

Expand fluidized catalytic capacity and conversion with oxygen enrichment



The achievable capacity or conversion in a refinery's Fluid Catalytic Cracking (FCC) unit is often restricted by the maximum air blower capacity or regenerator gas velocity. Oxygen enrichment is a reliable, low-cost option for achieving capacity increases up to 40% or conversion increases of one to two points while avoiding significant capital outlays or unit modifications.

Benefits of FCC oxygen enrichment

FCC oxygen enrichment involves the addition of a controlled flow of gaseous oxygen into the combustion air main. The additional oxygen increases the coke-burning capacity of the regenerator and provides various benefits.

Overcomes air blower capacity limitation – addition of oxygen to the combustion air offers a practical solution to increasing the capacity of a blower-limited catalytic cracker

Overcomes regenerator velocity limitation – reduction of air blower rate followed by the addition of oxygen can increase the capacity of a velocity-limited catalytic cracker

Improves yield Higher oxygen level in the regenerator air improves coke removal and thereby increases the yield of the higher value light-end products

Maintains capacity on a seasonal basis – higher oxygen level in the combustion air can counter the problem of reduced FCC capacity when high ambient temperatures and humidity decrease air blower output

Reduces flue gas velocity – addition of oxygen without additional nitrogen minimizes regenerator vapor velocity, resulting in production increase without additional catalyst stake losses and cyclone erosion normally associated with higher throughput

Increases time between turnarounds – lower gas velocity reduces wear and tear on FCC's cyclones

Improves temperature control – oxygen flow control system designed by Air Products allows simple and precise adjustments for changes in the ambient air temperature, production rate, or desired product selectivity associated with day-to-day FCC operations

Overcomes operational challenges that are typically associated with using lighter (e.g., tight oil) or heavier feedstocks – higher oxygen concentration in FCC can increase temperature in case of lighter feedstocks and can handle the extra carbon formed on the catalyst in the regenerator when heavier feedstocks are used

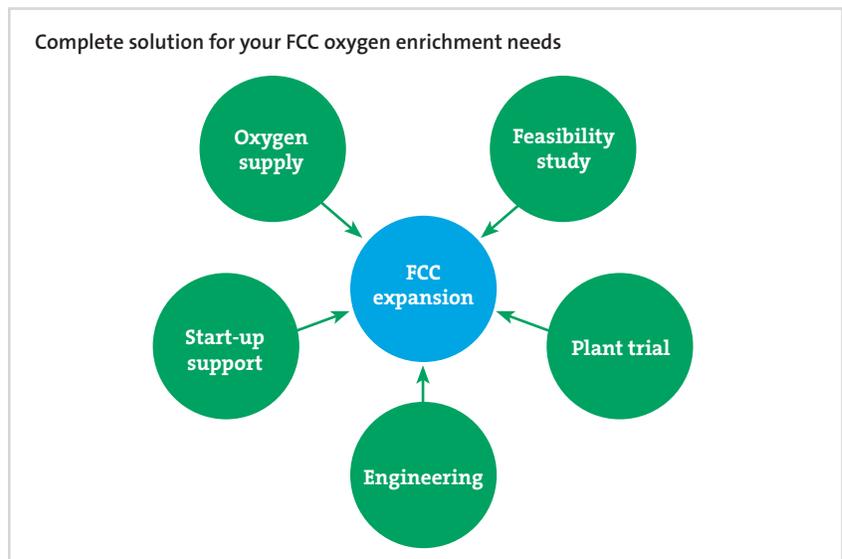
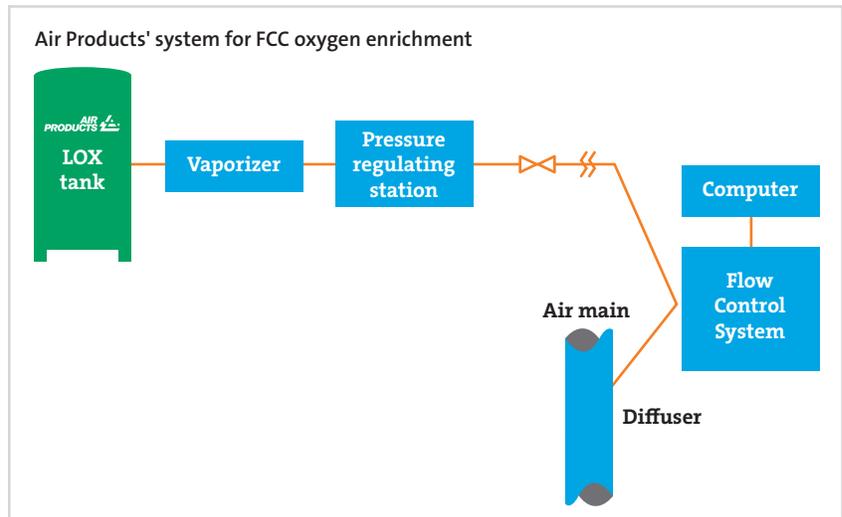
You will never feel alone when working with Air Products. We are always here for you!

Feasibility study After completion of an FCC oxygen enrichment questionnaire, www.airproducts.com/SulfurOut, we will perform a technical evaluation of your FCC operation to show the level of oxygen required for your desired capacity increase. We will also help you to determine the most cost-effective mode of oxygen supply.

Plant trial We highly recommend an in-plant test to show the benefits of oxygen enrichment. Equipment for the test would include a portable oxygen storage system, an oxygen flow control skid, and an oxygen diffuser. The test would have all the safety interlocks that a permanent system would have.

Engineering We will design and build an oxygen flow control system, just for you. This system will include a stainless steel flow control skid, multiple safety shutdowns, and a specialized oxygen diffuser that will mix oxygen with air thoroughly in the air main to the FCC.

Start-up support We will provide start-up assistance which includes oxygen safety training, P&ID review of the oxygen flow control system, and hands-on training on how to operate the flow controls. In addition, our engineers remain on-site until you are comfortable with the new system.



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