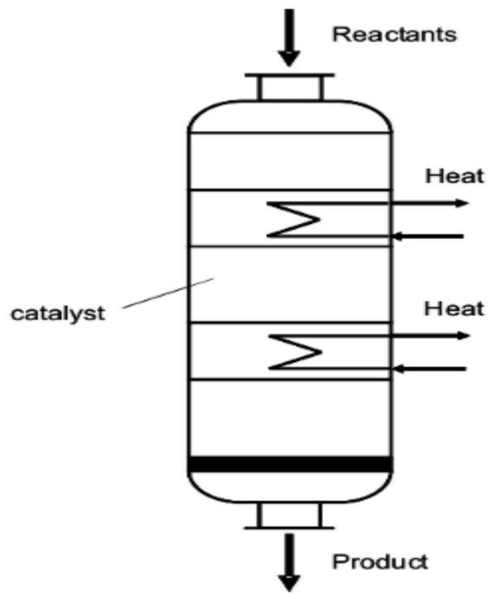
- Environmental Consideration
- Catalyst Impurities
- Deactivation of the Catalyst
- 100% Conversion is not economically efficient

PROCESS FLOW DIAGRAM



PROTOTYPE IMAGES



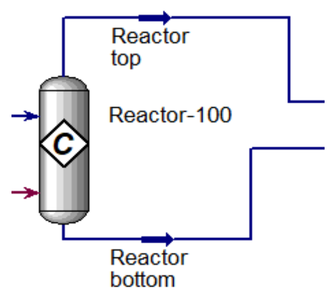


TESTING / VALIDATION

Diesel after treatment

Diesel after treatment		
H2S Composition(ppm)	5.094e-013	

Reactor-100		
Temperature	385.0	C
Pressure	82.00	bar



PROJECT COST OPTIMIZATION

Parameter	Single bed reactor	Multi bed Reactor
Capital Cost(without catalyst)	6,720,00	8,400,00
With catalyst price	1,064,000	1,232,000
Capital cost difference	13.6%	
Operating cost	Higher	Lower

CONCLUSION

Our innovative multi-bed reactor unit represents a significant leap forward in diesel treatment technology. By integrating desulfurization, denitrogenation, and demetallization into a single step, we have revolutionized the process, surpassing traditional Ultra Low Sulfur Diesel (ULSD) units in terms of efficiency and operational costs. Our solution not only meets the industry's stringent requirements, with sulfur emissions below 10 ppm, conversion rates exceeding 90%, and operating pressures and temperatures well within optimal ranges, but it also addresses the pressing environmental concerns associated with high sulfur emissions from diesel fuels. By offering a streamlined and eco-friendly alternative, our unit paves the way for a more sustainable future in the diesel production sector, safeguarding the environment and public health.

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