

De-NO_x Systems

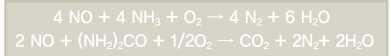
A Global Leader in Air Pollution Control

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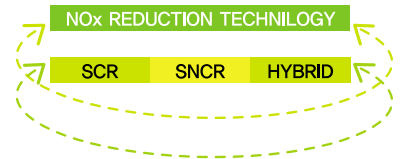


De-NOx Systems

The main removed method of NOx gas, that is created by Fuel burning processes, is using a reducing agent. This process converts NOx into harmless gases, N₂ and H₂O. The reducing agents usually are Anhydrous Ammonia, Aqueous Ammonia, Urea Solution. The injection amount and position are decided based on the De-NOx method and removal efficiency.



• Main Reaction for NOx Reduction

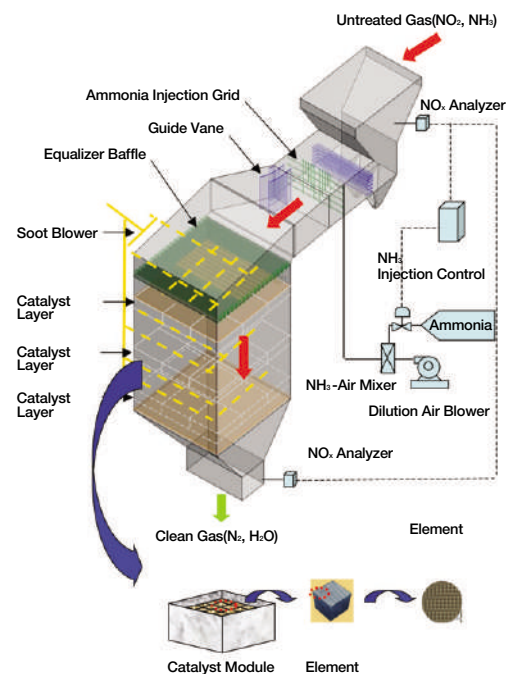


1 SCR (Selective Catalytic Reduction) Process

SCR technology enables reduction of nitrogen oxide even with low activation energy by passing flue gas through a catalyst layer after mixing a reducing agent. The SCR process uses a catalyst that selectively reacts with nitrogen oxide in flue gas. It has the highest removal efficiency among de-NOx technologies and stable operation.

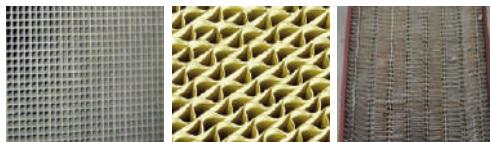
Advantages

- High NOx removal efficiency (over 90%)
- Minimal NH₃ slip due to use of optimal amount of reducing agent
- Operation at high SO₂ concentration
- Low conversion rate of SO₂ to SO₃
- Equipped with device for even flue gas distribution into the reactor
- Regular catalyst activation test and reporting
- Savings in catalyst replacement cost due to catalyst regeneration and reuse
- Optimal reactor design using CFD
- High quality technical service
- Ease in injecting and decomposing catalyst



Reducing agents & Types of Catalyst

- Reducing agents : Anhydrous ammonia, Aqueous ammonia, Urea solution
- Catalyst : Formation V₂O₅/WO₃/TiO₂



• Honeycomb Type Catalyst • Corrugated Type Catalyst • Plate Type Catalyst



• Dangjin Thermal Power Plant

• Taishan Thermal Power Plant



• Gwangyang Ferronickel Plant

• Gwangyang Sintering Plants 1~4

Projects

- Dangjin Thermal Power Plant Units 1~4 500MW X 4, Korea (2006)
- Taishan Thermal Power Plant Unit 5 600MW, China (2006)
- Gwangyang Ferronickel Plant (POSCO), Korea (2007)
- Gwangyang Sintering Plants 1~4 (POSCO), Korea (2008)

2 SNCR (Selective Non-Catalytic Reduction) Process

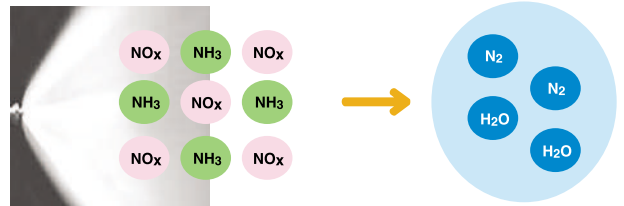
SNCR technology is used to remove nitrogen oxide in a high temperature range (850°C~1050°C) by directly injecting a reducing agent into the sidewall or duct of a furnace. The required NOx removal efficiency can be obtained through precise injection within an appropriate temperature range. A key design factor for performance is the location of the injection nozzle for the reducing agent.



• CFBC Boiler, LG Chem

Advantages

- Low investment
- Can be used during low load operation of the boiler
- NOx removal efficiency
- Stable NOx removal efficiency
- Minimal NH₃ slip due to use of optimal amount of reducing agent
- Optimal nozzle location through CFD
- High quality technical service



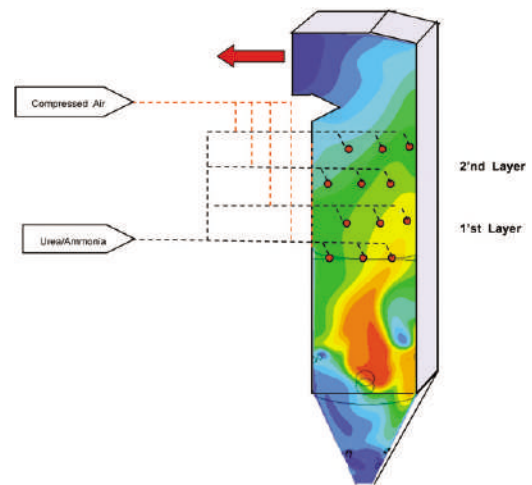
• Two fluid Nozzle

Reducing agent

- Anhydrous ammonia
- Aqueous ammonia
- Urea solution

Projects

- Sunglim Oil & Chemical company, Korea (2003)
- Taiwan Taoyuan International Airport (Chiang Kai-shek International Airport), Taiwan (2000)
- Yoecheon Plant, KCES company, Korea (2004)
- CFBC Boiler, LG Chem company, Korea (2008)



• SNCR Process

3 Hybrid System (SCR + SNCR)

A hybrid process combining the merits of SCR and SNCR can be arranged depending on a plant's features and economic analysis.



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